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## Revision Summary

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1 Introduction

The Excel (.xlsx) Extensions to the Office Open XML SpreadsheetML File Format specifies extensions to the Office Open XML file formats described in [ISO/IEC29500-1:2016]. The extensions are specified using conventions provided by the Office Open XML file formats described in [ISO/IEC29500-3:2015]. The extensions are a collection of structures and parts in a container that specify appropriate content, which can include unstructured or semi-structured tables of numbers, text, or both numbers and text, equations or functions, external data connections, charts, and images. Content in such a container is typically organized in a grid-based layout, and often includes numeric data, structured data, and formulas.

Sections 1.7 and 2 of this specification are normative. All other sections and examples in this specification are informative.

1.1 Glossary

This document uses the following terms:

add-in: Supplemental functionality that is provided by an external application or macro to extend the capabilities of an application.

attribute: A characteristic of some object or entity, typically encoded as a name/value pair.

Augmented Backus-Naur Form (ABNF): A modified version of Backus-Naur Form (BNF), commonly used by Internet specifications. ABNF notation balances compactness and simplicity with reasonable representational power. ABNF differs from standard BNF in its definitions and uses of naming rules, repetition, alternatives, order-independence, and value ranges. For more information, see [RFC5234].

AutoComplete: A feature that suggests text automatically based on the first few characters that a user types.

Boolean: An operation or expression that can be evaluated only as either true or false.

bottom N filter: A filter that matches the smallest numerical values or oldest time and date values in a specified range.

calculate: The process by which computations in a workbook are performed.

cell: A box that is formed by the intersection of a row and a column in a worksheet or a table. A cell can contain numbers, strings, and formulas, and various formats can be applied to that data.

cell error value: Any of a number of special values that are returned as a result of an unsuccessful formula calculation.

cell reference: A set of coordinates that a cell occupies on a worksheet. For example, "B3" is the reference of a cell that appears at the intersection of column "B" and row "3".

cell value: The text or numeric content of a cell, or the results of a formula. A cell value does not include a formula expression, cell formatting, or other metadata.

character set: A mapping between the characters of a written language and the values that are used to represent those characters to a computer.

color scale: A specific range of colors that is used to give additional meaning to data by assigning certain values to colors in the spectrum.

column: A single set of data that is displayed vertically in a worksheet or a table.
**comment**: An annotation that is associated with a cell, text, or other object to provide context-specific information or reviewer feedback.

**comment thread**: A collection of annotations that is associated with a cell to provide context-specific information, viewer feedback and collaborative discussion, which is made of a main comment and its replies, if there are any.

**condition**: A logical expression comparing one or more properties in all incoming Message objects against a set of clauses. This logical expression can evaluate to TRUE or FALSE.

**conditional formatting**: A mechanism that changes the appearance of a user interface element based on the evaluation of a rule or expression.

**control**: A graphical user interface object that users interact with when working with applications, forms, documents, webpages, and other types of files.

**credential**: Previously established, authentication data that is used by a security principal to establish its own identity. When used in reference to the Netlogon Protocol, it is the data that is stored in the NETLOGON_CREDENTIAL structure.

**cube function**: A function that is used to extract and display Online Analytical Processing (OLAP) data sets and values.

**custom filter**: A filter that contains preconfigured expressions in which users can optionally enter a string to filter data.

**custom list**: A user-defined list or enumeration that can be used to sort data in a worksheet.

**data bar**: A graphical representation of cell content as a bar graph.

**data connection**: A collection of information, such as the type and location, that defines how to connect to an external data source, such as a database, web service, SharePoint list, or XML file.

**data marker**: A customizable symbol or shape that identifies a data point on a line, scatter, or radar chart. A data marker can be formatted with various sizes and colors.

**data point**: A representation of a PivotTable item in a PivotTable data field contained in a PivotChart report.

**data provider**: A known data source that is specific to a target type and that provides data to a collector type.

**data source**: A database, web service, disk, file, or other collection of information from which data is queried or submitted. Supported data sources vary based on application and data provider.

**data table**: A range of cells that is designated to perform what-if analysis for formulas, based on various input values.

**data type**: A property of a field that defines the kind of data that is stored in the field, or defines the kind of data returned by an expression when the expression is evaluated.

**data validation**: The process of testing the accuracy of data; a set of rules that specify the type and range of data that users can enter.

**defined name**: A word or string of characters in a formula that represents a cell, range of cells, formula, or constant value.

**descendant**: A member that is below the current member in a hierarchy.
**dimension**: A structural attribute of a cube, which is an organized hierarchy of categories (levels) that describe data in a fact table. These categories typically describe a similar set of members upon which the user bases an analysis.

**display folder**: A folder into which attributes, measures, calculated members, and key performance indicators can be organized to facilitate browsing.

**drillthrough**: A query that is used to retrieve individual records that were used to calculate an aggregate value.

**email address**: A string that identifies a user and enables the user to receive Internet messages.

**English Metric Unit (EMU)**: A measurement in computer typography. There are 635 EMUs per twip, 6,350 EMUs per half-point, 12,700 EMUs per point, and 914,400 EMUs per inch. These units are used to translate on-screen layouts to printed layouts for specified printer hardware.

**field**: An element or **attribute** in a data source that can contain data.

**filter**: A mechanism by which a set of data is scoped to display only those entries that meet specified logical criteria.

**formula**: A logical equation or function that produces a result in a spreadsheet application.

**future function**: A function that can be written to but is not implemented in a file.

**globally unique identifier (GUID)**: A term used interchangeably with universally unique identifier (UUID) in Microsoft protocol technical documents (TDs). Interchanging the usage of these terms does not imply or require a specific algorithm or mechanism to generate the value. Specifically, the use of this term does not imply or require that the algorithms described in [RFC4122] or [C706] must be used for generating the **GUID**. See also universally unique identifier (UUID).

**hash**: A fixed-size result that is obtained by applying a one-way mathematical function, which is sometimes referred to as a hash algorithm, to an arbitrary amount of data. If the input data changes, the hash also changes. The hash can be used in many operations, including authentication and digital signing.

**hidden**: A condition of an object that prevents it from being displayed in rendered output.

**hierarchy**: A logical tree structure that organizes the members of a dimension such that each member has one parent member and zero or more child members.

**icon**: A graphical image used to supplement alphanumeric text in the visual identification of an object on a computer monitor. **Icons** are typically small, relative to the size of the area on which they are displayed.

**icon set**: A collection of icons that can be used to comment and classify data into categories.

**Input Method Editor (IME)**: An application that is used to enter characters in written Asian languages by using a standard 101-key keyboard. An IME consists of both an engine that converts keystrokes into phonetic and ideographic characters and a dictionary of commonly used ideographic words.

**key value pair (KVP)**: A set of two linked data items: a key that is an identifier for some data item, and a value that is a value associated with the data item for the identifier represented by the key.

**left-to-right**: A reading order in which characters in words are read from left to right, and words are read from left to right in sentences.
locale: A collection of rules and data that are specific to a language and a geographical area. A locale can include information about sorting rules, date and time formatting, numeric and monetary conventions, and character classification.

locked: The condition of a cell, worksheet, or other object that restricts edits or modifications to it by users.

MDX unique name: A unique identifier for a multidimensional expression (MDX) member or value in a given Online Analytical Processing (OLAP) cube, for example "[Customer].[Customer Geography].[Country].&[Australia]".

measure: In a cube, a set of values that are typically numeric and are based on a column in the fact table of the cube. Measures are the central values that are aggregated and analyzed.

mention: A part of a threaded comment that provides a reference to a person's information.

Multidimensional Expressions (MDX): A syntax that is used for defining multidimensional objects, and for querying and manipulating multidimensional data.

Object Linking and Embedding (OLE): A technology for transferring and sharing information between applications by inserting a file or part of a file into a compound document. The inserted file can be either embedded or linked. See also embedded object and linked object.

object model: A collection of object-oriented APIs that represent data structures and are designed to promote software interoperability.

OLAP All level: An optional level at the top of a hierarchy. It typically contains an OLAP All member that represents an aggregation of all of the lower-level members of that hierarchy.

OLAP All member: A multidimensional expression (MDX) that evaluates a hierarchy and returns a set that contains all of the members of the specified hierarchy.

OLAP allocation: An operation in which the values for members at lower levels in an OLAP hierarchy are changed based on changes to values for members at higher levels in that hierarchy.

OLAP hierarchy: An attribute hierarchy or a user-defined hierarchy in a data structure. By default, each dimension attribute has an attribute hierarchy. A user-defined hierarchy is a set of related attribute hierarchies that is used to facilitate browsing an OLAP cube.

OLAP level: Within an OLAP hierarchy, a set of data that is organized into a lower or higher level of detail, such as Year, Quarter, Month, and Day levels in a Time hierarchy.

OLAP measure: A set of numeric values in an OLAP cube that is used in aggregation and analysis.

OLAP member: An item that is in an OLAP level. For example, a Canada member in a Country level of a Geography hierarchy.

OLAP named set: A collection of OLAP tuples that have the same dimensionality. Also referred to as OLAP set.

OLAP subselect: The ability to execute multiple SELECT commands in a FROM clause that is inside a multidimensional expression (MDX) statement.

OLAP tuple: An ordered collection of members that are from different dimensions of an OLAP cube. A single member is a special case of a tuple.

OLAP weight expression: A multidimensional expression (MDX) that is used to apply and allocate modified values to an Online Analytical Processing (OLAP) provider. It typically returns a decimal value between "0" and "1".
OLE DB: A set of interfaces that are based on the Component Object Model (COM) programming model and expose data from a variety of sources. These interfaces support the amount of Database Management System (DBMS) functionality that is appropriate for a data store and they enable a data store to share data.

Online Analytical Processing (OLAP): A technology that uses multidimensional structures to provide access to data for analysis. The source data for OLAP is stored in data warehouses in a relational database. See also cube.

PivotTable: An interactive table that summarizes large amounts of data from various sources by using format and calculation methods. Row and column headings can be rotated to view different summaries of the source data, filter the data, or display detail data for specific areas.

PivotTable field list: A user interface element that displays a list of all of the fields in a PivotTable report. It can be used to populate a PivotTable report and to manipulate the fields.

pixel: A discrete unit of display on a computer display device.

plot area: A portion of a chart area that contains the plotted data and axes.

point: A unit of measurement for fonts and spacing. A point is equal to 1/72 of an inch.

protection: A mechanism that helps restrict users from making unwanted changes to the data or structure of a workbook.

query table: A two-dimensional table that presents data from an external data source.

range: An addressable region that is in a workbook. A range typically consists of zero or more cells and represents a single, contiguous rectangle of cells on a single sheet.

rich array: A type of rich value data that is a two-dimensional array of values.

rich value: A complex representation of data that contains a rich value type, a rich value fallback, and a collection of key value pairs (KVP). A rich value can exist as the value of a cell or nested as the value in a key value pair.

rich value data: The value part of the key value pair (KVP).

rich value fallback: A value that will be used for any feature that does not know how to interpret a given rich value type.

rich value key: The name of the key in the key value pair (KVP).

rich value key flag: A rich value flag assigned to a particular rich value key. Each flag is assigned a Boolean value that indicates particular behaviors for the key.

rich value type: A collection of required key value pairs (KVP) and key flag definitions.

right-to-left: A reading and display order that is optimized for right-to-left languages.

root element: The top-level element in an XML document. It contains all other elements and is not contained by any other element, as described in [XML].

row: A single set of data that is displayed horizontally in a worksheet or a table.

salt: An additional random quantity, specified as input to an encryption function that is used to increase the strength of the encryption.

security descriptor: A data structure containing the security information associated with a securable object. A security descriptor identifies an object's owner by its security identifier (SID). If access control is configured for the object, its security descriptor contains a
discretionary access control list (DACL) with SIDs for the security principals who are allowed or denied access. Applications use this structure to set and query an object’s security status. The **security descriptor** is used to guard access to an object as well as to control which type of auditing takes place when the object is accessed. The **security descriptor** format is specified in [MS-DTYP] section 2.4.6; a string representation of **security descriptors**, called SDDL, is specified in [MS-DTYP] section 2.5.1.

**selected**: The condition of a set of items that has focus in a workbook.

**service**: A process or agent that is available on the network, offering resources or services for clients. Examples of services include file servers, web servers, and so on.

**shape**: A collection of qualifiers, such as names, and quantifiers, such as coordinates, that is used to represent a geometric object. A shape can be contained in a document, file structure, run-time structure, or other medium.

**sheet**: A part of an Excel workbook. There are four types of sheets: **worksheet**, macro sheet, dialog sheet, and chart sheet. Multiple sheets are stored together within a workbook.

**sort**: A process that arranges cells in ascending or descending order, based on cell content.

**sort condition**: A condition that determines how to sort cells in a range.

**sort order**: A specific arrangement of cells that is based on cell content. The order can be ascending or descending.

**source data**: The data that is used as the basis for charts, PivotTable reports, and other data visualization features.

**sparkline**: A miniature chart that can be inserted into text or embedded in a cell on a worksheet to illustrate highs, lows, and trends in data.

**spreadsheet data model**: A local Online Analytical Processing (OLAP) storage of data used by a spreadsheet application.

**style**: A set of formatting options that is applied to text, tables, charts, and other objects in a document.

**supporting property bag**: A set of GLOSSARY: [key value pairs (KVP)]. A supporting property bag can exist as the value of a **rich value** or nested as the value in another supporting property bag.

**supporting property bag array**: A type of **supporting property bag data** that is a one-dimensional array of values.

**supporting property bag data**: The value part of the **key value pair (KVP)**.

**supporting property bag key**: The name of the key in a **key value pair (KVP)**.

**table**: A list that is defined in a workbook.

**threaded comment**: A comment in a comment thread. It can be a main comment or a reply.

**top N filter**: A filter that matches the top or bottom N items or N% of items in a specified **column**.

**Unicode**: A character encoding standard developed by the Unicode Consortium that represents almost all of the written languages of the world. The **Unicode** standard [UNICODE5.0.0/2007] provides three forms (UTF-8, UTF-16, and UTF-32) and seven schemes (UTF-8, UTF-16, UTF-16 BE, UTF-16 LE, UTF-32, UTF-32 LE, and UTF-32 BE).
**unique identifier (UID):** A pair consisting of a GUID and a version sequence number to identify each resource uniquely. The UID is used to track the object for its entire lifetime through any number of times that the object is modified or renamed.

**workbook:** A container for a collection of sheets.

**worksheet:** A single logical container for a set of tabular data and other objects in a workbook.

**XML:** The Extensible Markup Language, as described in [XML1.0].

**XML namespace:** A collection of names that is used to identify elements, types, and attributes in XML documents identified in a URI reference [RFC3986]. A combination of XML namespace and local name allows XML documents to use elements, types, and attributes that have the same names but come from different sources. For more information, see [XMLNS-2ED].

**XML schema definition (XSD):** The World Wide Web Consortium (W3C) standard language that is used in defining XML schemas. Schemas are useful for enforcing structure and constraining the types of data that can be used validly within other XML documents. XML schema definition refers to the fully specified and currently recommended standard for use in authoring XML schemas.

**XOR obfuscation:** A type of file encryption that helps protect private data by using an exclusive or bitwise operation. This is done by adding a mathematical expression that prevents a simple reverse-engineering process.

**zoom level:** The degree to which a portion of an image, document, or other screen object is made to appear closer or farther away relative to its default appearance. This value is usually expressed as a percentage of the default appearance.

**MAY, SHOULD, MUST, SHOULD NOT, MUST NOT:** These terms (in all caps) are used as defined in [RFC2119]. All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

### 1.2 References

Links to a document in the Microsoft Open Specifications library point to the correct section in the most recently published version of the referenced document. However, because individual documents in the library are not updated at the same time, the section numbers in the documents may not match. You can confirm the correct section numbering by checking the Errata.

**1.2.1 Normative References**

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information.


[MS-DTYP] Microsoft Corporation, "Windows Data Types".

[MS-ODRAWXML] Microsoft Corporation, "Office Drawing Extensions to Office Open XML Structure".


[MS-XLDM] Microsoft Corporation, "Spreadsheet Data Model File Format".


1.2.2 Informative References


1.3 Structure Overview (Synopsis)

1.4 Relationship to Protocols and Other Structures
This file format is a specified set of extensions to Office Open XML SpreadsheetML, specified in [ISO/IEC29500-1:2016]. This specification is dependent on the structures and concepts defined in the following references:
- [MS-OFFCRYPTO] for the persistence format for document signing, information rights management, document encryption, and obfuscation.
- [MS-ODRAWXML] for the persistence format for shapes.

1.5 Applicability Statement
This document specifies a persistence format for extensions to Office Open XML file formats as described in [ISO/IEC29500-1:2016] SpreadsheetML documents. The extensions specified in this document allow for expressing additional content and properties, and are not applicable as a stand-alone file format. Each structure specified in this document is integrated with SpreadsheetML documents as described in [ISO/IEC29500-1:2016] in a particular way, as specified in the section for that structure. All structures are integrated into SpreadsheetML documents in such a way that maintains compatibility with implementations of the Office Open XML file formats as described in [ISO/IEC29500-1:2016].

The extensions specified in this document do not require any other extensions to be used, and do not prohibit any other extensions from being used in the same document.

This persistence format provides interoperability with applications that create or read documents conforming to this structure.

1.6 Versioning and Localization
This document covers versioning issues in the following areas:
- **Structure Versions**: There is only one version of Excel Extensions to the Office Open XML SpreadsheetML File Format.
- **Localization**: The CT_ProtectedRange structure contains fields that specify locale-dependent meaning.
The Security Considerations section also specifies processes and data that are locale-dependent. See each structure and section description for more information.

1.7 Vendor-Extensible Fields

Specified in this document are extensions, using conventions described in [ISO/IEC29500-3:2015], both as structures within parts described in [ISO/IEC29500-1:2016] and as extension parts within the package described in [ISO/IEC29500-2:2012]. Implementations are not required to preserve or remove additional parts when modifying an existing document. See [ISO/IEC29500-3:2015] for more information.
2 Structures

In the following sections, the schema definition might be less restrictive than the processing rules imposed by the application. The XSD in this specification provides a base description of the file format. The text that introduces the XSD specifies additional restrictions that reflect actual Microsoft product behavior. For example, the schema definition might allow for an element to be empty, null, or not present but the behavior of the application as specified restricts the same elements to being non-empty, not null, and present.

2.1 PartEnumerations

This section specifies parts in this file format that extend Office Open XML file formats as specified in [ISO/IEC29500-1:2016].

2.1.1 ControlProperties

Content type: application/vnd.ms-excel.controlproperties+xml


An instance of this part type specifies the properties of a form control embedded object in the package. A package can contain one or more control properties parts, and each part MUST be the target of an explicit relationship from a SpreadsheetML control, as specified in [ISO/IEC29500-1:2016] section 18.3.1.19.

If this relationship is present, the control MUST NOT have a relationship with an embedded control persistence part, as specified in [ISO/IEC29500-1:2016] section 15.2.9.

The syntax of the structures contained in this part uses XML schema definition (XSD), as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various XML namespaces by using the mechanisms specified in [XMLNS].

The content of this part is XML, and the root element for the part is the formControlPr element, as specified in section 2.4.34.

2.1.2 CustomData

Content type: application/binary

Source relationship:
http://schemas.openxmlformats.org/officeDocument/2006/relationships/customData

An instance of this part type specifies user-defined binary data.

A package MUST contain at most one custom data part per custom data properties part, as specified in section 2.1.3, and that part MUST be the target of an implicit relationship from a custom data properties part.

A custom data part MUST NOT have any implicit or explicit relationships to any other part specified by this protocol.

The content of this part consists of user-defined binary data that is stored on behalf of add-ins. The content is not specified in this protocol.
2.1.3 Custom Data Properties

Content type: application/vnd.openxmlformats-officedocument.customDataProperties+xml


An instance of this part type specifies a single custom data properties part. This part specifies properties for the associated custom data part, as specified in section 2.1.2, specifically a unique identifier (UID) for the data storage.

A custom data properties part MUST be the target of an implicit relationship from the workbook part, as specified in [ISO/IEC29500-1:2016] section 12.3.23.

A custom data properties part is permitted to contain implicit relationships to the custom data part specified in section 2.1.2.

The syntax of the structures contained in this part uses XSD, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various XML namespaces by using the mechanisms specified in [XMLNS].

The content of this part is XML, and the root element for the part is the datastoreItem element, as specified in section 2.4.35.

2.1.4 Slicer Cache

Content type: application/vnd.ms-excel.slicerCache+xml


An instance of this part type specifies a single slicer cache part, as specified in section 3.1.1, in the workbook.

A package MUST contain one slicer cache part per CT_SlicerCache element, as specified in section 2.6.14, in the workbook part, a specified in [ISO/IEC29500-1:2016] section 12.3.23, and that part MUST be the target of an explicit relationship from the workbook part.

A slicer cache part MUST NOT have implicit or explicit relationships to any part specified by this protocol.

The syntax of the structures contained in this part uses XSD, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various XML namespaces by using the mechanisms specified in [XMLNS].

The content of this part is XML, and the root element for the part is the slicerCacheDefinition element, as specified in section 2.4.38.

2.1.5 Slicers

Content type: application/vnd.ms-excel.slicer+xml


An instance of this part type specifies the slicer views, as specified in section 2.3.2.2, for a single worksheet.
The presence of a slicers part indicates that there is at least one slicer view on the associated worksheet, and that this part MUST be the target of an explicit relationship from the worksheet part, as specified in [ISO/IEC29500-1:2016] section 12.3.24.

A slicers part MUST NOT have implicit or explicit relationships to any part specified by this protocol.

The syntax of the structures contained in this part uses XSD, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various XML namespaces by using the mechanisms specified in [XMLNS].

The content of this part is XML, and the root element for the part is the slicers element, as specified in section 2.4.36.

2.1.6 Data Model

Content type: application/vnd.openxmlformats-officedocument.model+data

The presence of a model part indicates that there is a spreadsheet data model present in the workbook.

The content of this part is specified in [MS-XLDM]. In addition, this specification is extended by the Annotations property on different objects. Unless otherwise specified, all extensions in an Annotations object are written as XML.

2.1.6.1 Command Annotations

The Annotations property of a command object describing a measure ([MS-XLDM] section 2.6.9) can be extended with the following optional properties:

Type: MUST be either "Implicit" or "Explicit". "Implicit" specifies that the measure was created in the field list. "Explicit" specifies that the measure was created by the user specifying the definition of the measure.

Name: Specifies the name of the measure. MUST exist if Type is equal to "Implicit".

Table: Specifies the name of the source table for this measure. MUST exist if Type is equal to "Implicit".

Column: Specifies the name of the source field for this measure. MUST exist if Type is equal to "Implicit".

Aggregation: Specifies the aggregation type of an implicit measure. If this attribute is present, Type MUST be equal to "Implicit". This value MUST have the following form:

AGGREGATION(TABLENAME.COLUMNNAME)

Where TABLENAME MUST be equal to Table, COLUMNNAME MUST be equal to Column, and the aggregation MUST be equal to one of the following:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUM</td>
<td>The measure is the sum of the values in the source field specified by Column.</td>
</tr>
</tbody>
</table>
### Value and Meaning

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX</td>
<td>This measure is the maximum value in the source field specified by Column.</td>
</tr>
<tr>
<td>COUNTA</td>
<td>This measure is the count of values in the source field specified by Column.</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>This measure is the average of the values in the source field specified by Column.</td>
</tr>
<tr>
<td>STDEV.S</td>
<td>This measure is the standard deviation of the values in the source field specified by Column.</td>
</tr>
<tr>
<td>STDEV.P</td>
<td>This measure is the standard deviation of the values in the source field specified by Column.</td>
</tr>
<tr>
<td>VAR.S</td>
<td>This measure is the variance in the values of the source field specified by Column.</td>
</tr>
<tr>
<td>DISTINCTCOUNT</td>
<td>This measure is the count of unique values in the source field specified by Column.</td>
</tr>
</tbody>
</table>

**Application**: Specifies the name of the application that created this measure. MUST exist if Type is equal to "Implicit"

#### 2.1.6.2 DimensionAttribute Annotations

The **Annotations** property of a **DimensionAttribute** object describing a **column** in a DimensionTabularModel ([MS-XLDM] section 2.6.6) can be extended with the following optional properties:

- **ShortColumnId**: Specifies the identifier used to represent this column in the command text when data is pushed to the model.

#### 2.1.7 Timeline Cache

**Content type**: application/vnd.ms-excel.TimelineCache+xml

**Source relationship**: http://schemas.microsoft.com/office/2010/relationships/TimelineCache

An instance of this part type specifies a single Timeline Cache (section 2.3.5.1) in the workbook. A Timeline cache part MUST NOT have implicit or explicit relationships to any part specified by this protocol.
The syntax of the structures contained in this part uses **XSD**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the **timelineCacheDefinition** element, as specified in section 2.4.58.

### 2.1.8 Timelines

**Content type:** application/vnd.ms-excel.Timeline+xml  
**Source relationship:** http://schemas.microsoft.com/office/2010/relationships/Timeline

An instance of this part type specifies the **Timeline views** for a single **worksheet**.

The presence of a Timelines part indicates that there is at least one Timeline view on the associated worksheet, and that this part MUST be the target of an explicit relationship from the worksheet part, as specified in [ISO/IEC29500-1:2016] section 12.3.24.

A Timelines part MUST NOT have implicit or explicit relationships to any part specified by this protocol.

The syntax of the structures contained in this part uses **XSD**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the **timelines** element, as specified in section 2.4.57.

### 2.1.9 Survey

**Content type:** application/vnd.ms-excel.Survey+xml  
**Source relationship:** http://schemas.microsoft.com/office/2010/relationships/Survey

The syntax of the structures contained in this part uses **XSD**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the **survey** element, as specified in section 2.4.69.

### 2.1.10 Rich Value Data

**Content type:** application/vnd.ms-excel.rdRichValue+xml  
**Source relationship:** http://schemas.microsoft.com/office/2017/06/relationships/rdRichValue

The presence of this part type indicates that there are **rich values** in the **workbook** and a **Rich Value Structure** (section 2.1.11) part MUST be part of the package.

A **Rich Value Data** part MUST be the target of an implicit relationship from the **Metadata** part, as specified in [ISO/IEC29500-1:2016] section 18.9.2.
The syntax of the structures contained in this part uses **XSD**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the `rvData` element, as specified in section 2.4.77.

### 2.1.11 Rich Value Structure

**Content type:** application/vnd.ms-excel.rdRichValueStructure+xml

**Source relationship:** http://schemas.microsoft.com/office/2017/06/relationships/rdRichValueStructure

The presence of this part type indicates that there are **rich values** in the **workbook** and a **Rich Value Data** (section 2.1.10) part MUST be part of the package.

A **Rich Value Structure** part MUST be the target of an implicit relationship from the **Rich Value Data** part, as specified in section 2.6.175.

The syntax of the structures contained in this part uses **XSD**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the `rvStructures` element, as specified in section 2.4.78.

### 2.1.12 Rich Value Array

**Content type:** application/vnd.ms-excel.rdArray+xml

**Source relationship:** http://schemas.microsoft.com/office/2017/06/relationships/rdArray

The presence of this part type indicates that there are **rich values** in the **workbook** and a **Rich Value Data** (section 2.1.10) part and a **Rich Value Structure** (section 2.1.11) part MUST be part of the package.

A **Rich Value Array** part MUST be the target of an implicit relationship from the **Rich Value Data** part, as specified in section 2.6.175.

The syntax of the structures contained in this part uses **XSD**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the `arrayData` element, as specified in section 2.4.74.

### 2.1.13 Rich Styles

**Content type:** application/vnd.ms-excel.richStyles+xml

**Source relationship:** http://schemas.microsoft.com/office/2017/06/relationships/richStyles
The presence of this part type indicates that there are rich values with styles in the workbook and a Rich Value Data (section 2.1.10) part, a Rich Value Structure (section 2.1.11) part, a Supporting Property Bag Data (section 2.1.14) part, and a Supporting Property Bag Structure (section 2.1.15) part MUST be part of the package.

A Rich Styles part MUST be the target of an implicit relationship from the Supporting Property Bags, as specified in section 2.3.6.2.

The syntax of the structures contained in this part uses XSD, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various XML namespaces by using the mechanisms specified in [XMLNS].

The content of this part is XML, and the root element for the part is the richStyleSheet element, as specified in section 2.4.75.

2.1.14 Supporting Property Bag Data

Content type: application/vnd.ms-excel.rdSupportingPropertyBag+xml

Source relationship:
http://schemas.microsoft.com/office/2017/06/relationships/rdSupportingPropertyBag

The presence of this part type indicates that there are rich values with supporting property bags in the workbook and a Rich Value Data (section 2.1.10) part, a Rich Value Structure (section 2.1.11) part, and a Supporting Property Bag Structure (section 2.1.15) part MUST be part of the package.

A Supporting Property Bag part MUST be the target of an implicit relationship from the Rich Value Data part, as specified in section 2.6.175.

The syntax of the structures contained in this part uses XSD, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various XML namespaces by using the mechanisms specified in [XMLNS].

The content of this part is XML, and the root element for the part is the supportingPropertyBags element, as specified in section 2.4.81.

2.1.15 Supporting Property Bag Structure

Content type: application/vnd.ms-excel.rdSupportingPropertyBagStructure+xml

Source relationship:

The presence of this part type indicates that there are rich values with supporting property bags in the workbook and a Rich Value Data (section 2.1.10) part, a Rich Value Structure (section 2.1.11) part, and a Supporting Property Bag Data (section 2.1.14) part MUST be part of the package.

A Supporting Property Bag Structure part MUST be the target of an implicit relationship from the Supporting Property Bag part, as specified in section 2.6.188.

The syntax of the structures contained in this part uses XSD, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].
This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the `spbStructures` element, as specified in section 2.4.80.

### 2.1.16 Rich Value Types

**Content type:** application/vnd.ms-excel.rdRichValuetypes+xml

**Source relationship:** http://schemas.microsoft.com/office/2017/06/relationships/rdRichValueTypes

The presence of this part type indicates that there is information about **rich value types** in the **workbook** and a **Rich Value Data** (section 2.1.10) part, and a **Rich Value Structure** (section 2.1.11) part MAY be part of the package.

A **Rich Value Types** part MAY be the target of an implicit relationship from the **Rich Value Structure** part, as specified in section 2.3.6.3.

The syntax of the structures contained in this part uses **XSD**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** by using the mechanisms specified in [XMLNS].

The content of this part is **XML**, and the **root element** for the part is the `rvTypesInfo` element, as specified in section 2.4.79.

### 2.2 Extensions

Extensions are specified by using the conventions provided by Office Open XML file formats as specified in [ISO/IEC29500-3:2015]. The following namespaces are utilized by the extensions specified in this document:

- "http://schemas.microsoft.com/office/drawingml/2010/slicer"<1>
- "http://schemas.microsoft.com/office/excel/2006/main"

### 2.2.1 SpreadsheetML Extensibility Elements

When the global elements f, ref, or sqref are contained within an ext ([ISO/IEC29500-1:2016] section 18.2.7) element and contain cell references, an application can adjust these cell references when the worksheet layout changes, even when the containing ext element ([ISO/IEC29500-1:2016] section 18.2.7) is not recognized by the application. See [ISO/IEC29500-3:2015] section 10.1.2 for more details about how extension lists are used.

### 2.2.2 Formulas

The following ABNF grammar is used by formulas in other parts of this document.
formula = expression

expression= ref-expression / whitespace nospaces-expression * whitespace
ref-expression= *whitespace ref-nospaces-expression *whitespace
nospaces-expression = "(" expression ")" / constant / prefix-operator expression / expression infix-operator expression / expression postfix-operator / function-call
constant = error-constant / logical-constant / numerical-constant / string-constant / array-constant
ref-constant = "#REF!"
error-constant = ref-constant / "DIV/0!" / "N/A" / "NAME?" / "NULL!" / "#NUM!" / "#VALUE!" / "#GETTING_DATA"
logical-constant = "FALSE" / "TRUE"
numerical-constant = [neg-sign] significand-part [exponent-part]
significand-part = whole-number-part [fractional-part] / fractional-part
whole-number-part = digit-sequence
fractional-part = full-stop digit-sequence
exponent-part = exponent-character [ sign ] digit-sequence
full-stop = "."
sign = "-" / neg-sign
neg-sign = "-"

exponent-character = "E"
digit-sequence = 1*decimal-digit
decimal-digit = %x30-39
nonzero-decimal-digit = %x31-39
string-constant = double-quote [string-chars] double-quote
string-chars = string-char *string-char
string-char = escaped-double-quote / character
escaped-double-quote = double-quote escape-sequence *whitespace
escape-sequence = [sequence escape-sequence]
escape-sequence = [quote \ [sequence escape-sequence]
sequence = 1*digit
operator / function
operator = ref
prefix = A1
postfix = !
ref-infix-operator = ref-infix-operator / value-infix-operator
value-infix-operator = value-op / "=" / "<" / "<=" / ">" / ">=" / "&" / "<>
union = "|"
intersection = "&"

formula = expression

expression= ref-expression / whitespace nospaces-expression * whitespace
ref-expression= *whitespace ref-nospaces-expression *whitespace
nospaces-expression = "(" expression ")" / constant / prefix-operator expression / expression infix-operator expression / expression postfix-operator / function-call
constant = error-constant / logical-constant / numerical-constant / string-constant / array-constant
ref-constant = "#REF!"
error-constant = ref-constant / "DIV/0!" / "N/A" / "NAME?" / "NULL!" / "#NUM!" / "#VALUE!" / "#GETTING_DATA"
logical-constant = "FALSE" / "TRUE"
numerical-constant = [neg-sign] significand-part [exponent-part]
significand-part = whole-number-part [fractional-part] / fractional-part
whole-number-part = digit-sequence
fractional-part = full-stop digit-sequence
exponent-part = exponent-character [ sign ] digit-sequence
full-stop = "."
sign = "-" / neg-sign
neg-sign = "-"

exponent-character = "E"
digit-sequence = 1*decimal-digit
decimal-digit = %x30-39
nonzero-decimal-digit = %x31-39
string-constant = double-quote [string-chars] double-quote
string-chars = string-char *string-char
string-char = escaped-double-quote / character
escaped-double-quote = double-quote escape-sequence *whitespace
escape-sequence = [sequence escape-sequence]
escape-sequence = [quote \ [sequence escape-sequence]
sequence = 1*digit
operator / function
operator = ref
prefix = A1
postfix = !
ref-infix-operator = ref-infix-operator / value-infix-operator
value-infix-operator = value-op / "=" / "<" / "<=" / ">" / ">=" / "&" / "<>
union = "|"
intersection = "&"
whitespace = space / %x0D %x0A
sheet-name-special = sheet-name-base-character [*sheet-name-character-special sheet-name-base-character]
sheet-name-character-special = @apostrophe / sheet-name-base-character
sheet-name-base-character = character ; MUST NOT be ', *[, ], \, :, /, ?, or Unicode character 'END OF TEXT'
A-to-D = %x41-44 / %x61-64
A-to-E = A-to-D / "E"
A-to-W = %x41-57 / %x61-77
letter = %x41-5A / %x61-7A
A1-relative-column = "$" A1-relative-column
A1-relative-row = row-digit-sequence
row-digit-sequence = nonzero-decimal-digit *5decimal-digit / "10" %x30-33 decimal-digit / "104" %x30-37 decimal-digit / "1048" %x30-34 2decimal-digit / "10485" %x30-36 decimal-digit / "104857" %x30-36
cell-function-call = A1-cell "(" argument-list ")"
user-defined-function-call = user-defined-function-name "(" argument-list ")"
user-defined-function-name = name-reference
argument-list = argument *253(comma argument)
comma = ",
argument = *whitespace [argument-expression]
argument-expression = ref-argument-expression / *whitespace nospace-argument-expression
*whitespace
ref-argument-expression= *whitespace ref-argument-nospace-expression *whitespace
nospace-argument-expression = "(" expression ")" / constant / prefix-operator argument-expression / expression argument-prefix expression argument-infix-operator argument-expression / argument-expression postfix-operator / function-call
argument-infix-operator = ref-argument-infix-operator / value-infix-operator
ref-argument-infix-operator = range-operator / intersection-operator
unicode-digit = (any code points which are digits as defined by the Unicode character properties, [UNICODE5.1] chapter 4)
R1C1-cell-reference = R1C1-row / R1C1-column / R1C1-row R1C1-column / R1C1-column R1C1-row
R1C1-row = "R" row-number
R1C1-column = "C" column-number
column-number = 1-16384
; A string composed of unicode-digits that represents an unsigned integer that is greater than or equal to 1 and less than or equal to 16384
row-number = 1-1048576
; A string composed of unicode-digits that represents an unsigned integer that is greater than or equal to 1 and less than or equal to 1048576.
name-reference = name / external-name
external-name = bang-name / (single-sheet-prefix / book-prefix ) name
bang-name = "!" name
name = name-start-character [ name-characters ]
name-start-character = underscore / slash / letter / name-base-character
underscore = "_"
slash = "\"
name-base-character = (any code points which are characters as defined by the Unicode character properties, [UNICODE5.1] chapter 4 ; MUST NOT be 0x0-0x7F)
name-characters = *name-character
name-character = name-start-character / decimal-digit / full-stop / questionmark
questionmark = "?
; A name MUST NOT have any of the following forms: ;TRUE or FALSE ;cell-reference
complex-params = "(" argument "," argument [+"," argument] ")"
coccatenate-params = "(" (argument-expression / (argument 1*253("," argument))) ")"
concatenate-params = "(" (argument-expression / (argument 1*254("," argument))) ")"
confidence-norm-params = "(" argument "," argument "," argument ")"
confidence-params = "(" argument "," argument "," argument ")"
confidence-t-params = "(" argument "," argument "," argument ")"
convert-params = "(" argument "," argument "," argument ")"
correl-params = "(" argument "," argument "," argument ")"
cosh-params = "(" argument-expression ")"
cos-params = "(" argument-expression ")"
coth-params = "(" argument-expression ")"
cot-params = "(" argument-expression ")"
counta-params = "(" (argument-expression / (argument 1*254("," argument))) ")"
countblank-params = "(" ref-argument-expression ")"
countif-params = "(" ref-argument-expression "," argument ")"
countifs-params = "(" ref-argument-expression "," argument "," argument "," argument ")"
count-param = "(" (argument-expression / (argument 1*254("," argument))) ")"
coupdaysba-params = "(" argument "," argument "," argument ["", argument] ")"
coupdaysnc-params = "(" argument "," argument "," argument ["", argument] ")"
coupdaysys-params = "(" argument "," argument "," argument ["", argument] ")"
coupinnum-params = "(" argument "," argument "," argument ["", argument] ")"
coupncd-params = "(" argument "," argument "," argument ["", argument] ")"
coupon-params = "(" argument "," argument "," argument ["", argument] ")"
cvar-params = "(" argument "," argument "," argument ")"
critbinom-params = "(" argument "," argument "," argument "," argument ")"
csch-params = "(" argument-expression ")"
csc-params = "(" argument-expression ")"
cubekpmember-params = "(" argument "," argument "," argument ["", argument] ")"
cubemember-params = "(" argument "," argument ["", argument] ")"
cubememberproperty-params = "(" argument "," argument "," argument ")"
cub rankedmember-params = "(" argument "," argument "," argument ["", argument] ")"
cubebset-params = "(" argument "," argument ["", argument] ")"
cubevalue-params = "(" (argument-expression / (argument 1*253("," argument))) ")"
cumipmt-params = "(" (argument-expression / (argument 1*253("," argument))) ")"
cumistat-params = "(" argument "," argument "," argument "," argument ")"
cumipmt-param = "(" argument "," argument "," argument "," argument ")"
cumistat-param = "(" argument "," argument "," argument "," argument ")"
cumprinc-params = "(" argument "," argument "," argument "," argument "," argument "," argument ")"
cumprinc-param = "(" argument "," argument "," argument "," argument "," argument "," argument ")"
datedif-params = "(" argument "," argument "," argument ")"
date-params = "(" argument "," argument "," argument ")"
datestring-params = "(" argument-expression ")"
datevalue-params = "(" argument-expression ")"
day-params = "(" argument-expression ")"
days-params = "(" argument "," argument ["", argument] ")"
days360-params = "(" argument "," argument "," argument ["", argument] ")"
dbcs-params = "(" argument-expression ")"
db-param = "(" argument "," argument "," argument ["", argument] ")"
dcounparam = "(" ref-argument-expression "," argument ["", argument] ")"
dcount-param = "(" ref-argument-expression "," argument ["", argument] ")"
ddelta-param = "(" argument-expression / (argument 1*254("," argument))) ")"
ddev-param = "(" argument-expression / (argument 1*254("," argument))) ")"
ddevsq-param = "(" argument-expression / (argument 1*254("," argument))) ")"
dget-params = "(" ref-argument-expression "," argument "," argument ")"
disc-param = "(" argument "," argument "," argument "," argument ["", argument] ")"
dmax-param = "(" ref-argument-expression "," argument "," argument ")"
dmin-param = "(" ref-argument-expression "," argument "," argument ")"
dollar-params = "(" argument "," argument ")"
dollar-param = "(" argument-expression / (argument "," argument)) ")"
dproduct-params = "(" ref-argument-expression "," argument ["", argument] ")"
Release: August 1, 2018
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Release: August 1, 2018
len-params = "(" argument-expression "),"
linest-params = "(" (argument-expression / (argument "," argument ["," argument][]) "),"
ln-params = "(" argument-expression ")"
log10-params = "(" argument-expression ")"
logest-params = "(" (argument-expression / (argument "," argument ["," argument][]) "),"
loginv-params = "(" argument "," argument "," argument ")"
lognormdist-params = "(" argument "," argument "," argument "," argument ")"
lognorminv-params = "(" argument "," argument "," argument "," argument ")"
log-param = "(" argument-expression / (argument "," argument) ")"
lookup-params = "(" argument "," argument ["," argument] ")"
lower-params = "(" argument-expression ")"
match-params = "(" argument "," argument ["," argument] ")"
maxa-params = "(" argument-expression / (argument 1*254(" argument)) ")"
max-param = "(" argument-expression / (argument 1*254(" argument)) ")"
maxifs-params = "(" ref-argument-expression "," ref-argument-expression "," argument *125(" argument-ref-expression "," argument ")"
mdet-params = "(" argument-expression ")"
mduration-params = "(" argument "," argument ["," argument] ")"
middle-params = "(" argument-expression / (argument 1*254(" argument)) ")"
mid-param = "(" argument "," argument [" argument] ")"
mina-params = "(" argument-expression / (argument 1*254(" argument)) ")"
min-param = "(" argument-expression / (argument 1*254(" argument)) ")"
minifs-params = "(" ref-argument-expression "," ref-argument-expression "," argument *125(" argument-ref-expression "," argument ")"
mint-params = "(" argument-expression ")"
mirr-params = "(" argument "," argument "," argument ")"
mmlist-params = "(" argument "," argument [" argument] ")"
mode-mult-params = "(" (argument-expression / (argument 1*253(" argument))) ")"
mode-safe-params = "(" (argument-expression / (argument 1*254(" argument))) ")"
mode-params = "(" argument "," argument [" argument] ")"
month-params = "(" argument-expression ")"
month-param = "(" argument [" argument] ")"
mround-params = "(" argument "," argument [" argument] ")"
mmedian-params = "(" argument-expression / (argument 1*254(" argument)) ")"
munit-params = "(" argument-expression ")"
namerange-params = emptyparams
nbigomdist-params = "(" argument "," argument "," argument ")"
nbigominv-params = "(" argument "," argument [" argument] ")"
netdays-ntpl-params = "(" argument "," argument [" argument] [" argument] ")"
netdays-params = "(" argument "," argument [" argument] ")"
nominal-params = "(" argument "," argument [" argument] ")"
normdist-params = "(" argument "," argument [" argument] [" argument] ")"
norminv-params = "(" argument "," argument [" argument] [" argument] ")"
norm-params = "(" argument-expression ")"
norm-s-inv-params = "(" argument-expression ")"
norm-s-dist-params = "(" argument [" argument] [" argument] ")"
normdist-params = "(" argument-expression ")"
norminv-params = "(" argument-expression ")"
not-params = "(" argument-expression ")"
now-params = emptyparams
npv-params = "(" argument "," argument 1*253(" argument [" argument] [" argument] ")"
numbervalue-params = "(" (argument-expression / (argument [" argument] [" argument])) ")"
oct2bin-params = "(" (argument-expression / (argument [" argument] [" argument])) ")"
oct2dec-params = "(" argument-expression ")"
oct2hex-params = "(" (argument-expression / (argument [" argument] [" argument])) ")"
second-params = "(["argument-expression","])"
sec-params = "(["argument-expression","])"
series-params = "(["argument","argument","argument","argument [","argument"]"])"
seriesum-sum-params = "(["argument","argument","argument","argument"]")
sheet-params = "(["argument"]")
sheets-params = "(["argument-expression"]")
sign-params = "(["argument-expression"]")
sinh-params = "(["argument-expression"]")
sin-params = "(["argument","argument","argument"]")

skew-params = "(["argument-expression / (argument 1*254("","argument")")

skew-p-params = "(["argument-expression / (argument 1*253("","argument")")

slin-params = "(["argument","argument","argument"]")
slope-params = "(["argument","argument"]")
small-params = "(["argument","argument"]")
sqrt-params = "(["argument-expression"]")

standardize-params = "(["argument","argument","argument"]")
stddeva-params = "(["argument-expression / (argument 1*254("","argument")")
stddev-p-params = "(["argument-expression / (argument 1*254("","argument")")
stddev-params = "(["argument-expression / (argument 1*253("","argument")")
stddev-s-params = "(["argument-expression / (argument 1*253("","argument")")
steyp-params = "(["argument","argument"]")

subtotal-params = "(["argument","argument","argument [","argument"]")
sumif-params = "("ref-argument-expression","argument [","ref-argument-expression"]")"
sumifs-params = "("ref-argument-expression","ref-argument-expression","argument *126","ref-argument-expression","argument")"

sum-params = "(["argument-expression / (argument 1*254("","argument")")
sumproduct-params = "(["argument-expression / (argument 1*254("","argument")")
sumsq-params = "(["argument-expression / (argument 1*254("","argument")")
sumx2my2-params = "(["argument","argument"]")

sumx2py2-params = "(["argument","argument"]")
sumx2y2-params = "(["argument","argument"]")
switch-params = "(["argument","argument","argument 1*251("","argument")"]"
sydf-params = "(["argument","argument","argument","argument"]")

tanh-params = "(["argument-expression"]")
tan-params = "(["argument-expression"]")
tbilleq-params = "(["argument","argument","argument"]")
tbillprice-params = "(["argument","argument","argument"]")
tbillyield-params = "(["argument","argument","argument"]")
tdist-2t-params = "(["argument","argument"]")
tdist-params = "(["argument","argument","argument"]")
tdist-params = "(["argument","argument","argument"]")
tdist-rr-params = "(["argument","argument"]")
textparams-params = "(["argument","argument"]")
textjoin-params = "(["argument","argument","argument*251("","argument")"]")
thdayofweek-params = "(["argument-expression"]")

thdayofmonth-params = "(["argument-expression"]")

thaimonthofyear-params = "(["argument-expression"]")

thainum-month-params = "(["argument-expression"]")

thaistring-length-params = "(["argument-expression"]")

thaiyear-params = "(["argument-expression"]")
time-params = "(["argument","argument","argument"]")
timevalue-params = "(["argument-expression"]")

t-inv-2t-params = "(["argument","argument"]")
tinv-params = "(["argument","argument"]")
t-inv-params = "(["argument","argument"]")
today-params = emptyparams

t-params = "(["argument-expression"]")

transpose-params = "(["argument-expression"]")
trend-params = "(["argument-expression / (argument","argument","argument [","argument")")

trimmean-params = "(["argument","argument"]")
trim-params = "(["argument-expression"]")

true-params = emptyparams
absref-params = "(" argument "," ref-argument-expression ")"
active-cell-params = "(" "space ")"
add-bar-params = "(" argument ")"
add-command-params = "(" argument "," argument "," argument ["," argument ["," argument]] ")"
add-menu-params = "(" argument "," argument "," argument ")"
add-toolbar-params = "(" argument ["," argument] ")"
app-title-params = "(" argument ")"
argument-params = "(" argument "," argument ["," ref-argument-expression] ")"
brack-params = "(" "space ")"
caller-params = "(" argument-expression / (argument "," argument "+253(""," argument))) ")"
caller-key-params = "(" argument "," ref-argument-expression ")"
check-command-params = "(" argument "," argument "," argument "," argument ["," argument] ")"
custom-repeat-params = "(" argument ["," argument] ")"
custom-undo-params = "(" argument ["," argument] ")"
delete-bar-params = "(" argument-expression ")"
delete-command-params = "(" argument "," argument "," argument ["," argument] ")"
delete-menu-params = "(" argument "," argument ["," argument] ")"
delete-toolbar-params = "(" argument-expression ")"
def-ref-params = "(" ref-argument-expression ")"
dialog-box-params = "(" argument-expression ")"
directory-params = "(" argument ")"
documents-params = "(" argument "," argument ")"
echo-params = "(" argument ")"
else-params = "(" "space ")"
else-if-params = "(" argument-expression ")"
enable-command-params = "(" argument "," argument "," argument "," argument ["," argument] ")"
enable-tool-params = "(" argument "," argument "," argument ")"
end-if-params = "(" "space ")"
error-params = "(" argument ["," argument] ")"
evaluate-params = "(" argument-expression ")"
exec-params = "(" argument-expression / (argument "," argument ["," argument ["," argument]] ")")"
execute-params = "(" argument ["," argument] ")"
cfopen-params = "(" argument-expression ")"
cfiles-params = "(" argument ["," argument] ")"
fopen-params = "(" argument-expression / (argument "," argument) ")"
for-params = "(" argument "," argument "," argument ["," argument] ")"
for-cell-params = "(" argument-expression / (argument "," argument ["," argument]) ")"
formula-convert-params = "(" argument "," argument ["," argument "," argument ["," argument]] ")"
fpabs-params = "(" argument-expression / (argument "," argument) ")"
fread-params = "(" argument "," argument ")"
freadln-params = "(" argument-expression ")"/fwriteln-params = "(" argument "," argument ")"
get-bar-params = "(" argument ["," argument ["," argument ["," argument]] ")"
get-cell-params = "(" argument-expression / (argument "," ref-argument-expression) ")"
get-chart-item-params = "(" argument-expression / (argument "," argument ["," argument]) ")"
get-def-params = "(" argument-expression / (argument "," argument ["," argument]) ")"
get-document-params = "(" argument-expression / (argument "," argument) ")"
get-formula-params = "(" argument-expression ")"
get-link-info-params = "(" argument "," argument ["," argument ["," argument]) ")"
get-move-params = "(" argument "," argument ["," argument] ")"
generate-param = "(" argument-expression / (argument "," argument) ")"
get-note-params = "(" argument ["," argument ["," argument]] ")"
chart-add-data-params = "(" argument *5(""," argument) ")"
chart-click-param = "(" argument *7(""," argument) ")"
chart-populate-param = "(" argument *13(""," argument) ")"
chart-render-param = "(" argument *2(""," argument) ")"
checkbox-properties-param = "(" argument *4(""," argument) ")"
clear-param = "(" argument ")"
clear-outline-param = "(" *space ")"
clear-print-area-param = "(" *space ")"
clear-routing-slip-param = "(" argument ")"
close-param = "(" argument ")"
close-all-param = "(" *space ")"
combo-param = "(" argument ")"
column-width-param = "(" argument *4(""," argument) ")"
combination-param = "(" argument ")"
consolidate-param = "(" argument *4(""," argument) ")"
constraint-numeric-param = "(" argument ")"
copy-param = "(" argument ")"
copy-chart-param = "(" argument ")"
copy-picture-param = "(" argument *2(""," argument) ")"
copy-tool-param = "(" argument ")"
create-names-param = "(" argument *3(""," argument) ")"
create-publisher-param = "(" argument ")"
customize-toolbar-param = "(" argument ")"
cut-param = "(" argument ")"
data-delete-param = "(" *space ")"
data-find-param = "(" argument ")"
data-find-next-param = "(" *space ")"
data-find-prev-param = "(" *space ")"
data-form-param = "(" *space ")"
data-label-param = "(" argument *9(""," argument) ")"
data-series-param = "(" argument *5(""," argument) ")"
define-name-param = "(" argument "6(""," argument) ")"
define-style-param = "(" argument *13(""," argument) ")"
delete-arrow-param = "(" *space ")"
delete-chart-autoformat-param = "(" argument ")"
delete-format-param = "(" argument ")"
delete-name-param = "(" argument ")"
delete-note-param = "(" argument ")"
delete-overlap-param = "(" *space ")"
delete-style-param = "(" argument ")"
delete-tool-param = "(" argument ")"
demote-param = "(" argument ")"
disable-input-param = "(" argument ")"
display-param = "(" argument *8(""," argument) ")"
duplicate-param = "(" *space ")"
edit-color-param = "(" argument *3(""," argument) ")"
edit-delete-param = "(" argument ")"
edit-object-param = "(" argument ")"
edit-repeat-param = "(" *space ")"
edit-series-param = "(" argument *6(""," argument) ")"
edit-tool-param = "(" argument "6(""," argument) ")"
editbox-properties-param = "(" argument *3(""," argument) ")"
edition-options-param = "(" argument "6(""," argument) ")"
enable-object-param = "(" argument "6(""," argument) ")"
enable-tipwizard-param = "(" argument "6(""," argument) ")"
enter-data-param = "(" argument ")"
errorbar-x-param = "(" argument *3(""," argument) ")"
errorbar-y-param = "(" argument *3(""," argument) ")"
extend-polygon-param = "(" argument ")"
extract-param = "(" argument "6(""," argument) ")"
file-close-param = "(" argument "6(""," argument) ")"
file-delete-param = "(" argument "6(""," argument) ")"
file-auto-param = "(" argument "6(""," argument) ")"
file-down-param = "(" *space ")"
file-group-param = "(" argument "6(""," argument) ")"
file-left-param = "(" *space ")"
file-right-param = "(" *space ")"
fill-up-param = "(" *space ")"
filter-param = "(" argument "5(""," argument) ")"
filter-advanced-param = "(" argument "4(""," argument) ")"
pivot-show-pages-params = "({" argument "," argument " })"
pivot-table-params = "({" argument "," argument " }")
pivot-table-wizard-params = "({" argument "," argument " })"
post-document-params = "(" argument ")"
precision-params = "(" argument ")"
preference-params = "(" *space ")"
print-params = "(" argument "," argument ")"
print-preview-params = "(" argument ")"
printer-setup-params = "(" argument ")"
promote-params = "(" argument ")"
protect-document-params = "(" argument "," argument ")"
prompt-revisions-params = "(" *space ")"
pushbutton-properties-params = "(" argument "," argument ")"
quit-params = "(" *space ")"
remove-list-item-params = "(" argument "," argument ")"
remove-page-break-params = "(" argument "," argument ")"
rename-object-params = "(" argument ")"
replace-font-params = "(" argument "," argument ")"
reset-tool-params = "(" argument "," argument ")"rm-print-area-params = "(" argument ")"
route-document-params = "(" *space ")"
routing-slide-params = "(" argument "," argument ")"
row-height-params = "(" argument "," argument ")"
runt-params = "(" argument "," argument ")"
save-params = "(" *space ")"
save-as-params = "(" argument "," argument ")"
save-copy-as-params = "(" argument ")"
save-new-object-params = "(" argument ")"
save-workbook-params = "(" argument "," argument ")"
save-workspace-params = "(" argument ")"
scale-params = "(" argument "," argument ")"
scenario-add-params = "(" argument "," argument ")"
scenario-cells-params = "(" argument ")"
scenario-delete-params = "(" argument ")"
scenario-edit-params = "(" argument "," argument ")"
scenario-merge-params = "(" argument ")"
scenario-show-params = "(" argument ")"
scenario-show-next-params = "(" *space ")"
scenario-summary-params = "(" argument "," argument ")"
scrollbar-properties-params = "(" argument "," argument ")"
select-params = "(" argument "," argument ")"
select-all-params = "(" *space ")"
select-chart-params = "(" *space ")"
select-end-params = "(" argument ")"
select-last-cell-params = "(" *space ")"
select-list-item-params = "(" argument "," argument ")"
select-plot-area-params = "(" *space ")"
select-special-params = "(" argument "," argument ")"
send-keys-params = "(" argument "," argument ")"
send-mail-params = "(" argument "," argument ")"
send-to-back-params = "(" *space ")"
series-axes-params = "(" argument ")"
series-order-params = "(" argument "," argument ")"
series-x-params = "(" argument ")"
series-y-params = "(" argument "," argument ")"
set-control-value-params = "(" argument ")"
set-criteria-params = "(" *space ")"
set-database-params = "(" *space ")"
set-dialog-default-params = "(" argument ")"
set-dialog-focus-params = "(" argument ")"
set-extract-params = "(" *space ")"
set-list-item-params = "(" argument "," argument ")"
set-page-break-params = "(" *space ")"
set-preferred-params = "(" argument ")"
set-print-area-params = "(" argument ")"
set-print-titles-params = "(" argument "," argument ")"
set-update-status-params = "(" argument "," argument ")"
share-params = "(" *space ")"
share-name-params = "(" argument ")"
sheet-background-params = "(" argument [",", argument] ")"
nshort-menu-params = "(" argument ")"
show-active-cell-params = "(" *space ")"
show-clipboard-params = "(" *space ")"
show-detail-params = "(" argument *3(",", argument) ")"
show-dialog-params = "(" argument ")"
show-info-params = "(" argument ")"
show-levels-params = "(" argument [",", argument] ")"
show-toolbar-params = "(" argument *9(",", argument) ")"
sort-params = "(" argument *16(",", argument) ")"
sort-special-params = "(" argument *13(",", argument) ")"
sound-note-params = "(" argument *2(",", argument) ")"
sound-play-params = "(" argument *2(",", argument) ")"
spelling-params = "(" argument *5(",", argument) ")"
split-params = "(" argument [",", argument] ")"
standard-font-params = "(" argument *8(",", argument) ")"
standard-width-params = "(" argument ")"
style-params = "(" argument [",", argument] ")"
subscribe-to-params = "(" argument [",", argument] ")"
subtotal-create-params = "(" argument *5(",", argument) ")"
subtotal-remove-params = "(" *space ")"
summary-info-params = "(" argument *4(",", argument) ")"
tab-order-params = "(" *space ")"
table-params = "(" argument [",", argument] ")"
text-to-columns-params = "(" argument *13(",", argument) ")"
tracer-clear-params = "(" *space ")"
tracer-display-params = "(" argument [",", argument] ")"
tracer-error-params = "(" *space ")"
tracer-navigate-params = "(" argument *2(",", argument) ")"
traverse-notes-params = "(" argument [",", argument] ")"
undo-params = "(" *space ")"
unigroup-params = "(" *space ")"
unigroup-sheets-params = "(" *space ")"
unhide-params = "(" argument ")"
unlocked-next-params = "(" *space ")"
unlocked-prev-params = "(" *space ")"
unprotect-revisions-params = "(" *space ")"
update-link-params = "(" argument [",", argument] ")"
vba-insert-file-params = "(" argument ")"
vba-make-addin-params = "(" argument ")"
vba-procedure-definition-params = "(" *space ")"
vbaactivate-params = "(" argument [",", argument] ")"
view-3d-params = "(" argument *5(",", argument) ")"
view-define-params = "(" argument *2(",", argument) ")"
view-delete-params = "(" argument ")"
view-show-params = "(" argument ")"
vline-params = "(" argument ")"
vpage-params = "(" argument ")"
vscroll-params = "(" argument [",", argument] ")"
wait-params = "(" argument ")"
web-publish-params = "(" argument *8(",", argument) ")"
window-maximize-params = "(" argument ")"
window-minimize-params = "(" argument ")"
window-move-params = "(" argument *2(",", argument) ")"
window-restore-params = "(" argument ")"
window-size-params = "(" argument *2(",", argument) ")"
workbook-activate-params = "(" argument [",", argument] ")"
workbook-add-params = "(" argument *2(",", argument) ")"
workbook-copy-params = "(" argument *2(",", argument) ")"
workbook-delete-params = "(" argument [",", argument] ")"
workbook-hide-params = "(" argument [",", argument] ")"
workbook-insert-params = "(" argument ")"
workbook-move-params = "(" argument *2(",", argument) ")"
workbook-name-params = "(" argument [",", argument] ")"
workbook-new-params = "(" argument *2(",", argument) ")"
workbook-next-params = "(" *space ")"
workbook-options-params = "(" argument *2(",", argument) ")"
workbook-protect-params = "(" argument *2(",", argument) ")"
workbook-scroll-params = "{" argument "," argument }"
workbook-select-params = "{" argument +1(," argument }"
workbook-tab-split-params = "{" argument }
workbook-unhide-params = "{" argument }
workgroup-params = "{" argument }
workgroup-options-params = "{" space }
workspace-params = "{" argument +15(" argument }"
zoom-params = "{" argument }

2.2.2.1 Cell Formulas

A **cell** formula is a **formula** that adheres to the grammar specified in section 2.2.2, with the following restrictions:

- The formula MUST NOT use the bang-reference or bang-name production rules.

All * elements of CT_Cell elements, as specified in [ISO/IEC29500-4:2016] section A.2, and all calculatedColumnFormula and totalsRowFormula elements of CT_TableColumn elements, as specified in [ISO/IEC29500-4:2016] section A.2, are cell formulas.

2.2.2.2 Conditional Formatting Formulas

A **conditional formatting** formula is a **formula** that adheres to the grammar specified in section 2.2.2, with the following restrictions:

- The formula MUST NOT use the union-operator, intersection-operator, range-operator, bang-reference, bang-name, array-constant, external-cell-reference, or structure-reference production rules.


2.2.2.3 Data Validation Formulas

A **data validation** formula is a **formula** that adheres to the grammar specified in section 2.2.2, with the following restrictions:

- The formula MUST NOT use the union-operator, intersection-operator, range-operator, bang-reference, bang-name, array-constant, sheet-range-reference, or structure-reference production rules.

All formula1 and formula2 elements of CT_DataValidation elements, as specified in [ISO/IEC29500-4:2016] section A.2, are data validation formulas.

2.2.2.4 External Name Formulas

An external name formula is a **formula** that adheres to the following grammar:

```
  external-name-formula = ref-constant / sheet-range-reference / single-sheet-reference
```

When matching the single-sheet or sheet-range rules for an external name formula, the optional workbook-index in those rules MUST NOT be omitted.

All * attributes of CT_ExternalDefinedName elements, as specified in [ISO/IEC29500-4:2016] section A.2, are external name formulas.
2.2.2.5 Name Formulas

A name formula is a formula that adheres to the grammar specified in section 2.2.2, with the following differences.

For name formulas, the function-call rule is expanded as follows:

function-call ← (macro-function-call / command-function-call)

The formula MUST NOT use the local-cell-reference production rule.

All formula and oldFormula elements of CT_RevisionDefinedName elements, as specified in [ISO/IEC29500-4:2016] section A.2, and all definedName elements of CT_DefinedNames elements, as specified in [ISO/IEC29500-4:2016] section A.2, are name formulas.

2.2.2.6 Pivot Field Formulas

A pivot field formula is a formula that adheres to the grammar specified in section 2.2.2, with the following differences.

For pivot field formulas, the nospace-expression rule is expanded as follows:

nospace-expression ← pivot-field-name
pivot-field-name ← name / apostrophe 1*pivot-field-string-character apostrophe
pivot-field-string-character ← apostrophe apostrophe / pivot-field-character
pivot-field-character ← character ; MUST NOT be apostrophe


A name used in a pivot field formula MUST NOT have any of the following forms:

- All
- Blank

All formula attributes of CT_CacheField elements, as specified in [ISO/IEC29500-4:2016] section A.2, are pivot field formulas.

2.2.2.7 Pivot Item Formulas

A pivot item formula is a formula that adheres to the grammar specified in section 2.2.2, with the following differences.

For pivot item formulas, the nospace-expression rule is expanded as follows:

nospace-expression ← pivot-items
pivot-items ← pivot-item space *("whitespace pivot-item"
pivot-item ← pivot-field-name / pivot-field-name "]"
pivot-item-value ← pivot-field-name / [sign] whole-number-part

A name used in a pivot item formula MUST NOT have any of the following forms:

- All
- Blank

All **formula** attributes of **CT_CalculatedItem** elements, as specified in [ISO/IEC29500-4:2016] section A.2, are pivot item formulas.

### 2.2.3 Functions

The predefined functions ([ISO/IEC29500-1:2016] section 18.17.7) are extended by the following **future functions**.

<table>
<thead>
<tr>
<th>Future function</th>
</tr>
</thead>
<tbody>
<tr>
<td>_xlfn.ACOT</td>
</tr>
<tr>
<td>_xlfn.ACOTH</td>
</tr>
<tr>
<td>_xlfn.AGGREGATE</td>
</tr>
<tr>
<td>_xlfn.ARABIC</td>
</tr>
<tr>
<td>_xlfn.BASE</td>
</tr>
<tr>
<td>_xlfn.BETA.DIST</td>
</tr>
<tr>
<td>_xlfn.BETA.INV</td>
</tr>
<tr>
<td>_xlfn.BINOM.DIST</td>
</tr>
<tr>
<td>_xlfn.BINOM.DIST.RANGE</td>
</tr>
<tr>
<td>_xlfn.BINOM.INV</td>
</tr>
<tr>
<td>_xlfn.BITAND</td>
</tr>
<tr>
<td>_xlfn.BITLSHIFT</td>
</tr>
<tr>
<td>_xlfn.BITOR</td>
</tr>
<tr>
<td>_xlfn.BITRSHIFT</td>
</tr>
<tr>
<td>_xlfn.BITXOR</td>
</tr>
<tr>
<td>_xlfn.CEILING.MATH</td>
</tr>
<tr>
<td>_xlfn.CEILING.PRECISE</td>
</tr>
<tr>
<td>_xlfn.CHISQ.DIST</td>
</tr>
<tr>
<td>_xlfn.CHISQ.DIST.RT</td>
</tr>
<tr>
<td>_xlfn.CHISQ.INV</td>
</tr>
<tr>
<td>_xlfn.CHISQ.INV.RT</td>
</tr>
<tr>
<td>_xlfn.CHISQ.TEST</td>
</tr>
<tr>
<td>Future function</td>
</tr>
<tr>
<td>---------------------------------------</td>
</tr>
<tr>
<td>_xlfn.COMBINA</td>
</tr>
<tr>
<td>_xlfn.CONCAT</td>
</tr>
<tr>
<td>_xlfn.CONFIDENCE.NORM</td>
</tr>
<tr>
<td>_xlfn.CONFIDENCE.T</td>
</tr>
<tr>
<td>_xlfn.COT</td>
</tr>
<tr>
<td>_xlfn.COTH</td>
</tr>
<tr>
<td>_xlfn.COVARIANCE.P</td>
</tr>
<tr>
<td>_xlfn.COVARIANCE.S</td>
</tr>
<tr>
<td>_xlfn.CSC</td>
</tr>
<tr>
<td>_xlfn.CSCH</td>
</tr>
<tr>
<td>_xlfn.DAYS</td>
</tr>
<tr>
<td>_xlfn.DECIMAL</td>
</tr>
<tr>
<td>ECMA.CEILING</td>
</tr>
<tr>
<td>_xlfn.ERF.PRECISE</td>
</tr>
<tr>
<td>_xlfn.ERFC.PRECISE</td>
</tr>
<tr>
<td>_xlfn.EXPON.DIST</td>
</tr>
<tr>
<td>_xlfn.F.DIST</td>
</tr>
<tr>
<td>_xlfn.F.DIST.RT</td>
</tr>
<tr>
<td>_xlfn.F.INV</td>
</tr>
<tr>
<td>_xlfn.F.INV.RT</td>
</tr>
<tr>
<td>_xlfn.F.TEST</td>
</tr>
<tr>
<td>_xlfn.FILTERXML</td>
</tr>
<tr>
<td>_xlfn.FLOOR.MATH</td>
</tr>
<tr>
<td>_xlfn.FLOOR.PRECISE</td>
</tr>
<tr>
<td>_xlfn.FORECAST.ETS</td>
</tr>
<tr>
<td>_xlfn.FORECAST.ETS.CONFINT</td>
</tr>
<tr>
<td>_xlfn.FORECAST.ETS.SEASONALITY</td>
</tr>
<tr>
<td>_xlfn.FORECAST.ETS.STAT</td>
</tr>
<tr>
<td>_xlfn.FORECAST.LINEAR</td>
</tr>
<tr>
<td>_xlfn.FORMULATEXT</td>
</tr>
<tr>
<td>_xlfn.GAMMA</td>
</tr>
<tr>
<td>_xlfn.GAMMA.DIST</td>
</tr>
<tr>
<td>Future function</td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td>_xlfn.GAMMA.INV</td>
</tr>
<tr>
<td>_xlfn.GAMMALN.PRECISE</td>
</tr>
<tr>
<td>_xlfn.GAUSS</td>
</tr>
<tr>
<td>_xlfn.HYPGEOM.DIST</td>
</tr>
<tr>
<td>_xlfn.IFNA</td>
</tr>
<tr>
<td>_xlfn.IFS</td>
</tr>
<tr>
<td>_xlfn.IMCOSH</td>
</tr>
<tr>
<td>_xlfn.IMCOT</td>
</tr>
<tr>
<td>_xlfn.IMCSC</td>
</tr>
<tr>
<td>_xlfn.IMCSCH</td>
</tr>
<tr>
<td>_xlfn.IMSEC</td>
</tr>
<tr>
<td>_xlfn.IMSECH</td>
</tr>
<tr>
<td>_xlfn.IMSINH</td>
</tr>
<tr>
<td>_xlfn.IMITAN</td>
</tr>
<tr>
<td>_xlfn.ISFORMULA</td>
</tr>
<tr>
<td>ISO.CEILING</td>
</tr>
<tr>
<td>_xlfn.ISOWEEKNUM</td>
</tr>
<tr>
<td>_xlfn.LOGNORM.DIST</td>
</tr>
<tr>
<td>_xlfn.LOGNORM.INV</td>
</tr>
<tr>
<td>_xlfn.MAXIFS</td>
</tr>
<tr>
<td>_xlfn.MINIFS</td>
</tr>
<tr>
<td>_xlfn.MODE.MULT</td>
</tr>
<tr>
<td>_xlfn.MODE.SNGL</td>
</tr>
<tr>
<td>_xlfn.MUNIT</td>
</tr>
<tr>
<td>_xlfn.NEGBINOM.DIST</td>
</tr>
<tr>
<td>NETWORKDAYS.INTL</td>
</tr>
<tr>
<td>_xlfn.NORM.DIST</td>
</tr>
<tr>
<td>_xlfn.NORM.INV</td>
</tr>
<tr>
<td>_xlfn.NORM.S.DIST</td>
</tr>
<tr>
<td>_xlfn.NORM.S.INV</td>
</tr>
<tr>
<td>_xlfn.NUMBERVALUE</td>
</tr>
<tr>
<td>_xlfn.PDURATION</td>
</tr>
<tr>
<td>Future function</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>_xlfn.PERCENTILE.EXC</td>
</tr>
<tr>
<td>_xlfn.PERCENTILE.INC</td>
</tr>
<tr>
<td>_xlfn.PERCENTRANK.EXC</td>
</tr>
<tr>
<td>_xlfn.PERCENTRANK.INC</td>
</tr>
<tr>
<td>_xlfn.PERMUTATIONA</td>
</tr>
<tr>
<td>_xlfn.PHI</td>
</tr>
<tr>
<td>_xlfn.POISSON.DIST</td>
</tr>
<tr>
<td>_xlfn.QUARTILE.EXC</td>
</tr>
<tr>
<td>_xlfn.QUARTILE.INC</td>
</tr>
<tr>
<td>_xlfn.QUERYSRSTRING</td>
</tr>
<tr>
<td>_xlfn.RANK.AVG</td>
</tr>
<tr>
<td>_xlfn.RANK.EQ</td>
</tr>
<tr>
<td>_xlfn.RRI</td>
</tr>
<tr>
<td>_xlfn.SEC</td>
</tr>
<tr>
<td>_xlfn.SECH</td>
</tr>
<tr>
<td>_xlfn.SHEET</td>
</tr>
<tr>
<td>_xlfn.SHEETS</td>
</tr>
<tr>
<td>_xlfn.SKEW.P</td>
</tr>
<tr>
<td>_xlfn.STDEV.P</td>
</tr>
<tr>
<td>_xlfn.STDEV.S</td>
</tr>
<tr>
<td>_xlfn.SWITCH</td>
</tr>
<tr>
<td>_xlfn.T.DIST</td>
</tr>
<tr>
<td>_xlfn.T.DIST.2T</td>
</tr>
<tr>
<td>_xlfn.T.DIST.RT</td>
</tr>
<tr>
<td>_xlfn.T.INV</td>
</tr>
<tr>
<td>_xlfn.T.INV.2T</td>
</tr>
<tr>
<td>_xlfn.T.TEST</td>
</tr>
<tr>
<td>_xlfn.TEXTJOIN</td>
</tr>
<tr>
<td>_xlfn.UNICHAR</td>
</tr>
<tr>
<td>_xlfn.UNICODE</td>
</tr>
<tr>
<td>_xlfn.VAR.P</td>
</tr>
<tr>
<td>_xlfn.VAR.S</td>
</tr>
</tbody>
</table>
The function syntax ([ISO/IEC29500-1:2016] section 18.17.2.4) is extended by changing the function-name rule to:

```
function-name =
    prefixed-function-name |
    predefined-function-name |
    user-defined-function-name |
    future-function-list;
```

The future-function-list rule is found in the Formulas grammar.

### 2.2.4 Extensions by Part


#### 2.2.4.1 Connections


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{D79990A0-CA42-45E3-83F4-45C500A0EAA5}</td>
<td>connection</td>
</tr>
<tr>
<td>{DE250136-89BD-433C-8126-D09C5730AF9}</td>
<td>connection</td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more details about how extension lists are used.

#### 2.2.4.2 Drawing

The oneCellAnchor element ([ISO/IEC29500-1:2016] section 20.5.2.24) is extended by the addition of a child AlternateContent element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>sp</td>
</tr>
<tr>
<td></td>
<td>([ISO/IEC29500-1:2016] section 20.5.2.29)</td>
</tr>
</tbody>
</table>

---

[MS-XLSX] - v20180801
Excel (.xlsx) Extensions to the Office Open XML SpreadsheetML File Format
Copyright © 2018 Microsoft Corporation
Release: August 1, 2018
The **twoCellAnchor** element ([ISO/IEC29500-1:2016] section 20.5.2.33) is extended by the addition of a child **AlternateContent** element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th><strong>AlternateContent components</strong></th>
<th><strong>Child element</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td><code>sp</code> ([ISO/IEC29500-1:2016] section 20.5.2.29)</td>
</tr>
</tbody>
</table>

The **grpSp** element ([ISO/IEC29500-1:2016] section 20.5.2.17) is extended by the addition of a child **AlternateContent** element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th><strong>AlternateContent components</strong></th>
<th><strong>Child element</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td><code>sp</code> ([ISO/IEC29500-1:2016] section 20.5.2.29)</td>
</tr>
</tbody>
</table>

The **absoluteAnchor** element ([ISO/IEC29500-1:2016] section 20.5.2.1) is extended by the addition of a child **AlternateContent** element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th><strong>AlternateContent components</strong></th>
<th><strong>Child element</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td><code>sp</code> ([ISO/IEC29500-1:2016] section 20.5.2.29)</td>
</tr>
</tbody>
</table>

### 2.2.4.3 External Workbook References

The **oleItems** element ([ISO/IEC29500-1:2016] section 18.14.10) is extended by the addition of a child **AlternateContent** element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th><strong>AlternateContent components</strong></th>
<th><strong>Child element</strong></th>
</tr>
</thead>
</table>

### 2.2.4.4 Metadata

The **extLst** child element ([ISO/IEC29500-1:2016] section A.2) of the **futureMetadata** element ([ISO/IEC29500-1:2016] section 18.9.4) is extended by the addition of a new child **ext** element ([ISO/IEC29500-1:2016] section A.2) whose structure is specified in the following table. All **futureMetadata** elements are also linked to a **metadataType** ([ISO/IEC29500-1:2016] section 18.9.10) by the **name** attribute.
### 2.2.4.5 Pivot Table

The `extLst` child element ([ISO/IEC29500-1:2016] section 18.2.10) of the `pivotTableDefinition` element ([ISO/IEC29500-1:2016] section 18.10.1.73) is extended by the addition of new child `ext` elements ([ISO/IEC29500-1:2016] section 18.2.7) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>{3E2802C4-A4D2-4D8B-9148-E3BE6C30E623}</code></td>
<td>“XLRICHVALUE”</td>
</tr>
<tr>
<td><code>{962EF5D1-5CA2-4C93-8EF4-D8F5C05439D2}</code></td>
<td><code>pivotTableDefinition</code></td>
</tr>
<tr>
<td><code>{44433962-1CF7-4059-B4EE-95C3D5FFCF73}</code></td>
<td><code>pivotTableData</code></td>
</tr>
<tr>
<td><code>{C510F80B-63DE-4267-81D5-13C33094786E}</code></td>
<td><code>pivotTableServerFormats</code></td>
</tr>
<tr>
<td><code>{E67621CE-5B39-4880-91FE-76760E9C1902}</code></td>
<td><code>pivotTableUISettings</code></td>
</tr>
<tr>
<td><code>{747A6164-185A-40DC-8AA5-F01512510D54}</code></td>
<td><code>pivotTableDefinition16</code></td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>{2946ED86-A175-432A-8AC1-64E0C546D7DE}</code></td>
<td><code>pivotField</code></td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>{E15A36E0-9728-4E99-A89B-3F7291B0FE68}</code></td>
<td><code>dataField</code></td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>{F1805F06-0CD304483-9156-8803C3D141DF}</code></td>
<td><code>pivotHierarchy</code></td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.

The `filterColumn` element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a child `AlternateContent` element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td><code>customFilters</code> ([ISO/IEC29500-1:2016])</td>
</tr>
</tbody>
</table>
### AlternateContent components Child element

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>Either customFilters ([ISO/IEC29500-1:2016] section 18.3.2.3) or none</td>
</tr>
</tbody>
</table>

The **filterColumn** element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a child **AlternateContent** element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

### AlternateContent components Child element

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>customFilters ([ISO/IEC29500-1:2016] section 18.3.2.3)</td>
</tr>
</tbody>
</table>

The **extLst** child element ([ISO/IEC29500-1:2016] section 18.2.10) of the **filterColumn** element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a new child **ext** element ([ISO/IEC29500-1:2016] section 18.2.7) whose structure is specified in the following table.

### AlternateContent components Child element

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>Either filter ([ISO/IEC29500-1:2016] section 18.3.2.6) or none</td>
</tr>
</tbody>
</table>

The **filters** element ([ISO/IEC29500-1:2016] section 18.3.2.8) is extended by the addition of a child **AlternateContent** element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

### AlternateContent components Child element

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>Either filter ([ISO/IEC29500-1:2016] section 18.3.2.6) or none</td>
</tr>
</tbody>
</table>

The **sortState** element ([ISO/IEC29500-1:2016] section 18.3.1.92) is extended by the addition of a child **AlternateContent** element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

### AlternateContent components Child element

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>sortCondition ([ISO/IEC29500-1:2016] section 18.3.1.91)</td>
</tr>
</tbody>
</table>

2.2.4.6 Pivot Table Cache Definition


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{0605FD5F-26C8-4aeb-8148-2DB25E43C511}</td>
<td>pivotFilter</td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{725AE2AE-9491-48BE-B2B4-4EB974FC3084}</td>
<td>pivotCacheDefinition</td>
</tr>
<tr>
<td>{5DA0FC9A-693D-419c-AD59-312A39285967}</td>
<td>timelinePivotCacheDefinition</td>
</tr>
<tr>
<td>{ABF5C744-AB39-4b91-8756-CFA1BBC848D5}</td>
<td>pivotCacheIdVersion</td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{63CAB8AC-B538-458D-9797-405883B0398D}</td>
<td>cacheField</td>
</tr>
<tr>
<td>{4F2E5C28-24EA-4EB8-9CBF-B6C8F9C3D259}</td>
<td>cachedUniqueNames</td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{0C70D0D5-359C-4A49-802D-23B6F952B5CE}</td>
<td>calculatedMember</td>
</tr>
<tr>
<td>{57DEB092-A4DC-418E-9C9A-C0C97F85S52CB}</td>
<td>calculatedMember</td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{F057638F-6D5F-4E77-A914-E7F072B9BCA8}</td>
<td>sourceConnection</td>
</tr>
</tbody>
</table>
See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.

### 2.2.4.7 Query Table

The sortState element ([ISO/IEC29500-1:2016] section 18.3.1.92) is extended by the addition of a child AlternateContent element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>sortCondition ([ISO/IEC29500-1:2016] section 18.3.1.91)</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{883FBD77-0823-4A55-B5E3-86C4891E6966}</td>
<td>queryTable</td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.

### 2.2.4.8 SlicerCache

The extLst child element ([ISO/IEC29500-1:2016] section 18.2.10) of the slicerCacheDefinition element (section 2.4.38) is extended by the addition of a new child ext element ([ISO/IEC29500-1:2016] section 18.2.7) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{03082B11-2C62-411c-B77F-237D8FCFBE4C}</td>
<td>slicerCachePivotTables</td>
</tr>
<tr>
<td>{2F2917AC-EB37-4324-AD4E-50D8C200BD13}</td>
<td>tableSlicerCache</td>
</tr>
<tr>
<td>{47072E0-4C17-9DC1-7EF765DBC7E}</td>
<td>slicerCacheHideItemsWithNoData</td>
</tr>
</tbody>
</table>

### 2.2.4.9 Styles


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{EB79DEF2-80B8-43E5-95BD-54CBBDF9020C}</td>
<td>slicerStyles</td>
</tr>
<tr>
<td>{46F421CA-312F-682F-3DD2-61675219B42D}</td>
<td>dxfs</td>
</tr>
<tr>
<td>{9260A510-F301-46A8-8635-F512D64BE5F5}</td>
<td>timelineStyles</td>
</tr>
<tr>
<td>{A0A4C193-F2C1-4fcb-8827-314CF5A85BB}</td>
<td>dxfs</td>
</tr>
</tbody>
</table>

2.2.4.10 Table Definition


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{504A1906-F514-4F6F-8877-14C23A59335A}</td>
<td>table</td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.

The filterColumn element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a child AlternateContent element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>customFilters ([ISO/IEC29500-1:2016] section 18.3.2.3)</td>
</tr>
</tbody>
</table>

The filterColumn element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a child AlternateContent element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
</table>

The filterColumn element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a child AlternateContent element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>customFilters ([ISO/IEC29500-1:2016] section 18.3.2.3)</td>
</tr>
</tbody>
</table>

The filters element ([ISO/IEC29500-1:2016] section 18.3.2.8) is extended by the addition of a child AlternateContent element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>Either filter ([ISO/IEC29500-1:2016] section 18.3.2.6) or none</td>
</tr>
</tbody>
</table>
The `sortState` element ([ISO/IEC29500-1:2016] section 18.3.1.92) is extended by the addition of a child `AlternateContent` element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td><code>sortCondition</code> ([ISO/IEC29500-1:2016] section 18.3.1.91)</td>
</tr>
</tbody>
</table>

### 2.2.4.11 Workbook


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{876F7934-8845-4945-9796-88D515C7AA90}</td>
<td>pivotCaches</td>
</tr>
<tr>
<td>{BBE1A952-AA13-448E-AADC-164F8A28A991}</td>
<td>slicerCaches</td>
</tr>
<tr>
<td>{79F54976-1DA5-4618-B147-AC6E4B953A3B}</td>
<td>workbookPr</td>
</tr>
<tr>
<td>{841E416B-1EF1-43B6-AB56-02D37102C6D5}</td>
<td>pivotCaches</td>
</tr>
<tr>
<td>{98342DD0-5260-488c-9760-48F4B6AC55F4}</td>
<td>pivotTableReferences</td>
</tr>
<tr>
<td>{A2CB5862-8E78-49C6-8D9D-AF26E26ADB89}</td>
<td>timelineCachePivotCaches</td>
</tr>
<tr>
<td>{D0CA8CA8-9F24-4464-BF8E-62219DCF47F9}</td>
<td>timelineCacheRefs</td>
</tr>
<tr>
<td>{140A7094-0E35-4892-8432-C4D2E57EDEB5}</td>
<td>workbookPr</td>
</tr>
<tr>
<td>{FCE2AD5D-F65C-4FA6-A056-5C36A1767C6B}</td>
<td>dataModel</td>
</tr>
<tr>
<td>{B58B0392-4F1F-4190-BB64-5DF3571DCE5F}</td>
<td>calcFeatures</td>
</tr>
</tbody>
</table>

The `extLst` child element ([ISO/IEC29500-1:2016] section 18.2.10) of the `dataModel` element (section 2.4.62) is extended by the addition of a new child `ext` element ([ISO/IEC29500-1:2016] section 18.2.7) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{9835A34E-60A6-4A7C-AA8-D5F71C897F49}</td>
<td>ModelTimeGroupings</td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.

### 2.2.4.12 Worksheet


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{78C0D931-6437-407D-ABEE-F0AAD7539E65}</td>
<td>conditionalFormattings</td>
</tr>
<tr>
<td>{CC6A557-97BC-4B89-ADB6-D9C93AA83DF}</td>
<td>dataValidations</td>
</tr>
<tr>
<td>{05C60535-F16-4FD2-B633-F4F36F0B64E0}</td>
<td>sparklineGroups</td>
</tr>
<tr>
<td>{A8765BA9-456A-4DAB-B4F3-ACF83BC121DE}</td>
<td>slicerList</td>
</tr>
<tr>
<td>{FC87AEE6-9EDD-4A0A-B7FB-166175694B37}</td>
<td>protectedRanges</td>
</tr>
<tr>
<td>{01252117-D84E-4E92-8308-4BE1C098FCBB}</td>
<td>ignoredErrors</td>
</tr>
</tbody>
</table>
See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.


<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{F7C9EE02-42E1-4005-9D12-6889AFFD525C}</td>
<td>webExtensions</td>
</tr>
<tr>
<td>{3A4CF648-6AED-40f4-B6FF-DC5316D8AED3}</td>
<td>slicerList</td>
</tr>
<tr>
<td>{7E03D99C-D04-49d9-9315-930204A7B6E9}</td>
<td>timelineRefs</td>
</tr>
</tbody>
</table>

See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.


The `sortState` element ([ISO/IEC29500-1:2016] section 18.3.1.92) is extended by the addition of a new child `AlternateContent` element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>sortCondition ([ISO/IEC29500-1:2016] section 18.3.1.91)</td>
</tr>
</tbody>
</table>

The `sortState` element ([ISO/IEC29500-1:2016] section 18.3.1.92) is extended by the addition of a new child `ext` element ([ISO/IEC29500-1:2016] section 18.2.7) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{0FC57C36-975A-43D2-8416-53689B585D1B}</td>
<td>richSortCondition</td>
</tr>
</tbody>
</table>

The `filterColumn` element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a child `AlternateContent` element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>customFilters ([ISO/IEC29500-1:2016] section 18.3.2.3)</td>
</tr>
</tbody>
</table>
The `filterColumn` element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a child `AlternateContent` element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td>Either <code>customFilters</code> ([ISO/IEC29500-1:2016] section 18.3.2.3) or none</td>
</tr>
</tbody>
</table>

The `filterColumn` element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a child `AlternateContent` element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fallback</td>
<td><code>customFilters</code> ([ISO/IEC29500-1:2016] section 18.3.2.3)</td>
</tr>
</tbody>
</table>

The `filterColumn` element ([ISO/IEC29500-1:2016] section 18.3.2.7) is extended by the addition of a new child `ext` element ([ISO/IEC29500-1:2016] section 18.2.7) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>Ext URI</th>
<th>Child element</th>
</tr>
</thead>
<tbody>
<tr>
<td>{68452572-C921-441B-96FD-77FB3E787301}</td>
<td><code>filterColumn</code></td>
</tr>
</tbody>
</table>

The `filters` element ([ISO/IEC29500-1:2016] section 18.3.2.8) is extended by the addition of a child `AlternateContent` element ([ISO/IEC29500-3:2015] section 10.2.1) whose structure is specified in the following table.

<table>
<thead>
<tr>
<th>AlternateContent components</th>
<th>Child element</th>
</tr>
</thead>
</table>

### 2.3 Conceptual Overview

This section specifies how higher-level features of the file format are represented by combinations of low-level structures.
2.3.1 PivotTable What-if Analysis

PivotTable what-if analysis enables the editing of summarized values in an OLAP PivotTable ([ISO/IEC29500-1:2016] section 18.10) view, for example, editing summarized values in the PivotTable data area of the PivotTable view.

A CT_PivotEdits element, as specified in section 2.6.37, and its child CT_PivotEdit elements, as specified in section 2.6.38, specify the values in the OLAP PivotTable view that have been modified and the corresponding values in the OLAP PivotTable source data. The CT_PivotUserEdit child element, as specified in section 2.6.41, of the CT_PivotEdit element specifies a value or a formula. The location of the modified value in the OLAP PivotTable view is specified by a PivotTable rule specified by the CT_PivotArea element ([ISO/IEC29500-4:2016] section A.2) in this CT_PivotEdit element. The OLAP tuple that identifies the corresponding value in the OLAP PivotTable source data is specified by the CT_TupleItems element, as specified in section 2.6.43, in this CT_PivotEdit element.

A CT_PivotChanges element, as specified in section 2.6.39, and its child CT_PivotChange elements, as specified in section 2.6.40, specify the values in the OLAP PivotTable view that have been designated for OLAP allocation and the corresponding values in the OLAP PivotTable source data. The order of the CT_PivotChange elements determines the order in which they are designated for OLAP allocation. The CT_PivotChange element specifies a single edited value designated for OLAP allocation. An OLAP allocation value is specified by the CT_PivotEditValue child element, as specified in section 2.6.42, of the CT_PivotChange element. The allocationMethod attribute of the CT_PivotChange element specifies the OLAP allocation method. The OLAP tuple that identifies the location of the edited value in the OLAP PivotTable view and the corresponding value in the OLAP PivotTable source data is specified by the CT_TupleItems child element of the CT_PivotChange element.

For example, when an OLAP PivotTable is refreshed, the values designated for OLAP allocation, specified by the CT_PivotChanges element and its child CT_PivotChange elements, are sent to the OLAP data provider along with the OLAP allocation method indicating how to allocate the updated values. The OLAP data provider updates the values, and those new values are then refreshed and summarized in the data area of the PivotTable view, instead of summarizing the original values from the OLAP PivotTable source data.

If the enableEdit attribute of the CT_PivotTableDefinition element, as specified in section 2.6.32, is "false", CT_PivotEdits and CT_PivotChanges elements MUST NOT exist in this part. PivotTable what-if analysis is enabled if, and only if, the enableEdit attribute of the CT_PivotTableDefinition element is "true" and the PivotTable source data is OLAP.

2.3.2 Slicers

A slicer is a mechanism for filtering data in PivotTable ([ISO/IEC29500-1:2016] section 18.10) views, cube functions, tables ([ISO/IEC29500-1:2016] section 18.5.1.2) and Charts ([ISO/IEC29500-1:2016] section 21.2) based on Non-Worksheet PivotTables. A slicer is based on a field in the slicer source data, and the slicer filters on distinct values in that column. In the case of using OLAP slicer source data, a slicer is based on an OLAP hierarchy.

A slicer has two major parts, a slicer cache and a slicer view. There can be more than one slicer view based on a single slicer cache. When filtering multi-level OLAP hierarchies using slicers, separate slicer views are used for each OLAP level.

2.3.2.1 Slicer Cache

A slicer cache specifies the subset of slicer source data that is cached for display in slicer views, as well as properties related to slicer filtering. A slicer cache is specified by the CT_SlicerCacheDefinition element.
A slicer cache has an associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache as specified in section 2.3.2.1.2, or Table ([ISO/IEC29500-1:2016] section 18.5.1.2).

If the slicer source data is an **OLAP data source**, the sourceName attribute of the CT_SlicerCacheDefinition element specifies the **MDX unique name** of the associated **OLAP hierarchy**.

If the slicer source data is a non-OLAP data source, the sourceName attribute of the CT_SlicerCacheDefinition element specifies the associated PivotTable cache **field** of the associated PivotTable PivotCache.

If the slicer source data is a table data source, the sourceName attribute of the CT_SlicerCacheDefinition element specifies the associated **table field**.

If the slicer is used to **filter** PivotTable views, the slicer cache specifies the PivotTable views being filtered as specified in section 2.3.2.1.4.

### 2.3.2.1.1 Slicer Source Data

The **source data** for a slicer is specified by the associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache as specified in Slicer Cache Relationship to PivotCache, or Table ([ISO/IEC29500-1:2016] section 18.5.1.2) as specified in Slicer Cache Relationship to Table.

### 2.3.2.1.2 Slicer Cache Relationship to PivotCache

A **slicer cache** can be associated with a PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache. The association is specified by the following rules:

- If the **CT_SlicerCacheDefinition** element has a child **CT_OlapSlicerCache** element, then the type of **slicer source data** is **OLAP** and the associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache of the slicer cache is specified by the pivotCacheId attribute of the CT_OlapSlicerCache element. The associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache MUST be based on an OLAP connection ([ISO/IEC29500-1:2016] section 18.13.5). The **slicerData** attribute of the CT_PivotCacheDefinition element MUST be "true".

- If the **CT_SlicerCacheDefinition** element has a child **CT_TabularSlicerCache** element, the type of slicer source data is non-OLAP and the associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache of the slicer cache is specified by the pivotCacheId attribute of the CT_TabularSlicerCache element. The associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache MUST be based on a non-OLAP connection ([ISO/IEC29500-1:2016] section 18.13). The **slicerData** attribute of the CT_PivotCacheDefinition element MUST be "false".

Multiple slicer caches can be associated with one PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache.

If a slicer cache is associated, as specified by Slicer Cache Relationship to PivotTable View, with one or more PivotTable ([ISO/IEC29500-1:2016] section 18.10) views, and the slicer source data type is non-OLAP, the slicer cache and each associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) view MUST be associated with the same PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache and the **slicerData** attribute of the CT_PivotCacheDefinition element MUST be "false".

If a slicer cache is associated, as specified by Slicer Cache Relationship to PivotTable View, with one or more PivotTable ([ISO/IEC29500-1:2016] section 18.10) views, and the slicer source data type is OLAP, the PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache that is associated with the slicer and all PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCaches that are associated with the PivotTable ([ISO/IEC29500-1:2016] section 18.10) views MUST be based on the same OLAP connection ([ISO/IEC29500-1:2016] section 18.13.5) and the PivotTable ([ISO/IEC29500-1:2016] section 18.10).

2.3.2.1.3 Slicer Cache Relationship to Table

A slicer cache can be associated with a Table ([ISO/IEC29500-1:2016] section 18.5.1.2). The association is specified by the following rule:

- If the CT_SlicerCacheDefinition element has a child extLst element with a child CT_TableSlicerCache element, the type of slicer source data is table and the associated Table ([ISO/IEC29500-1:2016] section 18.5.1.2) of the slicer cache is specified by the tableId attribute of the CT_TableSlicerCache element.

Multiple slicer caches can be associated with one Table ([ISO/IEC29500-1:2016] section 18.5.1.2).

2.3.2.1.4 Slicer Cache Relationship to PivotTable View

A slicer, as specified in section 2.3.2.1, can be associated with PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, views and Charts ([ISO/IEC29500-1:2016] section 21.2) based on Non-Worksheet PivotTables, by the pivotTables group element of the CT_SlicerCacheDefinition element, as specified in section 2.6.70.

If the associated PivotTable PivotCache of a slicer cache, as specified by the Slicer Cache Relationship to PivotCache, is an OLAP PivotTable PivotCache, the slicer items, as specified in section 2.3.2.1.6, in the slicer cache are used to apply PivotTable OLAP manual filters to the PivotTable hierarchy specified by the sourceName attribute of the CT_SlicerCacheDefinition element in all associated PivotTable views and Charts based on Non-Worksheet PivotTables, of the slicer cache. The selected slicer items in the slicer cache are converted into selected PivotTable items in the PivotTable OLAP manual filters by the application to apply the filter state of the slicer cache to the associated PivotTable views.

If the associated PivotTable PivotCache of a slicer cache, as specified by Slicer Cache Relationship to PivotCache, is a non-OLAP PivotTable PivotCache, the PivotTable PivotCache of the PivotTable views and the PivotTable PivotCache of the slicer cache MUST be the same.

When an OLAP PivotTable view is associated with an OLAP slicer cache, there MUST NOT be more than one slicer cache for each OLAP hierarchy. If the slicer cache is associated with at least one Chart based on Non-Worksheet PivotTable then the slicer cache MUST be OLAP sourced.

If the associated PivotTable PivotCache of a slicer cache, as specified by Slicer Cache Relationship to PivotCache, is a non-OLAP PivotTable PivotCache, the slicer items in the slicer cache are used to apply PivotTable non-OLAP manual filters to the PivotTable field specified by the sourceName attribute of the CT_SlicerCacheDefinition element in all associated PivotTable views of the slicer cache. The selected slicer items in the slicer cache are converted into selected PivotTable items in the PivotTable non-OLAP manual filters by the application to apply the filter state of the slicer cache to the associated PivotTable views. See the PivotTable items in [ISO/IEC29500-1:2016] section 18.10 for more details.

2.3.2.1.5 Slicer Cache Relationship to Table column

A slicer cache, as specified in section 2.3.2.1, can be associated with column in a Table, as specified in [ISO/IEC29500-1:2016] section 18.5.1.2. Associated column is specified by the column attribute of the CT_TableSlicerCache element.
2.3.2.1.6 Slicer Items

Slicer items in a slicer cache represent distinct values in a column of the slicer source data. In the case of slicers based on OLAP slicer source data, the slicer cache is based on an OLAP hierarchy and slicer items represent OLAP members within levels of that OLAP hierarchy.

For slicers associated with PivotTable ([ISO/IEC29500-1:2016] section 18.10) views, each slicer item specifies whether slicer source data exists for that slicer item. For more information, see Slicer Cross Filtering.

Each slicer item also specifies the item selection state, used for filtering, and can specify additional properties. For more information see Non-OLAP Slicer Items and OLAP Slicer Items.

2.3.2.1.6.1 Non-OLAP Slicer Items

The slicer items of a non-OLAP slicer are specified by an ordered sequence of CT_TabularSlicerCacheItem elements. Each slicer item is associated with a PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache item of the associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache field in the associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache. For more information, see Slicer Cache Relationship to PivotCache.


The order of non-OLAP slicer items in the slicer cache is specified by the sortOrder, crossFilter, and customListSort attributes of the CT_TabularSlicerCache element.

The CT_TabularSlicerCacheItem element also specifies whether the non-OLAP slicer item is selected for filtering and whether data exists in the slicer source data for it. For more information, see Slicer Cross Filtering.

2.3.2.1.6.2 OLAP Slicer Items

A CT_OlapSlicerCache element specifies properties of an OLAP slicer cache, and its descendant elements specify OLAP slicer items.

A CT_OlapSlicerCacheRanges element specifies the cache for an OLAP level in an OLAP slicer cache.

The cache is organized into ranges of cached OLAP slicer items for each OLAP level in the slicer cache. Each range is specified in a CT_OlapSlicerCacheRange element. The startItem attribute of the CT_OlapSlicerCacheRange element specifies the zero-based index of the first OLAP slicer item in this cached range in the ordered collection of all OLAP members that exist in the slicer source data for the associated OLAP level. The collection in the slicer source data is ordered as specified by the sortOrder and crossFilter attributes of the earlier CT_OlapSlicerCacheLevelData element.

Each cached OLAP slicer item in a range is specified by a CT_OlapSlicerCacheItem element.

The OLAP slicer items that are selected for filtering are specified by the CT_OlapSlicerCacheSelections element.
Each individual OLAP slicer item selected for filtering is specified by a `CT_OlapSlicerCacheSelection` element.

### 2.3.2.1.7 Slicer Cross Filtering

Cross filtering is an application behavior that allows one slicer to reflect the results of filtering by another. This behavior exposes whether data exists in the slicer source data for each slicer item when the slicer source data is filtered by the selected slicer items of all associated slicer caches of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) view, as specified by Slicer Cache Relationship to PivotTable View, and all PivotTable ([ISO/IEC29500-1:2016] section 18.10) manual filters in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view.

If the type of slicer source data is OLAP, the existence of data, after filtering, for a slicer item is specified by the `nd` attribute of the `CT_OlapSlicerCacheItem` element. If the type of slicer source data is non-OLAP, the existence of data for a slicer item is specified by the `nd` attribute of the `CT_TabularSlicerCacheItem` element.

If the type of slicer source data is non-OLAP, the `crossFilter` attribute of the `CT_TabularSlicerCache` element specifies how the non-OLAP slicer items that have no data appear.

If the type of slicer source data is OLAP, the `crossFilter` attribute of the `CT_OlapSlicerCacheLevelData` element specifies how the OLAP slicer items that have no data are displayed for the OLAP level specified by the `uniqueName` attribute of the `CT_OlapSlicerCacheLevelData` element.

### 2.3.2.2 Slicer View

A slicer view specifies the display of a slicer on a worksheet. A slicer view is displayed as a list of slicer items. The slicer view is specified by a `CT_Slicer` element.

Each slicer view is associated with a slicer cache as specified in Slicer View Relationship to Slicer Cache. The filtering state of slicer items displayed in the slicer view is specified by the associated slicer cache.


#### 2.3.2.2.1 Slicer View Relationship to Slicer Cache

Each slicer view is associated with a slicer cache. The slicer view is associated with a slicer cache through the `name` attribute of the `CT_SlicerCacheDefinition` element in the slicer cache that matches the `cache` attribute of the `CT_Slicer` element that specifies this slicer view.

If a slicer view is associated with an OLAP slicer cache, the slicer view also has an associated OLAP level, specified by the `level` attribute of the `CT_Slicer` element. In this case, the slicer view displays OLAP Slicer Items of that OLAP level.

There can be multiple slicer views associated with a single slicer cache. There are two main reasons for this:

- For a user-defined OLAP hierarchy with several OLAP levels—for example, a Geography OLAP hierarchy with Country, State, and City OLAP levels—each slicer view is associated with a single OLAP level, providing a mechanism for filtering different OLAP levels of the OLAP hierarchy.

- Multiple slicer views associated with either the same slicer cache (for a non-OLAP slicer cache) or the same OLAP level (for an OLAP slicer cache) provide a mechanism for displaying the filter state in more than one location in the workbook.
2.3.2.3 Slicers and Cube Functions

Each slicer cache has a defined name associated with it as specified by the name attribute of the CT_SlicerCacheDefinition element.

The value of the CT_DefinedName ([ISO/IEC29500-1:2016] section 18.2.5) element specifying a defined name associated with a slicer cache MUST be #N/A.

If the slicer source data type of a slicer cache is OLAP, cube functions can use the defined name of the slicer cache as a parameter to refer to the selection state of the slicer cache.

2.3.2.4 Slicer Styles

Slicer styles specify the formatting to apply to visual components of slicer views. The style attribute of the CT_Slicer element specifies the slicer style to be applied. A slicer style can be either built-in or user-defined. Built-in slicer styles are specified in the CT_Slicer element. User-defined slicer styles are specified in the CT_SlicerStyles element.


2.3.3 Non-Worksheet PivotTable

Non-Worksheet PivotTables provide a way for Charts ([ISO/IEC29500-1:2016] section 21.2) to be based on PivotTable data without having to show the data in a worksheet. For more information see [MS-ODRAWXML].

A Non-Worksheet PivotTable MUST only be referenced from workbook.

2.3.4 PivotValues

PivotValues specifies the collection of values that are in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area. The PivotValues contain a collection of PivotValueCells organized as a two dimensional array corresponding to the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area.

For a Non-Worksheet PivotTable the PivotValues are specified by the pivotTableData element (section 2.4.63).

For PivotTables on a worksheet the PivotValues are specified by the cells of the worksheet ([ISO/IEC29500-1:2016] section 18.3) cell table in the locations specified by the location element ([ISO/IEC29500-1:2016] section 18.10.1.49) of the PivotTable.
2.3.4.1 PivotValueCell

A PivotValueCell is a point in individual data unit in the data area of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area. PivotValueCells contain summarized values for associated PivotTable data items. Every PivotValueCell can have two kinds of information associated with it, the value and the server formatting information.

2.3.4.1.1 Value

The value of a PivotValueCell is specified to be the number, string, error, date associated with the PivotValueCell.

2.3.4.1.2 Server Formatting

The server formatting of a PivotValueCell specifies formatting to be applied to the PivotValueCell.

2.3.5 Timelines

A Timeline is a mechanism for filtering data in PivotTable ([ISO/IEC29500-1:2016] section 18.10) views, cube functions and Charts ([ISO/IEC29500-1:2016] section 21.2) based on Non-Worksheet PivotTables. In the case of using OLAP Timeline source data, a Timeline is based on a key attribute of an OLAP Hierarchy. In the case of using native Timeline source data, a Timeline is based on a data table column.

A Timeline has two major parts: a Timeline cache, and a Timeline view. There can be more than one Timeline view based on a single Timeline cache.

2.3.5.1 Timeline Cache

A Timeline cache specifies the subset of Timeline source data (section 2.3.5.1.1) that is cached for display in Timeline views (section 2.3.5.2), as well as properties related to Timeline filtering (section 2.3.5). A Timeline cache is specified by the CT_TimelineCacheDefinition element (section 2.6.112).

A Timeline cache has an associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache as specified in section 2.3.5.1.2.

If the Timeline source data is an OLAP data source, the sourceName attribute of the CT_TimelineCacheDefinition element specifies the key attribute name of the associated OLAP hierarchy. If the Timeline source data is a native data source, the sourceName attribute of the CT_TimelineCacheDefinition element specifies the name of the associated data table column.

If the timeline is used to filter PivotTable views, the Timeline cache specifies the PivotTable views being filtered as specified in Timeline Cache Relationship to PivotTable View (section 2.3.5.1.3).

2.3.5.1.1 Timeline Source Data

The source data for a Timeline is specified by the associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache as specified in Timeline Cache Relationship to PivotCache.

2.3.5.1.2 Timeline Cache Relationship to PivotCache

A Timeline cache is associated with a PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache through the pivotCacheId attribute of the CT_TimelineState element. If the Timeline cache has an associated PivotTable PivotCache, the timelineData attribute of the CT_TimelinePivotCacheDefinition element MUST be "true".

Multiple Timeline caches can be associated with one PivotTable PivotCache.
If a Timeline cache is associated, as specified by Timeline Cache Relationship to PivotTable View, with
one or more PivotTable views, the PivotTable PivotCache that is associated with the Timeline cache
and all PivotTable PivotCaches that are associated with the PivotTable views MUST be based on the
same source – an OLAP connection ([ISO/IEC29500-1:2016] section 18.13.5) if the Timeline source
data is OLAP and a data table if the Timeline source data is native, and the PivotTable PivotCaches
associated with the PivotTable views MUST NOT be associated with any Timeline cache. The
timelineData attribute of the CT_TimelinePivotCacheDefinition element for each PivotTable
PivotCache associated with the PivotTable views MUST be "false".

2.3.5.1.3 Timeline Cache Relationship to PivotTable View

A Timeline cache can be associated with PivotTable ([ISO/IEC29500-1:2016] section 18.10) views and
Charts ([ISO/IEC29500-1:2016] section 21.2) based on Non-Worksheet PivotTables, as specified by the
pivotTables group element of the CT_TimelineCacheDefinition element.

The Timeline State of the Timeline cache is used to apply the PivotTable date filter to the PivotTable
hierarchy which belongs to the same dimension as the hierarchy associated with the sourceName
attribute of the CT_TimelineState element, in all associated PivotTable views and Charts based on
Non-Worksheet PivotTables of the Timeline cache. The selected date range in the Timeline cache is
converted into selected PivotTable items in the PivotTable date filters by the application to apply the
filter state of the Timeline cache to the associated PivotTable views and Charts based on Non-
Worksheet PivotTables.

When an OLAP PivotTable view is associated with an OLAP Timeline cache, there MUST NOT be more
than one Timeline cache for each OLAP hierarchy. If the Timeline cache has at least one Chart based
on Non-Worksheet PivotTable, then the Timeline cache MUST be OLAP sourced. When a native
PivotTable view is associated with a native Timeline cache, there MUST NOT be more than one
Timeline cache for each data table column.

2.3.5.1.4 Timeline State

Timeline state specifies the information used for display in Timeline view. The Timeline state
contains two elements, selection and bounds, of type CT_TimelineRange. The selection element
specifies the start and end dates of the selection in the Timeline and is used for filtering data in
PivotTable ([ISO/IEC29500-1:2016] section 18.10) views and cube functions. The bounds element
specifies the minimum and maximum dates that can be displayed by the Timeline view.

2.3.5.2 Timeline View

A Timeline view specifies the display of a Timeline (section 2.1.8) on a worksheet. The Timeline view
is specified by a CT_Timeline element.

Each Timeline view is associated with a Timeline cache as specified in Timeline View Relationship to
Timeline Cache. The filtering state of Timeline displayed in the Timeline view is specified by the
associated Timeline cache.

Each Timeline view is associated with a drawing ([ISO/IEC29500-1:2016] section 20.5), contained in

2.3.5.2.1 Timeline View Relationship to Timeline Cache

Each Timeline view is associated with a Timeline cache. The Timeline view is associated with Timeline
cache through the name attribute of the CT_TimelineCacheDefinition element in the Timeline cache
that matches the cache attribute of the CT_Timeline element that specifies this Timeline view.

There can be multiple Timeline views associated with a single Timeline cache. The main reason for this
is that multiple Timeline views associated with the same Timeline cache provide a mechanism for
displaying the filter state in more than one location in the workbook.

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2.3.5.3 Timelines and Cube Functions

Each Timeline cache has a defined name associated with it as specified by the name attribute of the CT_TimelineCacheDefinition element.

The value of the CT_DEFINEDName ([ISO/IEC29500-1:2016] section 18.2.5) element specifying a defined name associated with a Timeline Cache MUST be #N/A.

If the Timeline source data type of a Timeline cache is OLAP, cube functions can use the defined name of the Timeline cache as a parameter to refer to the selection state of the Timeline cache.

2.3.5.4 Timeline Styles

Timeline styles specify the formatting to apply to visual components of Timeline views. The style attribute of the CT_Timeline element specifies the Timeline style to be applied. A Timeline style can be either built-in or user-defined. Built-in Timeline styles are specified in the CT_Timeline element. User-defined Timeline styles are specified in the CT_TimelineStyles element.

A Timeline style is an extension of a table style ([ISO/IEC29500-1:2016] section 18.8) with additional table style elements specific to the formatting of Timeline views. A user-defined Timeline style is specified by a CT_TimelineStyle element and the table style it references.

A user-defined Timeline style consists of the table style elements from the referenced table style and table style elements specified by a group of CT_TimelineStyleElement elements.

The TimelineStyleElements element of a CT_TimelineStyle element specifies the Timeline-style-specific table style elements of the Timeline style. The name attribute of the CT_TimelineStyle element references the user-defined table style that specifies the Timeline-style-specific table style elements of the Timeline style.

2.3.6 Rich Data

Rich Data is an extensible mechanism to store compound data objects and their properties in a workbook.

2.3.6.1 Rich Values

Each rich value consists of three components, rich value type, key value pairs (KVP), and an optional rich value fallback.

The rich value type is indicated by a CT_RichValueStructure (section 2.6.180). All type names, specified by the t attribute, that begin with an underscore symbol MAY have restrictions on required key value pairs (KVP) and other defined behavior.

The set of key value pairs (KVP) is defined in CT_RichValue (section 2.6.175) and CT_RichValueStructure (section 2.6.180).

The rich value fallback is optionally defined in CT_RichValueFallback (section 2.6.178) and stands in place of the rich value for some features.

While there are restrictions on required key value pairs (KVP) for some rich value types (see the subsections of this section for more details), additional key value pairs (KVP) are allowed.

2.3.6.1.1 Error Types

The rich value type for errors is an extension of cell error values. This type represents a modern error in the file, which enables the storage of additional descriptive properties about the error.
This rich value type is identified by having a CT_RichValueStructure (section 2.6.180) t attribute of "_error" and MUST have the following key value pair (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;errorType&quot;</td>
<td>Default</td>
<td>Integer, see following sub-sections for more information on specific errors.</td>
</tr>
</tbody>
</table>

2.3.6.1.1.1  Field Error Type

A Field error is a subset of the rich value type for errors (section 2.3.6.1.1).

A Field error will show as #FIELD. These errors indicate that a rich value key was not found. This rich value type is identified by having a CT_RichValueStructure (section 2.6.180) t attribute of "_error" and MUST have the following key value pairs (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;errorType&quot;</td>
<td>Default</td>
<td>12</td>
</tr>
<tr>
<td>&quot;field&quot;</td>
<td>String</td>
<td>A string representing the name of the rich value key that could not be found.</td>
</tr>
</tbody>
</table>

2.3.6.1.1.2  Unknown Error Type

An Unknown error is a subset of the rich value type for errors (section 2.3.6.1.1).

An Unknown error will show as #UNKNOWN. These errors indicate a rich value with an unknown rich value type. This rich value type is identified by having a CT_RichValueStructure (section 2.6.180) t attribute of "_error" and MUST have the following key value pair (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;errorType&quot;</td>
<td>Default</td>
<td>11</td>
</tr>
</tbody>
</table>

2.3.6.1.2  Linked Entity and Linked Entity Core Types

Linked Entities represent a service connected rich value type.

This rich value type is identified by having a CT_RichValueStructure (section 2.6.180) t attribute of "_linkedentity" and MUST have the following key value pair (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;%cvl&quot;</td>
<td>rv</td>
<td>Integer that identifies the index to the nested Linked Entity Core Value</td>
</tr>
</tbody>
</table>

All Linked Entities MUST nest a Linked Entity Core Value, which represents the information received from the service. Linked Entity Core Values are identified by having a CT_RichValueStructure (section 2.6.180) t attribute of "_linkedentitycore" and MUST have the following key value pairs (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;%EntityServiceId&quot;</td>
<td>Default</td>
<td>Integer value that is an index to the service domain</td>
</tr>
<tr>
<td>&quot;%EntitySubDomainId&quot;</td>
<td>Default</td>
<td>Integer value that is an index to the service sub-domain</td>
</tr>
</tbody>
</table>
This rich value type has the additional optional key value pairs (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;%EntityCulture&quot;</td>
<td>s</td>
<td>String value for the service culture</td>
</tr>
<tr>
<td>&quot;%EntityId&quot;</td>
<td>s</td>
<td>String value that when combined with the &quot;%EntityServiceId&quot; and &quot;%EntityCulture&quot; creates a unique identifier</td>
</tr>
</tbody>
</table>

This rich value type has the following rich value key flag definitions for any other key value pairs (KVP). These rich value key flag definitions do not apply to the rich value keys listed above. See section 2.3.6.3 for more information.

<table>
<thead>
<tr>
<th>Flag</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ShowInCardView</td>
<td>True</td>
</tr>
<tr>
<td>ShowInDotNotation</td>
<td>True</td>
</tr>
<tr>
<td>ShowInAutoComplete</td>
<td>True</td>
</tr>
</tbody>
</table>

2.3.6.1.3 Hyperlink Type

The rich value type for a hyperlink contains a hyperlink and optional display text.

This rich value type is identified by having a CT_RichValueStructure (section 2.6.180) t attribute of "_hyperlink" and MUST have the following key value pair (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Address&quot;</td>
<td>s</td>
<td>String representation of the hyperlink</td>
</tr>
</tbody>
</table>

This rich value type has the additional optional key value pair (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Text&quot;</td>
<td>s</td>
<td>String representation of the display text associated with the hyperlink</td>
</tr>
</tbody>
</table>

This rich value type has the following rich value key flag definitions for any other key value pairs (KVP). These rich value key flag definitions do not apply to the rich value keys listed above. See section 2.3.6.3 for more information.

<table>
<thead>
<tr>
<th>Flag</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ShowInCardView</td>
<td>True</td>
</tr>
<tr>
<td>ShowInDotNotation</td>
<td>True</td>
</tr>
<tr>
<td>ShowInAutoComplete</td>
<td>True</td>
</tr>
</tbody>
</table>

2.3.6.1.4 ImageUrl Type

The rich value type for an ImageUrl represents information for a URL to an image and associated optional properties.

This rich value type is identified by having a CT_RichValueStructure (section 2.6.180) t attribute of "_imageurl" and MUST have the following key value pair (KVP):
This rich value type has the additional optional key value pairs (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Attribution Size&quot;</td>
<td>i</td>
<td>Integer value of the minimum size in pixels that requires the attribution to be rendered</td>
</tr>
<tr>
<td>&quot;Attribution&quot;</td>
<td>rv</td>
<td>Index to a nested SourceAttribution rich value type (section 2.3.6.1.5)</td>
</tr>
<tr>
<td>&quot;Text&quot;</td>
<td>s</td>
<td>String representation of the alt text associated with the image</td>
</tr>
<tr>
<td>&quot;More Images Address&quot;</td>
<td>s</td>
<td>String representation of the Url for more images</td>
</tr>
</tbody>
</table>

This rich value type has the following \textbf{rich value key flag} definitions for any other key value pairs (KVP). These rich value key flag definitions do not apply to the \textbf{rich value keys} listed above. See section 2.3.6.3 for more information.

<table>
<thead>
<tr>
<th>Flag</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ShowInCardView</td>
<td>True</td>
</tr>
<tr>
<td>ShowInDotNotation</td>
<td>True</td>
</tr>
<tr>
<td>ShowInAutoComplete</td>
<td>True</td>
</tr>
</tbody>
</table>

2.3.6.1.5 SourceAttribution Type

The \textbf{rich value type} for SourceAttribution represents information about data source and license.

This rich value type is identified by having a a \texttt{CT\_RichValueStructure} (section 2.6.180) \texttt{t} attribute of "sourceattribution" and MUST have the following \textbf{key value pair (KVP)}:

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Source&quot;</td>
<td>s or rv</td>
<td>String or a nested Hyperlink rich value type (section 2.3.6.1.3)</td>
</tr>
</tbody>
</table>

This rich value type has the additional optional key value pairs (KVP):

<table>
<thead>
<tr>
<th>CT_Key &quot;n&quot; attribute</th>
<th>CT_Key &quot;t&quot; attribute</th>
<th>CT_Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;License&quot;</td>
<td>s or rv</td>
<td>String or a nested Hyperlink rich value type (section 2.3.6.1.3)</td>
</tr>
</tbody>
</table>

This rich value type has the following \textbf{rich value key flag} definitions for any other key value pairs (KVP). These rich value key flag definitions do not apply to the \textbf{rich value keys} listed above. See section 2.3.6.3 for more information.

<table>
<thead>
<tr>
<th>Flag</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ShowInCardView</td>
<td>True</td>
</tr>
<tr>
<td>ShowInDotNotation</td>
<td>True</td>
</tr>
<tr>
<td>ShowInAutoComplete</td>
<td>True</td>
</tr>
</tbody>
</table>
2.3.6.2 Supporting Property Bags

Each supporting property bag is comprised of a set of key value pairs (KVP).

The set of key pairs (KVP) is defined in CT_SupportingPropertyBag (section 2.6.188) for the values and CT_SupportingPropertyBagStructure (section 2.6.195) for the keys.

Supporting property bags can be the data portion of a key value pair (KVP) in a rich value to give extra information.

2.3.6.3 Special Keys and Key Flags

All rich value keys that begin with a non-alphanumeric ASCII character MAY be used internally to define behavior.

The following rich value keys define special behavior.

<table>
<thead>
<tr>
<th>Key name</th>
<th>Key definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;_Attribution&quot;</td>
<td>This key MUST reference a supporting property bag that contains information about the source and license attribution.</td>
</tr>
<tr>
<td>&quot;_Display&quot;</td>
<td>This key MUST reference a supporting property bag that contains information that MAY be used to determine how the rich value is displayed.</td>
</tr>
<tr>
<td>&quot;_DisplayString&quot;</td>
<td>This key MUST reference a string that MAY be shown in the cell.</td>
</tr>
<tr>
<td>&quot;_Flags&quot;</td>
<td>This key MUST reference a supporting property bag that contains key value pairs (KVP) containing rich value keys and supporting property bags containing associated rich value key flags, which define behavior for the associated rich value key value pair (KVP).</td>
</tr>
<tr>
<td>&quot;_Format&quot;</td>
<td>This key MUST reference a supporting property bag that is a list of identifiers to a CT_RichStyle (section 2.6.170). These are zero-based indices. The index of the key value pair (KVP) in the supporting property bag determines which rich value key the CT_RichStyle is associated with. The first key value pair (KVP) in this supporting property bag will have an index for a CT_RichStyle associated with the first key value pair (KVP) in the rich value that this key is a member of, and so on.</td>
</tr>
<tr>
<td>&quot;_Icon&quot;</td>
<td>This key contains a value that describes the icon that MAY be used in render.</td>
</tr>
<tr>
<td>&quot;_Self&quot;</td>
<td>This key SHOULD NOT exist in the file and will be removed when the file is saved.</td>
</tr>
<tr>
<td>&quot;_SubLabel&quot;</td>
<td>This key MUST reference a supporting property bag that contains key value pairs (KVP) containing rich value keys and supporting property bags containing strings, which define the label that MAY be used to describe the associated rich value key value pair (KVP).</td>
</tr>
<tr>
<td>&quot;_CRID&quot;</td>
<td>This key MUST reference an integer. If this key is a part of a rich value with an unknown rich value type (for more information see section 2.3.6.1.1.2), this rich value MUST be preserved.</td>
</tr>
</tbody>
</table>

The following supporting property bag key defines special behavior.

<table>
<thead>
<tr>
<th>Key name</th>
<th>Key definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;^Order&quot;</td>
<td>This supporting property bag key is associated with a supporting property bag array of strings that SHOULD be comprised of rich value keys in the associated rich value and MAY be used to display the rich value key value pairs (KVP) in a different order.</td>
</tr>
</tbody>
</table>
Rich value keys with defined behavior for all rich value types MAY be listed in **CT_RichValueGlobalType** (section 2.6.179).

Rich value keys with defined behavior for a particular rich value type MAY be listed in **CT_RichValueTypes** (section 2.6.186). The rich value type can be identified by matching the **CT_RichValueType** (section 2.6.182) name attribute to the **CT_RichValueStructure** (section 2.6.180) t attribute.

Both **CT_RichValueGlobalType** and **CT_RichValueTypes** contain **CT_RichValueType** (section 2.6.182), which defines the rich value key flags and their values for each of the reserved rich value keys.

Rich value key flags are associated with key value pairs (KVP) and control particular behavior. Any flags that are absent are treated as having a value of false unless the rich value type has a different default for that rich value key flag. See sections under section 2.3.6.1 for specific type definitions.

Rich value key flags are listed here:

<table>
<thead>
<tr>
<th>Flag name</th>
<th>Flag definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ShowInCardView</td>
<td>False indicates that we hide this key value pair (KVP) in the default Card View</td>
</tr>
<tr>
<td>ShowInDotNotation</td>
<td>False indicates that we hide this key value pair (KVP) from formulas and the object model</td>
</tr>
<tr>
<td>ShowInAutoComplete</td>
<td>False indicates that we hide this key value pair (KVP) from AutoComplete, sort, filter, and Find</td>
</tr>
<tr>
<td>ExcludeFromFile</td>
<td>True indicates that we do not write this key value pair (KVP) into the file, it only exists in memory</td>
</tr>
<tr>
<td>ExcludeFromCalcComparison</td>
<td>True indicates that we exclude this key value pair (KVP) when comparing rich values.</td>
</tr>
</tbody>
</table>

**CT_RichValueType** information that is not recognized at runtime will be persisted unless the associated rich value type is removed. **CT_RichValueType** information that contradicts runtime expectations will be ignored and will not be persisted.

### 2.3.6.4 Rich Styles and Properties

**Rich values** MAY contain particular properties that are used to define the **style** for a given **key value pair (KVP)**. See **CT_RichFormatProperties** (section 2.6.167) and the "_Format" **rich value key** (section 2.3.6.3) for more information.

<table>
<thead>
<tr>
<th>Property Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>IsHeroFlag</td>
<td>True indicates that the related key value pair (KVP) MAY be emphasized.</td>
</tr>
<tr>
<td>IsTitleFlag</td>
<td>True indicates that the related key value pair (KVP) is the title for the rich value. This MAY be used for visualizing the rich value.</td>
</tr>
<tr>
<td>IsPrimaryFlag</td>
<td>True indicates that the related key value pair (KVP) MAY be emphasized.</td>
</tr>
<tr>
<td>IsSecondaryFlag</td>
<td>True indicates that the related key value pair (KVP) MAY be emphasized.</td>
</tr>
<tr>
<td>IsFooterFlag</td>
<td>True indicates that the related key value pair (KVP) is the footer for the rich value. This MAY be used for visualizing the rich value.</td>
</tr>
<tr>
<td>IsCellDisplayFlag</td>
<td>True indicates that the related rich value data MAY be shown in the cell.</td>
</tr>
</tbody>
</table>
2.3.7 Threaded Comments

Threaded comments represent a collaborative annotation system that replaces and/or works in addition to legacy comments ([ISO/IEC29500-1:2016] section 18.7). The comment threads attached to and associated with cells in a worksheet are stored separately from other cell content. A comment thread attached to a cell is comprised of a top-level threaded comment and its replies, if there are any, to provide annotations, assumptions, instructions, reminders, feedback, collaborative discussion among coauthors, and so forth. A threaded comment specified by complex type CT_ThreadedComment (section 2.6.205) contains information about the author, mentions in the comment, and its parent if it is not a top-level comment.

2.3.7.1 Persons

Information about people who have authored and/or have been mentioned in threaded comments is specified by complex type CT_Person (section 2.6.203), and is stored separately from the comments.

When a user creates a threaded comment, a person element of CT_Person (section 2.6.203) is generated for the author if it is their first threaded comment in this workbook. To associate the author to the comment, the id of the person element MUST correspond to the personId of the threadedComment element specified by complex type CT_ThreadedComment (section 2.6.205).

When a user creates a mention within a comment, a person element of CT_Person is generated for the person mentioned if it’s the first time the person is mentioned. The providerId MUST be set to PeoplePicker. To associate the person to the mention, the id of the person element MUST correspond to the mentionpersonId of the mention element specified by complex type CT_Mention (section 2.6.202).

2.3.7.2 Mentions

A mention is a portion of the text in a threaded comment associated with a person’s information. The startIndex and the length attributes of CT_Mention (section 2.6.202) specify a range in the text element of CT_ThreadedComment (section 2.6.205) as the mention text.

2.3.7.3 Legacy Comment Placeholders

To integrate with legacy comments ([ISO/IEC29500-1:2016] section 18.7) and aid backward compatibility, a legacy comment placeholder is created along with each top-level threaded comment. This legacy comment MAY contain information about threaded comment compatibilities. This comment SHOULD NOT be displayed unless the file is opened in a version that does not support threaded comments. The uid ([ISO/IEC29500-1:2016] section 18.7.3) of the comment SHOULD correspond to the id attribute of the associated threaded comment specified by CT_ThreadedComment (section 2.6.205). Additionally, the author of the comment MUST contain "tc={uid}", where {uid} is the corresponding threaded comment id. The ref attribute specified in comment ([ISO/IEC29500-1:2016] section 18.7.3) SHOULD correspond to the ref attribute specified in CT_ThreadedComment. If the ref attributes don’t match, the ref specified in legacy comment placeholder will be used while displaying the threaded comment.

2.3.7.3.1 Reconciliation

After all parts are loaded, reconciliation will be done in two steps.

1. Enumerate all top-level threaded comments in comment threads in the entire workbook to adjust their location or delete them.
   • If the corresponding placeholder is at a different location, adjust the comment thread to the location of the first placeholder that corresponds to the comment.
- If the corresponding placeholder is not found, delete the comment thread.
  
2. Enumerate all placeholders.

- If any comment thread has more than one placeholder, copy it for each additional placeholder. Each copied threaded comment, including top-level comment and reply, is assigned a new unique identifier.

- If a placeholder has no corresponding comment thread, remove the placeholder.

The following table shows how comment loading is handled if changes were made in a previous version of Excel.

<table>
<thead>
<tr>
<th>Situation</th>
<th>Description</th>
<th>Reconciliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move</td>
<td>Corresponding placeholder is at a different location</td>
<td>Change the ref of all the threaded comments in the comment thread to the location of the placeholder.</td>
</tr>
<tr>
<td>Delete</td>
<td>Corresponding placeholder is not found</td>
<td>Delete the entire comment thread.</td>
</tr>
<tr>
<td>Copy</td>
<td>Multiple corresponding placeholders are found</td>
<td>Copy the entire comment thread for each additional placeholder and assign a new unique id.</td>
</tr>
<tr>
<td>Orphan</td>
<td>Placeholder with no corresponding comment thread are found</td>
<td>Delete the placeholder.</td>
</tr>
</tbody>
</table>

### 2.4 Global Elements

#### 2.4.1 pivotTableReference

A pivotTableReference element is a CT_PivotTableReference type element, as specified in section 2.6.87, that specifies a PivotTable ([ISO/IEC29500-1:2016] section 18.10) part identifier for the workbook. The PivotTable specified by this element MUST be a Non-Worksheet PivotTable. See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

#### 2.4.2 pivotTableServerFormats

A pivotTableServerFormats is a CT_PivotTableServerFormats element that specifies collection of numeric formats specified by elements of complex type CT_ServerFormat ([ISO/IEC29500-1:2016] section 18.10.1.86), for a PivotTable ([ISO/IEC29500-1:2016] section 18.10) that is specified by a pivotTableReference element in the extension of a workbook. See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016]. If the PivotTable ([ISO/IEC29500-1:2016] section 18.10) is not a Non-Worksheet PivotTable, MUST NOT be specified.

#### 2.4.3 f

Target namespace: http://schemas.microsoft.com/office/excel/2006/main

Referenced by: CT_WebExtension, CT_CRule, CT_Cfvo, CT_DataValidationFormula, CT_SparklineGroup, CT_Sparkline, CT_PivotUserEdit

The f element is an ST_Formula element, as specified in [ISO/IEC29500-1:2016] section 18.18.35, that specifies a generic formula that adheres to section 2.2.2.
An application can adjust the **cell references** within this formula when the **worksheet** layout changes, even when the containing **ext** element, as specified in [ISO/IEC29500-1:2016] section 18.2.7, is not recognized by the application. See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="f" type="x:ST_Formula"/>
```

See section 5.1 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.4 ref

**Target namespace:** http://schemas.microsoft.com/office/excel/2006/main

The **ref** element is a **CT_Ref** type element, as specified in section 2.6.146, that specifies a **cell reference**.

An application can adjust this cell reference when the **worksheet** layout changes, even when the containing **ext** element, as specified in [ISO/IEC29500-1:2016] section 18.2.7, is not recognized by the application. See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="ref" type="CT_Ref"/>
```

See section 5.1 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.5 sqref

**Target namespace:** http://schemas.microsoft.com/office/excel/2006/main

**Referenced by:** **CT_ConditionalFormatting**, **CT_DataValidation**, **CT_Sparkline**, **CT_IgnoredError**, **CT_ProtectedRange**

A **sqref** element is a **CT_Sqref** type element, as specified in section 2.6.147, that specifies a list of **cell references**.

An application can adjust these cell references when the **worksheet** layout changes, even when the containing **ext** element, as specified in [ISO/IEC29500-1:2016] section 18.2.7, is not recognized by the application. See [ISO/IEC29500-3:2015] section 10.1.2 for more information about how extension lists are used.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="sqref" type="CT_Sqref"/>
```

See section 5.1 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.4.6 conditionalFormattings


A conditionalFormattings element is a CT_ConditionalFormattings type element, as specified in section 2.6.1, that specifies conditional formatting information for the worksheet. See section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="conditionalFormattings" type="CT_ConditionalFormattings"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.7 dataValidations


The dataValidations element is a CT_DataValidations type element, as specified in section 2.6.3, that specifies a group of data validation items on the sheet. This element also specifies data validation properties of a sheet that are used by the application user interface. See section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="dataValidations" type="CT_DataValidations"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.8 sparklineGroups


A sparklineGroups element is a CT_SparklineGroups type element, as specified in section 2.6.6, that specifies the groups of sparklines on the sheet. See section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="sparklineGroups" type="CT_SparklineGroups"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.9 slicerList


A slicerList element is a CT_SlicerRefs type element, as specified in section 2.6.11, that specifies a list of slicer, as specified in section 2.3.2, part identifiers for the worksheet. See section 2.2.4.12 for
how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```
<xsd:element name="slicerList" type="CT_SlicerRefs"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.10 protectedRanges

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A `protectedRanges` element is a `CT_ProtectedRanges` type element, as specified in section 2.6.55, that specifies a group of protected ranges on the sheet. See section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```
<xsd:element name="protectedRanges" type="CT_ProtectedRanges"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.11 ignoredErrors

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

An `ignoredErrors` element is a `CT_IgnoredErrors` type element, as specified in section 2.6.53, that specifies a list of cell ranges and the types of cell errors that are to be ignored for each of those specific cell ranges. See section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```
<xsd:element name="ignoredErrors" type="CT_IgnoredErrors"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.12 pivotCaches

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A `pivotCaches` element is a `CT_PivotCaches` element, as specified in [ISO/IEC29500-4:2016] section A.2, that specifies a list of PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, PivotCache identifier elements. The list of elements specifies the PivotTable PivotCaches used by slicer caches, as specified in section 2.1.4, with OLAP slicer source data, as specified in section 2.3.2.1.1. See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.13 slicerCaches

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A *slicerCaches* element is a *CT_SlicerCaches* type element, as specified in section 2.6.13, that specifies a group of slicer cache, as specified in section 2.1.4, identifiers for the *workbook*. See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="slicerCaches" type="CT_SlicerCaches"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.14 workbookPr

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A *workbookPr* element is a *CT_WorkbookPr* element, as specified in section 2.6.10, that specifies additional properties for a *workbook*. See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="workbookPr" type="CT_WorkbookPr"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.15 calculatedMember

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A *calculatedMember* element is a *CT_CalculatedMember* type element, as specified in section 2.6.15, that specifies extended properties of a PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, **OLAP calculated** member. See section 2.2.4.6 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="calculatedMember" type="CT_CalculatedMember"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.4.16 cacheHierarchy


A cacheHierarchy element is a CT_CacheHierarchy type element, as specified in section 2.6.24, that specifies extended properties of a PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, named set. See section 2.2.4.6 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="cacheHierarchy" type="CT_CacheHierarchy"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.17 dataField


A dataField element is a CT_DataField type element, as specified in section 2.6.25, that specifies extended information about a PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, data field item. See section 2.2.4.5 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="dataField" type="CT_DataField"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.18 pivotField


A pivotField element is a CT_PivotField element, as specified in section 2.6.31, that specifies properties of a PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, field. See section 2.2.4.5 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="pivotField" type="CT_PivotField"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.19 pivotTableDefinition


A pivotTableDefinition element is a CT_PivotTableDefinition type element, as specified in section 2.6.32, that specifies additional properties of the PivotTable, as specified in [ISO/IEC29500-1:2016]
section 18.10, view. See section 2.2.4.5 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="pivotTableDefinition" type="CT_PivotTableDefinition"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.20 pivotCacheDefinition

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A **pivotCacheDefinition** element is a **CT_PivotCacheDefinition** type element, as specified in section 2.6.33, that specifies the extended properties of a PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, **PivotCache** definition. See section 2.2.4.6 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="pivotCacheDefinition" type="CT_PivotCacheDefinition"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.21 connection

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A **connection** element is a **CT_Connection** type element, as specified in section 2.6.34, that specifies the extended properties of an external connection, as specified in [ISO/IEC29500-1:2016] section 18.13. If this element exists, the **type** attribute of the ancestor **CT_Connection** element, as specified in [ISO/IEC29500-4:2016] section A.2, MUST be equal to "5". See section 2.2.4.1 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="connection" type="CT_Connection"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.22 table

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A **table** element is a **CT_Table** type element, as specified in section 2.6.35, that specifies alternate text properties for the table. See section 2.2.4.10 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.23 slicerStyles


A slicerStyles element is a CT_SlicerStyles type element, as specified in section 2.6.51, that specifies a group of slicer styles, as specified in section 2.3.2.4. See section 2.2.4.9 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

<xsd:element name="slicerStyles" type="CT_SlicerStyles"/>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.24 dxfs


The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

<xsd:element name="dxfs" type="x:CT_Dxfs"/>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.25 oleItem


An oleItem element is a CT_OleItem type element, as specified in section 2.6.46, that specifies an Object Linking and Embedding (OLE) data item, as specified in [ISO/IEC29500-1:2016] section 18.14, with associated cached values. See section 2.2.4.3 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

<xsd:element name="oleItem" type="CT_OleItem"/>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.4.26 pivotHierarchy


A pivotHierarchy element is a CT_PivotHierarchy type element, as specified in section 2.6.47, that specifies multiple data items based on the same OLAP measure that exists in a PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, view. See section 2.2.4.5 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="pivotHierarchy" type="CT_PivotHierarchy"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.27 cacheField


The cacheField element is a CT_CacheField type element, as specified in section 2.6.48, that specifies that duplicate OLAP measures exist in a PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, PivotCache definition. See section 2.2.4.6 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="cacheField" type="CT_CacheField"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.28 id


An id element is an ST_Guid element, as specified in [ISO/IEC29500-1:2016] section 22.9.2.4, that specifies an identifier for a conditional formatting rule. See section 2.2.4.12, section 2.2.4.10, and section 2.2.4.5 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="id" type="x:ST_Guid"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.29 iconFilter


An iconFilter element is a CT_IconFilter type element, as specified in section 2.6.57, that specifies the properties of an icon filter. See section 2.2.4.5, section 2.2.4.10, and section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="iconFilter" type="CT_IconFilter"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.30 filter

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A `filter` element is a `CT_Filter` type element, as specified in section 2.6.58, that specifies the properties of a `filter`. See section 2.2.4.5, section 2.2.4.10, and section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="filter" type="CT_Filter"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.31 customFilters

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A `customFilters` element is a `CT_CustomFilters` type element, as specified in section 2.6.59, that specifies the properties of custom filters. See section 2.2.4.5, section 2.2.4.10, and section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="customFilters" type="CT_CustomFilters"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.32 sortCondition

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A `sortCondition` element is a `CT_SortCondition` type element, as specified in section 2.6.61, that specifies a sort condition to apply to a range. See section 2.2.4.5, section 2.2.4.7, section 2.2.4.10, and section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="sortCondition" type="CT_SortCondition"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.4.33 sourceConnection


Referenced by: CT_CacheSourceExt

A sourceConnection element is a CT_SourceConnection type element, as specified in section 2.6.62, that specifies the name of a connection of the cache source element on a pivot cache. See section 2.2.4.6 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="sourceConnection" type="CT_SourceConnection"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.34 formControlPr


A formControlPr element is a CT_FormControlPr type element, as specified in section 2.6.65, that specifies properties of form control objects. This element is the root element of the control properties part, as specified in section 2.1.1.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="formControlPr" type="CT_FormControlPr"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.35 datastoreItem


A datastoreItem element is a CT_DatastoreItem type element, as specified in section 2.6.66, that specifies properties for an embedded custom data part, as specified in section 2.1.2. This element is the root element of the custom data properties part, as specified in section 2.1.3.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="datastoreItem" type="CT_DatastoreItem"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.36 slicers


A slicers element is a CT_Slicers type element, as specified in section 2.6.67, that specifies all the slicer views, as specified in section 2.3.2.2, on the sheet. This element is the root element of the slicers part, as specified in section 2.3.2.
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="slicers" type="CT_Slicers"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.37 slicer

**Target namespace:** http://schemas.microsoft.com/office/drawing/2010/slicer

A **slicer** element is a **CT_Slicer** type element, as specified in section 2.6.69, that specifies which slicer view, as specified in section 2.3.2.2, is associated with this drawing element. See section 2.2.4.2 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="slicer" type="CT_Slicer"/>
```

See section 5.2 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.38 slicerCacheDefinition

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

A **slicerCacheDefinition** element is a **CT_SlicerCacheDefinition** type element, as specified in section 2.6.70, that specifies a slicer cache, as specified in section 2.3.2.1. This element is the **root element** of the slicer cache part.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="slicerCacheDefinition" type="CT_SlicerCacheDefinition"/>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.39 pivotCaches

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A **pivotCaches** element is a **CT_PivotCaches** element, as specified in [ISO/IEC29500-4:2016] section A.2 that specifies a list of **PivotTable**, as specified in [ISO/IEC29500-1:2016] section 18.10, **PivotCache** identifier elements. The list of elements specifies the PivotTable **PivotCaches**. See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016]. The **pivotCacheDefinition** ([ISO/IEC29500-1:2016] section 18.10.1.67) element identified by the **relationship** identifier in the **CT_PivotCache** ([ISO/IEC29500-4:2016] section A.2) child element of this element, MUST satisfy the following criteria.

- There MUST be a **CT_PivotCacheIdVersion** element in the extension of the element **pivotCacheDefinition**.
The **type** attribute of the **CT_CacheSource** ([ISO/IEC29500-4:2016] section A.2) child element of the element **pivotCacheDefinition**, MUST have the value **external** specified by **ST_SourceType** ([ISO/IEC29500-1:2016] 18.18.75).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="pivotCaches" type="x:CT_PivotCaches"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.40 pivotTableReferences


A **pivotTableReferences** element is a **CT_PivotTableReferences** element, as specified in section 2.6.86, that specifies a list of PivotTable ([ISO/IEC29500-1:2016] section 18.10) part identifiers for the **workbook**. See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="pivotTableReferences" type="CT_PivotTableReferences"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.41 queryTable


A **CT_QueryTable** element (section 2.6.88) that specifies extended properties of a **query table** ([ISO/IEC29500-1:2016] section 18.12).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="queryTable" type="CT_QueryTable"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.42 webExtensions


A **CT_WebExtensions** element that specifies a group of **CT_WebExtension** elements that specify Bindings on the Web Extensions, as specified by [MS-OWXML] section 1.3, on the **worksheet**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="webExtensions" type="CT_WebExtensions"/>
```
See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.43 connection


A CT_Connection element that specifies the extended properties of an external connection.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="connection" type="CT_Connection"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.44 calculatedMember


Referenced by: CT_CalculatedMemberExt

A CT_CalculatedMember (section 2.6.93) element that specifies a definition for a custom member or measure that is applied to a pivot table.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="calculatedMember" type="CT_CalculatedMember"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.45 pivotTableUISettings


A CT_PivotTableUISettings element that specifies state of the PivotTable field list for this PivotTable ([ISO/IEC29500-1:2016] section 18.10).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="pivotTableUISettings" type="CT_PivotTableUISettings"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.46 pivotFilter


A CT_PivotFilter element that specifies the extended properties of a filter (PivotTable Advanced Filter), as specified in ([ISO/IEC29500-1:2016] section 18.10.1.33). See section 2.2.4.5 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

<xsd:element name="pivotFilter" type="CT_PivotFilter"/>

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.47 slicerCaches

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `CT_SlicerCaches` element that specifies a group of slicer cache, as specified in section 2.1.4, identifiers for the **workbook**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

<xsd:element name="slicerCaches" type="x14:CT_SlicerCaches"/>

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.48 tableSlicerCache

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `CT_TableSlicerCache` element that specifies a table **data source** for the **slicer cache**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

<xsd:element name="tableSlicerCache" type="CT_TableSlicerCache"/>

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.49 timelineCacheRefs

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `timelineCacheRefs` element is a `CT_TimelineCacheRefs` type element, as specified in section 2.6.98, that specifies a group of **Timeline Cache** (section 2.3.5.1) identifiers for the **workbook**. See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016](#).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

<xsd:element name="timelineCacheRefs" type="CT_TimelineCacheRefs"/>

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.50 timelineRefs

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main
A `timelineRefs` element is a `CT_TimelineRefs` type element, as specified in section 2.6.100, that specifies a list of Timeline (section 2.3.5) part identifiers for the worksheet. See section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="timelineRefs" type="CT_TimelineRefs"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.51 timelineCachePivotCaches

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `timelineCachePivotCaches` element is a `CT_PivotCaches` element, as specified in [ISO/IEC29500-4:2016] section A.2 that specifies a list of PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, PivotCache identifier elements. The list of elements specifies the PivotTable PivotCaches. This element MUST be associated with a Timeline (section 2.3.5). See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="timelineCachePivotCaches" type="x:CT_PivotCaches"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.52 cacheHierarchy

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `CT_CacheHierarchy` element that specifies the extended properties of an OLAP measure.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="cacheHierarchy" type="CT_CacheHierarchy"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.53 slicerCacheHideItemsWithNoData

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `CT_SlicerCacheHideNoData` element that specifies the extended properties of a slicer cache, as specified in section 2.3.2.1. If this element exists, the non-OLAP slicer items that have no data in its ancestor slicer cache are not displayed and the OLAP slicer items that have no data are not displayed for the OLAP levels specified by the `uniqueName` attribute of the `CT_SlicerCacheOlapLevelName` element.
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="slicerCacheHideItemsWithNoData" type="CT_SlicerCacheHideNoData"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.54 timelineStyles

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `timelineStyles` element is a `CT_TimelineStyles` type element, as specified in section 2.6.105, that specifies a group of timeline styles, as specified in section 2.3.5.4. See section 2.2.4.9 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="timelineStyles" type="CT_TimelineStyles"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.55 dxfs

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main


The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="dxfs" type="x:CT_Dxfs"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.56 timelinePivotCacheDefinition

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `timelinePivotCacheDefinition` element is a `CT_TimelinePivotCacheDefinition` element that specifies the extended properties of a PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, PivotCache definition. See section 2.2.4.6 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="timelinePivotCacheDefinition" type="CT_TimelinePivotCacheDefinition"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.4.57 timelines


A timelines element is a CT_Timelines type element, as specified in section 2.6.110, that specifies all the Timeline views (section 2.3.5.2), on the sheet. This element is the root element of the Timelines part (section 2.3.5).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="timelines" type="CT_Timelines"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.58 timelineCacheDefinition


A timelineCacheDefinition element is a CT_TimelineCacheDefinition type element, as specified in section 2.6.112, that specifies a Timeline cache (section 2.3.5.1). This element is the root element of the Timeline cache part.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="timelineCacheDefinition" type="CT_TimelineCacheDefinition"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.59 workbookPr


A workbookPr element is a CT_WorkbookPr (section 2.6.117) element that specifies additional properties for a workbook. See section 2.2.4.11 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="workbookPr" type="CT_WorkbookPr"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.60 slicerCachePivotTables


A CT_SlicerCachePivotTables element (section 2.6.72) that specifies a group of CT_SlicerCachePivotTable elements (section 2.6.73) that specify the PivotTable ([ISO/IEC29500-1:2016] section 18.10) views that are filtered by the slicer cache (section 2.1.4). The PivotTables specified by the CT_SlicerCachePivotTable (section 2.6.73) child elements of this element MUST be Non-Worksheet PivotTables (section 2.3.3).
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="slicerCachePivotTables" type="x14:CT_SlicerCachePivotTables"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.61 cachedUniqueNames

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `CT_CachedUniqueNames` element that specifies the **MDX unique names** for PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache items in this PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache field.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="cachedUniqueNames" type="CT_CachedUniqueNames"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.62 dataModel

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `CT_DataModel` element that specifies properties of **spreadsheet data model**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="dataModel" type="CT_DataModel"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.63 pivotTableData

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

A `pivotTableData` element is a `CT_PivotTableData` element that specifies the **PivotValues** of a PivotTable ([ISO/IEC29500-1:2016] section 18.10), specified by the `pivotTableReference` element in the extension of a workbook. See section 2.2.4.5 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016]. If the PivotTable ([ISO/IEC29500-1:2016] section 18.10) is not a **Non-Worksheet PivotTable**, MUST NOT be specified.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="pivotTableData" type="CT_PivotTableData"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.4.64 pivotCacheIdVersion


A **CT_PivotCacheIdVersion** element that specifies the extended properties of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) **PivotCache Definition**. If this element exists, there MUST be a preceding **CT_PivotCacheDefinition** element and the pivotCacheId attribute of the preceding **CT_PivotCacheDefinition** element MUST be equal to one of the following:

- The cacheId attribute of the **CT_PivotTableData** element in the PivotTable part that specifies a Non-Worksheet PivotTable.
- The pivotCacheId attribute of the **CT_TimelineState** (section 2.6.116) child element of a **CT_TimelineCacheDefinition** (section 2.6.112) element that specifies a Timeline cache.

See section 2.2.4.6 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="pivotCacheIdVersion" type="CT_PivotCacheIdVersion"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.65 timeslicer

Target namespace: http://schemas.microsoft.com/office/drawing/2012/timeslicer

A **CT_Timeline** element that specifies which timeline view is associated with this drawing element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="timeslicer" type="CT_Timeline"/>
```

See section 5.7 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.66 list

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2011/1/ac

An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) element that specifies the first formula in the DataValidation dropdown used for custom or list type data validation. Only used when items need to be quoted.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="list" type="x:ST_Xstring"/>
```

See section 5.6 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.4.67 absPath


A CT_AbsolutePath element that specifies the absolute path to the workbook.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="absPath" type="CT_AbsolutePath"/>
```

See section 5.9 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.68 dataField


A dataField element is a CT_DataField type element, as specified in section 2.6.141, that specifies extended information about a PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, data field item. See section 2.2.4.5 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="dataField" type="CT_DataField"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.69 survey


A survey element is a CT_Survey type element, as specified in section 2.6.142, that specifies the properties of a survey associated with a Table ([ISO/IEC29500-1:2016] section 18.5). This element is the root element of the Survey part (section 2.1.9).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="survey" type="CT_Survey"/>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.70 contentPart


A CT_ContentPart element that specifies a reference to XML content.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="contentPart" type="CT_ContentPart"/>
```
See section 5.8 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.71 modelTimeGroupings

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2014/11/main

A CT_ModelTimeGroupings (section 2.6.154) element that specifies the data model time groupings in this workbook.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```
<xsd:element name="modelTimeGroupings" type="CT_ModelTimeGroupings"/>
```

See section 5.10 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.72 revisionPtr

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2014/revision

A CT_RevisionPtr element that specifies metadata supporting runtime scenarios for Microsoft Excel. It SHOULD be ignored and SHOULD NOT be saved by all others.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```
<xsd:element name="revisionPtr" type="CT_RevisionPtr"/>
```

See section 5.15 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.73 pivotTableDefinition16

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2016/pivotdefaultlayout

A CT_PivotTableDefinition16 element that specifies additional properties of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view. See section 2.2.4.5 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```
<xsd:element name="pivotTableDefinition16" type="CT_PivotTableDefinition16"/>
```

See section 5.19 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.74 arrayData

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

A CT_ArrayData element that specifies arrays in rich values called rich arrays.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.
See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.75 richStyleSheet

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

A **CT_RichStylesheet** element that specifies the collection of **dxfs**, as specified in section 2.4.55, **CT_RichFormatProperties**, as specified in section 2.6.167, and **CT_RichStyles**, as specified in section 2.6.172.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="richStyleSheet" type="CT_RichStylesheet"/>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.76 rvb

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

A **CT_RichValueBlock** element that specifies the index to the **rich value**, as specified in section 2.6.176.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="rvb" type="CT_RichValueBlock"/>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.77 rvData

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

A **CT_RichValueData** element that specifies **rich value data**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="rvData" type="CT_RichValueData"/>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.78 rvStructures

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

A **CT_RichValueStructures** element that specifies **rich value structures**, which contain lists of **rich value keys** and the **data types** for the corresponding **rich value data**.
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

    <xsd:element name="rvStructures" type="CT_RichValueStructures"/>

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.79 rvTypesInfo

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

A CT_RichValueTypesInfo element that specifies information related to rich value types.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

    <xsd:element name="rvTypesInfo" type="CT_RichValueTypesInfo"/>

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.80 spbStructures

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

A CT_SupportingPropertyBagStructures element that specifies supporting property bag structures, which contain lists of supporting property bag keys and the data types for the corresponding supporting property bag data.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

    <xsd:element name="spbStructures" type="CT_SupportingPropertyBagStructures"/>

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.81 supportingPropertyBags

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

A CT_SupportingPropertyBags element that specifies supporting property bag data.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

    <xsd:element name="supportingPropertyBags" type="CT_SupportingPropertyBags"/>

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.4.82 calcFeatures

A **CT_CalcFeatures** element that specifies a list of **CT_CalcFeature** elements (section 2.6.199). These elements add granularity to the version of the calc engine along with the **calcId** ([ISO/IEC29500-1:2016] section 18.2.2).

Each **CT_CalcFeature** element contains the name of a calculation engine feature that was present when the workbook was calculated. This is used with the **calcId** to determine the version of the calculation engine. When a workbook is opened, the application will recalculate if the **calcId** value is at least 179016 and any of the features present in the current version of the calculation engine are not represented in this element. See **CalcPr** ([ISO/IEC29500-1:2016] section 18.2.2) for more information about the calculation engine. See **CT_CalcFeature** for a list of calculation engine features.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="calcFeatures" type="CT_CalcFeatures"/>
```

See section 5.22 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.83 filterColumn

*Target namespace:* http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

A **CT_RichFilterColumn** element that specifies filter information associated with rich values.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="filterColumn" type="CT_RichFilterColumn"/>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.84 richSortCondition

*Target namespace:* http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

A **CT_RichSortCondition** element that specifies sort conditions associated with rich values.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="richSortCondition" type="CT_RichSortCondition"/>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.85 personList


A **CT_PersonList** element that specifies a list of person information associated with a collection of threaded comments and mentions.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.
See section 5.23 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.4.86 ThreadedComments

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2018/threadedcomments

A **CT_ThreadedComments** element that specifies a collection of threaded comments on the associated sheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this element.

```xml
<xsd:element name="ThreadedComments" type="CT_ThreadedComments"/>
```

See section 5.23 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.5 Global Attributes

#### 2.5.1 coauthVersionLast

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2016/revision6

**Referenced by:** CT_RevisionPtr

An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that SHOULD be ignored.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="coauthVersionLast" type="xsd:unsignedInt"/>
```

See section 5.14 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

#### 2.5.2 coauthVersionMax

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2016/revision6

**Referenced by:** CT_RevisionPtr

An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that SHOULD be ignored.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="coauthVersionMax" type="xsd:unsignedInt"/>
```

See section 5.14 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.5.3 dyDescent


The dyDescent attribute is a double attribute, as specified in [XMLSCHEMA2] section 3.2.5, that specifies the vertical distance in pixels from the bottom of the cells in the current row to the typographical baseline of the cell content if, hypothetically, the zoom level for the sheet containing this row is 100 percent and the cell has bottom-alignment formatting. See section 2.2.4.12 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016]. The dyDescent attribute has a side effect; it sets the customHeight attribute to true even if the customHeight attribute is explicitly set to false.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```
<xsd:attribute name="dyDescent" type="xsd:double"/>
```

See section 5.5 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.5.4 formatCode16

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2015/02/main

The formatCode16 attribute<6> is an ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the number format codes for this number format. If present, the formatCode16 attribute takes precedence over the formatCode attribute ([ISO/IEC29500-1:2016] section 18.8.31).

The contents of the formatCode16 attribute are identical to that of the formatCode attribute ([ISO/IEC29500-1:2016] section 18.8.31), with the following modifications to the "International Considerations" therein. The syntax for the formatCode16 attribute's currency and locale/date system/number system information is [ xlabel currency string y ] - [ xlabel culture info ] | [ xlabel calendar type and numeral system ] ]

The currency string is the string to use as a currency symbol.

The culture info is a culture tag, which can be either an IETF language tag ([RFC5646]) or one of the following private use namespace tags.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>x-sysdate</td>
<td>System long date format. Cannot be combined with other culture tags.</td>
</tr>
<tr>
<td>x-systime</td>
<td>System time format. Cannot be combined with other culture tags.</td>
</tr>
<tr>
<td>x-euro1</td>
<td>Trailing generic Euro currency. Cannot be combined with other culture tags.</td>
</tr>
<tr>
<td>x-euro2</td>
<td>Leading generic Euro currency. Cannot be combined with other culture tags.</td>
</tr>
<tr>
<td>x-genlower</td>
<td>Use genitive lowercase form for any full month names in the format (Russian language only). Append to IETF language tag, for example, &quot;ru-RU-x-genlower&quot;.</td>
</tr>
<tr>
<td>x-genupper</td>
<td>Use genitive uppercase form for any full month names in the format (Russian language only). Append to IETF language tag, for example, &quot;ru-RU-x-genupper&quot;.</td>
</tr>
<tr>
<td>x-nomlower</td>
<td>Use nominative lowercase form for any full month names in the format (Russian language only). Append to IETF language tag, for example, &quot;ru-RU-x-nomlower&quot;.</td>
</tr>
<tr>
<td>Value</td>
<td>Meaning</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>x-xbt1</td>
<td>Trailing Bitcoin currency. Cannot be combined with other culture tags.</td>
</tr>
<tr>
<td>x-xbt2</td>
<td>Leading Bitcoin currency. Cannot be combined with other culture tags.</td>
</tr>
</tbody>
</table>

The optional calendar type and numeral system data is a 16-bit number in hexadecimal form that is placed after a culture tag, separated by a comma. The contents are defined by the `formatCode` attribute ([ISO/IEC29500-1:2016] section 18.8.31), with the following modification: The calendar type is stored in byte 0 (the least significant byte) and the numeral system is stored in byte 1 (the most significant byte).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="formatCode16" type="x:ST_Xstring"/>
```

See section 5.11 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.5.5 knownFonts

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/ac

The `knownFonts` attribute is a `Boolean` attribute, as specified in ([XMLSCHEMA2] section 3.2.2, that specifies the typographical descent information that is stored in the `workbook`. See section 2.2.4.9 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="knownFonts" type="xsd:boolean"/>
```

See section 5.5 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.5.6 uid

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2015/revision2

**Referenced by:** [CT_SparklineGroup](#)

An `ST_Guid` ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier associated with the referencing type.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="uid" type="x:ST_Guid"/>
```

See section 5.16 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.5.7 uid

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2016/revision3
An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier associated with the referencing type.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="uid" type="x:ST_Guid"/>
```

See section 5.17 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.5.8 uid
Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2016/revision9

An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier associated with the referencing type.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="uid" type="x:ST_Guid"/>
```

See section 5.13 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.5.9 uid
Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2014/revision

Referenced by: CT_DataValidation

An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier associated with the referencing type.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="uid" type="x:ST_Guid"/>
```

See section 5.15 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.5.10 uid
Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2016/revision10

Referenced by: CT_SlicerCacheDefinition, CT_Slicer, CT_Timeline, CT_TimelineCacheDefinition

An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier associated with the referencing type.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="uid" type="x:ST_Guid"/>
```
See section 5.12 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.5.11 uid

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2016/revision6

An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier associated with the referencing type.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="uid" type="x:ST_Guid"/>
```

See section 5.14 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.5.12 uidLastSave

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2016/revision10

Referenced by: CT_RevisionPtr

An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that SHOULD be ignored.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this attribute.

```xml
<xsd:attribute name="uidLastSave" type="x:ST_Guid"/>
```

See section 5.12 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6 Complex Types

2.6.1 CT_ConditionalFormattings


Referenced by: conditionalFormattings

The CT_ConditionalFormattings complex type specifies conditional formatting information for the worksheet.

Child Elements:

- **conditionalFormatting**: A CT_ConditionalFormatting element (section 2.6.2) that specifies the conditional formatting properties for a range.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ConditionalFormattings">
  <xsd:sequence>
    <xsd:element name="conditionalFormatting" type="CT_ConditionalFormatting" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.2 CT_ConditionalFormatting


Referenced by: CT_ConditionalFormattings

The CT_ConditionalFormatting complex type specifies conditional formatting properties for a range.

Child Elements:

- **cfRule**: A CT_CfRule element (section 2.6.27) that specifies a conditional formatting rule for this range.
- **xm:sqref**: A sqref element (section 2.4.5) that specifies the range this conditional formatting applies to.

Attributes:

- **pivot**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this conditional formatting is applied only to a PivotTable. MUST be a value from the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The area specified by sqref only includes cells that are part of a PivotTable data area.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The area specified by sqref includes cells that are not part of a PivotTable data area.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ConditionalFormatting">
  <xsd:sequence>
    <xsd:element name="cfRule" type="CT_CfRule" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="xm:sqref" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" minOccurs="0" type="x:CT_ExtensionList"/>
  </xsd:sequence>
  <xsd:attribute name="pivot" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.3 CT_DataValidations


Referenced by: dataValidations
**CT_DataValidations** is a complex type that specifies a group of data validation items on the sheet. MUST contain less than or equal to 65,534 elements. This complex type also specifies data validation properties of a sheet that are used by the application UI.

**Child Elements:**

**dataValidation:** A CT_DataValidation element (section 2.6.5) that specifies the properties for a single data validation item defined on a range of the sheet.

**Attributes:**

**disablePrompts:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether all data validation input prompts are disabled for this sheet.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>All data validation input prompts are disabled for this sheet.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The data validation input prompts are enabled for this sheet.</td>
</tr>
</tbody>
</table>

**xWindow:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the x-coordinate, relative to the application window, of the upper-left corner of the data validation input prompt, measured in pixels. This value MUST be less than or equal to 65,535. <7>

**yWindow:** An unsignedInt attribute that specifies the y-coordinate, relative to the application window, of the upper-left corner of the data validation input prompt, measured in pixels. This value MUST be less than or equal to 65,535. <8>

**count:** An unsignedInt attribute that specifies the number of dataValidation child elements of this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DataValidations">
  <xsd:sequence>
    <xsd:element name="dataValidation" type="CT_DataValidation" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="disablePrompts" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="xWindow" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="yWindow" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.4 CT_DataValidationFormula

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_DataValidation

**CT_DataValidationFormula** is a complex type that specifies a formula used in data validation.

**Child Elements:**
xm:f: An f element (section 2.4.3) that specifies a formula for the data validation. The formula MUST adhere to the grammar provided in section 2.2.2, with the following restrictions:


- MUST be an external-cell-reference if used by the formula1 element of the ancestor CT_DataValidation element (section 2.6.5), and the formula1 element of the ancestor CT_DataValidation element uses the external-cell-reference production rule, and the type attribute of the ancestor CT_DataValidation element is "list".

- MUST NOT be an external-cell-reference that references more than one cell if used by the formula1 element of the ancestor CT_DataValidation element and the type attribute of the ancestor CT_DataValidation element is not "list".

- MUST NOT be an external-cell-reference that references more than one cell if used by the formula2 element of the ancestor CT_DataValidation element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DataValidationFormula">
  <xsd:sequence>
    <xsd:element ref="xm:f" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.5 CT_DataValidation


Referenced by: CT_DataValidations

CT_DataValidation is a complex type that specifies data validation for a range on this sheet.

Child Elements:

formula1: A CT_DataValidationFormula element (section 2.6.4) that specifies the first formula for the data validation.

- If operator is "between" or "notBetween" and type is not "custom", "list", or "none", this formula is used as the lesser of two bounding values and MUST exist.

- If operator is not "between" or "notBetween", or type is "custom", this formula is the only formula and MUST exist.

- If operator is not "between" or "notBetween", or type is "custom" or "list", either formula is the only formula and MUST exist or CT_DataValidation MUST have a list (section 2.4.66) child element.

- If the type is "none", this formula MUST NOT exist.

formula2: A CT_DataValidationFormula element that specifies the second formula for the data validation.

- If operator is "between" or "notBetween" and type is not "custom", "list", or "none", this formula is used as the greater of two bounding values and MUST exist.
- If `operator` is not "between" or "notBetween", or `type` is "custom", "list", or "none", this formula MUST NOT exist.

**xm:sqref**: A `sqref` element (section 2.4.5) that specifies ranges to which data validation is applied.

**Attributes:**

- **type**: An `ST_DataValidationType` ([ISO/IEC29500-1:2016] section 18.18.21) attribute that specifies the type of data validation.
- **errorStyle**: An `ST_DataValidationErrorStyle` ([ISO/IEC29500-1:2016] section 18.18.18) attribute that specifies the style of error alert used for this data validation.
- **imeMode**: An `ST_DataValidationImeMode` ([ISO/IEC29500-1:2016] section 18.18.19) attribute that specifies the Input Method Editor (IME) mode enforced by this data validation.
- **operator**: An `ST_DataValidationOperator` ([ISO/IEC29500-1:2016] section 18.18.20) attribute that specifies the relational operator used with this data validation. If `type` is "custom", "list", or "none", the value of the `operator` attribute is undefined and MUST be ignored.
- **allowBlank**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the data validation treats empty or blank entries as valid.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The data validation treats empty or blank entries as valid.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The data validation treats empty or blank entries as invalid.</td>
</tr>
</tbody>
</table>

- **showDropDown**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to display the drop-down combo box for a list type data validation.

<table>
<thead>
<tr>
<th>Value of <code>showDropDown</code></th>
<th>Value of type</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>list</td>
<td>Displays the drop-down combo box.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>list</td>
<td>Suppresses the drop-down combo box.</td>
</tr>
</tbody>
</table>

- **showInputMessage**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to display the input prompt message.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Display the input prompt message.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Suppress the input prompt message.</td>
</tr>
</tbody>
</table>

- **showErrorMessage**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to display the error alert message.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Display the error alert message.</td>
</tr>
<tr>
<td>Value</td>
<td>Meaning</td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Suppress the error alert message.</td>
</tr>
</tbody>
</table>

**errorTitle**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the text of the title bar of the error alert. The length of this string MUST be less than or equal to 32 characters.

**error**: An **ST_Xstring** attribute that specifies the message text of the error alert. The length of this string MUST be less than or equal to 225 characters.

**promptTitle**: An **ST_Xstring** attribute that specifies the text of the title bar of the input prompt. The length of this string MUST be less than or equal to 32 characters.

**prompt**: An **ST_Xstring** attribute that specifies the message text of the input prompt. This string MUST be less than or equal to 255 characters.

**xr:uid**: An **ST_Guid** ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier associated with this data validation rule.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DataValidation">
    <xsd:sequence>
        <xsd:element name="formula1" type="CT_DataValidationFormula" minOccurs="0" maxOccurs="1"/>
        <xsd:element name="formula2" type="CT_DataValidationFormula" minOccurs="0" maxOccurs="1"/>
        <xsd:element ref="xm:sqref" minOccurs="1" maxOccurs="1"/>
    </xsd:sequence>
    <xsd:attribute name="type" type="x:ST_DataValidationType" use="optional" default="none"/>
    <xsd:attribute name="errorStyle" type="x:ST_DataValidationErrorStyle" use="optional" default="stop"/>
    <xsd:attribute name="imeMode" type="x:ST_DataValidationImeMode" use="optional" default="noControl"/>
    <xsd:attribute name="operator" type="x:ST_DataValidationOperator" use="optional" default="between"/>
    <xsd:attribute name="allowBlank" type="xsd:boolean" use="optional" default="false"/>
    <xsd:attribute name="showDropDown" type="xsd:boolean" use="optional" default="false"/>
    <xsd:attribute name="showInputMessage" type="xsd:boolean" use="optional" default="false"/>
    <xsd:attribute name="showErrorMessage" type="xsd:boolean" use="optional" default="false"/>
    <xsd:attribute name="errorTitle" type="x:ST_Xstring" use="optional"/>
    <xsd:attribute name="error" type="x:ST_Xstring" use="optional"/>
    <xsd:attribute name="promptTitle" type="x:ST_Xstring" use="optional"/>
    <xsd:attribute name="prompt" type="x:ST_Xstring" use="optional"/>
    <xsd:attribute ref="xr:uid"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.6 CT_SparklineGroups

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by**: sparklineGroups

**CT_SparklineGroups** is a complex type that specifies the groups of sparklines on the sheet. MUST contain fewer than $2^{31}$ elements.
Child Elements:

sparklineGroup: A CT_SparklineGroup element (section 2.6.7) that specifies properties for a single sparkline group.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SparklineGroups">
  <xsd:sequence>
    <xsd:element name="sparklineGroup" type="CT_SparklineGroup" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.7 CT_SparklineGroup


Referenced by: CT_SparklineGroups

CT_SparklineGroup is a complex type that specifies properties for a sparkline group.

Child Elements:

colorSeries: A CT_Color ([ISO/IEC29500-4:2016] section A.2) element that specifies the color for each sparkline in this sparkline group. The auto attribute of the CT_Color element MUST NOT exist.

colorNegative: A CT_Color element that specifies the color of the negative data points for each sparkline in this sparkline group. The auto attribute of the CT_Color element MUST NOT exist.

colorAxis: A CT_Color element that specifies the color of the horizontal axis for each sparkline in this sparkline group. The auto attribute of the CT_Color element MUST NOT exist.

colorMarkers: A CT_Color element that specifies the color of the data markers for each sparkline in this sparkline group. The auto attribute of the CT_Color element MUST NOT exist.

colorFirst: A CT_Color element that specifies the color of the first data point for each sparkline in this sparkline group. The auto attribute of the CT_Color element MUST NOT exist.

colorLast: A CT_Color element that specifies the color of the last data point for each sparkline in this sparkline group. The auto attribute of the CT_Color element MUST NOT exist.

colorHigh: A CT_Color element that specifies the color of the highest data point for each sparkline in this sparkline group. The auto attribute of the CT_Color element MUST NOT exist.

colorLow: A CT_Color element that specifies the color of the lowest data point for each sparkline in this sparkline group. The auto attribute of the CT_Color element MUST NOT exist.

xm:f: An f element (section 2.4.3) that specifies the date range for the sparkline group. The syntax, as specified in section 2.2.2, for this f element is the following:

```
sparklinegroup-formula = single-sheet-area / [single-sheet-prefix / book-prefix] name
```

Additionally, if a single-sheet-area is specified, that single-sheet-area MUST contain cells from either a single row or a single column.
sparklines: A **CT_Sparklines** element (section 2.6.8) that specifies properties for individual sparklines.

**Attributes:**

**manualMax:** A **double** ([XMLSCHEMA2] section 3.2.5) attribute that specifies the maximum for the vertical axis that is shared across all sparklines in this sparkline group. This attribute MUST NOT exist if **maxAxisType** does not equal "custom".

**manualMin:** A **double** attribute that specifies the minimum for the vertical axis that is shared across all sparklines in this sparkline group. This attribute MUST NOT exist if **minAxisType** does not equal "custom".

**lineWeight:** A **double** attribute that specifies the line weight for each sparkline in the sparkline group, where the line weight is measured in **points**. MUST be greater than or equal to zero, and MUST be less than or equal to 1584.

**type:** An **ST_SparklineType** attribute (section 2.7.5) that specifies the type of the sparkline group.

<table>
<thead>
<tr>
<th>Value of dateAxis</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>No date axis is specified for this sparkline group.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>A date axis is specified for this sparkline group.</td>
</tr>
</tbody>
</table>

**displayEmptyCellsAs:** An **ST_DispBlanksAs** attribute (section 2.7.3) that specifies how empty cells are plotted.

**markers:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether data markers are displayed for each sparkline in this sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Data markers are displayed for each sparkline in this sparkline group.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>No data marker is displayed for sparkline in this sparkline group.</td>
</tr>
</tbody>
</table>

**high:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the data points with the highest value are formatted differently for each sparkline in this sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Data points (2) with the highest value are formatted differently for each sparkline in this sparkline group.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>No data point with the highest value is formatted for sparkline in this sparkline group.</td>
</tr>
</tbody>
</table>

**low:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the data points with the lowest value are formatted differently for each sparkline in this sparkline group.
<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Data points with the lowest value are formatted differently for each sparkline in this sparkline group.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>No data point with the lowest value is formatted for sparkline in this sparkline group.</td>
</tr>
</tbody>
</table>

**first:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the first data point is formatted differently for each sparkline in this sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The first data point is formatted differently for each sparkline in this sparkline group.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The first data point is not formatted for sparkline in this sparkline group.</td>
</tr>
</tbody>
</table>

**last:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the last data point is formatted differently for each sparkline in this sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The last data point is formatted differently for each sparkline in this sparkline group.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The last data point is not formatted for sparkline in this sparkline group.</td>
</tr>
</tbody>
</table>

**negative:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the negative data points are formatted differently for each sparkline in this sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The negative data point is formatted differently for each sparkline in this sparkline group.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The negative data point is not formatted for sparkline in this sparkline group.</td>
</tr>
</tbody>
</table>

**displayXAxis:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the horizontal axis is displayed for each sparkline in this sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The horizontal axis is displayed for each sparkline in this sparkline group.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>No horizontal axis is displayed for sparkline in this sparkline group.</td>
</tr>
</tbody>
</table>

**displayHidden:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether data in hidden cells are plotted for the sparklines in this sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Data in hidden cells are plotted for the sparklines in this sparkline group.</td>
</tr>
<tr>
<td>Value</td>
<td>Meaning</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Data in hidden cells are not plotted for the sparklines in this sparkline group.</td>
</tr>
</tbody>
</table>

**minAxisType**: An `ST_SparklineAxisMinMax` attribute (section 2.7.4) that specifies how the vertical axis minimums for the sparklines in this sparkline group are calculated.

**maxAxisType**: An `ST_SparklineAxisMinMax` attribute that specifies how the vertical axis maximums for the sparklines in this sparkline group are calculated.

**rightToLeft**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether each sparkline in the sparkline group is displayed in a **right-to-left** manner.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Each sparkline in the sparkline group is displayed in a right-to-left manner.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Not all sparklines in the sparkline group is displayed in a right-to-left manner.</td>
</tr>
</tbody>
</table>

**xr2:uid**: An `ST_Guid` ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies the unique id of the sparkline group. If any instance of this type specifies this attribute, then all instances MUST specify it, and the values MUST be distinct.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SparklineGroup">
  <xsd:sequence>
    <xsd:element name="colorSeries" minOccurs="0" maxOccurs="1" type="x:CT_Color"/>
    <xsd:element name="colorNegative" minOccurs="0" maxOccurs="1" type="x:CT_Color"/>
    <xsd:element name="colorAxis" minOccurs="0" maxOccurs="1" type="x:CT_Color"/>
    <xsd:element name="colorMarkers" minOccurs="0" maxOccurs="1" type="x:CT_Color"/>
    <xsd:element name="colorFirst" minOccurs="0" maxOccurs="1" type="x:CT_Color"/>
    <xsd:element name="colorLast" minOccurs="0" maxOccurs="1" type="x:CT_Color"/>
    <xsd:element name="colorHigh" minOccurs="0" maxOccurs="1" type="x:CT_Color"/>
    <xsd:element name="colorLow" minOccurs="0" maxOccurs="1" type="x:CT_Color"/>
    <xsd:element ref="xm:f" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="xm:sparklines" minOccurs="1" maxOccurs="1" type="CT_Sparklines"/>
  </xsd:sequence>
  <xsd:attribute name="manualMax" type="xsd:double" use="optional"/>
  <xsd:attribute name="manualMin" type="xsd:double" use="optional"/>
  <xsd:attribute name="lineWeight" type="xsd:double" use="optional" default="0.75"/>
  <xsd:attribute name="type" type="ST_SparklineType" use="optional" default="line"/>
  <xsd:attribute name="dateAxis" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="markers" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="high" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="low" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="first" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="last" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="negative" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="displayXAxisAs" type="ST_DispBlanksAs" use="optional" default="zero"/>
  <xsd:attribute name="displayEmptyCellsAs" type="ST_DispBlanksAs" use="optional" default="false"/>
  <xsd:attribute name="minAxisType" type="ST_SparklineAxisMinMax" use="optional" default="individual"/>
  <xsd:attribute name="maxAxisType" type="ST_SparklineAxisMinMax" use="optional" default="individual"/>
  <xsd:attribute name="rightToLeft" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute ref="xr2:uid"/>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema (XMLSCHEMA1/2] section 2.1).

### 2.6.8 CT_Sparklines

**Target namespace:** http://schemas.microsoft.com_office/spreadsheetml/2009/9/main

**Referenced by:** CT_SparklineGroup

**CT_Sparklines** is a complex type that specifies a list of individual sparklines in a sparkline group. It MUST contain fewer than $2^{31}$ elements.

**Child Elements:**

**sparkline:** A CT_Sparkline element (section 2.6.9) that specifies properties for an individual sparkline.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Sparklines">
  <xsd:sequence>
    <xsd:element name="sparkline" type="CT_Sparkline" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema (XMLSCHEMA1/2] section 2.1).

### 2.6.9 CT_Sparkline

**Target namespace:** http://schemas.microsoft.com_office/spreadsheetml/2009/9/main

**Referenced by:** CT_Sparklines

**CT_Sparkline** is a complex type that specifies information for a single sparkline.

**Child Elements:**

**xm:f:** An f element (section 2.4.3) that specifies the data range for this sparkline. The syntax, specified in section 2.2.2, for this element is the following:

```
sparkline-formula = single-sheet-area / [single-sheet-prefix / book-prefix] name
```

Additionally, if a single-sheet-area is specified, that single-sheet-area MUST contain cells from either a single row or a single column.

**xm:sqref:** A sqref element (section 2.4.5) that specifies the cell in which the sparkline is located. This sqref element MUST contain exactly one ref element (section 2.4.4) that MUST specify exactly one cell.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Sparkline">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.10 CT_WorkbookPr


Referenced by: workbookPr

CT_WorkbookPr is a complex type that specifies additional properties for a workbook.

Attributes:

defaultImageDpi: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the resolution in which images in the workbook is saved, in DPI ([ISO/IEC29500-1:2016] section 18.2.24), when the autoCompressPictures attribute of the WorkbookPr ([ISO/IEC29500-1:2016] section 18.2.28) element is "true" and the CT_UseLocalDpi ([MS-ODRAWXML] section 2.3.1.13) element of the drawings part ([ISO/IEC29500-1:2016] section 12.3.8) corresponding to the image being saved is "false". MUST be equal to "96", "150", or "220".

discardImageEditData: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether all CT_Photo ([MS-ODRAWXML] section 2.3.1.9) elements and cropped out areas of images in the workbook are not saved.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>All CT_Photo elements and cropped out areas of images in the workbook are not saved.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>All CT_Photo elements and cropped out areas of images in the workbook are saved.</td>
</tr>
</tbody>
</table>

accuracyVersion: An unsignedInt attribute that specifies how functions are calculated in the workbook. SHOULD be equal to zero ("0").<9>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_WorkbookPr">
  <xsd:attribute name="defaultImageDpi" type="xsd:unsignedInt" default="220"/>
  <xsd:attribute name="discardImageEditData" type="xsd:boolean" default="false"/>
  <xsd:attribute name="accuracyVersion" type="xsd:unsignedInt" default="0"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.11 CT_SlicerRefs


Referenced by: slicerList
**CT_SlicerRefs** is a complex type that specifies a list of slicer (section 2.3.2) part identifiers for the worksheet. MUST contain exactly one slicer part identifier.

*Child Elements:*

**slicer**: A **CT_SlicerRef** element (section 2.6.12) that specifies the slicer part identifier for the worksheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerRefs">
  <xsd:sequence>
    <xsd:element name="slicer" type="CT_SlicerRef" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

**2.6.12 CT_SlicerRef**


*Referenced by*: **CT_SlicerRefs**

A complex type that specifies a relationship identifier of the part that contains the slicers in this worksheet.

*Attributes:*

**r:id**: An **ST_RelationshipId** ([ISO/IEC29500-1:2016] section 22.8.2.1) attribute that specifies a relationship identifier of the part that contains the slicers in this worksheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerRef">
  <xsd:attribute ref="r:id" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

**2.6.13 CT_SlicerCaches**


*Referenced by*: **slicerCaches**

A complex type that specifies a list of slicer cache part identifiers for the workbook. MUST contain fewer than 2\(^{31}\) elements.

*Child Elements:*

**slicerCache**: A **CT_SlicerCache** element that specifies a slicer cache part identifier in this workbook.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.14 CT_SlicerCache


*Referenced by:* CT_SlicerCaches

A complex type that specifies a relationship identifier to a slicer cache part in this workbook.

**Attributes:**

- **r:id:** An ST_RelationshipId ([ISO/IEC29500-1:2016] section 22.8.2.1) attribute that specifies a relationship identifier to a slicer cache part in this workbook.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerCache">
   <xsd:attribute ref="r:id" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.15 CT_CalculatedMember


*Referenced by:* calculatedMember

A complex type that specifies extended properties of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) OLAP calculated member.

**Child Elements:**

- **tupleSet:** A CT_TupleSet element (section 2.6.16) that specifies OLAP tuples within this OLAP named set.

**Attributes:**

- **displayFolder:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the display folder of this PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set. The length of this value MUST be less than 65,536 characters. This attribute MUST NOT exist if the set attribute in the ancestor CT_CalculatedMember ([ISO/IEC29500-4:2016] section A.2) element is zero ("0").

- **flattenHierarchies:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to display members from different OLAP levels of the same PivotTable cache hierarchy of this PivotTable named set in the same PivotTable field. This attribute MUST NOT exist if the set attribute in the ancestor CT_CalculatedMember element is zero ("0").

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
</table>

[MS-XLSX] - v20180801
Excel (.xlsx) Extensions to the Office Open XML SpreadsheetML File Format
Copyright © 2018 Microsoft Corporation
Release: August 1, 2018
<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;0&quot;</td>
<td>Each member from a different level of the same PivotTable cache hierarchy of this PivotTable named set is displayed in a separate PivotTable field.</td>
</tr>
<tr>
<td>&quot;1&quot;</td>
<td>All members from different levels of the same PivotTable cache hierarchy of this PivotTable named set are displayed in the same PivotTable field.</td>
</tr>
</tbody>
</table>

**dynamicSet:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this PivotTable named set is a dynamic OLAP named set. This attribute MUST NOT exist if the set attribute in the ancestor CT_CalculatedMember element is zero ("0").

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;0&quot;</td>
<td>This PivotTable named set is a static OLAP named set.</td>
</tr>
<tr>
<td>&quot;1&quot;</td>
<td>This PivotTable named set is a dynamic OLAP named set.</td>
</tr>
</tbody>
</table>

**hierarchizeDistinct:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to automatically order and remove duplicates from this PivotTable named set. This attribute MUST NOT exist if the set attribute in the ancestor CT_CalculatedMember element is zero ("0").

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;0&quot;</td>
<td>Do not automatically order and remove duplicates from this PivotTable named set.</td>
</tr>
<tr>
<td>&quot;1&quot;</td>
<td>Automatically order and remove duplicates from this PivotTable named set.</td>
</tr>
</tbody>
</table>

**mdxLong:** An ST_Xstring attribute that specifies Multidimensional Expressions (MDX) of the PivotTable OLAP calculated member. The length of this attribute MUST be zero or it MUST be greater than 32,767 characters and less than 1,073,741,823 characters. If this value is greater than 32,767 characters, the length of the mdx attribute in the ancestor CT_CalculatedMember element MUST be "1" and the first character of the mdx attribute MUST be equal to ",", the space character (0x0020).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CalculatedMember">
   <xsd:sequence>
      <xsd:element name="tupleSet" minOccurs="0" maxOccurs="1" type="CT_TupleSet"/>
   </xsd:sequence>
   <xsd:attribute name="displayFolder" type="x:ST_Xstring" use="optional"/>
   <xsd:attribute name="flattenHierarchies" type="xsd:boolean" use="optional" default="true"/>
   <xsd:attribute name="dynamicSet" type="xsd:boolean" use="optional" default="false"/>
   <xsd:attribute name="hierarchizeDistinct" type="xsd:boolean" use="optional" default="true"/>
   <xsd:attribute name="mdxLong" type="x:ST_Xstring" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.16 CT_TupleSet


Referenced by: CT_CalculatedMember

A complex type that specifies an OLAP named set.

Child Elements:

headers: A CT_TupleSetHeaders element that specifies the MDX unique names of the OLAP hierarchies and the MDX unique names of the OLAP levels specified by this OLAP named set.

rows: A CT_TupleSetRows element that specifies the OLAP tuples specified by this OLAP named set.

Attributes:

rowCount: An unsignedInt ([XMLSCHEMA1] section 3.3.22) attribute that specifies the number of OLAP tuples specified by this OLAP named set. MUST equal the number of CT_TupleSetRow elements within the rows element. rowCount * columnCount MUST be less than or equal to 3,000.

columnCount: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of MDX unique names of the OLAP hierarchies and the MDX unique names of the OLAP levels specified by this OLAP named set. MUST equal the number of CT_TupleSetHeader elements within the headers element. rowCount * columnCount MUST be less than or equal to 3,000.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TupleSet">
  <xsd:sequence>
    <xsd:element name="headers" type="CT_TupleSetHeaders" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="rows" type="CT_TupleSetRows" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="rowCount" type="xsd:unsignedInt" use="optional" default="1"/>
  <xsd:attribute name="columnCount" type="xsd:unsignedInt" use="optional" default="1"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.17 CT_TupleSetHeaders


Referenced by: CT_TupleSet

A complex type that specifies the MDX unique names of the OLAP hierarchies and the MDX unique names of the OLAP levels of the OLAP named set.

Child Elements:

header: CT_TupleSetHeader elements that specify the MDX unique names of the OLAP hierarchies and the MDX unique names of the OLAP levels of the OLAP named set. The number of these elements MUST be equal to the value of the columnCount attribute in the CT_TupleSet element that is the ancestor of this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
<xsd:complexType name="CT_TupleSetHeaders">
  <xsd:sequence>
    <xsd:element name="header" type="CT_TupleSetHeader" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.18 CT_TupleSetHeader


Referenced by: CT_TupleSetHeaders

A complex type that specifies the MDX unique name of the OLAP hierarchy and the MDX unique name of the OLAP level of the OLAP named set that is specified by the CT_TupleSet element that is an ancestor of this element.

Attributes:

uniqueName: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the MDX unique name of the OLAP level. MUST be less than or equal to 65,535 characters in length.

hierarchyName: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the MDX unique name of the OLAP hierarchy. MUST be less than or equal to 65,535 characters in length.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

<xsd:complexType name="CT_TupleSetHeader">
  <xsd:attribute name="uniqueName" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="hierarchyName" type="x:ST_Xstring" use="optional"/>
</xsd:complexType>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.19 CT_TupleSetRows


Referenced by: CT_TupleSet

A complex type that specifies the OLAP tuples for this OLAP named set.

Child Elements:

row: CT_TupleSetRow elements that specify the OLAP tuples for this OLAP named set. The number of these elements MUST be equal to the value of the rowCount attribute in the parent CT_TupleSet element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

<xsd:complexType name="CT_TupleSetRows">
  <xsd:sequence>
    <xsd:element name="row" type="CT_TupleSetRow" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.20 CT_TupleSetRow


Referenced by: CT_TupleSetRows

A complex type that specifies an OLAP tuple for this OLAP named set.

Child Elements:

rowItem: CT_TupleSetRowItem elements that specify the OLAP members that are part of the OLAP tuple that is specified by this CT_TupleSetRow element. The number of these elements MUST be equal to value of the columnCount attribute in the CT_TupleSet element that is an ancestor of this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```
<xsd:complexType name="CT_TupleSetRow">
  <xsd:sequence>
    <xsd:element name="rowItem" type="CT_TupleSetRowItem" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.21 CT_TupleSetRowItem


Referenced by: CT_TupleSetRow

A complex type that specifies an OLAP member that is part of an OLAP tuple.

Attributes:

u: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the MDX unique name of this OLAP member. MUST be less than or equal to 65,535 characters in length.

d: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies a display name for this OLAP member. MUST be less than or equal to 65,535 characters in length.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```
<xsd:complexType name="CT_TupleSetRowItem">
  <xsd:attribute name="u" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="d" type="x:ST_Xstring" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.22 CT_SetLevels


Referenced by: CT_CacheHierarchy

A complex type that specifies a list of CT_SetLevel elements that specify the OLAP levels of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set.

Child Elements:


Attributes:

count: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of child setLevel elements of this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SetLevels">
  <xsd:sequence>
    <xsd:element name="setLevel" minOccurs="1" maxOccurs="unbounded" type="CT_SetLevel"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.23 CT_SetLevel


Referenced by: CT_SetLevels

A complex type that specifies an OLAP level of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache hierarchy of a PivotTable named set.

Attributes:

hierarchy: An int ([XMLSCHEMA2] section 3.3.17) attribute that specifies a reference to the PivotTable cache hierarchy. MUST be a value from the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;-2&quot;</td>
<td>The PivotTable measure cache hierarchy is used.</td>
</tr>
<tr>
<td>&quot;-1&quot;</td>
<td>No PivotTable cache hierarchy is used.</td>
</tr>
<tr>
<td>Greater than or equal to zero</td>
<td>A zero-based PivotTable cache hierarchy index. The referenced CT_CacheHierarchy ([ISO/IEC29500-4:2016] section A.2) element specifies the PivotTable cache hierarchy that is used. MUST be less than the number of CT_CacheHierarchy elements within the CT_CacheHierarchies ([ISO/IEC29500-1:2016] section 18.10) element.</td>
</tr>
</tbody>
</table>
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SetLevel">
  <xsd:attribute name="hierarchy" use="required" type="xsd:int"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.24 CT_CacheHierarchy

**Target namespace:** http://schemas.microsoft.com_office/spreadsheetml/2009/9/main  
**Referenced by:** cacheHierarchy

This complex type specifies the extended properties of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set. When an element of this type is present, the `set` attribute of the ancestor cacheHierarchy element of type CT_CacheHierarchy ([ISO/IEC29500-4:2016] section A.2) MUST be "true".

**Child Elements:**

- **setLevels**: A CT_SetLevels element that specifies the OLAP levels of the hierarchy that is used by this PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set.

**Attributes:**

- **flattenHierarchies**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to display members from different levels of the same PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache hierarchy of this PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set in the same PivotTable ([ISO/IEC29500-1:2016] section 18.10) field. MUST be "false" if `ignore` is "true". If a CT_CalculatedMember element that corresponds to the PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set exists, this attribute MUST be equal to the flattenHierarchies attribute of the CT_CalculatedMember element.

<table>
<thead>
<tr>
<th>ignore</th>
<th>flattenHierarchies</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>&quot;false&quot;</td>
<td>Each member from a different level of the same PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache hierarchy of this PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set is displayed in a separate PivotTable ([ISO/IEC29500-1:2016] section 18.10) field.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>&quot;true&quot;</td>
<td>All members from different levels of the same PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache hierarchy of this PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set is discarded.</td>
</tr>
</tbody>
</table>
measuresSet: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set contains one or more PivotTable ([ISO/IEC29500-1:2016] section 18.10) measure cache hierarchies. MUST be "false" if ignore is "true".

<table>
<thead>
<tr>
<th>ignore</th>
<th>measureSet</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>&quot;false&quot;</td>
<td>The PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set does not contain PivotTable ([ISO/IEC29500-1:2016] section 18.10) measure cache hierarchies.</td>
</tr>
</tbody>
</table>

hierarchizeDistinct: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to automatically order and remove duplicates from this PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set. MUST be "false" if ignore is "true". If a CT_CalculatedMember element that corresponds to the PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set exists, this attribute MUST be equal to hierarchizeDistinct attribute of the CT_CalculatedMember element.

<table>
<thead>
<tr>
<th>ignore</th>
<th>hierarchizeDistinct</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>&quot;false&quot;</td>
<td>Do not automatically order and remove duplicates from this PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>&quot;true&quot;</td>
<td>Automatically order and remove duplicates from this PivotTable ([ISO/IEC29500-1:2016] section 18.10) named set.</td>
</tr>
</tbody>
</table>
ignore: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the ancestor cacheHierarchy element of type CT_CacheHierarchy ([ISO/IEC29500-4:2016] section A.2) SHOULD <10> be discarded. If ignore is "true", the ancestor cacheHierarchy element of type CT_CacheHierarchy ([ISO/IEC29500-4:2016] section A.2) MUST have the following attribute values:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>measure</td>
<td>&quot;true&quot;</td>
</tr>
<tr>
<td>set</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>attribute</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>measures</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>oneField</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>time</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>keyAttribute</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>memberValueDatatype</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>unbalanced</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>unbalancedGroup</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>hidden</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>count</td>
<td>&quot;0&quot;</td>
</tr>
<tr>
<td>parentSet</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>dimensionUniqueName</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>defaultMemberUniqueName</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>allUniqueName</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>allCaption</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>displayFolder</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>measureGroup</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>uniqueName</td>
<td>&quot;Dummy N&quot;, where N is the text string representing in decimal form the zero-based index of the ancestor CT_CacheHierarchy ([ISO/IEC29500-4:2016] section A.2) element within the group of CT_CacheHierarchy ([ISO/IEC29500-4:2016] section A.2) elements that have a descendent CT_CacheHierarchy element with the ignore attribute equal to &quot;true&quot;.</td>
</tr>
</tbody>
</table>

Within the CT_CacheHierarchies ([ISO/IEC29500-4:2016] section A.2) element, all CT_CacheHierarchy ([ISO/IEC29500-4:2016] section A.2) elements that have a descendant CT_CacheHierarchy element with the ignore attribute equal to "true" MUST follow all other CT_CacheHierarchy ([ISO/IEC29500-4:2016] section A.2) elements without a descendent...
CT_CacheHierarchy element or with a descendent CT_CacheHierarchy element with the ignore attribute equal to "false".


For more details, see CT_DataField.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CacheHierarchy">
  <xsd:sequence>
    <xsd:element name="setLevels" minOccurs="0" maxOccurs="1" type="CT_SetLevels"/>
  </xsd:sequence>
  <xsd:attribute name="flattenHierarchies" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="measuresSet" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="hierarchizeDistinct" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="ignore" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.25 CT_DataField

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** dataField


**Attributes:**

- **pivotShowAs:** An ST_PivotShowAs attribute that specifies the data display format for this PivotTable ([ISO/IEC29500-1:2016] section 18.10) data field item. If this attribute is specified, the showDataAs attribute of the ancestor CT_DataField ([ISO/IEC29500-4:2016] section A.2) element MUST NOT be specified. If this attribute is equal to "percentOfParent", "percentOfRunningTotal", "rankAscending", or "rankDescending", the baseField attribute of the ancestor CT_DataField ([ISO/IEC29500-4:2016] section A.2) element MUST be greater than or equal to 0.


If an OLAP measure is summarized in a PivotTable ([ISO/IEC29500-1:2016] section 18.10) as a data field item ([ISO/IEC29500-1:2016] section 18.10.1.22) more than one time, data field items ([ISO/IEC29500-1:2016] section 18.10.1.22) that specify that OLAP measure after the first data field item ([ISO/IEC29500-1:2016] section 18.10.1.22) that specifies that OLAP measure MUST have a descendant CT_DataField element with a sourceField specified.
If this attribute is specified, the `CT_PivotField` (ISO/IEC29500-4:2016 section A.2) element specified by the `fld` attribute of the ancestor `CT_DataField` (ISO/IEC29500-4:2016 section A.2) element MUST have a descendant `CT_PivotField` element with an `ignore` attribute equal to "true".


If this attribute is specified, the `fld` attribute of the ancestor `CT_DataField` (ISO/IEC29500-4:2016 section A.2) element SHOULD be ignored.

This attribute MUST NOT be specified for non-OLAP PivotTables (ISO/IEC29500-1:2016 section 18.10).

`uniqueName`: An `ST_Xstring` (ISO/IEC29500-1:2016 section 22.9.2.19) attribute that specifies the unique name for duplicated OLAP measures. MUST be unique within this part. MUST be less than or equal to 65,535 characters in length.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DataField">
    <xsd:attribute name="pivotShowAs" type="ST_PivotShowAs" use="optional"/>
    <xsd:attribute name="sourceField" type="xsd:unsignedInt" use="optional"/>
    <xsd:attribute name="uniqueName" type="x:ST_Xstring" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.26 CT_Cfvo


Referenced by: CT_ColorScale, CT_DataBar, CT_IconSet

This complex type specifies a Conditional Formatting Value Object (CFVO) that specifies how to calculate a value from the range of cells to which a conditional formatting rule applies.

Child Elements:

`xfm:` An `f` element that specifies the formula that is evaluated and compared to the cell value by the comparison method specified by `gte`. The formula MUST adhere to the grammar provided in Formulas, with the following restrictions:
- MUST NOT match the single-sheet-area production rule.


Attributes:

- **type**: An ST_CfvoType attribute that specifies how the CFVO value is determined:
  - If this CT_Cfvo element is a child of a CT_ColorScale and specifies the beginning of the color scale, this attribute MUST NOT be max.
  - If this CT_Cfvo element is a child of a CT_ColorScale and specifies the end of the color scale, this attribute MUST NOT be min.
  - If this CT_Cfvo element is a child of a CT_ColorScale and specifies the midpoint of the color scale, this attribute MUST NOT be max and MUST NOT be min.
  - If this CT_Cfvo element is a child of a CT_DataBar and specifies the cell value for the min length of the data bar, this attribute MUST NOT be max or autoMax.
  - If this CT_Cfvo element is a child of a CT_DataBar and specifies the cell value for the max length of the data bar, this attribute MUST NOT be min or autoMin.
  - If this CT_Cfvo element is not a child of a CT_DataBar, this attribute MUST NOT be autoMin and MUST NOT be autoMax.
  - If this CT_Cfvo element is a child of a CT_IconSet record, this value MUST NOT be max or min.
  - If the value is max, min, autoMax, or autoMin, f MUST NOT be present.

- **gte**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the CT_Cfvo will use greater-than or greater-than-or-equal-to when applying conditional formatting rules. If this CT_Cfvo element is a child of something other than a CT_IconSet element, this attribute MUST NOT be present. The value of this attribute is interpreted as follows:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>Greater-than is used when applying conditional formatting rules.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>Greater-than-or-equal-to is used when applying conditional formatting rules.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Cfvo">
  <xsd:sequence>
    <xsd:element ref="xm:f" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="type" type="ST_CfvoType" use="required"/>
  <xsd:attribute name="gte" type="xsd:boolean" use="optional" default="true"/>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.27 CT_CfRule

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_ConditionalFormatting

This complex type specifies a **conditional formatting** rule for a **range**.

**Child Elements:**

- **xm:f:** *f* elements that specify the **formulas** in the conditional formatting rule. The formulas MUST adhere to the grammar specified in **Formulas**, with the following restrictions:

  - The formula MUST NOT match the single-sheet-area production rule.

The following table explains how to interpret the formulas.

<table>
<thead>
<tr>
<th>Value of type</th>
<th>Interpretation of the formulas in f</th>
</tr>
</thead>
<tbody>
<tr>
<td>cells</td>
<td><em>f</em> elements that specify the formulas, numeric values, or <strong>cell</strong> references that specify the operands for the <strong>ST_ConditionalFormattingOperator</strong> ([ISO/IEC29500-1:2016] section 18.18.15) specified by <strong>operator</strong>. If <strong>operator</strong> is &quot;between&quot; or &quot;notBetween&quot;, <em>f</em> MUST contain two formulas; otherwise, <em>f</em> MUST contain one formula.</td>
</tr>
<tr>
<td>expression</td>
<td>An <em>f</em> element that specifies a formula. When the formula returns zero, conditional formatting is not displayed. When the formula returns a nonzero value, conditional formatting is displayed.</td>
</tr>
<tr>
<td>colorScale, dataBar, iconSet</td>
<td>An <em>f</em> element that specifies a formula. When the formula returns zero, conditional formatting is not displayed. When the formula returns a nonzero value, conditional formatting is displayed.</td>
</tr>
<tr>
<td>containsText, notContainsText, beginsWith, endsWith, containsBlanks, notContainsBlanks, containsErrors, notContainsErrors</td>
<td>An <em>f</em> element that specifies a formula that implements the operation specified by <strong>type</strong>. When the formula returns zero, conditional formatting is not displayed. When the formula returns a nonzero value, conditional formatting is displayed.</td>
</tr>
</tbody>
</table>

**colorScale:** A **CT_ColorScale** element that specifies a **color scale**.

**dataBar:** A **CT_DataBar** element that specifies a **data bar**.

**iconSet:** A **CT_IconSet** element that specifies an **icon set**.

**dxf:** A **CT_Dxf** ([ISO/IEC29500-4:2016] section A.2) element that specifies the differential formatting ([ISO/IEC29500-1:2016] section M.2.7.3.8) applied to the range. If **type** is "colorScale", "dataBar", or "iconSet", or the **priority** attribute does not exist, this element MUST NOT exist.

**extLst:** A **CT_ExtensionList** ([ISO/IEC29500-4:2016] section A.2) element that specifies future extensibility for this element.
Attributes:

**type**: An ST_CfType ([ISO/IEC29500-1:2016] section 18.18.12) attribute that specifies the way conditional formatting is displayed in the range.

If and only if **type** is "colorScale", a **colorScale** child element MUST exist in this element.

If and only if **type** is "dataBar", a **dataBar** child element MUST exist in this element.

If and only if **type** is "iconSet", an **iconSet** child element MUST exist in this element.

**priority**: An int ([XMLSCHEMA2] section 3.3.17) attribute that specifies the relative priority of this rule compared to the other rules in this sheet, or whether this CT_CfRule specifies extension information for a conditional formatting data bar rule as specified by the associated CT_CfRule ([ISO/IEC29500-4:2016] section A.2) element. MUST be greater than 0.

If **priority** exists, rules are applied in order from the smallest **priority** to the largest **priority** and it MUST NOT duplicate a **priority** value in any other CT_CfRule or CT_CfRule ([ISO/IEC29500-4:2016] section A.2) element that exists in the same worksheet part.

If **priority** does not exist, this CT_CfRule specifies extension information for a conditional formatting data bar rule, and the dataBar child element MUST exist and describe this additional information. The **id** attribute is used to identify the associated CT_CfRule ([ISO/IEC29500-4:2016] section A.2), and the **priority** attribute of this CT_CfRule ([ISO/IEC29500-4:2016] section A.2) specifies the relative priority of this rule. If neither the **priority** attribute nor the **id** attribute exists in this element, or if **id** exists but there exists no CT_CfRule ([ISO/IEC29500-4:2016] section A.2) element containing a matching GUID, this record and the succeeding dataBar child element MUST be ignored. If the **priority** attribute exists in this element, **id** MUST be ignored.

**stopIfTrue**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether evaluation of additional conditional formatting rules is skipped for a cell if this rule evaluates to "true" for that cell.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Evaluation of additional conditional formatting rules is skipped for a cell if this rule evaluates to &quot;true&quot; for that cell.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Evaluation of additional conditional formatting rules is not skipped for a cell if this rule evaluates to &quot;true&quot; for that cell.</td>
</tr>
</tbody>
</table>

**aboveAverage**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the conditional formatting rule is applied to cells with values above or below the average value of other cells in the range as specified by the following table. This attribute MUST NOT exist if **type** is not equal to "aboveAverage".

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The conditional formatting rule is applied to cells with values above the average value of all cells in the range.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The conditional formatting rule is applied to cells with values below the average value of all cells in the range.</td>
</tr>
</tbody>
</table>

**percent**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the conditional formatting rule is applied to a percentage of cells as specified by the following table. This attribute MUST NOT exist if **type** is not equal to "top10".

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The conditional formatting rule is applied to a percentage of cells as specified.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The conditional formatting rule is not applied to a percentage of cells.</td>
</tr>
</tbody>
</table>
**bottom**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies how the conditional formatting rule is applied as specified by the following table. This attribute MUST NOT exist if **type** is not equal to "top10".

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Conditional formatting is applied to cells whose value is in the bottom end of the range specified by <strong>percent</strong> and <strong>rank</strong>.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Conditional formatting is applied to cells whose value is in the top end of the range specified by <strong>percent</strong> and <strong>rank</strong>.</td>
</tr>
</tbody>
</table>

**operator**: An **ST_ConditionalFormattingOperator** ([ISO/IEC29500-1:2016] section 18.18.15) attribute that specifies the type of value comparison used for this conditional formatting rule. This attribute MUST NOT exist if **type** is not equal to "cellIs".

**text**: A **string** ([XMLSCHEMA2] section 3.2.1) attribute that specifies a text value used for this conditional formatting rule. This attribute MUST NOT exist if type is not equal to "beginsWith", "containsText", "endsWith", or "notContainsText".

**timePeriod**: An **ST_TimePeriod** ([ISO/IEC29500-1:2016] section 18.18.82) attribute that specifies the time period used for this conditional formatting rule. This attribute MUST NOT exist if **type** is not equal to "timePeriod".

**rank**: An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that specifies how many cells are formatted by this conditional formatting rule. The value of **percent** specifies whether **rank** is a percentage or a quantity of cells. When **percent** is "true", **rank** MUST be greater than or equal to zero and less than or equal to 100. Otherwise, **rank** MUST be greater than or equal to 1 and less than or equal to 1,000. This attribute MUST NOT exist if **type** is not equal to "top10".

**stdDev**: An **int** ([XMLSCHEMA2] section 3.3.17) attribute that specifies the number of standard deviations above or below the average to format in the conditional formatting rule. This attribute MUST NOT exist if **type** is not equal to "aboveAverage" or if **equalAverage** is "true".

**equalAverage**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies, together with **aboveAverage**, how the conditional formatting rule is applied as specified by the following table. This attribute MUST NOT exist if **type** is not equal to "aboveAverage".

<table>
<thead>
<tr>
<th>Value of equalAverage</th>
<th>Value of aboveAverage</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>&quot;true&quot;</td>
<td>Conditional formatting is applied to cells whose value is equal to or above the average value of cells in the range.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>&quot;false&quot;</td>
<td>Conditional formatting is applied to cells whose value is equal to or below the average value of cells in the range.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>&quot;true&quot;</td>
<td>Conditional formatting is applied to cells whose value is above the average value of all cells in the range plus <strong>stdDev</strong> and multiplied by the standard deviation of all cells in the range.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>&quot;false&quot;</td>
<td>Conditional formatting is applied to cells whose value is below the average value of all cells in the range minus <strong>stdDev</strong> and multiplied by the standard deviation of all cells in the range.</td>
</tr>
</tbody>
</table>
**activePresent**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that MUST be "true" if, and only if, a formula is present in \( f \) and **type** is "colorScale", "dataBar", or "iconSet".

**id**: An **ST_Guid** ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that identifies this conditional formatting rule. If the priority attribute does not exist, and this attribute exists, this attribute is used to match this **CT_CfRule** element to the corresponding **CT_CfRule** ([ISO/IEC29500-4:2016] section A.2) element. If neither the priority attribute nor this attribute exists, this **CT_CfRule** and its child **CT_DataBar** element MUST be ignored.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```
<xsd:complexType name="CT_CfRule">
  <xsd:sequence>
    <xsd:element ref="xm:f" minOccurs="0" maxOccurs="3"/>
    <xsd:element name="colorScale" type="CT_ColorScale" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="dataBar" type="CT_DataBar" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="iconSet" type="CT_IconSet" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="type" type="x:ST_CfType" use="optional"/>
  <xsd:attribute name="priority" type="xsd:int" use="optional"/>
  <xsd:attribute name="stopIfTrue" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="aboveAverage" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="percent" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="bottom" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="operator" type="x:ST_ConditionalFormattingOperator" use="optional"/>
  <xsd:attribute name="text" type="xsd:string" use="optional"/>
  <xsd:attribute name="timePeriod" type="x:ST_TimePeriod" use="optional"/>
  <xsd:attribute name="rank" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="stdDev" type="xsd:int" use="optional"/>
  <xsd:attribute name="equalAverage" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="activePresent" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="id" type="x:ST_Guid" use="optional"/>
</xsd:complexType>
```

See section **5.4** for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.28 CT_IconSet

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by**: **CT_CfRule**

A complex type that specifies the properties of a **conditional formatting** rule that uses an **icon set**. The first **cfvo** element following this element MUST be ignored. There MUST be greater than or equal to three **cfvo** elements and MUST be less than or equal to five **cfvo** elements following this complex type.

**Child Elements**:

**cfvo**: A **CT_Cfvo** element that specifies a threshold value between each **icon** in the icon set.

**cfIcon**: A **CT_CfIcon** element that specifies a particular icon to use within an icon set. This element MUST be present if and only if **custom** equals "true".

**Attributes**:

**iconSet**: An **ST_IconSetType** attribute that specifies the icon set used.
**showValue**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the **cells** in the applied **range** display the icon and **cell value**, or the icon only.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The icon and cell value are shown in the cell.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Only the icon is shown in the cell.</td>
</tr>
</tbody>
</table>

**percent**: Undefined and MUST be ignored.

**reverse**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the icons in the icon set specified in **iconSet** are shown in reverse order. If **custom** equals "true" this value MUST be ignored.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The icons specified in <strong>iconSet</strong> are shown in reverse order.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The icons specified in <strong>iconSet</strong> are shown in the order defined by the icon set.</td>
</tr>
</tbody>
</table>

**custom**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether a custom set of icons is used. If this value is "true", there MUST be the same number of **cfIcon** elements as **cfvo** elements and the icons specified by the **cfIcon** elements are used rather than those specified by **iconSet**. If this value is "false", there MUST be 0 **cfIcon** elements.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>No custom set of icons is used.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>A custom set of icons is used.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_IconSet">
  <xsd:sequence>
    <xsd:element name="cfvo" type="CT_Cfvo" minOccurs="2" maxOccurs="unbounded"/>
    <xsd:element name="cfIcon" type="CT_CfIcon" minOccurs="0" maxOccurs="5"/>
  </xsd:sequence>
  <xsd:attribute name="iconSet" type="ST_IconSetType" use="optional" default="3TrafficLights1"/>
  <xsd:attribute name="showValue" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="percent" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="reverse" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="custom" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.29 CT_ColorScale


**Referenced by**: CT_CfRule

A complex type that specifies a **color scale** used in **conditional formatting**.

**Child Elements**:
**cfvo:** A **CT_Cfvo** element that specifies the **cell** values corresponding to the interpolation colors of the color scale. The **CT_ColorScale** MUST have either two or three child **CT_Cfvo** elements.

If there are two child **CT_Cfvo** elements present, the first child **CT_Cfvo** element specifies the cell value corresponding to the beginning color of the color scale. The second child **CT_Cfvo** element specifies the cell value corresponding to the end color of the color scale.

If there are three child **CT_Cfvo** elements present, the first child **CT_Cfvo** element specifies the cell value corresponding to the beginning color of the color scale. The second child **CT_Cfvo** element specifies the cell value corresponding to the midpoint color of the color scale. The third child **CT_Cfvo** element specifies the cell value corresponding to the end color of the color scale.

**color:** A **CT_Color** ([ISO/IEC29500-4:2016] section A.2) element that specifies the interpolation colors of the color scale for the **cfvo** element at the same corresponding position. The **CT_ColorScale** MUST have either two or three child **CT_Color** ([ISO/IEC29500-4:2016] section A.2) elements, and the number of child elements MUST equal the number of **CT_Cfvo** child elements.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ColorScale">
  <xsd:sequence>
    <xsd:element name="cfvo" type="CT_Cfvo" minOccurs="2" maxOccurs="unbounded"/>
    <xsd:element name="color" type="x:CT_Color" minOccurs="2" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.30 CT_DataBar

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** **CT_CfRule**

A complex type that specifies a **data bar** used in **conditional formatting**.

**Child Elements:**

**cfvo:** A **CT_Cfvo** element (section 2.6.26) that specifies the **cell** values corresponding to the min/max length of the data bar. If there exist **CT_Cfvo** ([ISO/IEC29500-4:2016] section A.2) elements in this **sheet** that are child elements of a **CT_DataBar** ([ISO/IEC29500-4:2016] section A.2) element that is a child of a **CT_CfRule** ([ISO/IEC29500-4:2016] section A.2) element that is a parent of a **CT_ExtensionList** ([ISO/IEC29500-4:2016] section A.2) element with a child **CT_Extension** ([ISO/IEC29500-4:2016] section A.2) element that has a child **ST_Guid** ([ISO/IEC29500-4:2016] section A.2) element equal to the **id** attribute of this complex type's parent **CT_CfRule** element (section 2.6.27), those **CT_Cfvo** elements SHOULD <12> be ignored. The first child **CT_Cfvo** element specifies the **condition** corresponding to the min length of the data bar. The second child **CT_Cfvo** element specifies the condition corresponding to the max length of the data bar.

**fillColor:** A **CT_Color** ([ISO/IEC29500-4:2016] section A.2) element that specifies the fill color of the data bar. This element MUST exist if and only if the **priority** attribute of the **CT_CfRule** that is a parent of this complex type exists.

**borderColor:** A **CT_Color** element that specifies the border color of the data bar. This element MUST exist if and only if **border** equals "true".
negativeFillColor: A CT_Color element that specifies the negative fill color of the data bar. This element MUST exist if and only if negativeBarColorSameAsPositive equals "false".

negativeBorderColor: A CT_Color element that specifies the negative border color of the data bar. This element MUST exist if and only if negativeBarBorderColorSameAsPositive equals "false" and border equals "true".

axisColor: A CT_Color element that specifies the axis color of the data bar. This element MUST exist if and only if axisPosition does not equal "none".

Attributes:

minLength: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the length of the shortest data bar in this conditional formatting range, expressed as a percentage of the width of the cell containing the data bar. MUST be greater than or equal to zero and less than or equal to maxLength. If, in this same worksheet part, there exists a CT_ExtensionList element that is a descendent of a CT_CfRule with a child CT_Extension element with the child ST_Guid element equal to the id attribute of the CT_CfRule element that is a parent of this element, and the minLength attribute of this element is zero ("0") and the maxLength attribute of this element is "100", the minLength attribute of the CT_DataBar element that is a descendent of the CT_CfRule element that is a parent of the CT_ExtensionList element that is a parent of the CT_Extension element with the child ST_Guid element equal to the id attribute of the CT_CfRule element that is a parent of this element MUST be "10". If in this same worksheet part there exists an CT_ExtensionList element that is a descendent of a CT_CfRule with a child CT_Extension element with the child ST_Guid element equal to the id attribute of the CT_CfRule element that is a parent of this element, and the minLength attribute of this element is not zero ("0") or the maxLength attribute of this element is not "100", the minLength attribute of the CT_DataBar element that is a descendent of the CT_CfRule element that is a parent of the CT_ExtensionList element that is a parent of the CT_Extension element with the child ST_Guid element that is equal to the id attribute of the CT_CfRule element that is a parent of this element MUST be equal to this complex type’s minLength.

maxLength: An unsignedInt attribute that specifies the length of the longest data bar in this conditional formatting range, expressed as a percentage of the width of the cell being formatted. MUST be greater than or equal to minLength and less than or equal to 100. If in this same worksheet part there exists a CT_ExtensionList element that is a descendent of a CT_CfRule with a child CT_Extension element with the child ST_Guid element equal to the id attribute of the CT_CfRule element that is a parent of this element, and the maxLength attribute of this element is zero ("0") and the minLength attribute of this element is "100", the maxLength attribute of the CT_DataBar element that is a descendent of the CT_CfRule element that is a parent of the CT_ExtensionList element that is a parent of the CT_Extension element with the child ST_Guid element that is equal to the id attribute of the CT_CfRule element that is a parent of this element MUST be "90". If, in this same worksheet part, there exists a CT_ExtensionList element that is a descendent of a CT_CfRule with a child CT_Extension element with the child ST_Guid element equal to the id attribute of the CT_CfRule element that is a parent of this element, and the minLength attribute of this element is not zero ("0") or the maxLength attribute of this element is not "100", the maxLength attribute of the CT_DataBar element that is a descendent of the CT_CfRule element that is a parent of the CT_ExtensionList element that is a parent of the CT_Extension element with the child ST_Guid element that is equal to the id attribute of the CT_CfRule element that is a parent of this element MUST be equal to this record’s maxLength.

showValue: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the cells in the conditional formatting range display both the data bar and the numeric value or only the data bar. The following table describes its possible values.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>Only the data bar is displayed in the cell.</td>
</tr>
<tr>
<td>Value</td>
<td>Meaning</td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>Both the data bar and the numeric value are displayed in the cell.</td>
</tr>
</tbody>
</table>

**border:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the data bar has a border.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The data bar has a border.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The data bar has no border.</td>
</tr>
</tbody>
</table>

**gradient:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the data bar has a gradient fill. The following table describes its possible values.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>The data bar fill is a solid color.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>The data bar fill is a gradient.</td>
</tr>
</tbody>
</table>

**direction:** An **ST_DataBarDirection** attribute (section 2.7.7) that specifies the direction of the data bar.

**negativeBarColorSameAsPositive:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the data bar has a negative bar color that is different from the positive bar color.

**negativeBarBorderColorSameAsPositive:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the data bar has a negative border color that is different from the positive border color.

**axisPosition:** An **ST_DataBarAxisPosition** attribute (section 2.7.8) that specifies the axis position for the data bar.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DataBar">
  <xsd:sequence>
    <xsd:element name="cfvo" type="CT_Cfvo" minOccurs="2" maxOccurs="2"/>
    <xsd:element name="fillColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="borderColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="negativeFillColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="negativeBorderColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="axisColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="minLength" type="xsd:unsignedInt" use="optional" default="10"/>
  <xsd:attribute name="maxLength" type="xsd:unsignedInt" use="optional" default="90"/>
  <xsd:attribute name="showValue" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="border" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="gradient" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="direction" type="ST_DataBarDirection" use="optional" default="context"/>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.31 CT_PivotField


Referenced by: pivotField

This complex type specifies additional properties of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) field.

Attributes:

**fillDownLabels:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the PivotTable ([ISO/IEC29500-1:2016] section 18.10) item labels are repeated for this PivotTable ([ISO/IEC29500-1:2016] section 18.10) field. This attribute is ignored when the compact attribute and the outline attribute of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) field are "true". This attribute is ignored if the PivotTable ([ISO/IEC29500-1:2016] section 18.10) field is not on the PivotTable ([ISO/IEC29500-1:2016] section 18.10) **row** axis or the PivotTable ([ISO/IEC29500-1:2016] section 18.10) **column** axis. This value MUST be one of the following:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>The item labels are not repeated.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>The item labels are repeated for each nested item.</td>
</tr>
</tbody>
</table>

**ignore:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this PivotTable ([ISO/IEC29500-1:2016] section 18.10) field SHOULD be ignored.

If this attribute is "true", the ancestor CT_PivotField ([ISO/IEC29500-4:2016] section A.2) MUST have only the following attributes specified, and these attributes MUST have the following values.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>compact</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>dataField</td>
<td>&quot;true&quot;</td>
</tr>
<tr>
<td>defaultSubtotal</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>dragOff</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>dragToCol</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>dragToData</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>dragToPage</td>
<td>&quot;false&quot;</td>
</tr>
<tr>
<td>dragToRow</td>
<td>&quot;false&quot;</td>
</tr>
</tbody>
</table>
If this attribute is equal to "true", there MUST exist a CT_DataField ([ISO/IEC29500-4:2016] section A.2) element with an fld attribute that specifies this PivotTable ([ISO/IEC29500-1:2016] section 18.10) field. Additionally, that CT_DataField ([ISO/IEC29500-4:2016] section A.2) element MUST have a descendant CT_DataField element with a sourceField attribute specified.

For more details, see CT_DataField.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotField">
  <xsd:attribute name="fillDownLabels" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="ignore" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.32 CT_PivotTableDefinition

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** pivotTableDefinition

This element specifies additional properties of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) view.

**Child Elements:**

- **pivotEdits:** A CT_PivotEdits element that specifies a collection of PivotTable What-if Analysis edits.
- **pivotChanges:** A CT_PivotChanges element that specifies a collection of PivotTable What-if Analysis changes.
- **conditionalFormats:** A CT_ConditionalFormats element that specifies a collection of conditional formats applied to the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view.

**Attributes:**

- **fillDownLabelsDefault:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies the behavior of PivotTable ([ISO/IEC29500-1:2016] section 18.10) fields that are not a part of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view if they are later added to a PivotTable ([ISO/IEC29500-1:2016] section 18.10) view. MUST be a value from the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
</table>

[MS-XLSX] - v20180801
Excel (.xlsx) Extensions to the Office Open XML SpreadsheetML File Format
Copyright © 2018 Microsoft Corporation
Release: August 1, 2018
visualTotalsForSets: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether hidden PivotTable ([ISO/IEC29500-1:2016] section 18.10) items will be included when calculating totals for PivotTable ([ISO/IEC29500-1:2016] section 18.10) named sets. MUST be a value from the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>Include hidden PivotTable ([ISO/IEC29500-1:2016] section 18.10) items in the set totals.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>Do not include hidden PivotTable ([ISO/IEC29500-1:2016] section 18.10) items in the set totals.</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
</table>

altText: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the alternate text for the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view. The string MUST be less than or equal to 2,000 characters in length.

altTextSummary: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the alternate text summary for the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view. This string MUST be less than or equal to 2,000 characters in length.
**enableEdit:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether PivotTable what-if analysis is enabled for the current PivotTable ([ISO/IEC29500-1:2016] section 18.10) view.

**autoApply:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether PivotTable what-if analysis values are automatically allocated.

**allocationMethod:** An `ST_AllocationMethod` attribute that specifies the allocation method to use for PivotTable what-if analysis.

**weightExpression:** An `ST_Xstring` ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the Multidimensional Expressions (MDX) of the weight expression for weighted allocations of PivotTable what-if analysis values. This string MUST be less than or equal to 65,535 characters in length.

**hideValuesRow:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the values row in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) report is visible.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>The values row in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) report is visible.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>The values row in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) report is not visible.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotTableDefinition">
  <xsd:sequence>
    <xsd:element name="pivotEdits" type="CT_PivotEdits" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="pivotChanges" type="CT_PivotChanges" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="conditionalFormats" type="CT_ConditionalFormats" minOccurs="0"/>
  </xsd:sequence>
  <xsd:attribute name="fillDownLabelsDefault" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="visualTotalsForSets" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="calculatedMembersInFilters" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="altText" type="x:ST_Xstring" use="optional" default="false"/>
  <xsd:attribute name="altTextSummary" type="x:ST_Xstring" use="optional" default="false"/>
  <xsd:attribute name="enableEdit" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="autoApply" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="allocationMethod" type="ST_AllocationMethod" use="optional" default="equalAllocation"/>
  <xsd:attribute name="weightExpression" type="x:ST_Xstring" use="optional" default="false"/>
  <xsd:attribute name="hideValuesRow" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.33 CT_PivotCacheDefinition

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** pivotCacheDefinition
A complex type that specifies the extended properties of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) **PivotCache** definition.

**Attributes:**

**slicerData:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the Slicer Cache Relationship to PivotCache. MUST be "true" if the OLAP PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache definition is being referenced by a slicer cache.

**pivotCacheId:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute which uniquely identifies this PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache. The value MUST be greater than or equal to zero. The value MUST NOT be zero if there is a slicer cache that uses this PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache as a data source, or if there is a CT_PivotCacheIdVersion element that is preceded by this element.

**supportSubqueryNonVisual:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the OLAP source data of this PivotTable ([ISO/IEC29500-1:2016] section 18.10) supports hidden PivotTable items.

**supportSubqueryCalcMem:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the OLAP source data of this PivotTable supports PivotTable calculated members in an OLAP subselect for filtering.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The OLAP source data of this PivotTable supports PivotTable calculated members in an OLAP subselect for filtering.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The OLAP source data of this PivotTable does not support PivotTable calculated members in an OLAP subselect for filtering.</td>
</tr>
</tbody>
</table>

**supportAddCalcMems:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether PivotTable ([ISO/IEC29500-1:2016] section 18.10) calculated members are shown for filtering.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```
<xsd:complexType name="CT_PivotCacheDefinition">
  <xsd:attribute name="slicerData" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="pivotCacheId" type="xsd:unsignedInt" use="optional" default="false"/>
  <xsd:attribute name="supportSubqueryNonVisual" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="supportSubqueryCalcMem" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="supportAddCalcMems" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.34 CT_Connection


Referenced by: connection

Child Elements:


Attributes:

**culture:** An `ST_Xstring` ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the language associated with this external connection ([ISO/IEC29500-1:2016] section 18.13). The length of this string MUST be less than 85 characters. If the length of this string is greater than 0, the contents of this string SHOULD be a language tag as specified by [RFC3066]. If this attribute is not present, the data connection is using the server language.

**embeddedDataId:** An `ST_Xstring` ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies an embedded Custom Data part. The length of this value MUST be less than 65,536 characters. If the length of this string is greater than 0, the contents of this string MUST be equal to the `id` attribute of a `CT_DatastoreItem` element, in a Custom Data Properties part in this package ([ISO/IEC29500-1:2016] section 9).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Connection">
  <xsd:sequence>
    <xsd:element name="calculatedMembers" type="x:CT_CalculatedMembers" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="culture" use="optional" type="x:ST_Xstring"/>
  <xsd:attribute name="embeddedDataId" use="optional" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.35 CT_Table

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** table

A complex type that specifies alternate text properties for the table.

Attributes:

**altText:** An `ST_Xstring` ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the alternate text for the table. The string MUST be less than or equal to 25,000 characters in length.

**altTextSummary:** An `ST_Xstring` ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the alternate text summary for the table. The string MUST be less than or equal to 50,000 characters in length.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Table">
</xsd:complexType>
```
<xsd:attribute name="altText" type="x:ST_Xstring" use="optional"/>
<xsd:attribute name="altTextSummary" type="x:ST_Xstring" use="optional"/>
</xsd:complexType>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.36 CT_CfIcon


Referenced by: CT_IconSet

A complex type that specifies a single icon of an icon set.

Attributes:

iconSet: An ST_IconSetType attribute that specifies the icon set.

iconId: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the icon to be used. If the icon set specified by iconSet has three icons, this value MUST be less than or equal to 2. If the icon set specified by iconSet has four icons, this value MUST be less than or equal to 3. If the icon set specified by iconSet has five icons, this value MUST be less than or equal to 4. If iconSet equals "NoIcons", this value MUST be 0.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xs:complexType name="CT_CfIcon">
  <xs:attribute name="iconSet" type="ST_IconSetType" use="required"/>
  <xs:attribute name="iconId" type="xsd:unsignedInt" use="required"/>
</xs:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.37 CT_PivotEdits


Referenced by: CT_PivotTableDefinition

A complex type that specifies user inputs related to PivotTable what-if analysis in single cells of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area. It also specifies the collections of MDX unique names that identify the values in the OLAP data source, and specifies the PivotTable ([ISO/IEC29500-1:2016] section 18.10) rules that can be used to identify the cells in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area.

Child Elements:

pivotEdit: A CT_PivotEdit element that specifies user input, related to PivotTable what-if analysis, in a single cell of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area, and specifies the collection of MDX unique names that identifies the value in the OLAP data source, and specifies a PivotTable ([ISO/IEC29500-1:2016] section 18.10) rule that can be used to identify the cell in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
<xsd:complexType name="CT_PivotEdits">
  <xsd:sequence>
    <xsd:element name="pivotEdit" minOccurs="1" maxOccurs="unbounded" type="CT_PivotEdit"/>
  </xsd:sequence>
</xsd:complexType>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.38 CT_PivotEdit


Referenced by: CT_PivotEdits

A complex type that specifies user input, related to PivotTable what-if analysis, in a single cell of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area.

Child Elements:

userEdit: A CT_PivotUserEdit element that specifies the user input value or formula that replaces the original cell value, in a single cell of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area.

tupleItems: A CT_TupleItems element that specifies the MDX unique names that identify the value in the OLAP data source that was changed using PivotTable what-if analysis.

pivotArea: A CT_PivotArea ([ISO/IEC29500-4:2016] section A.2) element that specifies a PivotTable ([ISO/IEC29500-1:2016] section 18.10) rule that can be used to identify the cell in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area.


The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

<xsd:complexType name="CT_PivotEdit">
  <xsd:sequence>
    <xsd:element name="userEdit" type="CT_PivotUserEdit" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="tupleItems" type="CT_TupleItems" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="pivotArea" type="x:CT_PivotArea" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.39 CT_PivotChanges


Referenced by: CT_PivotTableDefinition

A complex type that specifies the values used for PivotTable what-if analysis calculations and specifies the allocation methods for how to apply the values. It also specifies the collections of MDX unique names that identify the original values in the OLAP data source that were changed.

Child Elements:
pivotChange: A **CT_PivotChange** element that specifies the value used for PivotTable what-if analysis calculation and specifies the allocation method for how to apply the value. It also specifies a collection of MDX unique names that identifies the original value in the OLAP data source that was changed.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotChanges">
  <xsd:sequence>
    <xsd:element name="pivotChange" minOccurs="1" maxOccurs="unbounded" type="CT_PivotChange"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.40 CT_PivotChange

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_PivotChanges

A complex type that specifies the value used for PivotTable what-if analysis calculation and specifies the allocation method for how to apply the value. It also specifies a collection of **MDX unique names** that identifies the original value in the **OLAP data source** that was changed.

**Child Elements:**

- **editValue:** A **CT_PivotEditValue** element that specifies the value that replaces the original value in the OLAP data source for the PivotTable what-if analysis.

- **tupleItems:** A **CT_TupleItems** element that specifies the MDX unique names that identify the value in the OLAP data source that was changed using PivotTable what-if analysis.

- **extLst:** A **CT_ExtensionList** ([ISO/IEC29500-4:2016] section A.2) that specifies future extensibility for this element.

**Attributes:**

- **allocationMethod:** An **ST_AllocationMethod** attribute that specifies the allocation method, used by PivotTable what-if analysis, to change the value in the OLAP data source.

- **weightExpression:** An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the **OLAP weight expression** for PivotTable what-if analysis. The **weightExpression** MUST NOT exist if **allocationMethod** equals equalAllocation or equals equalIncrement. The **weightExpression** MUST be greater than or equal to 0 and less than or equal to 65,535 characters in length.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotChange">
  <xsd:sequence>
    <xsd:element name="editValue" type="CT_PivotEditValue" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="tupleItems" type="CT_TupleItems" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="allocationMethod" type="ST_AllocationMethod" default="equalAllocation"/>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.41 CT_PivotUserEdit


Referenced by: CT_PivotEdit

A complex type that specifies user input, related to PivotTable what-if analysis, in a single cell of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area.

Child Elements:

xm:f: An f element that specifies a formula. The formula MUST adhere to the grammar provided in Formulas, with the following restriction: The formula MUST NOT use the bang-reference or bang-name production rules.

editValue: A CT_PivotEditValue element that specifies the user input value that replaces the original cell value, in a single cell of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotUserEdit">
  <xsd:choice minOccurs="1" maxOccurs="1">
    <xsd:element ref="xm:f" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="editValue" type="CT_PivotEditValue" minOccurs="1" maxOccurs="1"/>
  </xsd:choice>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.42 CT_PivotEditValue


Referenced by: CT_PivotUserEdit, CT_PivotChange

A complex type that specifies the value type of the user input in the single cell of the PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, data area, or value type of the value that replaces the original value in the OLAP data source for PivotTable what-if analysis, as specified in section 2.3.1.

Attributes:

valueType: An ST_PivotEditValueType attribute, as specified in section 2.7.11, that specifies the type of the value of the user input or the type of the value that replaces the original value in the OLAP data source.

The length of the string MUST be greater than zero and MUST be less than 32,768 characters.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
<xsd:complexType name="CT_PivotEditValue">
  <xsd:simpleContent>
    <xsd:extension base="x:ST_Xstring">
      <xsd:attribute name="valueType" use="required" type="ST_PivotEditValueType"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.43 CT_TupleItems


*Referenced by:* CT_PivotEdit, CT_PivotChange

A complex type that specifies the **MDX unique names** that identify the value in the **OLAP data source** using PivotTable what-if analysis, as specified in section 2.3.1.

**Child Elements:**

- **tupleItem**: An **ST_Xstring** element, as specified in [ISO/IEC29500-1:2016] section 22.9.2.19, that specifies an MDX unique name. The number of these elements MUST be greater than zero and MUST be less than 2^31. The length of each **ST_Xstring** MUST be greater than zero and MUST be less than or equal to 65,535 characters.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TupleItems">
  <xsd:sequence>
    <xsd:element name="tupleItem" type="x:ST_Xstring" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.44 CT_SlicerStyle


*Referenced by:* CT_SlicerStyles

**CT_SlicerStyle** specifies table style elements, as specified in [ISO/IEC29500-1:2016] section 18.8, of the slicer style, as specified in section 2.3.2.4, that are specific to slicers, as specified in section 2.3.2.

**Child Elements:**

- **slicerStyleElements**: A **CT_SlicerStyleElements**, as specified in section 2.6.52, that specifies table style elements of the slicer style that are specific to slicers. There MUST NOT be more than one **CT_SlicerStyleElements** in this element.

**Attributes:**

- **name**: A **string** attribute, as specified in [XMLSCHEMA2] section 3.2.1, that specifies the name of the user-defined table style that this slicer style is based upon. The length of the **string** MUST be greater than or equal to 1 character and less than or equal to 255 characters. This **string** MUST be unique within the **CT SlicerStyle** elements in the **Styles** part, as specified in [ISO/IEC29500-1:2016] section...
12.3.20. This string MUST match the name attribute of a CT_TableStyle element, as specified in [ISO/IEC29500-4:2016] section A.2, in the Styles part. In the CT_TableStyle element with a name attribute that matches this string, the pivot attribute MUST equal "false" and the table attribute MUST equal "false".

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerStyle">
  <xsd:sequence>
    <xsd:element name="slicerStyleElements" type="CT_SlicerStyleElements" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.45 CT_SlicerStyleElement


Referenced by: CT_SlicerStyleElements

A complex type that specifies a table style element, as specified in [ISO/IEC29500-1:2016] section 18.8, of a slicer style, as specified in section 2.3.2.4.

Attributes:

- **type**: An ST_SlicerStyleType attribute, as specified in section 2.7.13, that specifies the type of the table style element. This attribute MUST be unique within the parent CT_SlicerStyleElements complex type.

- **dxfId**: An ST_DxfId attribute, as specified in [ISO/IEC29500-1:2016] section 18.18.25, that specifies a zero-based index for the list of elements specified by the dxfs global element, as specified in section 2.4.24. The specified CT_Dxf complex type, as specified in [ISO/IEC29500-4:2016] section A.2, specifies the formatting to use with this table style element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerStyleElement">
  <xsd:attribute name="type" type="ST_SlicerStyleType" use="required"/>
  <xsd:attribute name="dxfId" type="x:ST_DxfId" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.46 CT_OleItem


Referenced by: oleItem

OleItem is a complex type that specifies an OLE data item, as specified in [ISO/IEC29500-1:2016] section 18.14, with associated cached values.

Child Elements:
values: A **CT_DdeValues** element, as specified in [ISO/IEC29500-4:2016] section A.2, that specifies the cached values.

**Attributes:**

**name:** An **ST_Xstring** attribute, as specified in [ISO/IEC29500-1:2016] section 22.9.2.19, that specifies the name of the OLE data item.

**icon:** A **Boolean** attribute, as specified in [XMLSCHEMA2] section 3.2.2, that specifies whether the OLE data item is represented as an icon.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>The OLE data item is not represented as an icon.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>The OLE data item is represented as an icon.</td>
</tr>
</tbody>
</table>

**advise:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the application requests that the **OLE data source**, as specified in [ISO/IEC29500-1:2016] section 18.14, provides notifications when the source data changes.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>The application does not request to be notified when the source data changes.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>The application requests to be notified when the source data changes.</td>
</tr>
</tbody>
</table>

**preferPic:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the OLE data item is an image.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>The OLE data item is not an image.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>The OLE data item is an image.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OleItem">
  <xsd:sequence>
    <xsd:element name="values" type="x:CT_DdeValues" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="icon" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="advise" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="preferPic" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section **5.4** for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.47 CT_PivotHierarchy


Referenced by: pivotHierarchy

A complex type that specifies whether the ancestor CT_PivotHierarchy element, as specified in [ISO/IEC29500-4:2016] section A.2, SHOULD<15> be ignored.

The ancestor CT_PivotHierarchy element has the following restrictions on attributes.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>caption</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>dragOff</td>
<td>MUST equal &quot;false&quot;.</td>
</tr>
<tr>
<td>dragToCol</td>
<td>MUST equal &quot;false&quot;.</td>
</tr>
<tr>
<td>dragToData</td>
<td>MUST equal &quot;true&quot;.</td>
</tr>
<tr>
<td>dragToPage</td>
<td>MUST equal &quot;false&quot;.</td>
</tr>
<tr>
<td>dragToRow</td>
<td>MUST equal &quot;false&quot;.</td>
</tr>
<tr>
<td>includeNewItemsInFilter</td>
<td>MUST equal &quot;true&quot;.</td>
</tr>
<tr>
<td>multipleItemSelectionAllowed</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>outline</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>showInFieldList</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>subtotalTop</td>
<td>MUST NOT be specified.</td>
</tr>
</tbody>
</table>

The ancestor CT_PivotHierarchy element has the following restrictions on child elements.

<table>
<thead>
<tr>
<th>Child element</th>
<th>Restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT_PivotHierarchy (this element)</td>
<td>Exactly 1 MUST exist.</td>
</tr>
<tr>
<td>CT_Members (ISO/IEC29500-4:2016 section A.2)</td>
<td>MUST NOT exist.</td>
</tr>
<tr>
<td>CT_MemberProperties (ISO/IEC29500-4:2016 section A.2)</td>
<td>MUST NOT exist.</td>
</tr>
</tbody>
</table>


For more details, see section 2.6.25.

Attributes:
ignore: A Boolean attribute, as specified in [XMLSCHEMA2] section 3.2.2, that MUST be "true" and MUST be ignored.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotHierarchy">
  <xsd:attribute name="ignore" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.48 CT_CacheField

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** cacheField

This complex type specifies the ancestor CT_CacheField ([ISO/IEC29500-4:2016] section A.2) element that SHOULD `<16>` be ignored.

The following table lists the restrictions on attributes of the ancestor CT_CacheField element.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>caption</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>databaseField</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>formula</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>level</td>
<td>MUST equal &quot;32767&quot;.</td>
</tr>
<tr>
<td>mappingCount</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>memberPropertyField</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>numFmtId</td>
<td>MUST equal zero (&quot;0&quot;).</td>
</tr>
<tr>
<td>propertyName</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>serverField</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>sqlType</td>
<td>MUST NOT be specified.</td>
</tr>
<tr>
<td>uniqueList</td>
<td>MUST NOT be specified.</td>
</tr>
</tbody>
</table>

The following table lists the restrictions on child elements of the ancestor CT_CacheField element.

<table>
<thead>
<tr>
<th>Child element</th>
<th>Restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT_CacheField (this element)</td>
<td>Exactly 1 MUST exist.</td>
</tr>
</tbody>
</table>
If this element exists, there MUST exist a **CT_DataField** ([ISO/IEC29500-4:2016] section A.2) element with an `fld` attribute equal to the zero-based index of the ancestor **CT_CacheField** element in the list of **CT_CacheField** elements specified by **CT_CacheFields** ([ISO/IEC29500-4:2016] section A.2). Additionally, the **CT_DataField** element MUST have a descendant **CT_DataField** element (section 2.6.25) with a `sourceField` attribute specified. For more details, see **CT_DataField**

**Attributes:**

- **ignore**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that MUST be "true" and MUST be ignored.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CacheField">
  <xsd:attribute name="ignore" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.49 CT_ConditionalFormats

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by**: CT_PivotTableDefinition

This complex type specifies a collection of conditional formats applied to the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view.

**Child Elements:**

- **conditionalFormat**: A **CT_ConditionalFormat** element that specifies the conditional formatting applied to the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view.

**Attributes:**

- **count**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of `conditionalFormat` child elements of this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ConditionalFormats">
  <xsd:sequence>
    <xsd:element name="conditionalFormat" minOccurs="1" maxOccurs="unbounded" type="CT_ConditionalFormat"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.50 CT_ConditionalFormat

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2009/9/main
Referenced by: **CT_ConditionalFormats**

This complex type specifies the scope, type, and priority of **conditional formatting** applied to this **PivotTable** ([ISO/IEC29500-1:2016] section 18.10) view.

**Child Elements:**

- **pivotAreas**: A **CT_PivotAreas** ([ISO/IEC29500-4:2016] section A.2) element that specifies a set of PivotTable areas this conditional formatting applies to.

- **extLst**: A **CT_ExtensionList** ([ISO/IEC29500-4:2016] section A.2) element that specifies future extensibility for this element.

**Attributes:**

- **scope**: An **ST_Scope** ([ISO/IEC29500-1:2016] section 18.18.67) attribute that specifies the scope of this conditional formatting.

- **type**: An **ST_Type** ([ISO/IEC29500-1:2016] section 18.18.84) attribute that MUST NOT be present or MUST be equal to "none".

- **priority**: An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that specifies the priority of the PivotTable conditional formatting. This value MUST be greater than or equal to 1. If this attribute is present, there MUST exist a **CT_CfRule** with a priority attribute equal to the value of this field and it MUST be the same **CT_CfRule** element that is specified by **id**. The **CT_CfRule** specified by this value MUST have an ancestor **CT_ConditionalFormatting** element with a pivot attribute equal to "true".

- **id**: An **ST_Guid** ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a particular **CT_CfRule**. There MUST exist a **CT_CfRule** with an id attribute equal to this value and it MUST be the same **CT_CfRule** element that is specified by priority.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xs:complexType name="CT_ConditionalFormat">
  <xs:sequence>
    <xs:element name="pivotAreas" type="x:CT_PivotAreas" minOccurs="0" maxOccurs="1"/>
    <xs:element name="extLst" minOccurs="0" maxOccurs="1" type="x:CT_ExtensionList"/>
  </xs:sequence>
  <xs:attribute name="scope" type="x:ST_Scope" default="selection" use="optional"/>
  <xs:attribute name="type" type="x:ST_Type" default="none" use="optional"/>
  <xs:attribute name="priority" use="optional" type="xsd:unsignedInt"/>
  <xs:attribute name="id" type="x:ST_Guid" use="required"/>
</xs:complexType>
```

See section **5.4** for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.51 CT_SlicerStyles

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

Referenced by: **slicerStyles**

A complex type that specifies a group of **slicer styles** and the default slicer style to apply to **slicers**.

**Child Elements:**

- **slicerStyle**: A **CT_SlicerStyle** element that specifies a slicer style.

**Attributes:**
**defaultSlicerStyle**: A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the default slicer style to apply to slicers. The length of the string MUST be greater than or equal to 1 character and less than or equal to 255 characters.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerStyles">
  <xsd:sequence>
    <xsd:element name="slicerStyle" type="CT_SlicerStyle" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="defaultSlicerStyle" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

**2.6.52 CT_SlicerStyleElements**


*Referenced by:* CT_SlicerStyle

A complex type that specifies the list of table style ([ISO/IEC29500-1:2016] section 18.8) elements of a slicer style that are specific to slicers.

*Child Elements:*

**slicerStyleElement**: A CT_SlicerStyleElement element that specifies a table style ([ISO/IEC29500-1:2016] section 18.8) element of a slicer style that is specific to slicers.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerStyleElements">
  <xsd:sequence>
    <xsd:element name="slicerStyleElement" type="CT_SlicerStyleElement" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

**2.6.53 CT_IgnoredErrors**


*Referenced by:* ignoredErrors

A complex type that specifies a list of cell ranges and the types of cell errors that are to be ignored for each of those specific cell ranges.

*Child Elements:*

**ignoredError**: A CT_IgnoredError element that specifies the types of cell errors that are to be ignored for a specific cell range.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_IgnoredErrors">
  <xsd:sequence>
    <xsd:element name="ignoredError" type="CT_IgnoredError" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.54 CT_IgnoredError

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_IgnoredErrors

A complex type that specifies the types of cell errors that are to be ignored for a specific cell range. This complex type is equivalent to CT_IgnoredError ([ISO/IEC29500-1:2016] section 18.3.1.50), but allows the sqref child element to have greater than or equal to 8,192 ref child elements.

**Child Elements:**

- **xm: rqref:** A sqref element that specifies the range where cell errors have been ignored. This sqref MUST have greater than or equal to 8,192 ref child elements.

**Attributes:**

- **evalError:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to ignore calculation errors.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Ignore calculation errors.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Do not ignore calculation errors.</td>
</tr>
</tbody>
</table>

- **twoDigitTextYear:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to ignore errors arising from the formatting of date/time values.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Ignore errors arising from the formatting of data/time values.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Do not ignore errors arising from the formatting of data/time values.</td>
</tr>
</tbody>
</table>

- **numberStoredAsText:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to ignore errors arising from the formatting of numeric values.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Ignore errors arising from the formatting of numeric values.</td>
</tr>
<tr>
<td>Value</td>
<td>Meaning</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Do not ignore errors arising from the formatting of numeric values.</td>
</tr>
</tbody>
</table>

**formula**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to ignore errors arising from formulas that are inconsistent with formulas ([ISO/IEC29500-1:2016] section 18.17) in neighboring cells.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Ignore errors arising from formulas that are inconsistent with formulas ([ISO/IEC29500-1:2016] section 18.17) in neighboring cells.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Do not ignore errors arising from formulas that are inconsistent with formulas ([ISO/IEC29500-1:2016] section 18.17) in neighboring cells.</td>
</tr>
</tbody>
</table>

**formulaRange**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to ignore errors arising from formulas ([ISO/IEC29500-1:2016] section 18.17) that contain references to less than the entirety of a range containing contiguous data.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Ignore errors arising from formulas ([ISO/IEC29500-1:2016] section 18.17) that contain references to less than the entirety of a range containing contiguous data.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Do not ignore errors arising from formulas ([ISO/IEC29500-1:2016] section 18.17) that contain references to less than the entirety of a range containing contiguous data.</td>
</tr>
</tbody>
</table>

**unlockedFormula**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to ignore errors arising from unprotected formulas ([ISO/IEC29500-1:2016] section 18.17).

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
</table>

**emptyCellReference**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to ignore errors arising from references to empty cells.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Ignore errors arising from references to empty cells.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Do not ignore errors arising from references to empty cells.</td>
</tr>
</tbody>
</table>

**listDataValidation**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether to ignore errors arising from **data validation**.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>Do not ignore errors arising from calculated column (2) formulas ([ISO/IEC29500-1:2016] section 18.17).</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_IgnoredError">
  <xsd:sequence>
    <xsd:element ref="xm:sqref" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="evalError" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="twoDigitTextYear" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="numberStoredAsText" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="formula" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="formulaRange" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="unlockedFormula" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="emptyCellReference" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="listDataValidation" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="calculatedColumn" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.55 CT_ProtectedRanges


Referenced by: protectedRanges

A complex type that specifies a group of protected ranges on the sheet. MUST contain fewer than $2^{31}$ elements.

Child Elements:

protectedRange: A CT_ProtectedRange element that specifies the properties for a single protected range.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
<xsd:complexType name="CT_ProtectedRanges">
  <xsd:sequence>
    <xsd:element name="protectedRange" type="CT_ProtectedRange" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.56 CT_ProtectedRange

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_ProtectedRanges

A complex type that specifies a **cell range** to be unprotected. The cell range is editable with a password or proper **credentials** when **sheet protection** is on and the cell is **locked**.

**Child Elements:**

- **xml:sqref:** A `sqref` element that specifies the cell range to be unprotected.

**Attributes:**

- **password:** An `ST_UnsignedShortHex` ([ISO/IEC29500-4:2016] section 15.7.2) attribute that specifies the verifier value of the password required for editing the cell range. If the value is 0x0000, then there is no password.

  The verifier value is calculated in two stages. First, the provided **Unicode** password string is converted to a new character string in the ANSI code page of the current system by using the algorithm specified in the `revisionsPassword` attribute in [ISO/IEC29500-1:2016] section 18.2.29. Second, this string is input into the **XOR obfuscation** algorithm specified in [MS-OFFCRYPTO] section 2.3.7.1 to produce a 16-bit password verifier value.

  This attribute MUST NOT be present if `algorithmName` is present.

- **algorithmName:** An `ST_Xstring` ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the **hash** algorithm used to calculate `hashValue`. If this attribute is present, `hashValue`, `saltValue`, and `spinCount` MUST also be present. This attribute MUST NOT be present if `password` is present.

- **hashValue:** A `base64Binary` ([XMLSCHEMA2] section 3.2.16) attribute that specifies the hash value for the password required to edit this range. This value will be compared with the resulting hash value after hashing the user-supplied password by using the algorithm specified by `algorithmName`, and if the two values match, the protection will no longer be enforced.

  Password hashes are computed by the algorithm specified in [MS-OFFCRYPTO] section 2.4.2.4. Under some circumstances, the password is first converted to a 16-bit verifier value and reinterpreted as a single Unicode character, which is then passed to the algorithm specified in [MS-OFFCRYPTO] section 2.4.2.4. There is no way to determine which method was used to generate a hash without knowledge of the password; it is necessary to compute both hashes to verify the password.

  This attribute MUST be present if and only if `algorithmName` is present.

- **saltValue:** A `base64Binary` ([XMLSCHEMA2] section 3.2.16) attribute that specifies the **salt** used to calculate `hashValue`. This attribute MUST be present if and only if `algorithmName` is present.

- **spinCount:** An `unsignedInt` ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of times that the hash function was iterated over the password to generate the `hashValue`. It MUST
NOT be greater than 10,000,000. This attribute MUST be present if and only if algorithmName is present.

**name:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the title of the cell range. The value MUST be unique for the sheet. The number of characters in the string MUST be greater than or equal to 1, and less than or equal to 255. The string MUST conform to the following Augmented Backus-Naur Form (ABNF) ([RFC5234]) grammar:

```
string =  name-start-character *name-character
name-start-character = "_" / "\" / Unicode-character
name-character =  name-start-character / Unicode-space / Unicode-digit / "?" / "."
```

The following points summarize this grammar:

- Unicode-character is any code point that is a character as defined by the Unicode character properties, [UNICODE5.1] chapter 4.
- Unicode-digit is any code point that is a digit as defined by the Unicode character properties, [UNICODE5.1] chapter 4.
- Unicode-space is any code point that is a space as defined by the Unicode character properties, [UNICODE5.1] chapter 4.

**securityDescriptor:** A string ([XMLSCHEMA2] section 3.2.1) attribute that describes a security descriptor ([MS-AZOD] section 1.1.1.3) that lists users who can edit the cell range without providing the password.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ProtectedRange">
  <xsd:sequence maxOccurs="1">
    <xsd:element ref="xm:sqref" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="password" type="x:ST_UnsignedShortHex" use="optional"/>
  <xsd:attribute name="algorithmName" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="hashValue" type="xsd:base64Binary" use="optional"/>
  <xsd:attribute name="saltValue" type="xsd:base64Binary" use="optional"/>
  <xsd:attribute name="spinCount" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="securityDescriptor" type="xsd:string" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.57 CT_IconFilter

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** iconFilter

This complex type specifies the icon set and particular icon within that set to filter by. Rows with a cell icon that do not match these criteria will be hidden when the filter is applied.

**Attributes:**

- **iconSet:** An ST_IconSetType attribute that specifies the icon set used as the filter criteria.
**iconId**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the index of the icon to be used as filter criteria. If **iconSet** is "NoIcons", this value MUST be 0 and this record does not specify a filter and MUST be ignored. If **iconSet** is not "NoIcons", this value MUST be greater than or equal to 0. If the icon set specified by **iconSet** has three icons, this value MUST be less than or equal to 2. If the icon set specified by **iconSet** has four icons, this value MUST be less than or equal to 3. If the icon set specified by **iconSet** has five icons, this value MUST be less than or equal to 4.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_IconFilter">
  <xsd:attribute name="iconSet" type="ST_IconSetType" use="required"/>
  <xsd:attribute name="iconId" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.58 CT_Filter

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by**: filter

This complex type specifies a filter criterion. **Rows** that contain a **cell** within the filter **range** that have value **val** will not be hidden by this **filter** criterion. **Rows** that do not contain such a cell inside a **filters** element ([ISO/IEC29500-1:2016] section 18.3.2.8) will be hidden.

**Attributes**:

- **val**: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the value to be used as a filter criterion. The length of this value MUST be less than 65536 characters.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Filter">
  <xsd:attribute name="val" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.59 CT_CustomFilters

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by**: customFilters

This complex type specifies custom filter criteria. **Rows** that contain a **cell** within the filter **range** such that the value does not meet the custom filter criteria will be hidden.

**Child Elements**:

- **customFilter**: A CT_CustomFilter element that specifies a custom filter criterion.

**Attributes**:

- **and**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies the relationship between custom filter criterion. This attribute only applies when there are two criteria.
### Value | Meaning
--- | ---
"false" | The two criteria are related by an OR relationship. That is, for a cell value to meet the custom filter criteria, at least one criterion specified by the `customFilter` child elements MUST be met.

"true" | The two criteria are related by an AND relationship. That is, for a cell value to meet the custom filter criteria, both criteria specified by the `customFilter` child elements MUST be met.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CustomFilters">
  <xsd:sequence>
    <xsd:element name="customFilter" type="CT_CustomFilter" minOccurs="1" maxOccurs="2"/>
  </xsd:sequence>
  <xsd:attribute name="and" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.60 CT_CustomFilter

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_CustomFilters

This complex type specifies a custom filter criterion.

**Attributes:**

- **operator:** An ST_FilterOperator ([ISO/IEC29500-1:2016] section 18.18.31) attribute that specifies the operator of the custom filter criterion.

- **val:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the value to be used as a custom filter criterion. The length of this value MUST be less than 65536 characters.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CustomFilter">
  <xsd:attribute name="operator" type="x:ST_FilterOperator" default="equal" use="optional"/>
  <xsd:attribute name="val" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.61 CT_SortCondition

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_RichSortCondition, sortCondition

A complex type that specifies a sort condition to apply to a range.

**Attributes:**

- **descending:** A boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies the direction of the sort.
### Value | Meaning
--- | ---
"false" | If `sortBy` is "value", sort in ascending order. If `sortBy` is "cellColor" or "fontColor", cells in which the cell color or cell font color specified by `dxFId` occurs are ordered at the top of the range. If `sortBy` is "icon", cells in which the icon specified by `iconSet` and `iconId` occurs are ordered at the top of the range.

"true" | If `sortBy` is "value", sort in descending order. If `sortBy` is "cellColor" or "fontColor", cells in which the cell color or cell font color specified by `dxFId` occurs are ordered at the bottom of the range. If `sortBy` is "icon", cells in which the icon specified by `iconSet` and `iconId` occurs are ordered at the bottom of the range.

**sortBy:** An `ST_SortBy` ([ISO/IEC29500-1:2016] section 18.18.72) attribute that specifies how the cells in a range are sorted.

**ref:** An `ST_Ref` ([ISO/IEC29500-1:2016] section 18.18.62) attribute that specifies the row or column to which this sort condition applies. This value MUST be contained within the `ref` in the `sortState` ([ISO/IEC29500-1:2016] section 18.3.1.92) element that precedes this element. If the `sortState.columnSort` attribute that precedes this element is "false", this value specifies the column to which this sort condition applies and there MUST be only a single column specified by `ref`. If the `sortState.columnSort` attribute that precedes this element is "true", this value specifies the row to which this sort condition applies and there MUST be only a single row specified by `ref`.

**customList:** An `ST_Xstring` ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies a comma-delimited list of strings that specifies a custom sort order. The order of strings in the list specifies the sort order. When a cell value matches a string in the list, it is sorted ahead of the cell values that match a later string in the list, and so on for each cell in the range. MUST be ignored if `sortBy` is not equal to "value".

**dxFId:** An `ST_DxFId` ([ISO/IEC29500-1:2016] section 18.18.25) attribute that specifies the format identifier when `sortBy` equals "cellColor" or `sortBy` equals "fontColor". MUST NOT be present if `sortBy` equals "icon" or "value".

**iconSet:** An `ST_IconSetType` attribute that specifies the icon set when `sortBy` equals "icon". The absence of this attribute means no icon. MUST NOT be present if `sortBy` is not equal to "icon".

**iconId:** An `unsignedInt` ([XMLSCHEMA2] section 3.3.22) attribute that specifies the zero-based index of an icon in an icon set. If the icon set specified by `iconSet` has three icons, this value MUST be less than or equal to 2. If the icon set specified by `iconSet` has four icons, this value MUST be less than or equal to 3. If the icon set specified by `iconSet` has five icons, this value MUST be less than or equal to 4. The absence of this attribute means no icon. MUST NOT be present if `sortBy` is not equal to "icon".

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xs:complexType name="CT_SortCondition">
    <xs:attribute name="descending" type="xsd:boolean" use="optional" default="false"/>
    <xs:attribute name="sortBy" type="x:ST_SortBy" use="optional" default="value"/>
    <xs:attribute name="ref" type="x:ST_Ref" use="required"/>
    <xs:attribute name="customList" type="x:ST_Xstring" use="optional"/>
    <xs:attribute name="dxFId" type="x:ST_DxFId" use="optional"/>
    <xs:attribute name="iconSet" type="x:ST_IconSetType" use="optional" default="3Arrows"/>
    <xs:attribute name="iconId" type="xsd:unsignedInt" use="optional"/>
</xs:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.62 CT_SourceConnection


Referenced by: CT_CacheSourceExt, sourceConnection

A complex type that stores the connection, which is specified by the CT_Connection element as specified in [ISO/IEC29500-4:2016] section A.2, that is associated with this pivot cache. The pivot cache MUST be associated with either an OLAP slicer cache or a Non-Worksheet PivotTable.

Attributes:

name: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the connection, which is specified by the name attribute of CT_Connection ([ISO/IEC29500-4:2016] section A.2) for the connection that is associated with this pivot cache. The length, in characters, of this value MUST be less than 65,536.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SourceConnection">
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.63 CT_ListItem


Referenced by: CT_ListItems

A complex type that stores a single item for a list box or a drop-down form control.<17>

Attributes:

val: A string attribute, as specified in [XMLSCHEMA2] section 3.2.1, that specifies the data for a single item.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ListItem">
  <xsd:attribute name="val" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.64 CT_ListItems


Referenced by: CT_FormControlPr

A complex type that contains a list of items of type CT_ListItem, as specified in section 2.6.63, to populate a list box or a drop-down form control. When present, the FmlaRange attribute of CT_FormControlPr, as specified in section 2.6.65, takes precedence over this element. This element is valid only for list box and drop-down form control.
Child Elements:

**item**: A **CT_ListItem** element that contains a single data item for a list box or drop-down form control.

**extLst**: A **CT_ExtensionList** element, as specified in ([ISO/IEC29500-4:2016](#)) section A.2, that specifies future extensibility for this element.

The following W3C XML Schema ([XMLSCHEMA1/2](#)) section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ListItems">
  <xsd:sequence>
    <xsd:element name="item" type="CT_ListItem" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2](#)) section 2.1).

### 2.6.65 CT_FormControlPr

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by**: formControlPr

A complex type that stores a form control’s properties.

Child Elements:

**itemLst**: A **CT_ListItems** element, as specified in section 2.6.64, that specifies a list of items to populate a list box or drop-down form control.

**extLst**: A **CT_ExtensionList** element, as specified in [ISO/IEC29500-4:2016](#) section A.2, that specifies future extensibility for this element.

Attributes:

**objectType**: An **ST_ObjectType** attribute that specifies the form control object type.

**checked**: An **ST_Checked** attribute that specifies whether a check box is selected or a radio button is selected. This attribute only applies to check box and radio button form controls.

**colored**: A **Boolean** ([XMLSCHEMA2](#)) section 3.2.2) attribute that specifies whether a drop-down object has a color applied to it. This attribute only applies to drop-down form controls.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>A drop-down object has a color applied to it.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>A drop-down object has no color applied to it.</td>
</tr>
</tbody>
</table>

**dropLines**: An **unsignedInt** ([XMLSCHEMA2](#)) section 3.3.22) attribute that specifies the number of lines in the drop-down before scroll bars are added. This attribute only applies to drop-down form controls. This value MUST be at least 0 and at most 30000.

**dropStyle**: An **ST_DropStyle** attribute that specifies the style of the drop-down. This attribute only applies to drop-down form controls.
**dx**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the width of the scroll bar in pixels. This attribute only applies to list boxes, scroll bars, spin boxes and drop-downs<sup>18</sup>.

**firstButton**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the object is the first button in a set of radio buttons. This attribute only applies to radio button form controls.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The object is the first button in a set of radio buttons.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The object is not the first button in a set of radio buttons.</td>
</tr>
</tbody>
</table>

**fmlaGroup**: An ST_Formula ([ISO/IEC29500-1:2016] section 18.18.35) attribute that specifies the cell an object in a group box is linked to. This attribute overrides the attribute fmlaLink for any radio buttons within a group box. This attribute only applies to group box form controls. The application can choose to remove and not save this element and use the attribute fmlaLink of the first radio button in the group. This attribute MUST be a cell reference (see [ISO/IEC29500-1:2016] section 18.17.2.3).

**fmlaLink**: An ST_Formula ([ISO/IEC29500-1:2016] section 18.18.35) attribute that specifies the cell the object is linked to. This attribute only applies to check boxes, radio buttons, scroll bars, spin boxes, drop-downs and list boxes. The value in the linked cell and the index of the selected item in the object are linked together. This link is ignored if the form control allows multiple selections. This attribute MUST be a cell reference (see [ISO/IEC29500-1:2016] section 18.17.2.3).

**fmlaRange**: An ST_Formula ([ISO/IEC29500-1:2016] section 18.18.35) attribute that specifies the range of source data cells. This is used to populate a list box or a drop-down form control<sup>19</sup>. This attribute only applies to list box and drop-down form controls. This attribute MUST be a cell reference (see [ISO/IEC29500-1:2016] section 18.17.2.3).

**fmlaTxbx**: An ST_Formula ([ISO/IEC29500-1:2016] section 18.18.35) attribute that specifies the source data cell that the form control object’s data is linked to. Any cell range can be specified but only the first cell in the range is considered. This attribute applies only to label and edit box form controls. This attribute MUST be a cell reference (see [ISO/IEC29500-1:2016] section 18.17.2.3).

**horiz**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the scroll bar is horizontal. This attribute only applies to scroll bar form controls.

**inc**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the change in the current value of a scroll bar or a spin box form control as a result of on an increment click. If present, it MUST be at least 0 and at most 30000. This attribute applies only to scroll bar or spin box form controls.

**justLastX**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the last line in text is justified when in an East Asian alignment<sup>20</sup>.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The last line in text is justified when in an East Asian alignment.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>the last line in text is not justified when in an East Asian alignment.</td>
</tr>
</tbody>
</table>

**lockText**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the object’s text is locked. This attribute applies only to button, radio button, check box and label form controls.
max: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the maximum value generated by the scroll bar (when scrolled all the way down) or by the spin box. It MUST be at least 0 and at most 30000. This attribute only applies to scroll bars and spin boxes.

min: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the minimum value generated by the scroll bar (when scrolled all the way up) or by the spin box. It MUST be at least 0 and at most 30000. This attribute only applies to scroll bars and spin box.

multiSel: A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies the indices of selected items as a comma-delimited list. The list indices are one-based. This attribute is valid only if the attribute selType has the value "multi". This attribute applies only to list box form controls.

noThreeD: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether 3-D effects are disabled. This attribute only applies to check box, radio button, group box, scroll bar, drop-down, list box, and spin box form controls.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The 3-D effects are disabled.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The 3-D effects are enabled.</td>
</tr>
</tbody>
</table>

noThreeD2: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether 3-D effects are disabled. This element is used for drop-downs and list boxes.<21>

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The 3-D effects are disabled.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The 3-D effects are enabled.</td>
</tr>
</tbody>
</table>

page: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of items to move the scroll bar or spin box on a page click. It MUST be at least 0 and at most 30000.<22>

sel: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the index of the selected item. The list indices are one-based. If set to a value of 0, no items are selected. This attribute applies only to list box and drop-down form controls.

seltype: An ST_SelType attribute that specifies the selection type for the list box. This attribute applies only to list box form controls.

textHAlign: An ST_TextHAlign attribute that specifies the horizontal text alignment for the object.<23>

textVAlign: An ST_TextVAlign attribute that specifies the vertical text alignment for the object.<24>
val: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of top rows currently hidden in the scroll bar. If omitted, the value is assumed to be 0. Those rows are hidden but still accessible by clicking the scroll bar buttons. The number of top hidden rows can change as the user interacts with the scroll bar. This attribute only applies to scroll bar, spin box, list box, and drop-down form controls.

widthMin: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the smallest width allowed for the drop-down box window in screen pixels. This attribute only applies for drop-down form controls.

editVal: An ST_EditValidation attribute that specifies how the edit box content is validated if the application chooses to validate it. This attribute only applies to edit box form controls.

multiLine: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the form control is multiline. This attribute only applies to edit box form controls. This attribute only works when the form control is run in a dialog box.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The form control is multiline.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The form control is singleline.</td>
</tr>
</tbody>
</table>

verticalBar: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the control has a vertical scroll bar. This attribute only applies to edit box form controls. This attribute only works when the form control is run in a dialog box.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The control has a vertical scroll bar.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The control has no vertical scroll bar.</td>
</tr>
</tbody>
</table>

passwordEdit: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the edit box control stores a password. In this case the control will display * for every character on it. This attribute only applies to edit box form controls. This attribute only works when the control is run in a dialog box.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The edit box control stores a password.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The edit box control does not store password.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_FormControlPr">
  <xsd:sequence>
    <xsd:element name="itemLst" type="CT_ListItems" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="objectType" type="ST_ObjectType" use="optional"/>
  <xsd:attribute name="checked" type="ST_Checked" use="optional"/>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.66 CT_DatastoreItem


Referenced by: datastoreItem

A complex type that specifies properties for an embedded custom data part.

Child Elements:


Attributes:

id: An ST_Xstring attribute, as specified in ([ISO/IEC29500-1:2016] section 22.9.2.19, that specifies the identifier for the associated Custom Data storage. The value of the string is used to identify the associated Custom Data storage, and the value of the string MUST be unique for each Custom Data storage in the workbook. The length of this value MUST be less than 65536 characters.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DatastoreItem">
    <xsd:sequence>
        <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
    <xsd:attribute name="id" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.67 CT_Slicers

**Target namespace:** http://schemas.microsoft.com_office/spreadsheetml/2009/9/main

**Referenced by:** slicers

A complex type that specifies a list of CT_Slicer elements, as specified in section 2.6.69. The list of CT_Slicer elements specifies all slicer views on the worksheet.

**Child Elements:**

- **slicer:** A CT_Slicer element that specifies a slicer view on the worksheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Slicers">
  <xsd:sequence>
    <xsd:element name="slicer" type="CT_Slicer" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.68 CT_Slicer

**Target namespace:** http://schemas.microsoft.com_office/spreadsheetml/2009/9/main

**Referenced by:** CT_Slicers

A complex type that specifies a slicer view, as specified in section 2.3.2.2, in this worksheet.

**Child Elements:**

- **extLst:** A CT_ExtensionList element, a specified in [ISO/IEC29500-4:2016] section A.2, that specifies future extensibility for this element.

**Attributes:**

- **name:** An ST_Xstring attribute, as specified in [ISO/IEC29500-1:2016] section 22.9.2.19, that specifies the name of the slicer view. MUST be a unique case-insensitive name within the scope of this workbook. The length of this attribute MUST be greater than or equal to 1 character and MUST be less than or equal to 32767 characters.

- **xr10:uid:** An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies the unique id of the slicer view. If any instance of this type specifies this attribute, then all instances MUST specify it, and the values MUST be distinct.

- **cache:** An ST_Xstring attribute that specifies the name of the slicer cache, as specified in section 2.3.2.1, that this slicer view is associated with. There MUST be a CT_SlicerCacheDefinition element, as specified in section 2.6.70, within this workbook with the name attribute equal to the value of this attribute.

- **caption:** An ST_Xstring attribute that specifies the caption of the slicer view. If this string exists, the length MUST be greater than or equal to 1 character.
**startItem:** An unsignedInt attribute, as specified in [XMLSCHEMA2] section 3.3.22, that specifies the zero-based index of the first slicer item, as specified in section 2.3.2.1.6, displayed by the slicer view.

**columnCount:** An unsignedInt attribute that specifies the number of columns in the slicer view. MUST be greater than or equal to 1 and MUST be less than or equal to 20000.

**showCaption:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the caption is displayed.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The caption is displayed.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The caption is suppressed.</td>
</tr>
</tbody>
</table>

**level:** An unsignedInt attribute that specifies the OLAP level of the OLAP hierarchy of the slicer source data used by this slicer view.

If the slicer source data is OLAP, the value MUST be greater than or equal to 0 and MUST be less than count of the CT_OlapSlicerCacheLevelsData element specified by the CT_SlicerCacheDefinition element specified by cache. If the OLAP hierarchy has an OLAP All level, the value MUST NOT be 0.

If the slicer source data is non-OLAP, this attribute MUST NOT exist.

**style:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the slicer style of the slicer view. If this field exists, this string MUST match the name attribute of a CT_SlicerStyle element within this workbook or MUST be equal to one of the built-in slicer style names:

<table>
<thead>
<tr>
<th>Built-in slicer style names</th>
</tr>
</thead>
<tbody>
<tr>
<td>SlicerStyleLight1</td>
</tr>
<tr>
<td>SlicerStyleLight2</td>
</tr>
<tr>
<td>SlicerStyleLight3</td>
</tr>
<tr>
<td>SlicerStyleLight4</td>
</tr>
<tr>
<td>SlicerStyleLight5</td>
</tr>
<tr>
<td>SlicerStyleLight6</td>
</tr>
<tr>
<td>SlicerStyleOther1</td>
</tr>
<tr>
<td>SlicerStyleOther2</td>
</tr>
<tr>
<td>SlicerStyleDark1</td>
</tr>
<tr>
<td>SlicerStyleDark2</td>
</tr>
<tr>
<td>SlicerStyleDark3</td>
</tr>
<tr>
<td>SlicerStyleDark4</td>
</tr>
<tr>
<td>SlicerStyleDark5</td>
</tr>
<tr>
<td>SlicerStyleDark6</td>
</tr>
</tbody>
</table>
lockedPosition: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the slicer view is locked.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The slicer view is locked.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The slicer view is not locked.</td>
</tr>
</tbody>
</table>

rowHeight: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the row height of the slicer view in English Metric Units (EMUs).

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Slicer">
  <xsd:sequence>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
  <xsd:attribute ref="xr10:uid" use="optional"/>
  <xsd:attribute name="cache" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="caption" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="startItem" type="xsd:unsignedInt" use="optional" default="0"/>
  <xsd:attribute name="columnCount" type="xsd:unsignedInt" use="optional" default="1"/>
  <xsd:attribute name="showCaption" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="level" type="xsd:unsignedInt" use="optional" default="0"/>
  <xsd:attribute name="style" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="lockedPosition" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="rowHeight" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.69 CT_Slicer


Referenced by: slicer

This complex type specifies which slicer view is associated with this drawing element.

Child Elements:


Attributes:

name: A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the slicer view that is associated with this drawing element. The value of this attribute MUST match the value of the name attribute of a slicer element within the CT_Slicers element for the current worksheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
<xsd:complexType name="CT_Slicer">
  <xsd:sequence>
    <xsd:element name="extLst" type="a:CT_OfficeArtExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

See section 5.2 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

**2.6.70 CT_SlicerCacheDefinition**


*Referenced by:* slicerCacheDefinition

A complex type that specifies a slicer cache.

*Child Elements:*

- **pivotTables:** A CT_SlicerCachePivotTables element (section 2.6.72) that specifies a group of CT_SlicerCachePivotTable elements (section 2.6.73) that specify the PivotTable ([ISO/IEC29500-1:2016] section 18.10) views that are filtered by the slicer cache (section 2.1.4).

- **data:** A CT_SlicerCacheData element (section 2.6.71) that specifies a data source for the slicer cache.

- **extLst:** A CT_ExtensionList element, as specified in [ISO/IEC29500-4:2016] section A.2, that specifies future extensibility for this element.

*Attributes:*

- **name:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the slicer cache. MUST adhere to the name production rule provided in section 2.2.2. MUST be a unique case-insensitive name within the scope of defined names.

- **xr10:uid:** An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies the unique id of the slicer cache. If any instance of this type specifies this attribute, then all instances MUST specify it, and the values MUST be distinct.

- **sourceName:** An ST_Xstring attribute that specifies the MDX unique name or PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache field of the associated PivotTable PivotCache used by the slicer cache.

- If the slicer source data (section 2.3.2.1.1) is a non-OLAP data source, the value of this attribute MUST be equal to the name attribute of a CT_CacheField ([ISO/IEC29500-4:2016] section A.2) element in the list of cache fields, as specified in section 2.3.2.1.2, and specify a PivotTable cache field. The specified CT_CacheField MUST have a serverField attribute equal to "false". The includeNewItemsInFilter attributes of the CT_PivotField element with a zero-based index in the list of CT_PivotHierarchies specified by the CT_PivotHierarchies element in the list of CT_CacheHierarchies elements specified by...
CT_CacheHierarchies ([ISO/IEC29500-4:2016] section A.2) MUST have an includeNewItemsInFilter attribute equal to "false".

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerCacheDefinition">
  <xsd:sequence>
    <xsd:element name="pivotTables" type="CT_SlicerCachePivotTables" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="data" type="CT_SlicerCacheData" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
  <xsd:attribute ref="xr10:uid" use="optional"/>
  <xsd:attribute name="sourceName" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.71 CT_SlicerCacheData


Referenced by: CT_SlicerCacheDefinition

A complex type that specifies a data source for the slicer cache.

Child Elements:

- **olap**: A CT_OlapSlicerCache element that specifies an OLAP data source.
- **tabular**: A CT_TabularSlicerCache element that specifies a non-OLAP data source.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerCacheData">
  <xsd:choice minOccurs="1" maxOccurs="1">
    <xsd:element name="olap" type="CT_OlapSlicerCache" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="tabular" type="CT_TabularSlicerCache" minOccurs="1" maxOccurs="1"/>
  </xsd:choice>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.72 CT_SlicerCachePivotTables


Referenced by: slicerCachePivotTables, CT_SlicerCacheDefinition

A complex type that specifies a group of CT_SlicerCachePivotTable elements that specify the PivotTable ([ISO/IEC29500-1:2016] section 18.10) views that are filtered by the slicer cache.

Child Elements:

- **pivotTable**: A CT_SlicerCachePivotTable element that specifies the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view that is filtered. The list of pivotTable child elements MUST NOT contain
duplicates. The `showCalcMbrs` attribute of all `CT_PivotTableDefinition` ([ISO/IEC29500-4:2016] section A.2) elements associated with PivotTables ([ISO/IEC29500-1:2016] section 18.10) that are specified by `pivotTable` child elements MUST have the same value.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerCachePivotTables">
  <xsd:sequence>
    <xsd:element name="pivotTable" type="CT_SlicerCachePivotTable" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.73 CT_SlicerCachePivotTable

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main  
**Referenced by:** CT_SlicerCachePivotTables

A complex type that specifies a PivotTable ([ISO/IEC29500-1:2016] section 18.10) view filtered by a slicer cache.

**Attributes:**

- **tabId:** An `unsignedInt` ([XMLSCHEMA2] section 3.3.22) attribute that specifies the unique identifier (UID) of the worksheet that contains the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view specified by the `name` attribute. MUST match the `sheetId` of an existing `sheet` ([ISO/IEC29500-4:2016] section A.2) element within the `workbook`. MUST be ignored if the PivotTable specified by the `name` attribute is a Non-Worksheet PivotTable.

- **name:** An `ST_Xstring` ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view on the worksheet specified by `tabId` or a Non-Worksheet PivotTable. MUST match the `name` attribute of an existing `pivotTableDefinition` element in the worksheet. The `createdVersion` attribute of the `CT_PivotTableDefinition` ([ISO/IEC29500-4:2016] section A.2) element that defines the specified PivotTable ([ISO/IEC29500-1:2016] section 18.10) MUST be greater than or equal to 3. Field `showCalcMbrs` of all PivotTable ([ISO/IEC29500-1:2016] section 18.10) MUST have the same value. Field `calculatedMembersInFilters` of `CT_PivotTableDefinition` of all PivotTable ([ISO/IEC29500-1:2016] section 18.10) MUST have the same value.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerCachePivotTable">
  <xsd:attribute name="tabId" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.74 CT_OlapSlicerCacheItem

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main  
**Referenced by:** CT_OlapSlicerCacheRange
This element specifies an **OLAP slicer item** of the **OLAP level** in the **OLAP hierarchy** specified by the ancestor **CT_OlapSlicerCacheLevelData** element. This element contains a list of all ancestor **OLAP members** of this OLAP slicer item in the OLAP hierarchy.

**Child Elements:**

- **p:** A **CT_OlapSlicerCacheItemParent** element that specifies the OLAP members that are ascendants of the OLAP slicer item specified by this element. The first element in this list specifies the OLAP member that is the parent of the OLAP slicer item specified by this element. Each subsequent element in this list specifies an ascendant OLAP member in the next level up the OLAP hierarchy.

**Attributes:**

- **n:** An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the **MDX unique name** of the OLAP member associated with the OLAP slicer item specified by this element.

- **c:** An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the caption of the OLAP slicer item specified by this element.

- **nd:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the OLAP slicer item specified by this element has no data associated with it. This attribute MUST NOT exist if the **crossFilter** attribute of the ancestor element **CT_OlapSlicerCacheLevelData** is "none". For more information, see **Slicer Cross Filtering**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OlapSlicerCacheItem">
  <xsd:sequence>
    <xsd:element name="p" type="CT_OlapSlicerCacheItemParent" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="n" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="c" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="nd" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.75 CT_OlapSlicerCacheItemParent

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_OlapSlicerCacheItem, CT_OlapSlicerCacheSelection

This element specifies an ancestor **OLAP member** of the OLAP member specified by **CT_OlapSlicerCacheItem** or **CT_OlapSlicerCacheSelection** element that contains this element.

**Attributes:**

- **n:** An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the **MDX unique name** of the OLAP member specified by this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OlapSlicerCacheItemParent">
  <xsd:attribute name="n" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.76 CT_OlapSlicerCacheRange


Referenced by: CT_OlapSlicerCacheRanges

A complex type that specifies a collection of cached OLAP slicer items in the OLAP level specified by the ancestor CT_OlapSlicerCacheLevelData element.

Child Elements:

i: A CT_OlapSlicerCacheItem element that specifies an OLAP slicer item in the OLAP level specified by the CT_OlapSlicerCacheLevelData element that is part of this range. The number of CT_OlapSlicerCacheItem child elements MUST be greater than 0 and equal to or less than 1,000.

Attributes:

startItem: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the zero-based index of the OLAP member on this OLAP level for the first item in this range. The order of the OLAP slicer item is determined by the current sort order and current slicer cross filtering setting applied to all OLAP slicer items on this OLAP level. The value of the starting position MUST be 0 or MUST be a multiple of 1,000. See Slicer Items for more information.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OlapSlicerCacheRange">
  <xsd:sequence>
    <xsd:element name="i" type="CT_OlapSlicerCacheItem" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="startItem" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.77 CT_OlapSlicerCacheRanges


Referenced by: CT_OlapSlicerCacheLevelData

A complex type that specifies the cached OLAP slicer items for the OLAP level specified by the CT_OlapSlicerCacheLevelData element.

Child Elements:

range: A CT_OlapSlicerCacheRange element that specifies a range of OLAP slicer items for this OLAP level within the OLAP hierarchy specified by this slicer cache.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OlapSlicerCacheRanges">
  <xsd:sequence>
    <xsd:element name="range" type="CT_OlapSlicerCacheRange" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.78 CT_OlapSlicerCacheLevelData


Referenced by: CT_OlapSlicerCacheLevelsData

A complex type that specifies the properties of an OLAP level in the OLAP hierarchy specified by this slicer cache and specifies the OLAP members that are cached for this OLAP level within the OLAP hierarchy specified by this slicer cache.

Child Elements:

ranges: A CT_OlapSlicerCacheRanges element that specifies cached OLAP slicer items for the OLAP level specified by this element.

Attributes:

uniqueName: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the MDX unique name of the OLAP level specified by this element within the OLAP hierarchy specified with this slicer cache. The length of this string MUST be at least 1 character and MUST NOT exceed 32,767 characters.

caption: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the caption of the OLAP level specified by this element within the OLAP hierarchy specified with this cache. The length of this string MUST NOT exceed 65,535 characters.

count: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the total number of OLAP members in the OLAP data source in this OLAP level within the OLAP hierarchy specified by this slicer cache. The default value is zero.

crossFilter: An ST_SlicerCacheCrossFilter attribute that specifies how the OLAP slicer items that are used in slicer cross filtering are displayed.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OlapSlicerCacheLevelData">
  <xsd:sequence>
    <xsd:element name="ranges" type="CT_OlapSlicerCacheRanges" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="uniqueName" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="sourceCaption" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="required" default="natural"/>
  <xsd:attribute name="sortOrder" type="ST_OlapSlicerCacheSortOrder" use="optional" default="natural"/>
  <xsd:attribute name="crossFilter" type="ST_SlicerCacheCrossFilter" use="optional" default="showItemsWithDataAtTop"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.79 CT_OlapSlicerCacheLevelsData


Referenced by: CT_OlapSlicerCache

A complex type that specifies a list of OLAP levels of the OLAP hierarchy specified by this slicer cache.

Child Elements:

level: A CT_OlapSlicerCacheLevelData element that specifies properties of an OLAP level in the OLAP hierarchy specified by this slicer cache.

Attributes:

count: An unsignedInt ([XMLSHEMA2] section 3.3.22) attribute that specifies the number of level child elements of this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OlapSlicerCacheLevelsData">
  <xsd:sequence>
    <xsd:element name="level" type="CT_OlapSlicerCacheLevelData" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.80 CT_OlapSlicerCache


Referenced by: CT_SlicerCacheData


Child Elements:

levels: A CT_OlapSlicerCacheLevelsData element that specifies a list of OLAP levels of the OLAP hierarchy specified by this slicer cache.

selections: A CT_OlapSlicerCacheSelections element that specifies a list of OLAP Slicer Items that are selected.


Attributes:

pivotCacheId: An unsignedInt ([XMLSHEMA2] section 3.3.22) attribute that specifies the associated OLAP PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache. MUST be equal to the pivotCacheId attribute of an existing CT_PivotCacheDefinition element.
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OlapSlicerCache">
  <xsd:sequence>
    <xsd:element name="levels" type="CT_OlapSlicerCacheLevelsData" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="selections" type="CT_OlapSlicerCacheSelections" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="pivotCacheId" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.81 CT_OlapSlicerCacheSelections

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_OlapSlicerCache

A complex type that specifies the OLAP slicer items that are selected in the slicer cache.

**Child Elements:**

- **selection:** A CT_OlapSlicerCacheSelection element that specifies an OLAP slicer item that is selected in the slicer cache.

**Attributes:**

- **count:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of selection child elements of this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OlapSlicerCacheSelections">
  <xsd:sequence>
    <xsd:element name="selection" type="CT_OlapSlicerCacheSelection" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.82 CT_OlapSlicerCacheSelection

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_OlapSlicerCacheSelections

A complex type that specifies an individual OLAP slicer item that is selected for filtering. This complex type also specifies the ancestor OLAP members of the OLAP member associated with the OLAP slicer item in the OLAP hierarchy.

**Child Elements:**

---
CT_OlapSlicerCacheItemParent element that specifies OLAP members that are the ancestors of the OLAP member associated with the OLAP slicer item specified by this element. The first element in this list specifies the OLAP member that is the parent of the OLAP member associated with the OLAP slicer item specified by this element. Each subsequent element in this list specifies an ancestor OLAP member in the next level up the OLAP hierarchy, excluding the OLAP All member.

Attributes:

n: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the MDX unique name of the OLAP member associated with the OLAP slicer item specified by this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OlapSlicerCacheSelection">
  <xsd:sequence>
    <xsd:element name="p" type="CT_OlapSlicerCacheItemParent" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="n" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.83 CT_TabularSlicerCache


Referenced by: CT_SlicerCacheData

A complex type that specifies non-OLAP slicer items that are cached within this slicer cache and properties of the slicer cache specific to non-OLAP slicer items.

Child Elements:

items: A CT_TabularSlicerCacheItems element that specifies non-OLAP slicer items that are cached within this slicer cache.


Attributes:

pivotCacheId: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the associated non-OLAP PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache. MUST match the pivotCacheId attribute of an existing CT_PivotCacheDefinition element.

sortOrder: An ST_TabularSlicerCacheSortOrder attribute that specifies how the non-OLAP slicer items are sorted in the slicer view.

customListSort: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether custom lists are used when sorting the non-OLAP slicer items.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>Custom lists are not used when sorting the non-OLAP slicer items.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>Custom lists are used when sorting the non-OLAP slicer items.</td>
</tr>
</tbody>
</table>
**showMissing:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether non-OLAP slicer items that correspond to unused PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache items that existed previously, but are no longer present in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) source data, are displayed.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>The unused non-OLAP slicer items are not displayed.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>The unused non-OLAP slicer items are displayed.</td>
</tr>
</tbody>
</table>

**crossFilter:** An ST_SlicerCacheCrossFilter attribute that specifies how the non-OLAP slicer items that are used in slicer cross filtering are displayed.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TabularSlicerCache">
  <xsd:sequence>
    <xsd:element name="items" type="CT_TabularSlicerCacheItems" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="pivotCacheId" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="sortOrder" type="ST_TabularSlicerCacheSortOrder" use="optional" default="ascending"/>
  <xsd:attribute name="customListSort" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="showMissing" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="crossFilter" type="ST_SlicerCacheCrossFilter" use="optional" default="showItemsWithDataAtTop"/>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.84 CT_TabularSlicerCacheItems

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_TabularSlicerCache

A complex type that specifies non-OLAP slicer items that are cached within this slicer cache.

**Child Elements:**

- **i:** A CT_TabularSlicerCacheItem element that specifies a non-OLAP slicer item that is cached within this slicer cache. All CT_TabularSlicerCacheItem elements within this slicer cache MUST have unique x attributes. At least one CT_TabularSlicerCacheItem element MUST have s attribute be "true".

**Attributes:**

- **count:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of i child elements of this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
<xsd:complexType name="CT_TabularSlicerCacheItems">
  <xsd:sequence>
    <xsd:element name="i" type="CT_TabularSlicerCacheItem" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
</xsd:complexType>

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.85 CT_TabularSlicerCacheItem


Referenced by: CT_TabularSlicerCacheItems

A complex type that specifies a non-OLAP slicer item that is cached within this slicer cache.

Attributes:

x: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies an index of the associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache item in the associated PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache field. MUST be within the range of items as specified by the count attribute of the CT_PivotCacheRecords ([ISO/IEC29500-4:2016] section A.2) element of the associated non-OLAP PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache specified by the pivotCacheId attribute of the CT_TabularSlicerCache element that is an ancestor of this element.

s: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether a non-OLAP slicer item is selected.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>A non-OLAP slicer item is selected.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>A non-OLAP slicer item is not selected.</td>
</tr>
</tbody>
</table>

nd: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether a non-OLAP slicer item does not have data associated with it. This attribute MUST NOT exist if the crossFilter attribute of the CT_TabularSlicerCache element is equal to "none". For more information, see Slicer Cross Filtering.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>A non-OLAP slicer item does not have data associated with it.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>A non-OLAP slicer item has data associated with it.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TabularSlicerCacheItem">
  <xsd:attribute name="x" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="s" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="nd" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.86 CT_PivotTableReferences

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** pivotTableReferences

A complex type that specifies a list of PivotTable ([ISO/IEC29500-1:2016] section 18.10) part identifiers for Non-Worksheet PivotTables. MUST contain fewer than 2⁳¹ elements.

**Child Elements:**

**pivotTableReference:** A CT_PivotTableReference element that specifies a PivotTable part identifier of a Non-Worksheet PivotTable.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotTableReferences">
  <xsd:sequence>
    <xsd:element name="pivotTableReference" type="CT_PivotTableReference" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.87 CT_PivotTableReference

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** CT_PivotTableReferences

A complex type that specifies a relationship identifier to a PivotTable ([ISO/IEC29500-1:2016] section 18.10) part in this workbook. The PivotTable specified by the element pivotTableDefinition ([ISO/IEC29500-1:2016] section 18.10.1.73) identified by this type MUST be a Non-Worksheet PivotTable and MUST satisfy the following criteria.

- The enableEdit attribute of the CT_PivotTableDefinition element, as specified in section 2.6.32, MUST NOT exist or MUST be "false" if exists; CT_PivotEdits and CT_PivotChanges elements MUST NOT exist in this part.
- The PivotTable name specified by the name attribute of the element pivotTableDefinition ([ISO/IEC29500-1:2016] section 18.10.1.73), MUST be unique among all the PivotTables in the workbook.
- There MUST be a child CT_PivotCache ([ISO/IEC29500-4:2016] section A.2) element within the pivotCaches element, specified by section 2.4.39, with the attribute cacheID having the same value as the cacheID attribute of the element pivotTableDefinition ([ISO/IEC29500-1:2016] section 18.10.1.73).
- The PivotTable MUST NOT have CT_ConditionalFormats element as specified by section 2.6.49.
Attributes:

**r:id:** An **ST_RelationshipId** ([ISO/IEC29500-1:2016] section 22.8.2.1) attribute that specifies a relationship identifier to a PivotTable part in this workbook.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotTableReference">
    <xsd:attribute ref="r:id" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.88 CT_QueryTable

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** queryTable


**Attributes:**

- **clipped:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether a query table ([ISO/IEC29500-1:2016] section 18.12) did not fit to worksheet and was clipped.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>A query table ([ISO/IEC29500-1:2016] section 18.12) did not fit to the worksheet and was clipped.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>A query table ([ISO/IEC29500-1:2016] section 18.12) did not fit to the worksheet and was not clipped.</td>
</tr>
</tbody>
</table>

- **sourceDataName:** A **string** ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the primary data connection for the query table. For more details, see **connection** ([ISO/IEC29500-1:2016] section 18.13.1).

- **drillThrough:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether a query table ([ISO/IEC29500-1:2016] is a result of drillthrough operation on OLAP data source.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_QueryTable">
    <xsd:attribute name="clipped" use="optional" default="false" type="xsd:boolean"/>
    <xsd:attribute name="sourceDataName" type="xsd:string" use="optional"/>
    <xsd:attribute name="drillThrough" use="optional" default="false" type="xsd:boolean"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.89 CT_WebExtensions


Referenced by: webExtensions

A complex type that specifies a list of CT_WebExtension elements. The list of CT_WebExtension elements specifies all the bindings for web extensions, as specified by [MS-OWXML] section 1.3, on the worksheet.

Child Elements:

webExtension: A CT_WebExtension element that specifies a binding for a web extension, as specified by [MS-OWXML] section 1.3, on the worksheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_WebExtensions">
  <xsd:sequence>
    <xsd:element name="webExtension" type="CT_WebExtension" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.90 CT_WebExtension


Referenced by: CT_WebExtensions

A complex type that specifies a binding for a web extension, as specified by [MS-OWXML] section 1.3, on the worksheet.

Child Elements:

xm:f: An f element that specifies the data range for the Binding. The formula MUST adhere to the grammar specified in Section Formulas, with the following restrictions:

- MUST follow the ref-nospace-expression rule.
- MUST NOT use the bang-reference, bang-name, sheet-range-reference, or local-cell-reference production rules.

Attributes:

appRef: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies a unique identifier for a binding for a web extension. This value MUST be equal to the appref field of a CT_OsfWebExtensionBinding element as specified by [MS-OWXML] section 2.2.3.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_WebExtension">
  <xsd:sequence>
    <xsd:element ref="xm:f" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="appRef" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```
See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.91 CT_Connection


Referenced by: connection

A complex type that specifies the extended properties of an external connection ([ISO/IEC29500-1:2016] section 18.13). See section 2.2.4.1 for how this element integrates with the Office Open XML file formats specified in [ISO/IEC29500-1:2016].

Child Elements:


If this element is present, then the type attribute of the ancestor CT_Connection element, as specified in [ISO/IEC29500-4:2016] section A.2, MUST be equal to "103".

modelTextPr: A CT_ModelTextPr element that specifies a data model data source text importation ([MS-XLSB] section 2.2.8.9.4) properties in addition to those specified in textPr element.

If this element is present, then:

- the type attribute of the ancestor CT_Connection element, as specified in [ISO/IEC29500-4:2016] section A.2, MUST be equal to "103".

- Ancestor CT_Connection element MUST contain textPr element.

rangePr: A CT_RangePr element that specifies data model data source Worksheet Data connection ([MS-XLSB] section 2.2.8.9.3) properties.

If this element is present, then the type attribute of the ancestor CT_Connection element, as specified in [ISO/IEC29500-4:2016] section A.2, MUST be equal to "102".

oledbPr: A CT_OledbPr element that specifies data model data source OLE DB connection ([MS-XLSB] section 2.2.8.9.1) properties.

If this element is present, then the type attribute of the ancestor CT_Connection element, as specified in [ISO/IEC29500-4:2016] section A.2, MUST be equal to "100".

dataFeedPr: A CT_DataFeedPr element that specifies data model data source Data Feed connection ([MS-XLSB] section 2.2.8.9.2) properties.

If this element is present, then the type attribute of the ancestor CT_Connection element, as specified in [ISO/IEC29500-4:2016] section A.2, MUST be equal to "101".

Attributes:

id: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the identifier of the Data Model data source. The string MUST be less than or equal to 65535 characters in length. The string length MUST be equal to zero characters if the model attribute equals "true".

model: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this connection is a connection to the spreadsheet data model. If this element equals "true", the type attribute of the
ancestor **CT_Connection** element, as specified in [ISO/IEC29500-4:2016] section A.2, MUST be equal to "5".

**excludeFromRefreshAll**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this connection is not to be refreshed on Refresh All.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>This connection is not to be refreshed on Refresh All.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>This connection is to be refreshed on Refresh All.</td>
</tr>
</tbody>
</table>

**autoDelete**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this connection will be automatically deleted when all data features which use it are deleted.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>This connection will be automatically deleted when all data features that use it are deleted.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>This connection will not be automatically deleted when all data features that use it are deleted.</td>
</tr>
</tbody>
</table>

**usedByAddin**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this connection is used by an addin component and will not be deleted with any data feature that uses it.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>This connection is used by an addin component.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>This connection is not used by an addin component.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Connection">
  <xsd:sequence>
    <xsd:element name="textPr" minOccurs="0" maxOccurs="1" type="x:CT_TextPr"/>
    <xsd:element name="modelTextPr" minOccurs="0" maxOccurs="1" type="CT_ModelTextPr"/>
    <xsd:element name="rangePr" minOccurs="0" maxOccurs="1" type="CT_RangePr"/>
    <xsd:element name="oledbPr" minOccurs="0" maxOccurs="1" type="CT_OledbPr"/>
    <xsd:element name="dataFeedPr" minOccurs="0" maxOccurs="1" type="CT_DataFeedPr"/>
  </xsd:sequence>
  <xsd:attribute name="id" use="required" type="x:ST_Xstring"/>
  <xsd:attribute name="model" type="xsd:boolean" default="false" use="optional"/>
  <xsd:attribute name="excludeFromRefreshAll" type="xsd:boolean" default="false" use="optional"/>
  <xsd:attribute name="autoDelete" type="xsd:boolean" default="false" use="optional"/>
  <xsd:attribute name="usedByAddin" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.92 CT_CalculatedMemberExt

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main
This element adds an element for supporting new properties for calculated members.

**Child Elements:**

**calculatedMember:** A **CT_CalculatedMember** (section 2.6.93) element that specifies a definition for a custom member or measure that is applied to a pivot table.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CalculatedMemberExt">
  <xsd:sequence>
    <xsd:element ref="calculatedMember" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.93 CT_CalculatedMember

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** CT_CalculatedMemberExt, calculatedMember

This element adds new properties for supporting calculated members.

**Attributes:**

- **measureGroup:** An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the measure group that this calculated member is associated with if **measure** is TRUE.

- **numberFormat:** An **ST_CalcMemNumberFormat** (see section 2.7.25) attribute that specifies the formatting type of the calculated member.

- **measure:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this calculated member is also a calculated measure.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>This calculated member is also a calculated measure.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>This calculated member is not a calculated measure.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CalculatedMember">
  <xsd:attribute name="measureGroup" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="numberFormat" type="ST_CalcMemNumberFormat" use="optional" default="default"/>
  <xsd:attribute name="measure" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.94 CT_FieldListActiveTabTopLevelEntity


Referenced by: CT_PivotTableUISettings

A complex type which specifies a top level object in the hierarchy of objects displayed in the PivotTable field list.

Attributes:

name: A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies name of the object in the PivotTable field list.

type: An unsignedInt attribute that specifies the type of this top level object. MUST be specified. MUST be one of the values in the following table:

<table>
<thead>
<tr>
<th>Value</th>
<th>Object Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>OLAP Dimension. The name attribute of this element MUST be the MDX unique name of the dimension.</td>
</tr>
<tr>
<td>1</td>
<td>Workbook Table. The name attribute of this element MUST be the name of the workbook table.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_FieldListActiveTabTopLevelEntity">
  <xsd:attribute name="name" use="required" type="xsd:string"/>
  <xsd:attribute name="type" use="optional" default="0" type="xsd:unsignedInt"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.95 CT_PivotFilter


Referenced by: pivotFilter


Attributes:

useWholeDay: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the filter ([ISO/IEC29500-1:2016] section 18.10.1.33) element extended by this type uses whole days in its filtering criteria. MUST be false for filters for which the value of the attribute type ([ISO/IEC29500-1:2016] section 18.10.1.33) is not one of the values mentioned in the table below. MUST be true if the value of the name attribute of the containing CT_PivotTableDefinition ([ISO/IEC29500-4:2016] section A.2) element is equal to the value of the name (section 2.6.114) attribute of at least one CT_TimelineCachePivotTable (section 2.6.114) element in the Timeline cache (section 2.1.7) and the value of the attribute type of the containing filter element is one of the following.
<table>
<thead>
<tr>
<th>Enumeration Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dateBetween (Date Between)</td>
</tr>
<tr>
<td>dateEqual (Date Equals)</td>
</tr>
<tr>
<td>dateNewerThan (Date Newer Than)</td>
</tr>
<tr>
<td>dateNewerThanOrEqual (Date Newer Than or Equal To)</td>
</tr>
<tr>
<td>dateNotBetween (Date Not Between)</td>
</tr>
<tr>
<td>dateNotEqual (Date Does Not Equal)</td>
</tr>
<tr>
<td>dateOlderThan (Date Older Than)</td>
</tr>
<tr>
<td>dateOlderThanOrEqual (Date Older Than Or Equal)</td>
</tr>
<tr>
<td>lastMonth (Last Month)</td>
</tr>
<tr>
<td>lastQuarter (Last Quarter)</td>
</tr>
<tr>
<td>lastWeek (Last Week)</td>
</tr>
<tr>
<td>lastYear (Last Year)</td>
</tr>
<tr>
<td>M1 (Dates in January)</td>
</tr>
<tr>
<td>M10 (Dates in October)</td>
</tr>
<tr>
<td>M11 (Dates in November)</td>
</tr>
<tr>
<td>M12 (Dates in December)</td>
</tr>
<tr>
<td>M2 (Dates in February)</td>
</tr>
<tr>
<td>M3 (Dates in March)</td>
</tr>
<tr>
<td>M4 (Dates in April)</td>
</tr>
<tr>
<td>M5 (Dates in May)</td>
</tr>
<tr>
<td>M6 (Dates in June)</td>
</tr>
<tr>
<td>M7 (Dates in July)</td>
</tr>
<tr>
<td>M8 (Dates in August)</td>
</tr>
<tr>
<td>M9 (Dates in September)</td>
</tr>
<tr>
<td>nextMonth (Next Month)</td>
</tr>
<tr>
<td>nextQuarter (Next Quarter)</td>
</tr>
<tr>
<td>nextWeek (Next Week)</td>
</tr>
<tr>
<td>nextYear (Next Year)</td>
</tr>
<tr>
<td>percent (Percent)</td>
</tr>
<tr>
<td>Q1 (First Quarter)</td>
</tr>
<tr>
<td>Q2 (Second Quarter)</td>
</tr>
<tr>
<td>Q3 (Third Quarter)</td>
</tr>
<tr>
<td>Enumeration Value</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Q4 (Fourth Quarter)</td>
</tr>
<tr>
<td>sum (Sum)</td>
</tr>
<tr>
<td>thisMonth (This Month)</td>
</tr>
<tr>
<td>thisQuarter (This Quarter)</td>
</tr>
<tr>
<td>thisWeek (This Week)</td>
</tr>
<tr>
<td>thisYear (This Year)</td>
</tr>
<tr>
<td>today (Today)</td>
</tr>
<tr>
<td>tomorrow (Tomorrow)</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```
<xsd:complexType name="CT_PivotFilter">
  <xsd:attribute name="useWholeDay" type="xsd:boolean" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.96 CT_PivotTableUISettings

**Target namespace:** http://schemas.microsoft.com_office/spreadsheetml/2010/11/main

**Referenced by:** pivotTableUISettings

Specifies state for user interface used to construct and manipulate a PivotTable.

**Child Elements:**

- **activeTabTopLevelEntity:** A CT_FieldListActiveTabTopLevelEntity element that specifies a **field** that appears in the user’s working set of fields in the PivotTable field list.

- **extLst:** A CT_ExtensionList ([ISO/IEC29500-4:2016] section A.2) element that specifies future extensibility for this element.

**Attributes:**

- **sourceDataName:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the primary data connection for the PivotTable. See connection ([ISO/IEC29500-1:2016] section 18.13.1)

- **relNeededHidden:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the user closed the relationship warning for this PivotTable.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```
<xsd:complexType name="CT_PivotTableUISettings">
  <xsd:sequence>
    ...
  </xsd:sequence>
</xsd:complexType>
```
<xsd:element name="activeTabTopLevelEntity" type="CT_FieldListActiveTabTopLevelEntity" minOccurs="0" maxOccurs="unbounded"/>
<xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
</xsd:sequence>
<xsd:attribute name="sourceDataName" type="xsd:string" use="optional"/>
<xsd:attribute name="relNeededHidden" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.97 CT_TableSlicerCache


Referenced by: tableSlicerCache

A complex type that specifies properties of the slicer cache specific to table slicer items.

Child Elements:


Attributes:

tableId: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the associated Table ([ISO/IEC29500-1:2016] section 18.5.1.2). MUST match id attribute of an existing Table ([ISO/IEC29500-1:2016] section 18.5.1.2) element.

column: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies associated Table Column ([ISO/IEC29500-1:2016] section 18.5.1.3). MUST match id attribute of an existing tableColumn element representing a column in Table specified by the tableId attribute.

sortOrder: An ST_TabularSlicerCacheSortOrder attribute that specifies how the table slicer items are sorted in the slicer view.

customListSort: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether custom lists are used when sorting the table slicer items.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>Custom lists are not used when sorting the table slicer items.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>Custom lists are used when sorting the table slicer items.</td>
</tr>
</tbody>
</table>

crossFilter: An ST_SlicerCacheCrossFilter attribute that specifies how the table slicer items that are used in slicer cross filtering are displayed.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TableSlicerCache">
  <xsd:sequence>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="tableId" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="column" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```
<xsd:attribute name="sortOrder" type="x14:ST_TabularSlicerCacheSortOrder" use="optional" default="ascending"/>
<xsd:attribute name="customListSort" type="xsd:boolean" use="optional" default="true"/>
<xsd:attribute name="crossFilter" type="x14:ST_SlicerCacheCrossFilter" use="optional" default="showItemsWithDataAtTop"/>
</xsd:complexType>

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.98 CT_TimelineCacheRefs


Referenced by: timelineCacheRefs

A complex type that specifies a list of Timeline cache part identifiers for the workbook. MUST contain fewer than 2^{31} elements.

Child Elements:

timelineCacheRef: A CT_TimelineCacheRef element that specifies a Timeline cache part identifier in this workbook.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineCacheRefs">
  <xsd:sequence>
    <xsd:element name="timelineCacheRef" type="CT_TimelineCacheRef" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.99 CT_TimelineCacheRef


Referenced by: CT_TimelineCacheRefs

A complex type that specifies a Relationship (section 1.4) identifier to a Timeline Cache (section 2.3.5.1) part in this workbook.

Attributes:

r:id: An ST_RelationshipId ([ISO/IEC29500-1:2016] section 22.8.2.1) attribute that specifies a Relationship (section 1.4) identifier to a Timeline Cache (section 2.3.5.1) part in this workbook.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineCacheRef">
  <xsd:attribute ref="r:id" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.100 CT_TimelineRefs


Referenced by: timelineRefs

CT_TimelineRefs is a complex type that specifies a list of Timeline (section 2.3.5) part identifiers for the worksheet. MUST contain exactly one Timeline part identifier.

Child Elements:

timelineRef: A CT_TimelineRef element (section 2.6.101) that specifies the Timeline (section 2.3.5) part identifier for the worksheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineRefs">
  <xsd:sequence>
    <xsd:element name="timelineRef" type="CT_TimelineRef" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.101 CT_TimelineRef


Referenced by: CT_TimelineRefs

A complex type that specifies a relationship identifier of the part that contains the Timelines in this worksheet.

Attributes:

r:id: An ST_RelationshipId ([ISO/IEC29500-1:2016] section 22.8.2.1) attribute that specifies a relationship identifier of the part that contains the Timelines in this worksheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineRef">
  <xsd:attribute ref="r:id" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.102 CT_CacheHierarchy


Referenced by: cacheHierarchy

CT_CacheHierarchy is a complex type which specifies additional properties for an OLAP measure.

Attributes:
**aggregatedColumn:** An int attribute that specifies the zero-based index of PivotTable cache hierarchy which corresponds to this OLAP measure. The referenced CT_CacheHierarchy ([ISO/IEC29500-4:2016] section A.2) element specifies the PivotTable cache hierarchy that this OLAP measure aggregates. MUST only be specified if the measure attribute of this cache hierarchy is "true". The value MUST match the index of an existing cache hierarchy in CT_CacheHierarchies ([ISO/IEC29500-4:2016]) collection or be equal -1 if this OLAP measure is not an implicit measure which aggregates a cache hierarchy.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CacheHierarchy">
    <xsd:attribute name="aggregatedColumn" use="required" type="xsd:int"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.103 CT_SlicerCacheHideNoData

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** slicerCacheHideItemsWithNoData

A complex type that specifies the extended properties of a slicer cache, as specified in section 2.3.2.1.

**Child Elements:**

- **slicerCacheOlapLevelName:** A CT_SlicerCacheOlapLevelName element that specifies the properties of an OLAP level in the OLAP hierarchy specified by the ancestor slicer cache. slicer items with no data in this OLAP level are not displayed.

**Attributes:**

- **count:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of slicerCacheOlapLevelName child elements of this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerCacheHideNoData">
    <xsd:sequence>
        <xsd:element name="slicerCacheOlapLevelName" type="CT_SlicerCacheOlapLevelName" minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
    <xsd:attribute name="count" type="xsd:unsignedInt" use="optional" default="0"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.104 CT_SlicerCacheOlapLevelName

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** CT_SlicerCacheHideNoData

A complex type that specifies the properties of an OLAP level in the OLAP hierarchy specified by the ancestor slicer cache. slicer items with no data in this OLAP level are not displayed.
**Attributes:**

**uniqueName:** An [ST_Xstring][ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the [MDX unique name][ISO/IEC29500-1:2016] of the OLAP level specified by this element within the OLAP hierarchy specified with this slicer cache. The length of this string MUST be at least 1 character and MUST NOT exceed 32,767 characters.

**count:** An [unsignedInt][XMLSCHEMA2] section 3.3.22) attribute that specifies the total number of hidden slicer items in this OLAP level within the OLAP hierarchy specified by this slicer cache.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SlicerCacheOlapLevelName">
    <xsd:attribute name="uniqueName" type="x:ST_Xstring" use="required"/>
    <xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.105  **CT_TimelineStyles**

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** [timelineStyles][MS-XLSX]

A complex type that specifies a group of [Timeline Styles][MS-XLSX] and the default Timeline Style to apply to Timelines.

**Child Elements:**

**timelineStyle:** A [CT_TimelineStyle][MS-XLSX] element that specifies a Timeline Style.

**Attributes:**

**defaultTimelineStyle:** A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the default Timeline Style to apply to Timelines. The length of the string MUST be greater than or equal to 1 character and less than or equal to 255 characters.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineStyles">
    <xsd:sequence>
        <xsd:element name="timelineStyle" type="CT_TimelineStyle" minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
    <xsd:attribute name="defaultTimelineStyle" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.106  **CT_TimelineStyleElements**

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** [CT_TimelineStyle][MS-XLSX]
A complex type that specifies the list of table style ([ISO/IEC29500-1:2016] section 18.8) elements of a Timeline Style that are specific to Timelines.

Child Elements:

timelineStyleElement: A CT_TimelineStyleElement element that specifies a table style ([ISO/IEC29500-1:2016] section 18.8) element of a timeline style that is specific to timelines.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineStyleElements">
  <xsd:sequence>
    <xsd:element name="timelineStyleElement" type="CT_TimelineStyleElement" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.107 CT_TimelineStyle


Referenced by: CT_TimelineStyles

CT_TimelineStyle specifies table style elements, as specified in [ISO/IEC29500-1:2016] section 18.8, of the timeline style, as specified in section Timeline Styles, that are specific to timelines, as specified in section Timelines.

Child Elements:

timelineStyleElements: A CT_TimelineStyleElements, as specified in section Timeline Style Elements, that specifies table style elements of the timeline style that are specific to timelines. There MUST NOT be more than one CT_TimelineStyleElements in this element.

Attributes:

name: A string attribute, as specified in [XMLSCHEMA2] section 3.2.1, that specifies the name of the user-defined table style that this timeline style is based upon. The length of the string MUST be greater than or equal to 1 character and less than or equal to 255 characters. This string MUST be unique within the CT_TimelineStyle elements in the Styles part, as specified in [ISO/IEC29500-1:2016] section 12.3.20. This string MUST match the name attribute of a CT_TableStyle element, as specified in [ISO/IEC29500-4:2016] section A.2, in the Styles part. In the CT_TableStyle element with a name attribute that matches this string, the pivot attribute MUST equal "false" and the table attribute MUST equal "false".

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineStyle">
  <xsd:sequence>
    <xsd:element name="timelineStyleElements" type="CT_TimelineStyleElements" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.108  CT_TimelineStyleElement

Target namespace: http://schemas.microsoft.com_office/spreadsheetml/2010/11/main

Referenced by: CT_TimelineStyleElements

A complex type that specifies a table style element, as specified in [ISO/IEC29500-1:2016] section 18.8, of a timeline style, as specified in section Timeline Styles.

Attributes:

**type**: An ST_TimelineStyleType attribute that specifies the type of the table style element. This attribute MUST be unique within the parent CT_TimelineStyleElements complex type.

**dxfId**: An ST_DxfId attribute, as specified in [ISO/IEC 29500-1:2016] section 18.18.25, that specifies a zero-based index for the list of elements specified by the dxfs global element, as specified in section 2.4.55. The specified CT_Dxf complex type, as specified in [ISO/IEC29500-4:2016] section A.2, specifies the formatting to use with this table style element.

The following W3C XML Schema ([XMLSCHEMA2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineStyleElement">
  <xsd:attribute name="type" type="ST_TimelineStyleType" use="required"/>
  <xsd:attribute name="dxfId" type="x:ST_DxfId" use="optional"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA2] section 2.1).

2.6.109  CT_TimelinePivotCacheDefinition

Target namespace: http://schemas.microsoft.com_office/spreadsheetml/2010/11/main

Referenced by: timelinePivotCacheDefinition

A complex type that specifies the extended properties of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache definition.

Attributes:

**timelineData**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the Timeline Cache Relationship to PivotCache, MUST be "true" if the OLAP PivotTable ([ISO/IEC29500-1:2016] section 18.10) PivotCache definition is being referenced by a timeline cache.

The following W3C XML Schema ([XMLSCHEMA2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelinePivotCacheDefinition">
  <xsd:attribute name="timelineData" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA2] section 2.1).

2.6.110  CT_Timelines

Target namespace: http://schemas.microsoft.com_office/spreadsheetml/2010/11/main

Referenced by: timelines

...
A complex type that specifies a list of **CT_Timeline** elements, as specified in section 2.6.111. The list of **CT_Timeline** elements specifies all Timeline views on the worksheet.

**Child Elements:**

**timeline**: A **CT_Timeline** element that specifies a Timeline view on the worksheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Timelines">
  <xsd:sequence>
    <xsd:element name="timeline" type="CT_Timeline" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.111 CT_Timeline

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** CT_Timelines

The **CT_Timeline** complex type specifies a Timeline view (section 2.3.5.2) in this worksheet.

**Child Elements:**

**extLst**: A **CT_ExtensionList** element, as specified in [ISO/IEC29500-4:2016] section A.2, that specifies future extensibility for this element.

**Attributes:**

**name**: An **ST_Xstring** attribute, as specified in [ISO/IEC29500-1:2016] section 22.9.2.19, that specifies the name of the Timeline view. This element MUST be a unique case-insensitive name within the scope of this workbook. The length of this attribute MUST be greater than or equal to one character and MUST be less than or equal to 32767 characters.

**xr10:uid**: An **ST_Guid** ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies the unique id of the Timeline view. If any instance of this type specifies this attribute, then all instances MUST specify it, and the values MUST be distinct.

**cache**: An **ST_Xstring** attribute that specifies the name of the Timeline cache (section 2.3.5.1) that this Timeline view is associated with. There MUST be a **CT_TimelineCacheDefinition** element (section 2.6.112) within this workbook with the **name** attribute equal to the value of this attribute.

**caption**: An **ST_Xstring** attribute that specifies the caption of the Timeline view. If this string exists, the length MUST be greater than or equal to one character.

**showHeader**: A **Boolean** attribute, as specified in [XMLSCHEMA2] section 3.2.2, that specifies whether the header is displayed.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The header is displayed.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The header is suppressed.</td>
</tr>
</tbody>
</table>
**showSelectionLabel:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the selection label is displayed.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The selection label is displayed.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The selection label is suppressed.</td>
</tr>
</tbody>
</table>

**showTimeLevel:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the time level is displayed.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The time level is displayed.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The time level is suppressed.</td>
</tr>
</tbody>
</table>

**showHorizontalScrollbar:** A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the horizontal scrollbar is displayed.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The horizontal scrollbar is displayed.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The horizontal scrollbar is suppressed.</td>
</tr>
</tbody>
</table>

**level:** An **unsignedInt** attribute, as specified in [XMLSCHEMA2] section 3.3.22, that specifies the current time level of the **Timeline** (section 2.3.5). This element MUST be a value from the following table:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Year</td>
</tr>
<tr>
<td>1</td>
<td>Quarter</td>
</tr>
<tr>
<td>2</td>
<td>Month</td>
</tr>
<tr>
<td>3</td>
<td>Day</td>
</tr>
</tbody>
</table>

**selectionLevel:** An **unsignedInt** attribute that specifies the time level at which the current selection was made for the **Timeline**. This element MUST be a value from the following table:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Year</td>
</tr>
<tr>
<td>1</td>
<td>Quarter</td>
</tr>
<tr>
<td>2</td>
<td>Month</td>
</tr>
</tbody>
</table>
**scrollPosition:** A `dateTime` attribute ([XMLSCHEMA2] section 3.2.7) that specifies the start date of the timespan scrolling position of the **Timeline**.

**style:** An `ST_Xstring` attribute ([ISO/IEC29500-1:2016] section 22.9.2.19) that specifies the **Timeline style** (section 2.3.5.4) of the **Timeline view**. If this field exists, this string MUST match the `name` attribute of a `CT_TimelineStyle` element (section 2.6.107) within this workbook or MUST be equal to one of the built-in **Timeline style** names:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Built-in Timeline style names</th>
</tr>
</thead>
<tbody>
<tr>
<td>TimelineStyleLight1</td>
</tr>
<tr>
<td>TimelineStyleLight2</td>
</tr>
<tr>
<td>TimelineStyleLight3</td>
</tr>
<tr>
<td>TimelineStyleLight4</td>
</tr>
<tr>
<td>TimelineStyleLight5</td>
</tr>
<tr>
<td>TimelineStyleLight6</td>
</tr>
<tr>
<td>TimelineStyleDark1</td>
</tr>
<tr>
<td>TimelineStyleDark2</td>
</tr>
<tr>
<td>TimelineStyleDark3</td>
</tr>
<tr>
<td>TimelineStyleDark4</td>
</tr>
<tr>
<td>TimelineStyleDark5</td>
</tr>
<tr>
<td>TimelineStyleDark6</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Timeline">
  <xsd:sequence>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
  <xsd:attribute ref="xr10:uid" use="optional"/>
  <xsd:attribute name="cache" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="caption" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="showHeader" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="showSelectionLabel" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="showTimeLevel" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="showHorizontalScrollbar" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="level" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="selectionLevel" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="scrollPosition" type="xsd:dateTime" use="optional"/>
  <xsd:attribute name="style" type="x:ST_Xstring" use="optional"/>
</xsd:complexType>
```
See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.112 CT_TimelineCacheDefinition

Target namespace: http://schemas.microsoft.com_office/spreadsheetml/2010/11/main

Referenced by: timelineCacheDefinition

A complex type that specifies a Timeline cache.

Child Elements:

pivotTables: A CT_TimelineCachePivotTables element (section 2.6.113) that specifies a group of CT_TimelineCachePivotTable elements (section 2.6.114) that specify the PivotTable ([ISO/IEC29500-1:2016] section 18.10) views and Non-Worksheet PivotTables that are filtered by the Timeline cache (section 2.1.7).

state: A CT_TimelineState element (section 2.6.116) that specifies the information used for display in the Timeline view (section 2.3.5.2).

timelinePivotFilter: A CT_TimelinePivotFilter element (section 2.6.118) that specifies the filter used by the Timeline Cache (section 2.1.7) to filter PivotTable ([ISO/IEC29500-1:2016] section 18.10) views and Non-Worksheet PivotTables. This element MUST exist only if the filterType attribute of the CT_TimelineState (section 2.6.116) element of the Timeline Cache has a value that is not one of the following:

<table>
<thead>
<tr>
<th>Enumeration Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>dateBetween (Date Between)</td>
<td>Indicates the &quot;between&quot; filter for date values.</td>
</tr>
<tr>
<td>dateEqual (Date Equals)</td>
<td>Indicates the &quot;equals&quot; filter for date values.</td>
</tr>
<tr>
<td>unknown</td>
<td>Indicates the absence of a filter for date values.</td>
</tr>
</tbody>
</table>


Attributes:

name: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the Timeline cache (section 2.3.5.1). MUST adhere to the name production rule provided in section 2.2.2. MUST be a unique case-insensitive name within the scope of defined names.

xr10:uid: An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies the unique id of the Timeline cache (section 2.3.5.1). If any instance of this type specifies this attribute, then all instances MUST specify it, and the values MUST be distinct.

sourceName: An ST_Xstring attribute that specifies the MDX unique name of the key attribute of the associated OLAP hierarchy if the Timeline source data (section 2.3.5.1.1) is an OLAP data source.
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineCacheDefinition">
  <xsd:sequence>
    <xsd:element name="pivotTables" type="CT_TimelineCachePivotTables" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="state" type="CT_TimelineState" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="timelinePivotFilter" minOccurs="0" maxOccurs="1" type="CT_TimelinePivotFilter"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
  <xsd:attribute ref="xr10:uid" use="optional"/>
  <xsd:attribute name="sourceName" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.113 CT_TimelineCachePivotTables


Referenced by: CT_TimelineCacheDefinition

A complex type that specifies a group of CT_TimelineCachePivotTable elements that specify the PivotTable ([ISO/IEC29500-1:2016] section 18.10) views and Charts ([ISO/IEC29500-1:2016] section 21.2) based on Non-Worksheet PivotTables that are filtered by the Timeline cache.

Child Elements:

pivotTable: A CT_TimelineCachePivotTable element that specifies the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view or a Non-Worksheet PivotTable that is filtered. The list of pivotTable child elements MUST NOT contain duplicates.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineCachePivotTables">
  <xsd:sequence>
    <xsd:element name="pivotTable" type="CT_TimelineCachePivotTable" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.114 CT_TimelineCachePivotTable


Referenced by: CT_TimelineCachePivotTables

A complex type that specifies a PivotTable ([ISO/IEC29500-1:2016] section 18.10) view filtered by a Timeline cache.

Attributes:
**tabId**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the unique identifier (UID) of the worksheet that contains the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view specified by the name attribute. MUST match the sheetId of an existing sheet ([ISO/IEC29500-4:2016] section A.2) element within the workbook. MUST be equal to the decimal equivalent of 0xFFFFFFFF if the PivotTable specified by the name attribute is a Non-Worksheet PivotTable.

**name**: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) view on the worksheet specified by tabId. MUST match the name attribute of an existing pivotTableDefinition element in the worksheet. The createdVersion attribute of the CT_PivotTableDefinition ([ISO/IEC29500-4:2016] section A.2) element that defines the specified PivotTable ([ISO/IEC29500-1:2016] section 18.10) MUST be greater than or equal to 3.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineCachePivotTable">
  <xsd:attribute name="tabId" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.115 CT_TimelineRange

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by**: CT_TimelineState

A complex type that specifies the date range for a CT_TimelineState element that is the parent of this element.

**Attributes**:

- **startDate**: A dateTime ([XMLSCHEMA2] section 3.2.7) attribute that specifies the start value of the date range.
- **endDate**: A dateTime attribute that specifies the end value of the date range.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineRange">
  <xsd:attribute name="startDate" type="xsd:dateTime" use="required"/>
  <xsd:attribute name="endDate" type="xsd:dateTime" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.116 CT_TimelineState

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by**: CT_TimelineCacheDefinition

The **CT_TimelineState** complex type specifies the Timeline state (section 2.3.5.1.4) of the Timeline cache (section 2.3.5.1).
Child Elements:

**selection:** A CT_TimelineRange element (section 2.6.115) that specifies the start and end dates that are selected in the **Timeline view** (section 2.3.5.2). The start and end dates in the selection element MUST be interpreted as **dateTime** values ([XMLSCHEMA2] section 3.2.7).

**bounds:** A CT_TimelineRange element that specifies the minimum and maximum dates available for display in the **Timeline view**. The minimum and maximum dates in the bounds element MUST be interpreted as **dateTime** values ([XMLSCHEMA2] section 3.2.7).

**extLst:** A CT_ExtensionList element ([ISO/IEC29500-4:2016] section A.2) that specifies future extensibility for this element.

Attributes:

**singleRangeFilterState:** A **Boolean** attribute ([XMLSCHEMA2] section 3.2.2) that specifies whether the filtering state of the **Timeline** (section 2.3.5) is a contiguous date range.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The filtering state of the Timeline is a contiguous date range.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The filtering state of the Timeline is not a contiguous date range.</td>
</tr>
</tbody>
</table>

**minimalRefreshVersion:** An **unsignedInt** attribute ([XMLSCHEMA2] section 3.3.22) that specifies the minimum application version required to refresh the **Timeline cache**.

**lastRefreshVersion:** An **unsignedInt** attribute that specifies the application version that last refreshed the **Timeline cache**.

**pivotCacheId:** An **unsignedInt** attribute that specifies the associated **OLAP PivotTable** ([ISO/IEC29500-1:2016] section 18.10) PivotCache. This element MUST be equal to the **pivotCacheId** attribute of an existing CT_PivotCacheDefinition element (section 2.6.33).

**filterType:** An **ST_PivotFilterType** attribute ([ISO/IEC29500-1:2016] section 18.18.59) that specifies type of the **filter** ([ISO/IEC29500-1:2016] section 18.10.1.33) used in the **Timeline**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelineState">
  <xsd:sequence>
    <xsd:element name="selection" type="CT_TimelineRange" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="bounds" type="CT_TimelineRange" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="singleRangeFilterState" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="minimalRefreshVersion" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="lastRefreshVersion" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="pivotCacheId" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="filterType" use="required" type="x:ST_PivotFilterType"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.117  CT_WorkbookPr


Referenced by: workbookPr

CT_WorkbookPr is a complex type that specifies additional properties for a workbook.

Attributes:

chartTrackingRefBase: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies how data point properties and datalabels in all charts ([ISO/IEC29500-1:2016] section 21.2) in this workbook behave.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>True</td>
<td>Datapoint properties and datalabels ([MS-ODRAWXML] section 2.2.1.2) in all charts ([ISO/IEC29500-1:2016] section 21.2) in this workbook follow their reference.</td>
</tr>
<tr>
<td>False</td>
<td>Datapoint properties and datalabels ([MS-ODRAWXML] section 2.2.1.2) in all charts ([ISO/IEC29500-1:2016] section 21.2) in this workbook follow their position in the chart.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_WorkbookPr">
  <xsd:attribute name="chartTrackingRefBase" type="xsd:boolean" default="false"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.118  CT_TimelinePivotFilter


Referenced by: CT_TimelineCacheDefinition

A complex type that specifies the filter used by the Timeline Cache (section 2.1.7) to filter PivotTable ([ISO/IEC29500-1:2016] section 18.10) views and Non-Worksheet PivotTables.

Child Elements:

autoFilter: A CT_AutoFilter ([ISO/IEC29500-1:2016] section 18.3.1.2) element that specifies the embedded auto filter of the filter.

Attributes:

useWholeDay: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the pivot filter ([ISO/IEC29500-1:2016] section 18.10.1.33) associated with either the PivotTable ([ISO/IEC29500-1:2016] section 18.10) or Non-Worksheet PivotTable (section 2.3.3) filtered by the Timeline Cache (section 2.1.7) uses whole days in its filtering criteria.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| "true" | The pivot filter ([ISO/IEC29500-1:2016] section 18.10.1.33) associated with either the PivotTable ([ISO/IEC29500-1:2016] section 18.10) or Non-Worksheet PivotTable (section 2.3.3) filtered by
the Timeline Cache (section 2.1.7) uses whole days in its filtering criteria.

"false" The pivot filter ([ISO/IEC29500-1:2016] section 18.10.1.33) associated with either the PivotTable ([ISO/IEC29500-1:2016] section 18.10) or Non-Worksheet PivotTable (section 2.3.3) filtered by the Timeline Cache (section 2.1.7) does not use whole days in its filtering criteria.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>the Timeline Cache (section 2.1.7) uses whole days in its filtering criteria.</td>
<td></td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The pivot filter ([ISO/IEC29500-1:2016] section 18.10.1.33) associated with either the PivotTable ([ISO/IEC29500-1:2016] section 18.10) or Non-Worksheet PivotTable (section 2.3.3) filtered by the Timeline Cache (section 2.1.7) does not use whole days in its filtering criteria.</td>
</tr>
</tbody>
</table>

**fld**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the index of the **field** to which the **pivot filter** associated with this filter belongs to.

**id**: An unsignedInt attribute that specifies the unique identifier of the **pivot filter** associated with this filter as assigned by the PivotTable ([ISO/IEC29500-1:2016] section 18.10) or Non-Worksheet PivotTable (section 2.3.3) filtered by the Timeline Cache (section 2.1.7).

**name**: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the filter. This string MUST be less than or equal to 65,535 characters in length.

**description**: An ST_Xstring attribute that specifies the description of the filter. This string MUST be less than or equal to 65,535 characters in length.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_TimelinePivotFilter">
  <xsd:sequence>
    <xsd:element name="autoFilter" minOccurs="0" maxOccurs="1" type="x:CT_AutoFilter"/>
  </xsd:sequence>
  <xsd:attribute name="useWholeDay" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="fld" use="required" type="xsd:unsignedInt"/>
  <xsd:attribute name="id" use="required" type="xsd:unsignedInt"/>
  <xsd:attribute name="name" use="optional" type="x:ST_Xstring"/>
  <xsd:attribute name="description" use="optional" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.119 CT_ModelTextPr

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by**: CT_Connection

Specifies Model Data Source text importation ([MS-XLSB] section 2.2.8.9.4) properties in addition to those specified in CT_TextPr ([ISO/IEC29500-1:2016] section A.2) element.

**Attributes**:

**headers**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether data imported by this connection has column headers.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>Data imported by this connection has column headers.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>Data imported by this connection does not have column headers.</td>
</tr>
</tbody>
</table>
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ModelTextPr">
  <xsd:attribute name="headers" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.120 CT_RangePr

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** [CT_Connection](#)

The **CT_RangePr** complex type specifies properties of a Model Data Source Worksheet Data connection ([MS-XLSB] section 2.2.8.9.3).

**Attributes:**

- **sourceName**: An attribute of type ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) that specifies the string identifier of the source cell range for this connection. The string length MUST be less than or equal to 65,535 characters.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RangePr">
  <xsd:attribute name="sourceName" use="required" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.121 CT_DbTable

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** [CT_DbTables](#)

The **CT_DbTable** complex type specifies a single database table that is used by a Model Data Source OLE DB connection ([MS-XLSB] section 2.2.8.9.1) or Model Data Source Data Feed connection ([MS-XLSB] section 2.2.8.9.2).

**Attributes:**

- **name**: An attribute of type ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) that specifies the database table name.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DbTable">
  <xsd:attribute name="name" use="required" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.122  **CT_DbTables**


*Referenced by:* CT_OledbPr, CT_DataFeedPr

The **CT_DbTables** complex type specifies the list of database tables that are used by a Model Data Source OLE DB connection ([MS-XLSB] section 2.2.8.9.1) or Model Data Source Data Feed connection ([MS-XLSB] section 2.2.8.9.2).

*Child Elements:*

**dbTable:** An element of type **CT_DbTable** (section 2.6.121) specifying a single database table that is used by this connection.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DbTables">
    <xsd:sequence>
        <xsd:element name="dbTable" minOccurs="1" maxOccurs="unbounded" type="CT_DbTable"/>
    </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.123  **CT_DbCommand**


*Referenced by:* CT_OledbPr

The **CT_DbCommand** complex type specifies OLE DB command text that is used by a Model Data Source OLE DB connection ([MS-XLSB] section 2.2.8.9.1).

*Attributes:*

**text:** An attribute of type **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) that specifies OLE DB command text.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DbCommand">
    <xsd:attribute name="text" use="required" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.124  **CT_OledbPr**


*Referenced by:* CT_Connection

The **CT_OledbPr** complex type specifies properties of a Model Data Source OLE DB connection ([MS-XLSB] section 2.2.8.9.1).
Child Elements:

**dbTables**: An element of type `CT_DbTables` (section 2.6.122) specifying the list of database tables that are used by this connection.

**dbCommand**: An element of type `CT_DbCommand` (section 2.6.123) specifying OLE DB command text that is used by this connection.

Attributes:

**connection**: An attribute of type `ST_Xstring` ([ISO/IEC29500-1:2016] section 22.9.2.19) that specifies the OLE DB connection string.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_OledbPr">
  <xsd:choice minOccurs="1" maxOccurs="1">
    <xsd:element name="dbTables" type="CT_DbTables"/>
    <xsd:element name="dbCommand" type="CT_DbCommand"/>
  </xsd:choice>
  <xsd:attribute name="connection" use="optional" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.125 CT_DataFeedPr

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by**: CT_Connection

Specifies properties of a Model Data Source Data Feed connection ([MS-XLSB] section 2.2.8.9.2).

Child Elements:

**dbTables**: A `CT_DbTables` element that specifies the list of database tables used by this connection.

Attributes:


The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DataFeedPr">
  <xsd:sequence>
    <xsd:element name="dbTables" type="CT_DbTables" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="connection" use="required" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.126 CT_CachedUniqueNames

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main
A complex type that specifies the **MDX unique names** for PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache items in this **PivotTable** ([ISO/IEC29500-1:2016] section 18.10) cache field. MUST NOT exist if the **model** attribute of **CT_Connection** element of connection ([ISO/IEC29500-1:2016] section 2.6.91) associated with this PivotTable ([ISO/IEC29500-1:2016] section 18.10) pivot cache is not equal to "true".

**Child Elements:**

**cachedUniqueName**: A **CT_CachedUniqueName** element that specifies the MDX unique name for a PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache item.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CachedUniqueNames">
  <xsd:sequence>
    <xsd:element name="cachedUniqueName" minOccurs="1" maxOccurs="unbounded" type="CT_CachedUniqueName"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.127 CT_CachedUniqueName

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by**: **CT_CachedUniqueNames**

A complex type that specifies the **MDX unique name** for a PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache item.

**Attributes**:

**index**: An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that specifies an index of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) cache item in this **PivotTable** ([ISO/IEC29500-1:2016] section 18.10) cache field. MUST be less than **count** attributes of the **CT_Items** ([ISO/IEC29500-4:2016] section A.2) element specified by the ancestor **CT_CacheField** ([ISO/IEC29500-4:2016] section A.2) element. MUST be unique within parent **CT_CachedUniqueNames** (section 2.6.126) collection.

**name**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the MDX unique name. MUST be less than or equal to 65,535 characters in length.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CachedUniqueName">
  <xsd:attribute name="index" use="required" type="xsd:unsignedInt"/>
  <xsd:attribute name="name" use="required" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.128 CT_ModelTable


Referenced by: CT_ModelTables

Specifies properties of a single table in **spreadsheet data model**.

Attributes:

- **id**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies unique id of the spreadsheet data model table.

- **name**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies name of the spreadsheet data model table.

- **connection**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies name of the workbook connection associated with this spreadsheet data model table.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ModelTable">  
  <xsd:attribute name="id" type="x:ST_Xstring" use="required"/>  
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>  
  <xsd:attribute name="connection" type="x:ST_Xstring" use="required"/>  
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.129 CT_ModelTables


Referenced by: CT_DataModel

Specifies tables in the **spreadsheet data model**.

Child Elements:

- **modelTable**: A **CT_ModelTable** element that specifies properties of a single table in spreadsheet data model.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ModelTables">  
  <xsd:sequence>  
    <xsd:element name="modelTable" minOccurs="1" maxOccurs="unbounded" type="CT_ModelTable"/>  
  </xsd:sequence>  
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.130 CT_ModelRelationship

Referenced by: **CT_ModelRelationships**

Specifies a single relationship in the **spreadsheet data model**.

**Attributes:**

- **fromTable**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the foreign key table for this relationship.

- **fromColumn**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the foreign key table column for this relationship.

- **toTable**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the primary key table for this relationship.

- **toColumn**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the primary key table column for this relationship.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ModelRelationship">
    <xsd:attribute name="fromTable" type="x:ST_Xstring" use="required"/>
    <xsd:attribute name="fromColumn" type="x:ST_Xstring" use="required"/>
    <xsd:attribute name="toTable" type="x:ST_Xstring" use="required"/>
    <xsd:attribute name="toColumn" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```

See section **5.3** for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

---

**2.6.131 CT_ModelRelationships**

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

Referenced by: **CT_DataModel**

Specifies active relationships in the **spreadsheet data model**.

**Child Elements:**

- **modelRelationship**: A **CT_ModelRelationship** element that specifies a single relationship in the spreadsheet data model.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ModelRelationships">
    <xsd:sequence>
        <xsd:element name="modelRelationship" minOccurs="1" maxOccurs="unbounded" type="CT_ModelRelationship"/>
    </xsd:sequence>
</xsd:complexType>
```

See section **5.3** for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

---

**2.6.132 CT_DataModel**

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main
Referenced by: dataModel

Specifies properties of a spreadsheet data model.

Child Elements:

modelTables: A CT_ModelTables (section 2.6.129) element that specifies tables in the spreadsheet data model.

modelRelationships: A CT_ModelRelationships (section 2.6.131) element that specifies active relationships in the spreadsheet data model.


Attributes:

minVersionLoad: An unsignedByte attribute that specifies the minimum application version required to load the spreadsheet data model in this workbook. This MUST be greater than or equal to 5.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DataModel">
  <xsd:sequence>
    <xsd:element name="modelTables" minOccurs="0" maxOccurs="1" type="CT_ModelTables"/>
    <xsd:element name="modelRelationships" minOccurs="0" maxOccurs="1" type="CT_ModelRelationships"/>
    <xsd:element name="extLst" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="minVersionLoad" type="xsd:unsignedByte" use="optional" default="5"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.133 CT_PivotTableData


Referenced by: pivotTableData

The CT_PivotTableData complex type specifies the PivotValues (section 2.3.4) of the PivotTable ([ISO/IEC29500-1:2016] section 18.10) that is specified by the pivotTableReference (section 2.4.1) element in the extension of a workbook (section 2.2.4.11).

Child Elements:

pivotRow: A CT_PivotRow (section 2.6.134) element that specifies a single row of PivotValueCells (section 2.3.4.1) in an element of this type in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) that is specified by the pivotTableReference (section 2.4.1) element in the extension of a workbook (section 2.2.4.11).

Attributes:

rowCount: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of pivotRow child elements in an element of this type. This value MUST be equal to the value of the count attribute of the rowItems element, as specified in [ISO/IEC29500-1:2016] section 18.10.1.84.
columnCount: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute specifying the number of PivotValueCells (section 2.3.4.1) that are specified by the CT_PivotValueCell (section 2.6.135) complex type in each of the pivotRow child elements of this type. This value MUST be equal to the value of the count attribute in the pivotRow element, as specified by the CT_PivotRow (section 2.6.134) complex type. This value MUST be equal to the value of the count attribute of the colItems, ([ISO/IEC29500-1:2016] section 18.10.1.17) element.


The OLAP PivotTable PivotCache that is specified by this attribute MUST be extended by an ext ([ISO/IEC29500-1:2016] section 18.2.7) element that has a structure specified by a CT_PivotCacheDefinition (section 2.6.33) element. The pivotCacheId attribute of such a CT_PivotCacheDefinition element MUST be equal to this attribute.

The OLAP PivotTable PivotCache that is specified by this attribute MUST also be extended by an ext element that has structure specified by a CT_PivotCacheIdVersion (section 2.6.138) element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotTableData">
  <xsd:sequence>
    <xsd:element name="pivotRow" type="CT_PivotRow" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="rowCount" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="columnCount" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="cacheId" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.134 CT_PivotRow

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** [CT_PivotTableData]

A complex type that specifies a single row of PivotValueCells in the pivotTableData element of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) specified by the pivotTableReference element in the extension of a workbook as specified by section 2.2.4.11.

**Child Elements:**

- c: A CT_PivotValueCell element that specifies a PivotValueCell.

**Attributes:**

- r: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the row index of this element. MUST be within the range of items as specified by the rowCount attribute of the complex type CT_PivotTableData.

- count: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of child elements of type CT_PivotValueCell in the current pivotRow element. MUST be less than or equal to the value specified by the columnCount attribute of complex type CT_PivotTableData.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
..."
See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.135  CT_PivotValueCell


Referenced by: CT_PivotRow

A complex type that specifies a PivotValueCell.

Child Elements:


x: A CT_PivotValueCellExtra element that specifies the server formatting on the current CT_PivotValueCell element.

Attributes:

i: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the column index of the current CT_PivotValueCell element. MUST be within the range of items as specified by the columnCount attribute of complex type CT_PivotTableData.

t: An ST_SXVCellType attribute that specifies the type of the PivotValueCell represented by the parent element of this attribute.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.136  CT_PivotValueCellExtra


Referenced by: CT_PivotValueCell

A complex type that specifies the server formatting (section 2.3.4.1.2) for a CT_PivotValueCell element (section 2.6.135) that is the parent of this element.
Attributes:

in: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies an index to the list of the numeric formats, specified by the pivotTableServerFormats element (section 2.4.2) specified in the extension of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) specified by the pivotTableReference element (section 2.4.1) in the extension of a workbook as specified in section 2.2.4.11. The value MUST be between zero and the count attribute of the CT_PivotTableServerFormats element (section 2.6.137).

bc: An ST_UnsignedIntHex ([ISO/IEC29500-1:2016] section 18.18.86) attribute that specifies the background color for the CT_PivotValueCell element (section 2.6.135) that is a parent of this element. The color is specified as a hexadecimal value in RGB space.

fc: An ST_UnsignedIntHex ([ISO/IEC29500-1:2016] section 18.18.86) attribute that specifies the foreground color for the CT_PivotValueCell element that is a parent of this element. The color is specified as a hexadecimal value in RGB space.

i: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the PivotValueCell (section 2.3.4.1) specified by CT_PivotValueCell, that is a parent of this element, contains italic formatting. A value of one or true indicates this value contains italic formatting on the server.

un: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the PivotValueCell specified by CT_PivotValueCell that is a parent of this element contains underline formatting. A value of 1 or true indicates this value contains underline formatting on the server.

st: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the PivotValueCell specified by CT_PivotValueCell that is a parent of this element contains strikethrough formatting. A value of 1 or true indicates this value contains strikethrough formatting on the server.

b: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the PivotValueCell specified by CT_PivotValueCell that is a parent of this element contains bold formatting. A value of 1 or true indicates this value contains bold formatting on the server.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotValueCellExtra">
  <xsd:attribute name="in" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="bc" type="x:ST_UnsignedIntHex" use="optional"/>
  <xsd:attribute name="fc" type="x:ST_UnsignedIntHex" use="optional"/>
  <xsd:attribute name="i" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="un" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="st" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="b" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.137 CT_PivotTableServerFormats


A complex type that specifies a list of CT_ServerFormat ([ISO/IEC29500-1:2016] section 18.10.1.86) elements in a PivotTable ([ISO/IEC29500-1:2016] section 18.10) that is specified by a pivotTableReference element in the extension of a workbook. MUST contain fewer than \(2^{31}\) elements.

Child Elements:

serverFormat: A CT_ServerFormat ([ISO/IEC29500-1:2016] section 18.10.1.86) element that specifies the numeric format for one or more PivotValueCells.
Attributes:

**count**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of **serverFormat** child elements in the collection.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotTableServerFormats">
  <xsd:sequence>
    <xsd:element name="serverFormat" type="x:CT_ServerFormat" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="count" use="required" type="xsd:unsignedInt"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.138 **CT_PivotCacheIdVersion**

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2010/11/main  
**Referenced by**: pivotCacheIdVersion

A complex type that specifies the extended properties of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) **PivotCache** definition.

**Attributes:**

**cacheIdSupportedVersion**: An unsignedByte ([XMLSCHEMA2] section 3.3.24) attribute that specifies minimum version of the application where this **pivotCacheId** attribute of an existing **CT_PivotCacheDefinition** element is guaranteed to be unique.

**cacheIdCreatedVersion**: An unsignedByte ([XMLSCHEMA2] section 3.3.24) attribute that specifies the minimum version of the application where this **pivotCacheId** attribute of an existing **CT_PivotCacheDefinition** element can be changed upon saving the **workbook**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotCacheIdVersion">
  <xsd:attribute name="cacheIdSupportedVersion" type="xsd:unsignedByte" use="required"/>
  <xsd:attribute name="cacheIdCreatedVersion" type="xsd:unsignedByte" use="required"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.139 **CT_Timeline**

**Target namespace**: http://schemas.microsoft.com/office/drawing/2012/timeslicer  
**Referenced by**: timeslicer

This complex type specifies which **timeline view** is associated with this drawing element.

**Child Elements:**

Attributes:

name: A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the timeline view (section 2.3.5.2) that is associated with this drawing element. The value of this attribute MUST match the value of the name attribute of a timeline element within the CT_Timelines element (section 2.6.110) for the current worksheet.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Timeline">
    <xsd:sequence>
        <xsd:element name="extLst" type="a:CT_OfficeArtExtensionList" minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
    <xsd:attribute name="name" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.7 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.140  CT_AbsolutePath


Referenced by: absPath

CT_AbsolutePath is a complex type that specifies the absolute path to a workbook.

Attributes:

url: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the URL string of the absolute path to the workbook.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_AbsolutePath">
    <xsd:attribute name="url" use="required" type="x:ST_Xstring"/>
</xsd:complexType>
```

See section 5.9 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.141  CT_DataField


Referenced by: dataField


Attributes:
isCountDistinct: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies that the aggregation function which applies to this data field item ([ISO/IEC29500-1:2016] section 18.10.1.22) is the count of unique values. If this value is true, the subtotal attribute is ignored.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DataField">
  <xsd:attribute name="isCountDistinct" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.142 CT_Survey


Referenced by: survey

CT_Survey is a complex type that specifies the properties for a survey.

Child Elements:

- surveyPr: A CT_SurveyElementPr element that specifies additional properties of the survey.
- titlePr: A CT_SurveyElementPr element that specifies additional properties associated with the title of the survey.
- descriptionPr: A CT_SurveyElementPr element that specifies additional properties associated with the description of the survey.
- questions: A CT_SurveyQuestions element that specifies the set of survey question elements associated with this survey.

Attributes:

- id: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the unique identifier (UID) of the survey. This id MUST be unique within the workbook.
- guid: An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that identifies this survey.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Survey">
  <xsd:sequence>
    <xsd:element name="surveyPr" type="CT_SurveyElementPr" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="titlePr" type="CT_SurveyElementPr" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="descriptionPr" type="CT_SurveyElementPr" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="questions" type="CT_SurveyQuestions" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```
See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.143 CT_SurveyQuestions


Referenced by: CT_Survey

CT_SurveyQuestions is a complex type that specifies a list of survey question elements present in a survey.

Child Elements:

questionsPr: A CT_SurveyElementPr element that specifies additional properties associated with the list of survey question elements.

question: A CT_SurveyQuestion element that specifies one survey question in the list.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SurveyQuestions">
  <xsd:sequence>
    <xsd:element name="questionsPr" type="CT_SurveyElementPr" minOccurs="0" maxOccurs="1" maxOccurs="unbounded"/>
    <xsd:element name="question" type="CT_SurveyQuestion" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.144 CT_SurveyQuestion


Referenced by: CT_SurveyQuestions

CT_SurveyQuestion is a complex type that specifies the properties of a survey question.

Child Elements:

questionPr: A CT_SurveyElementPr element that specifies additional properties associated with the survey question.


Attributes:

binding: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the unique identifier (UID) of the Table Column ([ISO/IEC29500-1:2016] section 18.5.1.3) to which the survey question is bound. MUST match the id of an existing Table Column ([ISO/IEC29500-1:2016] section
18.5.1.3) element within the Table ([ISO/IEC29500-1:2016] section 18.5) with which the survey is associated.

**text:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the main text of the survey question.

**type:** An ST_QuestionType attribute that specifies the type of the survey question.

**format:** An ST_QuestionFormat attribute that specifies the format of answers to the survey question.

**helpText:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies additional descriptive text associated with the survey question.

**required:** A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether an answer for the survey question is required when filling in the corresponding survey.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>The answer to the survey question is not required when filling in the survey.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>The answer to the survey question is required when filling in the survey.</td>
</tr>
</tbody>
</table>

**defaultValue:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the default answer for the survey question.

**decimalPlaces:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of digits after the decimal to use in a numerical answer to a survey question. MUST be less than or equal to 15.

**rowSource:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the set of available answers for the survey question. The set of available answers is a semicolon delimited list of values. The string MUST conform to the following Augmented Backus-Naur Form (ABNF) ([RFC5234]) grammar:

```
rowsource = [value] / *terminated-value value
  terminated-value = value "\n" value = *value-char-with-\quote / quoted-value
  quoted-value = %x22 value-char-with-semicolon %x22
  value-char-with-semicolon = value-char / ";"
  value-char-with-\quote = value-char / %x22
  ;value-char = as defined by the production Char in the [W3C-XML] section 2.2, but MUST NOT be ";" or %x22
```

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SurveyQuestion">
  <xsd:sequence>
    <xsd:element name="questionPr" type="CT_SurveyElementPr" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="binding" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="text" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="type" type="ST_QuestionType" use="optional"/>
  <xsd:attribute name="format" type="ST_QuestionFormat" use="optional"/>
  <xsd:attribute name="helpText" type="ST_Xstring" use="optional"/>
  <xsd:attribute name="required" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="defaultValue" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="decimalPlaces" type="xsd:unsignedInt" use="optional"/>
</xsd:complexType>
```
See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.145 CT_SurveyElementPr


Referenced by: CT_Survey, CT_SurveyQuestions, CT_SurveyQuestion

CT_SurveyElementPr is a complex type that specifies additional properties of a survey element.

Child Elements:


Attributes:

cssClass: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies a Cascading Style Sheet (CSS, [CSS-Level2-2009]) class name to apply to the survey element.

cssClass: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies a Cascading Style Sheet (CSS, [CSS-Level2-2009]) class name to apply to the survey element.

bottom: An int ([XMLSCHEMA2] section 3.3.17) attribute that specifies the bottom boundary of this survey element in pixels.

top: An int ([XMLSCHEMA2] section 3.3.17) attribute that specifies the top boundary of the survey element in pixels.

left: An int ([XMLSCHEMA2] section 3.3.17) attribute that specifies the left boundary of the survey element in pixels.

right: An int ([XMLSCHEMA2] section 3.3.17) attribute that specifies the right boundary of the survey element in pixels.

width: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the width of the survey element in pixels.

height: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the height of the survey element in pixels.

position: An ST_SurveyPosition attribute that specifies the type of positioning to be used on the survey element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xs:complexType name="CT_SurveyElementPr">
  <xs:sequence>
    <xs:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xs:sequence>
  <xs:attribute name="cssClass" type="x:ST_Xstring" use="optional"/>
  <xs:attribute name="bottom" type="xsd:int" use="optional"/>
  <xs:attribute name="top" type="xsd:int" use="optional"/>
  <xs:attribute name="left" type="xsd:int" use="optional"/>
  <xs:attribute name="right" type="xsd:int" use="optional"/>
  <xs:attribute name="width" type="xsd:unsignedInt" use="optional"/>
  <xs:attribute name="height" type="xsd:unsignedInt" use="optional"/>
  <xs:attribute name="position" type="ST_SurveyPosition" use="optional"/>
</xs:complexType>
```
See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.146  CT_Ref

Target namespace: http://schemas.microsoft.com/office/excel/2006/main

Referenced by: ref

CT_Ref is a complex type that extends ST_Ref ([ISO/IEC29500-1:2016] section 18.18.62) specifies a rectangular range.

Attributes:

edited: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies that at least one cell in this range has been edited by an application version that is unable to read one or more ancestor records.

adjusted: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this range has been adjusted by an application version that is unable to read one or more ancestor records.

adjust: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether application versions that are unable to read one or more ancestor records will adjust this range if the contents of the cells that this range refers to are changed. MUST be TRUE if adjusted is TRUE.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Ref">
  <xsd:simpleContent>
    <xsd:extension base="ST_Ref">
      <xsd:attribute name="edited" type="xsd:boolean" use="optional"/>
      <xsd:attribute name="adjusted" type="xsd:boolean" use="optional"/>
      <xsd:attribute name="adjust" type="xsd:boolean" use="optional"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
```

See section 5.1 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.147  CT_Sqref

Target namespace: http://schemas.microsoft.com/office/excel/2006/main

Referenced by: sqref, CT_ConditionalFormatting, CT_DataValidation, CT_Sparkline, CT_IgnoredError, CT_ProtectedRange

CT_Sqref is a complex type that extends ST_Sqref ([ISO/IEC29500-1:2016] section 18.18.76) specifies a sequence of cell references.

Attributes:

edited: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies that at least one cell in this range has been edited by an application version that is unable to read one or more ancestor records.

split: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies that this range has been split.

adjusted: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this range has been adjusted by an application version that is unable to read one or more ancestor records.
adjust: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether application versions that are unable to read one or more ancestor records will adjust this range if the contents of the **cells** that this range refers to are changed. MUST be **TRUE** if adjusted is **TRUE**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Sqref">
  <xsd:simpleContent>
    <xsd:extension base="ST_Sqref">
      <xsd:attribute name="edited" type="xsd:boolean" use="optional"/>
      <xsd:attribute name="split" type="xsd:boolean" use="optional"/>
      <xsd:attribute name="adjusted" type="xsd:boolean" use="optional"/>
      <xsd:attribute name="adjust" type="xsd:boolean" use="optional"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
```

See section 5.1 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

#### 2.6.148 CT_ApplicationNonVisualDrawingProps

*Target namespace:*

*Referenced by:* **CT_ContentPart**

Non-visual ContentPart properties.

*Attributes:*

- **macro**: A **string** ([XMLSCHEMA2] section 3.2.1) attribute that contains an XL macro string.
- **fPublished**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that serves as a Flag to determine whether the shape will be published on XL server.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;true&quot;</td>
<td>The shape will be published on XL server.</td>
</tr>
<tr>
<td>&quot;false&quot;</td>
<td>The shape will not be published on XL server.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ApplicationNonVisualDrawingProps">
  <xsd:attribute name="macro" type="xsd:string" use="optional"/>
  <xsd:attribute name="fPublished" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.8 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

#### 2.6.149 CT_CacheSourceExt

*Target namespace:*

Extended description of the data source whose data is stored in the pivot cache.
Child Elements:

**sourceConnection**: A `CT_SourceConnection` element that specifies the source connection of the pivot cache.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT.CacheSourceExt">
    <xsd:sequence>
        <xsd:element ref="sourceConnection" minOccurs="1" maxOccurs="1"/>
    </xsd:sequence>
</xsd:complexType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.150 CT_ContentPart

**Target namespace**: http://schemas.microsoft.com/office/excel/2010/spreadsheetDrawing

**Referenced by**: `contentPart`

Specifies a reference to XML content in a format not specified in [ISO/IEC29500-1:2016].

**Child Elements**:

- `nvContentPartPr`: A `CT_ContentPartNonVisual` element that specifies the non-visual properties of the content part.
- `nvPr`: A `CT_ApplicationNonVisualDrawingProps` element that specifies non-visual drawing-specific properties.

**Attributes**:

- `r:id`: An `ST_RelationshipId` ([ISO/IEC29500-1:2016] section 22.8.2.1) attribute that specifies the relationship identifier to a content part.
- `bwMode`: An `ST_BlackWhiteMode` ([ISO/IEC29500-1:2016] section 20.1.10.10) attribute that specifies how to interpret color information contained within a content part to achieve a color, black and white, or grayscale rendering of the content part.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT.ContentPart">
    <xsd:sequence>
        <xsd:element name="nvContentPartPr" type="CT.ContentPartNonVisual" minOccurs="0" maxOccurs="1"/>
        <xsd:element name="nvPr" type="CT.ApplicationNonVisualDrawingProps" minOccurs="0" maxOccurs="1"/>
        <xsd:element name="xfrm" type="a:CT.Transform2D" minOccurs="0" maxOccurs="1"/>
        <xsd:element name="extLst" type="a:CT.OfficeArtExtensionList" minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
    <xsd:attribute ref="r:id" use="required"/>
</xsd:complexType>
```
2.6.151  CT_ContentPartNonVisual


Referenced by: CT_ContentPart

Non-visual ContentPart properties.

Child Elements:

- **cNvPr**: A CT_NonVisualDrawingProps ([ISO/IEC29500-1:2016] section A.4.1) element that specifies non-visual drawing properties of the content part. This enables additional information that does not affect the appearance of the content part to be stored.

- **cNvContentPartPr**: A CT_NonVisualInkContentPartProperties ([MS-ODRAWXML] section 2.3.3.7) element that specifies non-visual ink properties of the content part. This enables additional information that does not affect the appearance of ink in the content part to be stored.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ContentPartNonVisual">
  <xsd:sequence>
    <xsd:element name="cNvPr" type="a:CT_NonVisualDrawingProps" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="cNvContentPartPr" type="a14:CT_NonVisualInkContentPartProperties" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.8 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.152  CT_CalculatedTimeColumn

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2014/11/main

Referenced by: CT_ModelTimeGrouping

Specifies information about a single calculated time column.

Attributes:

- **columnName**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the model column name for a specific time grouping granularity.

- **columnId**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the model column immutable identifier for a specific time grouping.

- **contentType**: An **ST_ModelTimeGroupingContentType** attribute that specifies the type of content stored in this calculated column.

- **isSelected**: A **Boolean** ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether this grouping granularity was applied in the last time grouping selection.

See section 5.8 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```
<xsd:complexType name="CT_CalculatedTimeColumn">
  <xsd:attribute name="columnName" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="columnId" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="contentType" type="ST_ModelTimeGroupingContentType" use="required"/>
  <xsd:attribute name="isSelected" type="xsd:boolean" use="required"/>
</xsd:complexType>
```

See section 5.10 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.153 CT_ModelTimeGrouping

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2014/11/main

**Referenced by:** CT_ModelTimeGroupings

Specifies information about a single data model time grouping.

**Child Elements:**

- `calculatedTimeColumn`: A CT_CalculatedTimeColumn (section 2.6.152) element that specifies information about a data model time grouping calculated column.

**Attributes:**

- `tableName`: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the model table name for this time grouping.
- `columnName`: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the model column name for this time grouping.
- `columnId`: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the model column immutable identifier for this time grouping.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```
<xsd:complexType name="CT_ModelTimeGrouping">
  <xsd:sequence>
    <xsd:element name="calculatedTimeColumn" minOccurs="1" maxOccurs="unbounded" type="CT_CalculatedTimeColumn"/>
  </xsd:sequence>
  <xsd:attribute name="tableName" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="columnName" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="columnId" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
```

See section 5.10 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.154 CT_ModelTimeGroupings

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2014/11/main

**Referenced by:** modelTimeGroupings

Specifies information about data model time groupings.
Child Elements:

**modelTimeGrouping**: A **CT_ModelTimeGrouping** (section 2.6.153) element that specifies information about data model single time grouping.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ModelTimeGrouping">
  <xsd:sequence>
    <xsd:element name="modelTimeGrouping" minOccurs="1" maxOccurs="unbounded" type="CT_ModelTimeGrouping"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.10 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.155 CT_RevisionPtr

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2014/revision

**Referenced by**: revisionPtr

This element specifies metadata supporting runtime scenarios for Microsoft Excel.

**Attributes**:

- **revIDLastSave**: An **ST_Xrevid** attribute that SHOULD be ignored.
- **documentId**: An **ST_Xstring** ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that SHOULD be ignored.
- **xr6:coauthVersionLast**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that SHOULD be ignored.
- **xr6:coauthVersionMax**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that SHOULD be ignored.
- **xr10:uidLastSave**: An **ST_Guid** ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that SHOULD be ignored.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RevisionPtr">
  <xsd:attribute name="revIDLastSave" type="ST_Xrevid" use="required"/>
  <xsd:attribute name="documentId" type="x:ST_Xstring" use="required"/>
  <xsd:attribute ref="xr6:coauthVersionLast" use="optional" default="0"/>
  <xsd:attribute ref="xr6:coauthVersionMax" use="optional" default="0"/>
  <xsd:attribute ref="xr10:uidLastSave" use="optional"/>
</xsd:complexType>
```

See section 5.15 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.156 CT_PivotTableDefinition16

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2016/pivotdefaultlayout

**Referenced by**: pivotTableDefinition16
This element specifies additional properties of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) view.

Attributes:

**EnabledSubtotalsDefault**: A boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether subtotals are enabled by default for the PivotTable.

**SubtotalsOnTopDefault**: A boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether enabled subtotals are on the top of the PivotTable by default.

**InsertBlankRowDefault**: A boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether blank rows are inserted into the PivotTable by default.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PivotTableDefinition16">
  <xsd:attribute name="EnabledSubtotalsDefault" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="SubtotalsOnTopDefault" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="InsertBlankRowDefault" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.19 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.157 CT_Array

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by**: CT_ArrayData

This element specifies the properties of a single rich array.

**Child Elements**:

**v**: A CT_ArrayValue element that specifies a data type and value in the rich array. If the c attribute is not present, then the total number of CT_ArrayValue elements MUST be equal to the r attribute. If the c attribute is present, then the total number of CT_ArrayValue elements MUST be equal to the r attribute multiplied by the c attribute.

Certain data types indicate that the value represents an index as described in the table below.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;a&quot;</td>
<td>The CT_ValueValue identifies a CT_ArrayValue specified in section 2.6.159. This is a zero-based index. This index MUST reference a CT_Array that comes before the current CT_Array in the list specified in CT_ArrayData (section 2.6.158).</td>
</tr>
<tr>
<td>&quot;r&quot;</td>
<td>The CT_ArrayValue identifies a CT_RichValue specified in section 2.6.175. This is a zero-based index. This index MUST reference a CT_RichValue that comes before the current CT_RichValue that contains the current CT_Array in the list specified in CT_RichValueData (section 2.6.177).</td>
</tr>
</tbody>
</table>

**Attributes**:
**r**: An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of rows for the rich array. This number MUST be less than or equal to 1048576.

**c**: An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of columns for the array. This number MUST be less than or equal to 16384.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Array">
    <xsd:sequence>
        <xsd:element name="v" minOccurs="1" maxOccurs="unbounded" type="CT_ArrayValue"/>
    </xsd:sequence>
    <xsd:attribute name="r" type="xsd:unsignedInt" use="required"/>
    <xsd:attribute name="c" type="xsd:unsignedInt" use="optional" default="1"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.158 CT_ArrayData

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by**: arrayData

A complex type that specifies the values for **rich arrays**.

**Child Elements**:

**a**: A **CT_Array** element that specifies a single rich array.


**Attributes**:

**count**: An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that specifies the count of rich arrays. The number of **CT_Array** elements MUST match this count. This count MUST be less than or equal to 2147483647.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ArrayData">
    <xsd:sequence>
        <xsd:element name="a" minOccurs="0" maxOccurs="unbounded" type="CT_Array"/>
        <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
    <xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.159 CT_ArrayValue

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by**: CT_Array
A complex type that specifies the value and type of an element in a rich array.

Attributes:

t: An ST_ArrayValueType attribute that specifies the data type of the rich array value.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ArrayValue">
  <xsd:simpleContent>
    <xsd:extension base="x:ST_Xstring">
      <xsd:attribute name="t" type="ST_ArrayValueType" use="optional" default="d"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.160  CT_CustomRichFilter

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_CustomRichFilters

A complex type that specifies a custom filter criterion that is associated with a rich value.

Attributes:

key: An ST_RichFilterKey (section 2.7.38) attribute that specifies the rich value key for which the filters is defined.


val: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the value to be used as a custom filter criterion. The length of this value MUST be less than 65536 characters.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CustomRichFilter">
  <xsd:complexContent>
    <xsd:extension base="x:CT_CustomFilter">
      <xsd:attribute name="key" type="ST_RichFilterKey" use="optional"/>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.161  CT_CustomRichFilters

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_RichFilterColumn

This complex type specifies custom filter criteria associated with rich values. Rows that contain a cell within the filter range such that the value does not meet the custom filter criteria will be hidden.
Child Elements:

**customFilter**: A `CT_CustomRichFilter` element that specifies custom filter criterion that is associated with a rich value.


Attributes:

**and**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies the relationship between custom filter criterion. This attribute only applies when there are two criteria:

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>The two criteria are related by an OR relationship. That is, for a cell value to meet the custom filter criteria, at least one criterion specified by the <code>customRichFilter</code> child elements MUST be met.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>The two criteria are related by an AND relationship. That is, for a cell value to meet the custom filter criteria, both criteria specified by the <code>customRichFilter</code> child elements MUST be met.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CustomRichFilters">
  <xsd:sequence>
    <xsd:choice minOccurs="1" maxOccurs="2">
      <xsd:element name="customFilter" minOccurs="0" maxOccurs="1" type="CT_CustomRichFilter"/>
      <xsd:element name="extLst" minOccurs="0" maxOccurs="1" type="x:CT_ExtensionList"/>
    </xsd:choice>
  </xsd:sequence>
  <xsd:attribute name="and" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.162 CT_DynamicRichFilter

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by**: `CT_RichFilterColumn`

This complex type specifies the dynamic filter criteria associated with rich values. These criteria are considered dynamic because they can change, either with the data itself (e.g., "above average") or with the current system date (e.g., show values for "today"). For any cells within the filter range whose values do not meet the specified criteria, the corresponding rows will be hidden from view when the filter is applied.

Attributes:

**key**: An `ST_RichFilterKey` (section 2.7.38) attribute that specifies the rich value key for which the filters is defined.

**type**: An `ST_DynamicFilterType` ([ISO/IEC29500-1:2016] section 18.18.26) attribute that specifies the type of dynamic filter.

**val**: A `double` ([XMLSCHEMA2] section 3.2.5) attribute that specifies a minimum value for dynamic filter. It is inclusive for today, yesterday, tomorrow, nextWeek, thisWeek, lastWeek, nextMonth, thisMonth, lastMonth, nextQuarter, thisQuarter, lastQuarter, nextYear, thisYear, lastYear, and
yearToDate. The val attribute is not required for Q1, Q2, Q3, Q4, M1, M2, M3, M4, M5, M6, M7, M8, M9, M10, M11 and M12. It is exclusive for aboveAverage and belowAverage.

maxVal: A double ([XMLSCHEMA2] section 3.2.5) attribute that specifies a maximum value for dynamic filter. It is exclusive and required for today, yesterday, tomorrow, nextWeek, thisWeek, lastWeek, nextMonth, thisMonth, lastMonth, nextQuarter, thisQuarter, lastQuarter, nextYear, thisYear, lastYear, and yearToDate.

valIso: A dateTime ([XMLSCHEMA2] section 3.2.7) attribute that specifies a minimum value for dynamic filter. (See description of the maxValIso attribute to understand when the valIso attribute is required.)

maxValIso: A dateTime ([XMLSCHEMA2] section 3.2.7) attribute that specifies a maximum value for dynamic filter. The maxValIso attribute is required for today, yesterday, tomorrow, nextWeek, thisWeek, lastWeek, nextMonth, thisMonth, lastMonth, nextQuarter, thisQuarter, lastQuarter, nextYear, thisYear, lastYear, and yearToDate.

The above criteria are based on a value range; that is, if today's date is September 22nd, then the range for thisWeek is the values greater than or equal to September 17 and less than September 24. In the thisWeek range, the lower value is expressed valIso. The higher value is expressed using the maxValIso attribute.

These dynamic filters do not require the valIso or maxValIso attributes:
Q1, Q2, Q3, Q4, M1, M2, M3, M4, M5, M6, M7, M8, M9, M10, M11 and M12.

The above criteria shall not specify the range using valIso and maxValIso because Q1 always starts from M1 to M3, and M1 is always January.

These types of dynamic filters use valIso and do not use maxValIso:
aboveAverage and belowAverage

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_DynamicRichFilter">
 <xsd:complexContent>
  <xsd:extension base="x:CT_DynamicFilter">
   <xsd:attribute name="key" type="ST_RichFilterKey" use="optional"/>
  </xsd:extension>
 </xsd:complexContent>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.163 CT_Key

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

Referenced by: CT_RichValueStructure

This complex type specifies the rich value key.

Attributes:

n: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the rich value key. This name is case insensitive and MUST be unique in the CT_RichValueStructure. This string MUST be less than or equal to 255 characters in length.
**t**: An **ST_RichValueValueType** attribute that specifies the **data type** of the value associated with this key.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Key">
  <xsd:attribute name="n" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="t" type="ST_RichValueValueType" use="optional" default="d"/>
</xsd:complexType>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

#### 2.6.164 **CT_RichDateGroupItem**

**Target namespace**: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by**: **CT_RichFilters**

This complex type specifies a group of dates or times which are used in a filter criteria associated with rich values.

**Attributes**:

- **key**: An **ST_RichFilterKey** (section 2.7.38) attribute that specifies the **rich value key** for which the filters is defined.

- **year**: An **unsignedShort** ([XMLSCHEMA2] section 3.3.23) attribute that specifies the year (4 digits).

- **month**: An **unsignedShort** ([XMLSCHEMA2] section 3.3.23) attribute that specifies the month (1-12).

- **day**: An **unsignedShort** ([XMLSCHEMA2] section 3.3.23) attribute that specifies the day (1-31).

- **hour**: An **unsignedShort** ([XMLSCHEMA2] section 3.3.23) attribute that specifies the hour (0-23).

- **minute**: An **unsignedShort** ([XMLSCHEMA2] section 3.3.23) attribute that specifies the minute (0-59).

- **second**: An **unsignedShort** ([XMLSCHEMA2] section 3.3.23) attribute that specifies the second (0-59).

- **dateTimeGrouping**: An **ST_DateTimeGrouping** ([ISO/IEC29500-1:2016] section 18.18.22) attribute that specifies the grouping level.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichDateGroupItem">
  <xsd:complexContent>
    <xsd:extension base="x:CT_DateGroupItem">
      <xsd:attribute name="key" type="ST_RichFilterKey" use="optional"/>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.165  **CT_RichFilter**

*Target namespace:* http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

*Referenced by:* CT_RichFilters

This complex type specifies a filter criterion associated with rich values. Rows that contain a rich value within the filter range that have key value pair (KVP) with value val and key key will not be hidden by this filter criterion. Rows that do not contain such a rich value will be hidden.

**Attributes:**

- **key:** An ST_RichFilterKey (section 2.7.38) attribute that specifies the rich value key for which the filters is defined.
- **val:** An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the value to be used as a filter criterion. The length of this value MUST be less than 65536 characters.
- **blank:** A Boolean ([XMSHEMA2] section 3.2.2) attribute that specifies whether the filter criterion includes blank values.
- **nodata:** A Boolean ([XMSHEMA2] section 3.2.2) attribute that specifies whether the filter includes values that do not have the specified rich value key.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichFilter">
  <xsd:attribute name="key" type="ST_RichFilterKey" use="optional"/>
  <xsd:attribute name="val" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="blank" type="xsd:boolean" use="optional"/>
  <xsd:attribute name="nodata" type="xsd:boolean" use="optional"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.166  **CT_RichFilters**

*Target namespace:* http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

*Referenced by:* CT_RichFilterColumn

This complex type specifies a filter with multiple criteria associated with rich values.

**Child Elements:**

- **filter:** A CT_RichFilter element that specifies a filter criterion associated with rich values. Rows that contain a rich value within the filter range that have a key value pair (KVP) with value val and key key will not be hidden by this filter criterion. Rows that do not contain such a rich value will be hidden.

- **dateGroupItem:** A CT_RichDateGroupItem element that specifies a group of dates or times which are used in a filter criteria associated with rich values.

- **extLst:** A CT_ExtensionList ([ISO/IEC29500-4:2016] section A.2) element that specifies future extensibility for this element.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
<xsd:complexType name="CT_RichFilters">
  <xsd:sequence>
    <xsd:element name="filter" type="CT_RichFilter" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="dateGroupItem" type="CT_RichDateGroupItem" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.167 CT_RichFormatProperties

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_RichStylesheet

This complex type specifies a list of properties for rich value formats.

Child Elements:

rPr: A CT_RichFormatProperty element that specifies a property for rich value formats.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

<xsd:complexType name="CT_RichFormatProperties">
  <xsd:sequence>
    <xsd:element name="rPr" minOccurs="1" maxOccurs="unbounded" type="CT_RichFormatProperty"/>
  </xsd:sequence>
</xsd:complexType>

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.168 CT_RichFormatProperty

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_RichFormatProperties

This complex type specifies a property for rich value formats.

Attributes:

n: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of the property.

t: An ST_RichFormatPropertyType attribute that specifies the data type of the property.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

<xsd:complexType name="CT_RichFormatProperty">
  <xsd:attribute name="n" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="t" type="ST_RichFormatPropertyType" use="required"/>
</xsd:complexType>
See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.169 CT_RichSortCondition

Target namespace: http://schemas.microsoft.com_office/spreadsheetml/2017/richdata2

Referenced by: richSortCondition

This complex type specifies sort conditions associated with rich values.

Attributes:

richSortKey: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the rich value key for which the sort condition is defined. This string MUST be less than or equal to of 255 characters in length.

descending: A boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies the direction of the sort.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;false&quot;</td>
<td>If sortBy is &quot;value&quot;, sort in ascending order. If sortBy is &quot;cellColor&quot; or &quot;fontColor&quot;, cells in which the cell color or cell font color specified by dxfId occurs are ordered at the top of the range. If sortBy is &quot;icon&quot;, cells in which the icon specified by iconSet and iconId occurs are ordered at the top of the range.</td>
</tr>
<tr>
<td>&quot;true&quot;</td>
<td>If sortBy is &quot;value&quot;, sort in descending order. If sortBy is &quot;cellColor&quot; or &quot;fontColor&quot;, cells in which the cell color or cell font color specified by dxfId occurs are ordered at the bottom of the range. If sortBy is &quot;icon&quot;, cells in which the icon specified by iconSet and iconId occurs are ordered at the bottom of the range.</td>
</tr>
</tbody>
</table>

sortBy: An ST_SortBy ([ISO/IEC29500-1:2016] section 18.18.72) attribute that specifies how the cells in a range are sorted.

ref: An ST_Ref ([ISO/IEC29500-1:2016] section 18.18.62) attribute that specifies the row or column to which this sort condition applies. This value MUST be contained within the ref in the sortState ([ISO/IEC29500-1:2016] section 18.3.1.92) element that precedes this element. If the sortState.columnSort attribute that precedes this element is "false", this value specifies the column to which this sort condition applies and there MUST be only a single column specified by ref. If the sortState.columnSort attribute that precedes this element is "true", this value specifies the row to which this sort condition applies and there MUST be only a single row specified by ref.

customList: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies a comma-delimited list of strings that specifies a custom sort order. The order of strings in the list specifies the sort order. When a cell value matches a string in the list, it is sorted ahead of the cell values that match a later string in the list, and so on for each cell in the range. MUST be ignored if sortBy is not equal to "value".

dxFId: An ST_DxFId ([ISO/IEC29500-1:2016] section 18.18.25) attribute that specifies the format identifier when sortBy equals "cellColor" or sortBy equals "fontColor". MUST NOT be present if sortBy equals "icon" or "value".

iconSet: An ST_IconSetType attribute that specifies the icon set when sortBy equals "icon". The absence of this attribute means no icon. MUST NOT be present if sortBy is not equal to "icon".

iconId: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the zero-based index of an icon in an icon set. If the icon set specified by iconSet has three icons, this value MUST be less than or equal to 2. If the icon set specified by iconSet has four icons, this value MUST be less...
than or equal to 3. If the icon set specified by iconSet has five icons, this value MUST be less than or equal to 4. The absence of this attribute means no icon. MUST NOT be present if sortBy is not equal to "icon".

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichSortCondition">
  <xsd:complexContent>
    <xsd:extension base="x2:CT_SortCondition">
      <xsd:attribute name="richSortKey" type="x:ST_Xstring" use="optional"/>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.170 CT_RichStyle

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by:** CT_RichStyles

This complex type specifies a list of properties and optional style differential formats (DXFs) ([ISO/IEC29500-1:2016] section 18.8) associated with rich values.

**Child Elements:**

- **rpv:** A CT_RichStylePropertyValue element that specifies the value of and identifier to the CT_RichFormatProperty (section 2.6.168).

**Attributes:**

- **dxfid:** An ST_DxfId ([ISO/IEC29500-1:2016] section 18.18.25) attribute that specifies the identifier to CT_Dxfs ([ISO/IEC29500-4:2016] section A.2) in the styles part. This is a zero-based index. See [ISO/IEC29500-1:2016] section 18.8.30 in Style for more information on formats. This simple type's contents are a restricted by the unsignedInt ([XMLSCHEMA2] section 3.3.22) data type.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichStyle">
  <xsd:sequence>
    <xsd:element name="rpv" minOccurs="0" maxOccurs="unbounded" type="CT_RichStylePropertyValue"/>
  </xsd:sequence>
  <xsd:attribute name="dxfid" type="x:ST_DxfId" use="optional"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.171 CT_RichStylePropertyValue

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by:** CT_RichStyle

This complex type specifies the value of and identifier to a CT_RichFormatProperty (section 2.6.168).
Attributes:

i: An unsignedInt ([XMLSCHEMA2] 3.3.22) attribute that specifies the identifier to a CT_RichFormatProperty.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichStylePropertyValue">
  <xsd:simpleContent>
    <xsd:extension base="xsd:string">
      <xsd:attribute name="i" type="xsd:unsignedInt" use="required"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.172 CT_RichStyles

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_RichStylesheet

This complex type specifies a list of styles associated with rich values.

Child Elements:

rSty: A CT_RichStyle element that specifies a list of properties and optional style differential formats (DXFs) ([ISO/IEC29500-1:2016] section 18.8) associated with rich values.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichStyles">
  <xsd:sequence>
    <xsd:element name="rSty" minOccurs="1" maxOccurs="unbounded" type="CT_RichStyle"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.173 CT_RichStylesheet

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: richStyleSheet

This complex type contains style information associated with rich values.

Child Elements:


richProperties: A CT_RichFormatProperties element that specifies a list of properties for rich value formats.

richStyles: A CT_RichStyles element that specifies a list of styles associated with rich values.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichStylesheet">
  <xsd:sequence>
    <xsd:element name="dxfs" type="x:CT_Dxfs" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="richProperties" type="CT_RichFormatProperties" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="richStyles" type="CT_RichStyles" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.174 CT_RichTop10

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_RichFilterColumn

This complex type specifies a top N filter or bottom N filter.

Attributes:

- **key**: An ST_RichFilterKey (section 2.7.38) attribute that specifies the rich value key for which the filters is defined.
- **top**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether a top N filter or a bottom N filter is applied. True indicates a top N filter is applied. False indicates a bottom N filter is applied.
- **percent**: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies whether the top N filter or bottom N filter is based on a percentage of the total sum of values in the column or not. True indicates value filters by a percent value of the column. False indicates value filters by number of items.
- **val**: A double ([XMLSCHEMA2] section 3.2.5) attribute that specifies the top or bottom value to use as the filter criteria.
- **filterVal**: A double ([XMLSCHEMA2] section 3.2.5) attribute that specifies the actual cell value or rich value data in the range which is used to perform the comparison for this filter.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichTop10">
  <xsd:complexContent>
    <xsd:extension base="x:CT_Top10">
      <xsd:attribute name="key" type="ST_RichFilterKey" use="optional"/>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.175  CT_RichValue

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

Referenced by: CT_RichValueData

This complex type specifies rich value data information for a single rich value.

Child Elements:

**fb:** A CT_RichValueFallback element that specifies the rich value fallback.

**v:** A CT_Value element that specifies a value contained in the rich value as part of a key value pair (KVP). The rich value key and data type is determined by matching the index of the CT_Value with the index of the CT_Key (section 2.6.163) in the CT_RichValueStructure (section 2.6.180) identified by the s attribute.

Certain data types indicate that the value represents an index as described in the table below.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;a&quot;</td>
<td>The CT_Value identifies a CT_Array specified in section 2.6.157. This is a zero-based index.</td>
</tr>
<tr>
<td>&quot;rv&quot;</td>
<td>The CT_Value identifies a CT_RichValue specified in this section. This is a zero-based index. This index MUST reference a CT_RichValue that comes before the current CT_RichValue in the list specified in CT_RichValueData (section 2.6.177).</td>
</tr>
<tr>
<td>&quot;spb&quot;</td>
<td>The CT_Value identifies a CT_SupportingPropertyBag specified in section 2.6.188. This is a zero-based index.</td>
</tr>
</tbody>
</table>

Attributes:

**s:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the identifier to the CT_RichValueStructure (section 2.6.180). This is a zero-based index.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValue">
  <xsd:sequence>
    <xsd:element name="fb" minOccurs="0" maxOccurs="1" type="CT_RichValueFallback"/>
    <xsd:element name="v" minOccurs="1" maxOccurs="unbounded" type="CT_Value"/>
  </xsd:sequence>
  <xsd:attribute name="s" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.176  CT_RichValueBlock

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

Referenced by: rvb

This complex type specifies the identifier for the CT_RichValue (section 2.6.175).

Attributes:
i: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the identifier for the CT_RichValue (section 2.6.175). This is a zero-based index.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueBlock">
  <xsd:attribute name="i" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.177 CT_RichValueData

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

**Referenced by:** rvData

This complex type specifies a list of rich value data elements.

**Child Elements:**

- **rv:** A CT_RichValue element that specifies rich value data information for a single rich value

- **extLst:** A CT_ExtensionList ([ISO/IEC29500-4:2016] section A.2) element that specifies future extensibility for this element.

**Attributes:**

- **count:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the count of CT_RichValue elements. The number of CT_RichValue elements MUST match this count. This count MUST be less than or equal to 2147483647.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueData">
  <xsd:sequence>
    <xsd:element name="rv" minOccurs="0" maxOccurs="unbounded" type="CT_RichValue"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.178 CT_RichValueFallback

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

**Referenced by:** CT_RichValue

This complex type specifies the rich value fallback.

**Attributes:**

- **t:** An ST_RichValueFallbackType attribute that specifies the data type of the rich value fallback.
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueFallback">
  <xsd:simpleContent>
    <xsd:extension base="xsd:string">
      <xsd:attribute name="t" type="ST_RichValueFallbackType" use="optional" default="n"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.179  CT_RichValueGlobalType

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

**Referenced by:** CT_RichValueTypesInfo

This complex type specifies information that applies to all rich value types.

**Child Elements:**

- **keyFlags**: A CT_RichValueTypeKeyFlags element that specifies the values of rich value key flags that differ from the defaults for all rich value types. See sections under section 2.3.6.1 for specific type definitions.


The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueGlobalType">
  <xsd:sequence>
    <xsd:element name="keyFlags" minOccurs="0" maxOccurs="1" type="CT_RichValueTypeKeyFlags"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.180  CT_RichValueStructure

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

**Referenced by:** CT_RichValueStructures

This complex type specifies the structure for one or more rich values.

**Child Elements:**

- **k**: A CT_Key element that specifies the rich value key.

**Attributes:**

- **t**: A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the rich value type.
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueStructure">
  <xsd:sequence>
    <xsd:element name="k" minOccurs="1" maxOccurs="unbounded" type="CT_Key"/>
  </xsd:sequence>
  <xsd:attribute name="t" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.181 CT_RichValueStructures

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

**Referenced by:** rvStructures

This complex type specifies the list of rich value structures.

**Child Elements:**
- **s**: A CT_RichValueStructure element that specifies the structure for one or more rich values.

**Attributes:**
- **count**: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the count of supporting property bag child elements. The number of CT_RichValueStructure elements MUST match this count. This count MUST be less than or equal to 2147483647.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueStructures">
  <xsd:sequence>
    <xsd:element name="s" minOccurs="0" maxOccurs="unbounded" type="CT_RichValueStructure"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.182 CT_RichValueType

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by:** CT_RichValueTypes

This complex type specifies information about a single rich value type.

**Child Elements:**
- **keyFlags**: A CT_RichValueTypeKeyFlags element that specifies the set of rich value key flags that deviate from defaults for the rich value type identified by the name attribute.
**extLst:** A **CT ExtensionList** ([ISO/IEC29500-4:2016] section A.2) element that specifies future extensibility for this element.

**Attributes:**

**name:** A **string** ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the rich value type. This string MUST be less than or equal to 255 characters in length.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueType">
  <xsd:sequence>
    <xsd:element name="keyFlags" minOccurs="0" maxOccurs="1" type="CT_RichValueTypeKeyFlags"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.183 CT_RichValueTypeKeyFlags

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by:** CT_RichValueGlobalType, CT_RichValueType

This complex type specifies a collection of **CT_RichValueTypeReservedKey** elements.

**Child Elements:**

**key:** A **CT_RichValueTypeReservedKey** element that specifies a rich value key with rich value key flags that apply to it.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueTypeKeyFlags">
  <xsd:sequence>
    <xsd:element name="key" minOccurs="1" maxOccurs="unbounded" type="CT_RichValueTypeReservedKey"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.184 CT_RichValueTypeReservedKey

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by:** CT_RichValueTypeKeyFlags

This complex type specifies a rich value key with rich value key flags that apply to it.

**Child Elements:**

**flag:** A **CT_RichValueTypeReservedKeyFlag** element that specifies information for the rich value key flag.
Attributes:

name: A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the rich value key.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueTypeReservedKey">
  <xsd:sequence>
    <xsd:element name="flag" minOccurs="1" maxOccurs="unbounded" type="CT_RichValueTypeReservedKeyFlag"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.185 CT_RichValueTypeReservedKeyFlag

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_RichValueTypesInfo

This complex type specifies information for the rich value key flag.

Attributes:

name: A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the rich value key flag.

value: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies the value for the rich value key flag.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueTypeReservedKeyFlag">
  <xsd:attribute name="name" type="xsd:string" use="required"/>
  <xsd:attribute name="value" type="xsd:boolean" use="required"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.186 CT_RichValueTypes

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_RichValueTypesInfo

This complex type specifies a collection of elements that specify information about rich value types.

Child Elements:

type: A CT_RichValueType element that specifies information about a single rich value type.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.187  CT_RichValueTypesInfo

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: rvTypesInfo

This complex type specifies two groupings of information. One applies to all rich value types, and the other only applies to the identified rich value types.

Child Elements:

global: A CT_RichValueGlobalType element that specifies information that applies to all rich value types.

types: A CT_RichValueTypes element that specifies information about identified rich value types.


The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichValueTypesInfo">
  <xsd:sequence>
    <xsd:element name="global" minOccurs="0" maxOccurs="1" type="CT_RichValueGlobalType"/>
    <xsd:element name="types" minOccurs="0" maxOccurs="1" type="CT_RichValueTypes"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.188  CT_SupportingPropertyBag

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_SupportingPropertyBagData

This complex type specifies supporting property bag data information for a single supporting property bag.

Child Elements:

v: A CT_SupportingPropertyBagValue element that specifies a value contained in the supporting property bag as part of a key value pair (KVP). The supporting property bag key and data type is determined by matching the index of the CT_SupportingPropertyBagValue with the index of the CT_SupportingPropertyBagKey (section 2.6.193) in the CT_SupportingPropertyBagStructure (section 2.6.195) identified by the s attribute.

Certain data types indicate that the value represents an index as described in the table below.
<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;spb&quot;</td>
<td>The <strong>CT_SupportingPropertyBagValue</strong> identifies a <strong>CT_SupportingPropertyBag</strong> specified in section 2.6.188. This is a zero-based index. This index MUST reference a <strong>CT_SupportingPropertyBag</strong> that comes before the current <strong>CT_SupportingPropertyBag</strong> in the list specified in <strong>CT_SupportingPropertyBagData</strong> (section 2.6.192).</td>
</tr>
<tr>
<td>&quot;spba&quot;</td>
<td>The <strong>CT_SupportingPropertyBagValue</strong> identifies a <strong>CT_SupportingPropertyBagArray</strong> specified in section 2.6.189. This is a zero-based index.</td>
</tr>
</tbody>
</table>

**Attributes:**

s: An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that specifies the identifier to the **CT_SupportingPropertyBagStructure** (section 2.6.195). This is a zero-based index.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SupportingPropertyBag">
    <xsd:sequence>
        <xsd:element name="v" minOccurs="1" maxOccurs="unbounded" type="CT_SupportingPropertyBagValue"/>
    </xsd:sequence>
    <xsd:attribute name="s" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.189 CT_SupportingPropertyBagArray

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by:** CT_SupportingPropertyBagArrayData

This complex type specifies a collection of values and **data types** of elements in a **supporting property bag array**.

**Child Elements:**

v: A **CT_SupportingPropertyBagArrayValue** element that specifies the value and data type of a single element in a supporting property bag array.

**Attributes:**

count: An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that specifies the count of elements in the supporting property bag array. The number of **CT_SupportingPropertyBagArrayValue** elements MUST match this count.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SupportingPropertyBagArray">
    <xsd:sequence>
        <xsd:element name="v" minOccurs="1" maxOccurs="unbounded" type="CT_SupportingPropertyBagArrayValue"/>
    </xsd:sequence>
    <xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```
See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.190 CT_SupportingPropertyBagArrayData

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_SupportingPropertyBags

This complex type specifies a list of supporting property bag arrays.

Child Elements:

a: A CT_SupportingPropertyBagArray element that specifies a collection of values and data types of elements in a supporting property bag array.


Attributes:

count: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the count of supporting property bag arrays. The number of CT_SupportingPropertyBagArray elements MUST match this count.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SupportingPropertyBagArrayData">
  <xsd:sequence>
    <xsd:element name="a" minOccurs="0" maxOccurs="unbounded" type="CT_SupportingPropertyBagArray"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.191 CT_SupportingPropertyBagArrayValue

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_SupportingPropertyBagArray

This complex type specifies the value and data type of an element in a supporting property bag array.

Attributes:

t: An ST_SupportingPropertyBagArrayValueType attribute that specifies the data type of the supporting property bag array value.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SupportingPropertyBagArrayValue">
  <xsd:sequence>
    <xsd:element name="t" type="x:ST_SupportingPropertyBagArrayValueType"/>
  </xsd:sequence>
</xsd:complexType>
```
<xsd:simpleContent>
  <xsd:extension base="x:ST_Xstring">
    <xsd:attribute name="t" type="ST_SupportingPropertyBagArrayValueType" use="optional"
      default="d"/>
  </xsd:extension>
</xsd:simpleContent>

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.192   CT_SupportingPropertyBagData

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_SupportingPropertyBags

This complex type specifies a list of supporting property bag data.

Child Elements:

spb: A CT_SupportingPropertyBag element that specifies the supporting property bag data
    information for a single supporting property bag.

    extensibility for this element.

Attributes:

count: An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the count of
    supporting property bags. The number of CT_SupportingPropertyBag elements MUST match this
    count.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this
complex type.

<xsd:complexType name="CT_SupportingPropertyBagData">
  <xsd:sequence>
    <xsd:element name="spb" minOccurs="0" maxOccurs="unbounded"
      type="CT_SupportingPropertyBag"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.193   CT_SupportingPropertyBagKey

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_SupportingPropertyBagStructure

This complex type specifies the supporting property bag key.

Attributes:

n: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the name of
    the key. This name is case sensitive and MUST be unique in the
    CT_SupportingPropertyBagStructure.
t: An ST_SupportingPropertyBagValueType attribute that specifies the data type of the value associated with this key.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SupportingPropertyBagKey">
    <xsd:attribute name="n" type="x:ST_Xstring" use="required"/>
    <xsd:attribute name="t" type="ST_SupportingPropertyBagValueType" use="optional" default="d"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.194 CT_SupportingPropertyBags

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by:** supportingPropertyBags

This complex type specifies a list of **supporting property bag data**.

**Child Elements:**

- **spbArrays**: A CT_SupportingPropertyBagArrayData element that specifies a list of **supporting property bag arrays**.
- **spbData**: A CT_SupportingPropertyBagData element that specifies a list of supporting property bag data.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SupportingPropertyBags">
    <xsd:sequence>
        <xsd:element name="spbArrays" minOccurs="0" maxOccurs="1" type="CT_SupportingPropertyBagArrayData"/>
        <xsd:element name="spbData" minOccurs="1" maxOccurs="1" type="CT_SupportingPropertyBagData"/>
    </xsd:sequence>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.195 CT_SupportingPropertyBagStructure

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by:** CT_SupportingPropertyBagStructures

This complex type specifies the **supporting property bag** structure for one or more supporting property bags.

**Child Elements:**

- **k**: A CT_SupportingPropertyBagKey element that specifies the **supporting property bag key**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.
2.6.196 **CT_SupportingPropertyBagStructures**

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: spbStructures

This complex type specifies a list of **supporting property bag** structures.

**Child Elements:**

- **s:** A **CT_SupportingPropertyBagStructure** element that specifies the supporting property bag structure for one or more supporting property bags.

- **extLst:** A **CT_ExtensionList** ([ISO/IEC29500-4:2016] section A.2) element that specifies future extensibility for this element.

**Attributes:**

- **count:** An **unsignedInt** ([XMLSCHEMA2] section 3.3.22) attribute that specifies the count of supporting property bag structures. The number of **CT_SupportingPropertyBagStructure** elements MUST match this count.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SupportingPropertyBagStructures">
  <xsd:sequence>
    <xsd:element name="s" minOccurs="0" maxOccurs="unbounded" type="CT_SupportingPropertyBagStructure"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.197 **CT_SupportingPropertyBagValue**

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: **CT_SupportingPropertyBag**

This complex type specifies the **supporting property bag data**.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_SupportingPropertyBagValue">
  <xsd:simpleContent>
    <xsd:extension base="x:ST_Xstring"/>
  </xsd:simpleContent>
</xsd:complexType>
```
See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.198 CT_Value

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

**Referenced by:** CT_RichValue

This complex type specifies the rich value data.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Value">
  <xsd:simpleContent>
    <xsd:extension base="x:ST_Xstring"/>
  </xsd:simpleContent>
</xsd:complexType>
```

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.199 CT_CalcFeature

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2018/calcfeatures

**Referenced by:** CT_CalcFeatures

This complex type specifies the name of a calculation engine feature that was present when the workbook was calculated.

**Attributes:**

- **name:** A string ([XMLSCHEMA2] section 3.2.1) attribute that specifies the name of the calculation engine feature.

<table>
<thead>
<tr>
<th>Name</th>
<th>Calculation Engine Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;microsoft.com:RD&quot;</td>
<td>Rich data (section 2.3.6) was present in the calculation engine</td>
</tr>
<tr>
<td>&quot;microsoft.com:FV&quot;</td>
<td>_FV or FIELDVALUE functions were present in the calculation engine</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CalcFeature">
  <xsd:attribute name="name" type="xsd:string" use="required"/>
</xsd:complexType>
```

See section 5.22 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.6.200 CT_CalcFeatures


Referenced by: calcFeatures

This element specifies a list of CT_CalcFeature elements (section 2.6.199).

Child Elements:

feature: A CT_CalcFeature element that specifies a calculation engine feature.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_CalcFeatures">
  <xsd:sequence>
    <xsd:element name="feature" minOccurs="1" maxOccurs="unbounded" type="CT_CalcFeature"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.22 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.201 CT_RichFilterColumn

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: filterColumn

This complex type specifies filter information associated with rich values.

Child Elements:

filters: A CT_RichFilters element that specifies a filter with multiple criteria associated with rich values.

top10: A CT_RichTop10 element that specifies a top N filter or bottom N filter.

customFilters: A CT_CustomRichFilters element that specifies custom filter criteria associated with rich values. Rows that contain a cell within the filter range such that the value does not meet the custom filter criteria will be hidden.

dynamicFilter: A CT_DynamicRichFilter element that specifies the dynamic filter criteria associated with rich values. These criteria are considered dynamic because they can change, either with the data itself (e.g., "above average") or with the current system date (e.g., show values for "today"). For any cells within the filter range whose values do not meet the specified criteria, the corresponding rows will be hidden from view when the filter is applied.


The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_RichFilterColumn">
  <xsd:choice minOccurs="0" maxOccurs="1">
    <xsd:element name="filters" type="CT_RichFilters"/>
    <xsd:element name="top10" type="CT_RichTop10"/>
    <xsd:element name="customFilters" type="CT_CustomRichFilters"/>
    <xsd:element name="dynamicFilter" type="CT_DynamicRichFilter"/>
  </xsd:choice>
</xsd:complexType>
```
See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.202 CT_Mention

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2018/threadedcomments

**Referenced by:** CT_ThreadedCommentMentions

This complex type specifies the properties of a mention in a threaded comment.

**Attributes:**

- **mentionpersonId:** An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier for the person mentioned. This attribute MUST correspond to the id specified in CT_Person (section 2.6.203).

- **mentionId:** An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier for this mention.

- **startIndex:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the index in comment text where the mention starts.

- **length:** An unsignedInt ([XMLSCHEMA2] section 3.3.22) attribute that specifies the number of characters in the mention from startIndex.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Mention">
  <xsd:attribute name="mentionpersonId" type="x:ST_Guid" use="required"/>
  <xsd:attribute name="mentionId" type="x:ST_Guid" use="required"/>
  <xsd:attribute name="startIndex" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="length" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
```

See section 5.23 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.6.203 CT_Person

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2018/threadedcomments

**Referenced by:** CT_PersonList

This complex type specifies the information about an author of a comment or a person mentioned in a comment.

**Child Elements:**

- **extLst:** A CT_ExtensionList ([ISO/IEC29500-4:2016] section A.2) element that specifies future extensibility for this element.

**Attributes:**
displayName: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the display name of the person.

id: An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier for the person.

userId: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies a provider issued user identifier for the person.

providerId: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) attribute that specifies the provider type of the person's information.

This table lists example values of the providerId attribute and the corresponding meanings of the userId attribute.

<table>
<thead>
<tr>
<th>Identity Provider</th>
<th>providerId value</th>
<th>userId value</th>
<th>Description of userId value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Provider</td>
<td>&quot;None&quot;</td>
<td>&quot;Name&quot;</td>
<td>Author's name</td>
</tr>
<tr>
<td>Active Directory</td>
<td>&quot;AD&quot;</td>
<td>SID</td>
<td>Active Directory Security Identifier (as specified in [MS-DTYP] section 2.4.2)</td>
</tr>
<tr>
<td>Windows Live ID</td>
<td>&quot;Windows Live&quot;</td>
<td>CID</td>
<td>A 64-bit signed decimal that uniquely identifies a user on Windows Live.</td>
</tr>
<tr>
<td>Office 365</td>
<td>&quot;AD&quot;</td>
<td>O365ID</td>
<td>A string that uniquely identifies a user. It SHOULD be comprised of three individual values separated by a &quot;:::&quot; character delimiter.</td>
</tr>
<tr>
<td>People Picker</td>
<td>&quot;PeoplePicker&quot;</td>
<td>&quot;Email address&quot;</td>
<td>An email address provided by People Picker</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_Person">
  <xsd:sequence>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="displayName" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="id" type="x:ST_Guid" use="required"/>
  <xsd:attribute name="userId" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="providerId" type="x:ST_Xstring" use="optional"/>
</xsd:complexType>
```

See section 5.23 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.204 CT_PersonList


Referenced by: personList

This complex type specifies a collection of persons.

Child Elements:

person: A CT_Person element that specifies each person's information in the collection.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_PersonList">
  <xsd:sequence>
    <xsd:element name="person" type="CT_Person" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
```

See section 5.23 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.205 CT_ThreadedComment


Referenced by: CT_ThreadedComments

This complex type specifies the properties of a threaded comment.

Child Elements:

text: An ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) element that specifies the unformatted text of this comment.

mentions: A CT_ThreadedCommentMentions element that specifies a list of mentions in this comment.


Attributes:

ref: An ST_Ref (section 2.7.1) attribute that specifies the reference to the cell that this threaded comment is anchored to.

dT: A dateTime ([XMLSCHEMA2] section 3.2.7) attribute that specifies the UTC time that the comment was authored for the first time.

personId: An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier for the comment author. This attribute MUST correspond to the id specified in CT_Person (section 2.6.203).

id: An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies a unique identifier for this threaded comment.

parentId: An ST_Guid ([ISO/IEC29500-1:2016] section 22.9.2.4) attribute that specifies the id of the parent comment of this comment in the comment thread.

done: A Boolean ([XMLSCHEMA2] section 3.2.2) attribute that specifies a flag to track resolving status of the comment.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ThreadedComment">
  <xsd:sequence>
    <xsd:element name="text" type="ST_Xstring"/>
    <xsd:element name="mentions" type="CT_ThreadedCommentMentions"/>...
    <xsd:element name="extLst" type="x:CT_ExtensionList"/>...
  </xsd:sequence>
</xsd:complexType>
```
See section 5.23 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.206 **CT_ThreadedCommentMentions**


*Referenced by:* CT_ThreadedComment

This complex type specifies a collection of *mentions* in a *threaded comment*.

*Child Elements:*

- **mention**: A CT_Mention element that specifies each mention in the collection and its properties.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ThreadedCommentMentions">
    <xsd:sequence>
        <xsd:element name="mention" type="CT_Mention" minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
</xsd:complexType>
```

See section 5.23 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.6.207 **CT_ThreadedComments**


*Referenced by:* ThreadedComments

This complex type specifies a collection of *threaded comment* in a *comment thread*.

*Child Elements:*

- **threadedComment**: A CT_ThreadedComment element that specifies each threaded comment in the comment thread and its properties.


The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this complex type.

```xml
<xsd:complexType name="CT_ThreadedComments">
    <xsd:sequence>
    </xsd:sequence>
</xsd:complexType>
```
See section 5.23 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7 Simple Types

2.7.1 ST_Ref

Target namespace: http://schemas.microsoft.com/office/excel/2006/main

Referenced by: CT_Ref, ST_Sqref

This simple type specifies a reference to a range of cells.

This simple type is identical to the ST_Ref ([ISO/IEC29500-1:2016] section 18.18.62) simple type with the following exception: This simple type MUST have the following grammar.

(A1-cell ["":" A1-cell]) / ref-constant

The ABNF ([RFC5234]) definitions for A1-cell and ref-constant are specified in Formulas.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

<xsd:simpleType name="ST_Ref">
  <xsd:restriction base="xsd:string"/>
</xsd:simpleType>

See section 5.1 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.2 ST_Sqref

Target namespace: http://schemas.microsoft.com/office/excel/2006/main

Referenced by: CT_Sqref

This simple type specifies a list of cell ranges.

This simple type is identical to the ST_Sqref ([ISO/IEC29500-1:2016] section 18.18.76) simple type with the following exceptions:

- MUST contain zero or more values of type ST_Ref.
- If the value contains an ST_Ref of value "#REF!", then it MUST be the only value in the list.
- The number of cell references in this simple type MUST be less than 2,147,483,647.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

<xsd:simpleType name="ST_Sqref"/>
See section 5.1 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.3 ST_DispBlanksAs

Referenced by: CT_SparklineGroup

This simple type specifies how empty cells are plotted for all sparklines in the sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>span</td>
<td>Empty cells are plotted as interpolated.</td>
</tr>
<tr>
<td>gap</td>
<td>Empty cells are not plotted.</td>
</tr>
<tr>
<td>zero</td>
<td>Empty cells are plotted as zero.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_DispBlanksAs">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="span"/>
    <xsd:enumeration value="gap"/>
    <xsd:enumeration value="zero"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.4 ST_SparklineAxisMinMax

Referenced by: CT_SparklineGroup

This simple type specifies information about how the vertical axis minimum or maximum is computed for this sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>individual</td>
<td>Specifies that the vertical axis minimum or maximum for each sparkline in this sparkline group is calculated automatically such that the data point with the minimum or maximum value can be displayed in the plot area.</td>
</tr>
<tr>
<td>group</td>
<td>Specifies that the vertical axis minimum or maximum is shared across all sparklines in this sparkline group and is calculated automatically such that the data point with the minimum or maximum value can be displayed in the plot area.</td>
</tr>
<tr>
<td>custom</td>
<td>Specifies that the vertical axis minimum or maximum for each sparkline in this sparkline group is specified by the manualMin attribute or the manualMax attribute of CT_SparklineGroup.</td>
</tr>
</tbody>
</table>
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_SparklineAxisMinMax">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="individual"/>
    <xsd:enumeration value="group"/>
    <xsd:enumeration value="custom"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.5 ST_SparklineType

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** [CT_SparklineGroup](#)

This simple type specifies the type of the sparkline group.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>line</td>
<td>Line sparklines.</td>
</tr>
<tr>
<td>column</td>
<td><strong>Column</strong> sparklines.</td>
</tr>
<tr>
<td>stacked</td>
<td>100% stacked column sparklines.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_SparklineType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="line"/>
    <xsd:enumeration value="column"/>
    <xsd:enumeration value="stacked"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.6 ST_PivotShowAs

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** [CT_DataField](#)

This simple type specifies the display format values for a PivotTable ([ISO/IEC29500-1:2016] section 18.10) field.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>percentOfParent</td>
<td>Percentage of parent total.</td>
</tr>
<tr>
<td>Value</td>
<td>Meaning</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>percentOfParentRow</td>
<td>Percentage of parent row total.</td>
</tr>
<tr>
<td>percentOfParentCol</td>
<td>Percentage of parent column total.</td>
</tr>
<tr>
<td>percentOfRunningTotal</td>
<td>Percentage of running total.</td>
</tr>
<tr>
<td>rankAscending</td>
<td>Rank ascending.</td>
</tr>
<tr>
<td>rankDescending</td>
<td>Rank descending.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_PivotShowAs">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="percentOfParent"/>
    <xsd:enumeration value="percentOfParentRow"/>
    <xsd:enumeration value="percentOfParentCol"/>
    <xsd:enumeration value="percentOfRunningTotal"/>
    <xsd:enumeration value="rankAscending"/>
    <xsd:enumeration value="rankDescending"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.7 ST_DataBarDirection

*Target namespace: [XMLSCHEMA1/2] section 2.1*

*Referenced by: CT_DataBar*

A simple type that specifies the direction of the data bar.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>context</td>
<td>The direction of the data bar is determined by context.</td>
</tr>
<tr>
<td>leftToRight</td>
<td>The data bar is displayed in a left-to-right manner.</td>
</tr>
<tr>
<td>rightToLeft</td>
<td>The data bar is displayed in a right-to-left manner.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_DataBarDirection">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="context"/>
    <xsd:enumeration value="leftToRight"/>
    <xsd:enumeration value="rightToLeft"/>
  </xsd:restriction>
</xsd:simpleType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.8 ST_DataBarAxisPosition

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_DataBar

A simple type that specifies the axis position for the data bar.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>automatic</td>
<td>The axis position for the data bar is calculated automatically.</td>
</tr>
<tr>
<td>middle</td>
<td>The axis position for the data bar is the midpoint of the cell.</td>
</tr>
<tr>
<td>none</td>
<td>There is no axis for the data bar.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_DataBarAxisPosition">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="automatic"/>
    <xsd:enumeration value="middle"/>
    <xsd:enumeration value="none"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.9 ST_CfvoType

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_Cfvo

This simple type specifies how the Conditional Formatting Value Object (CFVO) value is determined. In the following table, X represents a parameter value. The value of X is determined by the value of the f element in the parent CT_Cfvo element. If the f element in the parent CT_Cfvo element is absent, then the value of X is 0. MUST be a value from the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>num</td>
<td>X</td>
</tr>
<tr>
<td>percent</td>
<td>The minimum value in the range of cells that the conditional formatting rule applies to plus X percent of the difference between the maximum and minimum values in the range of cells that the conditional formatting rule applies to. For example, if the min and max values in the range are 1 and 10 respectively, and X is 10, then the CFVO value is 1.9.</td>
</tr>
<tr>
<td>max</td>
<td>The maximum value from the range of cells that the conditional formatting rule applies to.</td>
</tr>
<tr>
<td>min</td>
<td>The minimum value from the range of cells that the conditional formatting rule applies to.</td>
</tr>
</tbody>
</table>
Value | Meaning
--- | ---
formula | X, or if the f element is formed by the numerical-constant rule alone in the grammar provided in Formulas, the formula is ignored and X is 0.
percentile | The minimum value of the cell that is in the X percentile of the range of cells that the conditional formatting rule applies to.
autoMin | The smaller of zero or the minimum value from the range of cells that the conditional formatting rule applies to.
autoMax | The larger of zero or the maximum value from the range of cells that the conditional formatting rule applies to.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_CfvoType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="num"/>
    <xsd:enumeration value="percent"/>
    <xsd:enumeration value="max"/>
    <xsd:enumeration value="min"/>
    <xsd:enumeration value="formula"/>
    <xsd:enumeration value="percentile"/>
    <xsd:enumeration value="autoMin"/>
    <xsd:enumeration value="autoMax"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.10 ST_IconSetType

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_RichSortCondition, CT_SortCondition, CT_IconFilter, CT_IconSet, CT_CfIcon

A simple type that specifies an icon set.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>3Arrows</td>
<td><img src="image" alt="3Arrows Icon" /></td>
</tr>
<tr>
<td>3ArrowsGray</td>
<td><img src="image" alt="3ArrowsGray Icon" /></td>
</tr>
<tr>
<td>3Flags</td>
<td><img src="image" alt="3Flags Icon" /></td>
</tr>
<tr>
<td>3TrafficLights1</td>
<td><img src="image" alt="3TrafficLights1 Icon" /></td>
</tr>
<tr>
<td>3TrafficLights2</td>
<td><img src="image" alt="3TrafficLights2 Icon" /></td>
</tr>
<tr>
<td>Value</td>
<td>Meaning</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td>3Signs</td>
<td><img src="image1" alt="Image" /></td>
</tr>
<tr>
<td>3Symbols</td>
<td><img src="image2" alt="Image" /></td>
</tr>
<tr>
<td>3Symbols2</td>
<td><img src="image3" alt="Image" /></td>
</tr>
<tr>
<td>4Arrows</td>
<td><img src="image4" alt="Image" /></td>
</tr>
<tr>
<td>4ArrowsGray</td>
<td><img src="image5" alt="Image" /></td>
</tr>
<tr>
<td>4RedToBlack</td>
<td><img src="image6" alt="Image" /></td>
</tr>
<tr>
<td>4Rating</td>
<td><img src="image7" alt="Image" /></td>
</tr>
<tr>
<td>4TrafficLights</td>
<td><img src="image8" alt="Image" /></td>
</tr>
<tr>
<td>5Arrows</td>
<td><img src="image9" alt="Image" /></td>
</tr>
<tr>
<td>5ArrowsGray</td>
<td><img src="image10" alt="Image" /></td>
</tr>
<tr>
<td>5Rating</td>
<td><img src="image11" alt="Image" /></td>
</tr>
<tr>
<td>5Quarters</td>
<td><img src="image12" alt="Image" /></td>
</tr>
<tr>
<td>3Stars</td>
<td><img src="image13" alt="Image" /></td>
</tr>
<tr>
<td>3Triangles</td>
<td><img src="image14" alt="Image" /></td>
</tr>
<tr>
<td>5Boxes</td>
<td><img src="image15" alt="Image" /></td>
</tr>
<tr>
<td>NoIcons</td>
<td>No icon set</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_IconSetType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="3Arrows"/>
  </xsd:restriction>
</xsd:simpleType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.11 ST_PivotEditValueType

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_PivotEditValue

A simple type that specifies the type of the modified value in the PivotTable ([ISO/IEC29500-1:2016] section 18.10) data area using PivotTable what-if analysis.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>number</td>
<td>Numerical value</td>
</tr>
<tr>
<td>dateTime</td>
<td>Date and time value</td>
</tr>
<tr>
<td>string</td>
<td>String value</td>
</tr>
<tr>
<td>boolean</td>
<td>Boolean value</td>
</tr>
<tr>
<td>error</td>
<td>Error value</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_PivotEditValueType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="number"/>
    <xsd:enumeration value="dateTime"/>
    <xsd:enumeration value="string"/>
    <xsd:enumeration value="boolean"/>
    <xsd:enumeration value="error"/>
  </xsd:restriction>
</xsd:simpleType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.12 ST_AllocationMethod

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_PivotTableDefinition, CT_PivotChange

A simple type that specifies the method of allocation for PivotTable what-if analysis.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>equalAllocation</td>
<td>Equal allocation</td>
</tr>
<tr>
<td>equalIncrement</td>
<td>Equal increment</td>
</tr>
<tr>
<td>weightedAllocation</td>
<td>Weighted allocation</td>
</tr>
<tr>
<td>weightedIncrement</td>
<td>Weighted increment</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_AllocationMethod">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="equalAllocation"/>
    <xsd:enumeration value="equalIncrement"/>
    <xsd:enumeration value="weightedAllocation"/>
    <xsd:enumeration value="weightedIncrement"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.13 ST_SlicerStyleType

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_SlicerStyleElement

A simple type that specifies the types of table style ([ISO/IEC29500-1:2016] section 18.8) elements that are specific to slicers. The possible values are listed in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>unselectedItemWithData</td>
<td>A slicer item with data that is not selected. Used for slicers only.</td>
</tr>
<tr>
<td>selectedItemWithData</td>
<td>A selected slicer item with data. Used for slicers only.</td>
</tr>
<tr>
<td>unselectedItemWithNoData</td>
<td>A slicer item with no data that is not selected. Used for slicers only.</td>
</tr>
<tr>
<td>selectedItemWithNoData</td>
<td>A selected slicer item with no data. Used for slicers only.</td>
</tr>
<tr>
<td>hoveredUnselectedItemWithData</td>
<td>A slicer item with data that is not selected and over which the mouse is paused on. Used for slicers only.</td>
</tr>
<tr>
<td>hoveredSelectedItemWithData</td>
<td>A selected slicer item with data and over which the mouse is paused on. Used for slicers only.</td>
</tr>
<tr>
<td>Value</td>
<td>Meaning</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>hoveredUnselectedItemWithNoData</td>
<td>A slicer item with no data that is not selected and over which the mouse is paused on. Used for slicers only.</td>
</tr>
<tr>
<td>hoveredSelectedItemWithNoData</td>
<td>A selected slicer item with no data and over which the mouse is paused on. Used for slicers only.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_SlicerStyleType">
    <xsd:restriction base="xsd:string">
        <xsd:enumeration value="unselectedItemWithData"/>
        <xsd:enumeration value="selectedItemWithData"/>
        <xsd:enumeration value="unselectedItemWithNoData"/>
        <xsd:enumeration value="selectedItemWithNoData"/>
        <xsd:enumeration value="hoveredUnselectedItemWithData"/>
        <xsd:enumeration value="hoveredSelectedItemWithData"/>
        <xsd:enumeration value="hoveredUnselectedItemWithNoData"/>
        <xsd:enumeration value="hoveredSelectedItemWithNoData"/>
    </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.14 ST_ObjectType

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_FormControlPr

A simple type that specifies the types of form control objects. The possible values are included in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Button</td>
<td>Button control</td>
</tr>
<tr>
<td>CheckBox</td>
<td>Check-box control</td>
</tr>
<tr>
<td>Drop</td>
<td>Drop-down (combo box) control</td>
</tr>
<tr>
<td>GBox</td>
<td>Group box control; this control is used for grouping radio button form controls</td>
</tr>
<tr>
<td>Label</td>
<td>Label control</td>
</tr>
<tr>
<td>List</td>
<td>List box control</td>
</tr>
<tr>
<td>Radio</td>
<td>Radio button control</td>
</tr>
<tr>
<td>Scroll</td>
<td>Scroll bar control</td>
</tr>
<tr>
<td>Spin</td>
<td>Spin box control</td>
</tr>
<tr>
<td>EditBox</td>
<td>Edit box control</td>
</tr>
<tr>
<td>Dialog</td>
<td>Dialog control</td>
</tr>
</tbody>
</table>
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_ObjectType">
    <xsd:restriction base="xsd:token">
        <xsd:enumeration value="Button"/>
        <xsd:enumeration value="CheckBox"/>
        <xsd:enumeration value="Drop"/>
        <xsd:enumeration value="GBox"/>
        <xsd:enumeration value="Label"/>
        <xsd:enumeration value="List"/>
        <xsd:enumeration value="Radio"/>
        <xsd:enumeration value="Scroll"/>
        <xsd:enumeration value="Spin"/>
        <xsd:enumeration value="EditBox"/>
        <xsd:enumeration value="Dialog"/>
    </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.15 ST_Checked

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_FormControlPr

A simple type that specifies if a check box is selected or if the radio button is selected.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unchecked</td>
<td>Object is unchecked or unselected.</td>
</tr>
<tr>
<td>Checked</td>
<td>Object is checked or selected.</td>
</tr>
<tr>
<td>Mixed</td>
<td>Mixed selection. Applies only to check boxes. The application can determine whether to consider this option as a check box that is not initialized and it is neither selected nor cleared.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_Checked">
    <xsd:restriction base="xsd:token">
        <xsd:enumeration value="Unchecked"/>
        <xsd:enumeration value="Checked"/>
        <xsd:enumeration value="Mixed"/>
    </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.16 ST_DropStyle

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main
Referenced by: CT_FormControlPr

This simple type specifies the style of a drop-down form control. The allowed values are included in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>combo</td>
<td>Standard combo box.</td>
</tr>
<tr>
<td>comboedit</td>
<td>Editable combo box&lt;25&gt;.</td>
</tr>
<tr>
<td>simple</td>
<td>Standard combo box with only the drop-down button visible when the box is not expanded.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_DropStyle">
  <xsd:restriction base="xsd:token">
    <xsd:enumeration value="combo"/>
    <xsd:enumeration value="comboedit"/>
    <xsd:enumeration value="simple"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.17 ST_SelType


Referenced by: CT_FormControlPr

A simple type that specifies the selection type for the list box form control object. The allowed values are included in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>single</td>
<td>Only single selection is allowed.</td>
</tr>
<tr>
<td>multi</td>
<td>Multiple selection is allowed. Clicking any item on the list will add it to the selection or, if already selected, will remove it from the selection.</td>
</tr>
<tr>
<td>extended</td>
<td>Multiple selection is allowed while the CTRL key is pressed.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_SelType">
  <xsd:restriction base="xsd:token">
    <xsd:enumeration value="single"/>
    <xsd:enumeration value="multi"/>
    <xsd:enumeration value="extended"/>
  </xsd:restriction>
</xsd:simpleType>
```
See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.18 ST_EditValidation

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_FormControlPr

This simple type specifies the type of validation used for data input to the control. If omitted, the value is assumed to be text. If present, the application can proceed to validate the data accordingly. The valid values are included in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>text</td>
<td>Edit box contains text.</td>
</tr>
<tr>
<td>integer</td>
<td>Edit box contains an integer.</td>
</tr>
<tr>
<td>number</td>
<td>Edit box contains a number.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_EditValidation">
  <xsd:restriction base="xsd:token">
    <xsd:enumeration value="text"/>
    <xsd:enumeration value="integer"/>
    <xsd:enumeration value="number"/>
    <xsd:enumeration value="reference"/>
    <xsd:enumeration value="formula"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.19 ST_OlapSlicerCacheSortOrder

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_OlapSlicerCacheLevelData

A simple type that specifies how the OLAP slicer items are sorted in the slicer view.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>natural</td>
<td>The OLAP slicer items are sorted in original order as determined by the OLAP slicer source data.</td>
</tr>
<tr>
<td>ascending</td>
<td>The OLAP slicer items are sorted in ascending alphabetical order.</td>
</tr>
<tr>
<td>descending</td>
<td>The OLAP slicer items are sorted in descending alphabetical order.</td>
</tr>
</tbody>
</table>
The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_OlapSlicerCacheSortOrder">
    <xsd:restriction base="xsd:string">
        <xsd:enumeration value="natural"/>
        <xsd:enumeration value="ascending"/>
        <xsd:enumeration value="descending"/>
    </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.20 ST_TabularSlicerCacheSortOrder

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_TableSlicerCache, CT_TabularSlicerCache

A simple type that specifies how the non-OLAP slicer items are sorted in the slicer view.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ascending</td>
<td>The non-OLAP slicer items are sorted in ascending alphabetical order.</td>
</tr>
<tr>
<td>descending</td>
<td>The non-OLAP slicer items are sorted in descending alphabetical order.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_TabularSlicerCacheSortOrder">
    <xsd:restriction base="xsd:string">
        <xsd:enumeration value="ascending"/>
        <xsd:enumeration value="descending"/>
    </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.21 ST_SlicerCacheCrossFilter

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_TableSlicerCache, CT_OlapSlicerCacheLevelData, CT_TabularSlicerCache

A simple type that specifies how the slicer items that are used in slicer cross filtering are displayed.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>The table style ([ISO/IEC29500-1:2016] section 18.8) element of the slicer style for slicer items with no data is not applied to slicer items with no data, and slicer items with no data are not sorted separately in the list of slicer items in the slicer view.</td>
</tr>
<tr>
<td>showItemsWithDataAtTop</td>
<td>The table style ([ISO/IEC29500-1:2016] section 18.8) element of the slicer style for slicer items with no data is applied to slicer items with no data, and slicer items with no data are sorted at the bottom in the list of slicer items in the slicer view.</td>
</tr>
</tbody>
</table>
### showItemsWithNoData

The table style ([ISO/IEC29500-1:2016] section 18.8) element of the slicer style for slicer items with no data is applied to slicer items with no data, and slicer items with no data are not sorted separately in the list of slicer items in the slicer view.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>showItemsWithNoData</td>
<td>The table style ([ISO/IEC29500-1:2016] section 18.8) element of the slicer style for slicer items with no data is applied to slicer items with no data, and slicer items with no data are not sorted separately in the list of slicer items in the slicer view.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_SlicerCacheCrossFilter">
    <xsd:restriction base="xsd:string">
        <xsd:enumeration value="none"/>
        <xsd:enumeration value="showItemsWithDataAtTop"/>
        <xsd:enumeration value="showItemsWithNoData"/>
    </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.22 ST_TextHAlign

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2009/9/main

**Referenced by:** CT_FormControlPr

A simple type that specifies the vertical text alignment for the object. The valid values are included in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>left</td>
<td>Left alignment</td>
</tr>
<tr>
<td>center</td>
<td>Center alignment</td>
</tr>
<tr>
<td>right</td>
<td>Right alignment</td>
</tr>
<tr>
<td>justify</td>
<td>Justify alignment</td>
</tr>
<tr>
<td>distributed</td>
<td>Distributed alignment</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_TextHAlign">
    <xsd:restriction base="xsd:string">
        <xsd:enumeration value="left"/>
        <xsd:enumeration value="center"/>
        <xsd:enumeration value="right"/>
        <xsd:enumeration value="justify"/>
        <xsd:enumeration value="distributed"/>
    </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.7.23 ST_TextVAlign


Referenced by: CT_FormControlPr

A simple type that specifies the vertical text alignment for the object. The valid values are included in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>top</td>
<td>Top alignment</td>
</tr>
<tr>
<td>center</td>
<td>Center alignment</td>
</tr>
<tr>
<td>bottom</td>
<td>Bottom alignment</td>
</tr>
<tr>
<td>justify</td>
<td>Justify alignment</td>
</tr>
<tr>
<td>distributed</td>
<td>Distributed alignment</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_TextVAlign">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="top"/>
    <xsd:enumeration value="center"/>
    <xsd:enumeration value="bottom"/>
    <xsd:enumeration value="justify"/>
    <xsd:enumeration value="distributed"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.4 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.24 ST_TimelineStyleType


Referenced by: CT_TimelineStyleElement

A simple type that specifies the types of table style ([ISO/IEC29500-1:2016] section 18.8) elements that are specific to Timelines. The possible values are listed in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>selectionLabel</td>
<td>Timeline style element that applies to the selection label which is the label that indicates the period that has been selected on the Timeline. Used for Timelines only.</td>
</tr>
<tr>
<td>timeLevel</td>
<td>Timeline style element that applies to the time level which is the label that indicates the time granularity of the Timeline. Used for Timelines only.</td>
</tr>
<tr>
<td>periodLabel1</td>
<td>Timeline style element that applies to the upper row of the time block labels. Used for Timelines only.</td>
</tr>
<tr>
<td>periodLabel2</td>
<td>Timeline style element that applies to the lower row of the time block labels. Used for Timelines only.</td>
</tr>
</tbody>
</table>
### Value | Meaning
--- | ---
selectedTimeBlock | Timeline style element that applies to the selected time blocks which are the segments on the Timeline that have been selected by the user. Used for Timelines only.
unselectedTimeBlock | Timeline style element that applies to the unselected time blocks which are the segments on the Timeline that have not been selected by the user. Used for Timelines only.
selectedTimeBlockSpace | Timeline style element that applies to the area between any two selected time blocks. Used for Timelines only.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_TimelineStyleType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="selectionLabel"/>
    <xsd:enumeration value="timeLevel"/>
    <xsd:enumeration value="periodLabel1"/>
    <xsd:enumeration value="periodLabel2"/>
    <xsd:enumeration value="selectedTimeBlock"/>
    <xsd:enumeration value="unselectedTimeBlock"/>
    <xsd:enumeration value="selectedTimeBlockSpace"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

#### 2.7.25 ST_CalcMemNumberFormat


Referenced by: CT_CalculatedMember

An enumeration that specifies the display format for a CT_CalculatedMember.

### Value | Meaning
--- | ---
default | Specifies that the number will be displayed using its current format.
number | Specifies that the number will be displayed using a comma as a thousands separator.
percent | Specifies that the number will be displayed as a percentage with two decimal places.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_CalcMemNumberFormat">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="default"/>
    <xsd:enumeration value="number"/>
    <xsd:enumeration value="percent"/>
  </xsd:restriction>
</xsd:simpleType>
```
See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.26 ST_SXVCellType


Referenced by: CT_PivotValueCell

A simple type that specifies the type of a PivotValueCell element of a PivotTable ([ISO/IEC29500-1:2016] section 18.10) that is specified by a pivotTableReference element in the extension of a workbook.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>The child element v of the CT_PivotValueCell. MUST be interpreted as a Boolean value. MUST be true or false.</td>
</tr>
<tr>
<td>n</td>
<td>The child element v of the CT_PivotValueCell. MUST be interpreted as a numeric value.</td>
</tr>
</tbody>
</table>
| e     | The child element v of the CT_PivotValueCell. MUST be interpreted as an error value. MUST be one of the following:  
|      | - #DIV/0!  
|      | - #VALUE!  
|      | - #NUM!  
|      | - #N/A  
|      | - #GETTING DATA |
| str   | The child element v of the CT_PivotValueCell. MUST be interpreted as a string value. The string MUST be less than or equal to 65,535 characters in length. |
| d     | The child element v of the CT_PivotValueCell. MUST be interpreted as a dateTime ([XMLSCHEMA2] section 3.2.7) value. |
| bl    | A blank cell. The child element v of the CT_PivotValueCell. MUST NOT have any value. |

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_SXVCellType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="b"/>
    <xsd:enumeration value="n"/>
    <xsd:enumeration value="e"/>
    <xsd:enumeration value="str"/>
    <xsd:enumeration value="d"/>
    <xsd:enumeration value="bl"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.27 ST_QuestionType


Referenced by: CT_SurveyQuestion
The **ST_QuestionType** simple type specifies the type of input for the answer to a survey question as specified by the **type** attribute of a **CT_SurveyQuestion** (section 2.6.144).

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>checkBox</td>
<td>Answer is indicated via checkbox.</td>
</tr>
<tr>
<td>choice</td>
<td>Answer is selected from a list of choices.</td>
</tr>
<tr>
<td>date</td>
<td>Answer in the form of a date.</td>
</tr>
<tr>
<td>time</td>
<td>Answer in the form of a time.</td>
</tr>
<tr>
<td>multipleLinesOfText</td>
<td>Answer in the form of multiple lines of text.</td>
</tr>
<tr>
<td>number</td>
<td>Answer is numerical.</td>
</tr>
<tr>
<td>singleLineOfText</td>
<td>Answer in the form of a single line of text.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```
xsd:simpleType name="ST_QuestionType">
xsd:restriction base="xsd:string">
xsd:enumeration value="checkBox"/>
xsd:enumeration value="choice"/>
xsd:enumeration value="date"/>
xsd:enumeration value="time"/>
xsd:enumeration value="multipleLinesOfText"/>
xsd:enumeration value="number"/>
xsd:enumeration value="singleLineOfText"/>
</xsd:restriction>
</xsd:simpleType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.28 ST_QuestionFormat

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2010/11/main

**Referenced by:** **CT_SurveyQuestion**

The **ST_QuestionFormat** simple type specifies the text formatting of the input for the answer to a survey question as specified by the **format** attribute of a **CT_SurveyQuestion** (section 2.6.144).

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>generalDate</td>
<td>Format answer as a date.</td>
</tr>
<tr>
<td>longDate</td>
<td>Format answer as a long form date.</td>
</tr>
<tr>
<td>shortDate</td>
<td>Format answer as a short form date.</td>
</tr>
<tr>
<td>longTime</td>
<td>Format answer as a long form time.</td>
</tr>
<tr>
<td>shortTime</td>
<td>Format answer as a short form time.</td>
</tr>
<tr>
<td>generalNumber</td>
<td>Format answer as a number.</td>
</tr>
<tr>
<td>Value</td>
<td>Meaning</td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>standard</td>
<td>Format answer as a number with thousands separators.</td>
</tr>
<tr>
<td>fixed</td>
<td>Format answer as a number with a fixed number of digits after the decimal.</td>
</tr>
<tr>
<td>percent</td>
<td>Format answer as a percentage.</td>
</tr>
<tr>
<td>currency</td>
<td>Format answer as a currency.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_QuestionFormat">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="generalDate"/>
    <xsd:enumeration value="longDate"/>
    <xsd:enumeration value="shortDate"/>
    <xsd:enumeration value="longTime"/>
    <xsd:enumeration value="shortTime"/>
    <xsd:enumeration value="generalNumber"/>
    <xsd:enumeration value="standard"/>
    <xsd:enumeration value="fixed"/>
    <xsd:enumeration value="percent"/>
    <xsd:enumeration value="currency"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.29 ST_SurveyPosition

**Target namespace:** http://schemas.microsoft.com_office/spreadsheetml/2010/11/main

**Referenced by:** [CT_SurveyElementPr](#)

The **ST_SurveyPosition** simple type specifies the type of positioning of an element in a survey, as specified by the position attribute of a [CT_SurveyElementPr](#) (section 2.6.145). The types correspond to the allowed values for the position property of Cascading Style Sheets 2.1, as defined in [CSS-Level2-2009](#).

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>absolute</td>
<td>Use absolute positioning.</td>
</tr>
<tr>
<td>fixed</td>
<td>Use fixed positioning.</td>
</tr>
<tr>
<td>relative</td>
<td>Use relative positioning.</td>
</tr>
<tr>
<td>static</td>
<td>Use static positioning.</td>
</tr>
<tr>
<td>inherit</td>
<td>Use inherit positioning.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.
<xsd:simpleType name="ST_SurveyPosition">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="absolute"/>
    <xsd:enumeration value="fixed"/>
    <xsd:enumeration value="relative"/>
    <xsd:enumeration value="static"/>
    <xsd:enumeration value="inherit"/>
  </xsd:restriction>
</xsd:simpleType>

See section 5.3 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.30 ST_ModelTimeGroupingContentType

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2014/11/main

Referenced by: CT_CalculatedTimeColumn

Specifies the grouping content type inside a calculated column.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>years</td>
<td>Years</td>
</tr>
<tr>
<td>quarters</td>
<td>Quarters</td>
</tr>
<tr>
<td>monthsindex</td>
<td>Months Index</td>
</tr>
<tr>
<td>months</td>
<td>Months</td>
</tr>
<tr>
<td>daysindex</td>
<td>Days Index</td>
</tr>
<tr>
<td>days</td>
<td>Days</td>
</tr>
<tr>
<td>hours</td>
<td>Hours</td>
</tr>
<tr>
<td>minutes</td>
<td>Minutes</td>
</tr>
<tr>
<td>seconds</td>
<td>Seconds</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_ModelTimeGroupingContentType">
  <xsd:restriction base="x:ST_Xstring">
    <xsd:enumeration value="years"/>
    <xsd:enumeration value="quarters"/>
    <xsd:enumeration value="monthsindex"/>
    <xsd:enumeration value="months"/>
    <xsd:enumeration value="daysindex"/>
    <xsd:enumeration value="days"/>
    <xsd:enumeration value="hours"/>
    <xsd:enumeration value="minutes"/>
    <xsd:enumeration value="seconds"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.10 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
2.7.31 ST_Xrevid

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2014/revision

Referenced by: CT_RevisionPtr

This simple type is used in runtime scenarios for Microsoft Excel, and SHOULD be ignored by all others.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_Xrevid">
  <xsd:restriction base="xsd:unsignedLong"/>
</xsd:simpleType>
```

See section 5.15 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.32 ST_ArrayValueType

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_ArrayValue

This simple type specifies the data type of the rich array value. The possible values are listed in the following table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>Indicates rich array value is a real number.</td>
</tr>
<tr>
<td>i</td>
<td>Indicates rich array value is an integer.</td>
</tr>
<tr>
<td>b</td>
<td>Indicates rich array value is a Boolean.</td>
</tr>
<tr>
<td>e</td>
<td>Indicates rich array value is an error.</td>
</tr>
<tr>
<td>s</td>
<td>Indicates rich array value is text.</td>
</tr>
<tr>
<td>r</td>
<td>Indicates rich array value is a rich value.</td>
</tr>
<tr>
<td>a</td>
<td>Indicates rich array value is a rich array.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_ArrayValueType">
  <xsd:restriction base="x:ST_Xstring">
    <xsd:enumeration value="d"/>
    <xsd:enumeration value="i"/>
    <xsd:enumeration value="b"/>
    <xsd:enumeration value="e"/>
    <xsd:enumeration value="s"/>
    <xsd:enumeration value="r"/>
    <xsd:enumeration value="a"/>
  </xsd:restriction>
</xsd:simpleType>
```
See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.33 ST_RichFormatPropertyType

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: CT_RichFormatProperty

This simple type specifies the data type of the value of the property for the rich value format.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>Indicates value of the property for the rich value format is a Boolean.</td>
</tr>
<tr>
<td>n</td>
<td>Indicates value of the property for the rich value format is a real number.</td>
</tr>
<tr>
<td>i</td>
<td>Indicates value of the property for the rich value format is an integer.</td>
</tr>
<tr>
<td>s</td>
<td>Indicates value of the property for the rich value format is text.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_RichFormatPropertyType">
  <xsd:restriction base="x:ST_Xstring">
    <xsd:enumeration value="b"/>
    <xsd:enumeration value="n"/>
    <xsd:enumeration value="i"/>
    <xsd:enumeration value="s"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.34 ST_RichValueFallbackType

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

Referenced by: CT_RichValueFallback

This simple type specifies the data type of the value of the fallback for the rich value.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>Indicates fallback value is a Boolean.</td>
</tr>
<tr>
<td>n</td>
<td>Indicates fallback value is a real number.</td>
</tr>
<tr>
<td>e</td>
<td>Indicates fallback value is an error.</td>
</tr>
<tr>
<td>s</td>
<td>Indicates fallback value is text.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_RichValueFallbackType">
  <xsd:restriction base="x:ST_Xstring">
    <xsd:enumeration value="b"/>
    <xsd:enumeration value="n"/>
    <xsd:enumeration value="e"/>
    <xsd:enumeration value="s"/>
  </xsd:restriction>
</xsd:simpleType>
```
See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.35 ST_RichValueValueType

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata

Referenced by: CT_Key

This simple type specifies the data type of the value of the key value pair (KVP).

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>Indicates value is a real number.</td>
</tr>
<tr>
<td>i</td>
<td>Indicates value is an integer.</td>
</tr>
<tr>
<td>b</td>
<td>Indicates value is a Boolean.</td>
</tr>
<tr>
<td>e</td>
<td>Indicates value is an error.</td>
</tr>
<tr>
<td>s</td>
<td>Indicates value is text.</td>
</tr>
<tr>
<td>r</td>
<td>Indicates value is a rich value.</td>
</tr>
<tr>
<td>a</td>
<td>Indicates value is a rich array.</td>
</tr>
<tr>
<td>spb</td>
<td>Indicates value is a supporting property bag.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

See section 5.21 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

2.7.36 ST_SupportingPropertyBagArrayValueType

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2
This simple type specifies the data type of a single value in the supporting property bag array.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>Indicates value is a real number.</td>
</tr>
<tr>
<td>i</td>
<td>Indicates value is an integer.</td>
</tr>
<tr>
<td>b</td>
<td>Indicates value is a Boolean.</td>
</tr>
<tr>
<td>s</td>
<td>Indicates value is text.</td>
</tr>
<tr>
<td>spb</td>
<td>Indicates value is a supporting property bag.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_SupportingPropertyBagArrayValueType">
  <xsd:restriction base="x:ST_Xstring">
    <xsd:enumeration value="d"/>
    <xsd:enumeration value="i"/>
    <xsd:enumeration value="b"/>
    <xsd:enumeration value="s"/>
    <xsd:enumeration value="spb"/>
  </xsd:restriction>
</xsd:simpleType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.37 ST_SupportingPropertyBagValueType

Target namespace: http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

Referenced by: **CT_SupportingPropertyBagKey**

This simple type specifies the data type of a value in the supporting property bag.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>Indicates value is a real number.</td>
</tr>
<tr>
<td>i</td>
<td>Indicates value is an integer.</td>
</tr>
<tr>
<td>b</td>
<td>Indicates value is a Boolean.</td>
</tr>
<tr>
<td>s</td>
<td>Indicates value is text.</td>
</tr>
<tr>
<td>spb</td>
<td>Indicates value is a supporting property bag.</td>
</tr>
<tr>
<td>spba</td>
<td>Indicates value is a supporting property bag array.</td>
</tr>
</tbody>
</table>

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_SupportingPropertyBagValueType">
  <xsd:restriction base="x:ST_Xstring">
    <xsd:enumeration value="d"/>
    <xsd:enumeration value="i"/>
    <xsd:enumeration value="b"/>
    <xsd:enumeration value="s"/>
    <xsd:enumeration value="spb"/>
    <xsd:enumeration value="spba"/>
  </xsd:restriction>
</xsd:simpleType>
```
<xsd:simpleType name="ST_SupportingPropertyBagValueBag"/>
</xsd:simpleType>

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).

### 2.7.38 ST_RichFilterKey

**Target namespace:** http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2

**Referenced by:** CT_RichFilter, CT_RichDateGroupItem, CT_RichTop10, CT_CustomRichFilter, CT_DynamicRichFilter

This simple type extends ST_Xstring ([ISO/IEC29500-1:2016] section 22.9.2.19) and specifies the rich value key for which the filter is defined. The length of this string MUST be less than or equal to 65,535 characters in length. This simple type MUST conform to one of the following grammars.

<table>
<thead>
<tr>
<th>Grammar</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>{ rich-value-key }</td>
<td>&quot;RichFilterKey&quot;</td>
</tr>
<tr>
<td>{ [&quot;#&quot; length-of-rich-value-key &quot;#&quot; rich-value-key] }</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- The length-of-rich-value-key MUST be specified with integers and MUST match the count of the characters in the associated rich-value-key.
- The rich-value-key MUST be less than or equal to 255 characters in length.
- If rich-value-key begins with ":#" then it MUST use the second grammar.
- The second grammar can be repeated to specify nested rich value keys.

The following W3C XML Schema ([XMLSCHEMA1/2] section 2.1) fragment specifies the contents of this simple type.

```xml
<xsd:simpleType name="ST_RichFilterKey">
  <xsd:restriction base="x:ST_Xstring"/>
</xsd:simpleType>
```

See section 5.20 for the full W3C XML Schema ([XMLSCHEMA1/2] section 2.1).
3 Structure Examples

This section contains examples of some of the most commonly used data structures in Excel Binary File Format files. The examples are meant to be a starting point for an implementer learning the file format. They are not meant to cover all records in the file format.

In the following sections, the schema definition might differ from the processing rules imposed by the application. The XSD in this specification provides a base description of the file format. The text that introduces the XSD specifies additional restrictions that reflect actual Microsoft product behavior. For example, the schema definition might allow for an element to be empty, null, or not present but the behavior of the application as specified restricts the same elements to being non-empty, not null, and present.

3.1 Slicer

This example shows a slicer attached to a native PivotTable and its associated slicer cache. The PivotTable has the "State" and "City" fields added to the row area and the "Population" field added to the data area. The slicer is based on the "State" field, and is currently filtering on "Washington".

The following figure shows a possible implementation of the slicer discussed in this example.

![Figure 1: PivotTable and slicer](image)

The following figure shows that the source data for the PivotTable that the slicer discussed in this example is filtering, as depicted on a possible implementation of a worksheet.
This example includes the entire slicer cache and slicer parts that are used in the specification of a non-OLAP slicer.

The elements inside the slice element specify the cached non-OLAP slicer items. "Washington" and "Oregon" are the cached non-OLAP slicer items in this example.

### 3.1.1 Slicer Cache Part

The following is an example slicer cache part, as specified in section 2.1.4.

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
xmlns:mc="http://schemas.openxmlformats.org/markup-compatibility/2006" mc:Ignorable="x"
xmlns:x="http://schemas.openxmlformats.org/spreadsheetml/2006/main" name="Slicer_State"
sourceName="State">
<pivotTables>
  <pivotTable tabId="1" name="PivotTable1"/>
</pivotTables>
<data>
  <tabular pivotCacheId="5">
    <items count="2">
      <i x="1"/>
      <i x="0" s="1"/>
    </items>
  </tabular>
</data>
</slicerCacheDefinition>
```

The following table describes the `slicerCacheDefinition` element used in this example.

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>Slicer_State</td>
<td>This is the name of the slicer cache.</td>
</tr>
<tr>
<td>sourceName</td>
<td>State</td>
<td>This is the name of the associated slicer, as specified in section 2.1.5.</td>
</tr>
</tbody>
</table>

The following table describes the `pivotTable` element used in this example.

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>tabId</td>
<td>1</td>
<td>This indicates that the associated PivotTable, as specified in [ISO/IEC29500-1:2016] section 18.10, is located on the first sheet.</td>
</tr>
<tr>
<td>name</td>
<td>PivotTable1</td>
<td>This is the name of the associated PivotTable.</td>
</tr>
</tbody>
</table>
The following table describes the **tabular** element used in this example.

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>pivotCacheId</td>
<td>5</td>
<td>This indicates that the identifier of the associated PivotTable <strong>PivotCache</strong> is &quot;5&quot;.</td>
</tr>
</tbody>
</table>

The following table describes the **items** element used in this example.

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>count</td>
<td>2</td>
<td>This indicates that there are two items in the slicer cache.</td>
</tr>
</tbody>
</table>

The following table describes the first **i** (item) element used in this example.

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>1</td>
<td>This indicates that the first item in the slicer cache is the second item in the PivotTable <strong>PivotCache</strong>.</td>
</tr>
</tbody>
</table>

The following table describes the second **i** (item) element used in this example.

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>0</td>
<td>This indicates that the second item in the slicer cache is the first item in the PivotTable <strong>PivotCache</strong>.</td>
</tr>
<tr>
<td>s</td>
<td>1</td>
<td>This indicates that this item is selected in the slicer.</td>
</tr>
</tbody>
</table>

### 3.1.2 Slicer Part

The following is an example slicer part, as specified in section 2.1.5.

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
    mc:Ignorable="x"
    xmlns:x="http://schemas.openxmlformats.org/spreadsheetml/2006/main">
    <slicer name="State" cache="Slicer_State" caption="State" rowHeight="228600"/>
</slicers>
```

The following table describes the slicer element used in this example.

<table>
<thead>
<tr>
<th>Attribute name</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>State</td>
<td>This is the name of the slicer.</td>
</tr>
<tr>
<td>cache</td>
<td>Slicer_State</td>
<td>This is the name of the slicer cache, as specified in section 2.1.4.</td>
</tr>
<tr>
<td>caption</td>
<td>State</td>
<td>This is the caption displayed at the top of the slicer.</td>
</tr>
<tr>
<td>rowHeight</td>
<td>228600</td>
<td>This is the height of a <strong>row</strong> in EMUs, equal to one-fourth of an inch.</td>
</tr>
</tbody>
</table>
4 Security Considerations

4.1 Security Considerations for Implementers

The password verifier features available in the file format are used to prevent accidental modification, rather than being used as security features. It is possible to remove the passwords by removing the records containing the verifier values.

The translation of passwords from a double-byte Unicode string to a new character string in the ANSI code page of the current system converts any Unicode character that cannot be mapped to the ANSI code page of the current system to the 0x3F character in that code page, as described in [ISO/IEC29500-1:2016] section 18.2.29. Replacing these characters with "0x3F" when the hash is verified will generate positive hash value matches. In certain locales, this can be a significant portion of the everyday character set.

Further security considerations regarding the file encryption algorithms are described in [MS-OFFCRYPTO] section 4.1.3.

4.2 Index of Security Fields

None.
# Appendix A: Full XML Schema

For ease of implementation, this section provides the full W3C XML schemas for the new elements, attributes, complex types, and simple types specified in the earlier sections. Any schema references to namespaces included in Office Open XML file formats as described in [ISO/IEC29500-1:2016] refer specifically to the transitional schemas as described in [ISO/IEC29500-4:2016].

For ease of implementation, the following sections provide the full XML schema for this protocol.

<table>
<thead>
<tr>
<th>Schema name</th>
<th>Prefix</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://schemas.microsoft.com/office/excel/2006/main">http://schemas.microsoft.com/office/excel/2006/main</a></td>
<td>section 5.1</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/drawing/2010/slicer">http://schemas.microsoft.com/office/drawing/2010/slicer</a></td>
<td>section 5.2</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2009/9/main">http://schemas.microsoft.com/office/spreadsheetml/2009/9/main</a></td>
<td>section 5.4</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2011/1/ac">http://schemas.microsoft.com/office/spreadsheetml/2011/1/ac</a></td>
<td>section 5.6</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/drawing/2012/timeslicer">http://schemas.microsoft.com/office/drawing/2012/timeslicer</a></td>
<td>section 5.7</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/excel/2010/spreadsheetDrawing">http://schemas.microsoft.com/office/excel/2010/spreadsheetDrawing</a></td>
<td>section 5.8</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2010/11/ac">http://schemas.microsoft.com/office/spreadsheetml/2010/11/ac</a></td>
<td>section 5.9</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2014/11/main">http://schemas.microsoft.com/office/spreadsheetml/2014/11/main</a></td>
<td>section 5.10</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2015/02/main">http://schemas.microsoft.com/office/spreadsheetml/2015/02/main</a></td>
<td>section 5.11</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2016/revision6">http://schemas.microsoft.com/office/spreadsheetml/2016/revision6</a></td>
<td>section 5.14</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2014/revision">http://schemas.microsoft.com/office/spreadsheetml/2014/revision</a></td>
<td>section 5.15</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2015/revision2">http://schemas.microsoft.com/office/spreadsheetml/2015/revision2</a></td>
<td>section 5.16</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2016/revision3">http://schemas.microsoft.com/office/spreadsheetml/2016/revision3</a></td>
<td>section 5.17</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2016/revision5">http://schemas.microsoft.com/office/spreadsheetml/2016/revision5</a></td>
<td>section 5.18</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2016/pivotdefaultlayout">http://schemas.microsoft.com/office/spreadsheetml/2016/pivotdefaultlayout</a></td>
<td>section 5.19</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2">http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2</a></td>
<td>section 5.20</td>
<td></td>
</tr>
<tr>
<td><a href="http://schemas.microsoft.com/office/spreadsheetml/2017/richdata">http://schemas.microsoft.com/office/spreadsheetml/2017/richdata</a></td>
<td>section 5.21</td>
<td></td>
</tr>
</tbody>
</table>

## 5.1 http://schemas.microsoft.com/office/excel/2006/main Schema

```xml
           elementFormDefault="qualified"
```
5.2 http://schemas.microsoft.com/office/drawing/2010/slicer Schema

<xsd:schema elementFormDefault="qualified"
xmlns:a="http://schemas.openxmlformats.org/drawingml/2006/main"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
importLocation="#aart14docprop.xsd"
importLocation="#oartdocprop.xsd"
importLocation="#orel.xsd"
complexType name="CT_Slicer">
  <xsd:sequence>
    <xsd:element name="extLst" type="a:CT_OfficeArtExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="xsd:string" use="required"/>
</xsd:schema>


<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:x="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
elementFormDefault="qualified"
<xsd:element name="webExtension" type="CT_WebExtension" minOccurs="1" maxOccurs="unbounded"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="CT_WebExtension">
<xsd:sequence>
<xsd:element ref="xm:f" minOccurs="1" maxOccurs="1"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="CT_TimelineCacheRefs">
<xsd:sequence>
<xsd:element name="timelineCacheRef" type="CT_TimelineCacheRef" minOccurs="1" maxOccurs="unbounded"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="CT_TimelineCacheRef">
<xsd:attribute ref="r:id" use="required"/>
</xsd:complexType>
<xsd:element name="timelineRefs" type="CT_TimelineRefs"/>
<xsd:complexType name="CT_TimelineRefs">
<xsd:sequence>
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</xsd:restriction>
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  </xsd:sequence>
  <xsd:attribute name="sourceDataName" type="xsd:string" use="optional"/>
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 xmlns:xr="http://schemas.microsoft.com/office/spreadsheetml/2014/revision"
 xmlns:xr2="http://schemas.microsoft.com/office/spreadsheetml/2015/revision2">
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<xsd:attribute name="crossFilter" type="ST_SlicerCacheCrossFilter" use="optional" default="showItemsWithDataAtTop"/>
<xsd:complexType name="CT_OlapSlicerCacheLevelsData">
  <xsd:sequence>
    <xsd:element name="level" type="CT_OlapSlicerCacheLevelData" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="CT_OlapSlicerCacheSelections">
  <xsd:sequence>
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  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
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  <xsd:sequence>
    <xsd:element name="p" type="CT_OlapSlicerCacheItemParent" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="n" type="x:ST_Xstring" use="required"/>
</xsd:complexType>

<xsd:complexType name="CT_TabularSlicerCache">
  <xsd:sequence>
    <xsd:element name="items" type="CT_TabularSlicerCacheItems" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="pivotCacheId" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="sortOrder" type="ST_TabularSlicerCacheSortOrder" use="optional" default="ascending"/>
  <xsd:attribute name="customListSort" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="showMissing" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="crossFilter" type="ST_SlicerCacheCrossFilter" use="optional" default="showItemsWithDataAtTop"/>
</xsd:complexType>

<xsd:complexType name="CT_TabularSlicerCacheItems">
  <xsd:sequence>
    <xsd:element name="i" type="CT_TabularSlicerCacheItem" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
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<xsd:complexType name="CT_TabularSlicerCacheItem">
  <xsd:attribute name="x" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="s" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="nd" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
</xsd:complexType>
<xsd:complexType name="CT_ConditionalFormatting">
  <xsd:sequence>
    <xsd:element name="cfRule" type="CT_CfRule" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="xm:sqref" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" minOccurs="0" type="x:CT_ExtensionList"/>
  </xsd:sequence>
  <xsd:attribute name="pivot" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>
<xsd:complexType name="CT_DataValidations">
  <xsd:sequence>
    <xsd:element name="dataValidation" type="CT_DataValidation" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="pivot" type="xsd:boolean" default="false" use="optional"/>
  <xsd:attribute name="disablePrompts" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="xWindow" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="yWindow" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
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  </xsd:sequence>
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  <xsd:sequence>
    <xsd:element name="formula1" type="CT_DataValidationFormula" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="formula2" type="CT_DataValidationFormula" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="xm:sqref" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="type" type="x:ST_DataValidationType" use="optional" default="none"/>
  <xsd:attribute name="errorStyle" type="x:ST_DataValidationErrorStyle" use="optional" default="stop"/>
  <xsd:attribute name="imeMode" type="x:ST_DataValidationImeMode" use="optional" default="noControl"/>
  <xsd:attribute name="operator" type="x:ST_DataValidationOperator" use="optional" default="between"/>
  <xsd:attribute name="allowBlank" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="showDropDown" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="showInputMessage" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="showErrorMessage" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="errorTitle" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="error" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute ref="xr:uid"/>
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<xsd:simpleType name="ST_DispBlanksAs">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="span"/>
    <xsd:enumeration value="gap"/>
    <xsd:enumeration value="zero"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_SparklineAxisMinMax">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="individual"/>
    <xsd:enumeration value="group"/>
    <xsd:enumeration value="custom"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="CT_SparklineGroups">
  <xsd:sequence>
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  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="CT_SparklineGroup">
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    <xsd:element name="colorSeries" minOccurs="0" maxOccurs="1" type="x:CT_Color/>
    <xsd:element name="colorNegative" minOccurs="0" maxOccurs="1" type="x:CT_Color/>
    <xsd:element name="colorAxis" minOccurs="0" maxOccurs="1" type="x:CT_Color/>
    <xsd:element name="colorMarkers" minOccurs="0" maxOccurs="1" type="x:CT_Color/>
    <xsd:element name="colorFirst" minOccurs="0" maxOccurs="1" type="x:CT_Color/>
    <xsd:element name="colorLast" minOccurs="0" maxOccurs="1" type="x:CT_Color/>
    <xsd:element name="colorHigh" minOccurs="0" maxOccurs="1" type="x:CT_Color/>
    <xsd:element name="colorLow" minOccurs="0" maxOccurs="1" type="x:CT_Color/>
    <xsd:element ref="xm:f" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="sparklines" type="CT_Sparklines" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="manualMax" type="xsd:double" use="optional"/>
  <xsd:attribute name="manualMin" type="xsd:double" use="optional"/>
  <xsd:attribute name="lineWeight" type="xsd:double" use="optional" default="0.75"/>
  <xsd:attribute name="type" type="ST_SparklineType" use="optional" default="line"/>
  <xsd:attribute name="dateAxis" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="displayEmptyCellsAs" type="ST_DispBlanksAs" use="optional" default="zero"/>
  <xsd:attribute name="markers" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="high" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="low" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="first" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="last" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="negative" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="displayXAxis" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="displayHidden" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="maxAxisType" type="ST_SparklineAxisMinMax" use="optional" default="individual"/>
  <xsd:attribute name="minAxisType" type="ST_SparklineAxisMinMax" use="optional" default="individual"/>
  <xsd:attribute name="rightToLeft" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>

<xsd:complexType name="ST_SparklineType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="line"/>
    <xsd:enumeration value="column"/>
    <xsd:enumeration value="stacked"/>
  </xsd:restriction>
</xsd:complexType>

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  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="CT_Sparkline">
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  </xsd:sequence>
</xsd:complexType>

<xsd:element name="pivotCaches" type="xC:CT_PivotCaches"/>
<xsd:element name="slicerCaches" type="CT_SlicerCaches"/>
<xsd:element name="workbookPr" type="CT_WorkbookPr"/>
<xsd:complexType name="CT_WorkbookPr">
  <xsd:attribute name="defaultImageDpi" type="xsd:unsignedInt" default="220"/>
  <xsd:attribute name="discardImageEditData" type="xsd:boolean" default="false"/>
  <xsd:attribute name="accuracyVersion" type="xsd:unsignedInt" default="0"/>
</xsd:complexType>

<xsd:complexType name="CT_SlicerRefs">
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    <xsd:element name="slicer" type="CT_SlicerRef" minOccurs="1" maxOccurs="unbounded"/>
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</xsd:complexType>

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    <xsd:element name="slicerCache" type="CT_SlicerCache" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
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  <xsd:attribute ref="r:id" use="required"/>
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  <xsd:sequence>
    <xsd:element name="tupleSet" minOccurs="0" maxOccurs="1" type="CT_TupleSet"/>
  </xsd:sequence>
  <xsd:attribute name="displayFolder" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="flattenHierarchies" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="dynamicSet" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="hierarchizeDistinct" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="mdxLong" type="x:ST_Xstring" use="optional"/>
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<xsd:complexType name="CT_TupleSet">
  <xsd:sequence>
    <xsd:element name="headers" type="CT_TupleSetHeaders" minOccurs="1" maxOccurs="1"/>
    <xsd:element name="rows" type="CT_TupleSetRows" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="rowCount" type="xsd:unsignedInt" use="optional" default="1"/>
  <xsd:attribute name="columnCount" type="xsd:unsignedInt" use="optional" default="1"/>
</xsd:complexType>
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    <xsd:element name="header" type="CT_TupleSetHeader" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
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<xsd:complexType name="CT_TupleSetHeader">
  <xsd:attribute name="uniqueName" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="hierarchyName" type="x:ST_Xstring" use="optional"/>
</xsd:complexType>
<xsd:complexType name="CT_TupleSetRows">
  <xsd:sequence>
    <xsd:element name="row" type="CT_TupleSetRow" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
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<xsd:complexType name="CT_TupleSetRow">
  <xsd:sequence>
    <xsd:element name="rowItem" type="CT_TupleSetRowItem" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
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<xsd:complexType name="CT_TupleSetRowItem">
  <xsd:attribute name="u" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="d" type="x:ST_Xstring" use="optional"/>
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<xsd:complexType name="CT_CacheHierarchy">
  <xsd:sequence>
    <xsd:element name="setLevel" minOccurs="1" maxOccurs="unbounded" type="CT_SetLevel"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
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  <xsd:attribute name="hierarchy" use="required" type="xsd:int"/>
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<xsd:attribute name="measuresSet" type="xsd:boolean" use="optional" default="false"/>
<xsd:attribute name="hierarchizeDistinct" type="xsd:boolean" use="optional" default="true"/>
<xsd:attribute name="ignore" type="xsd:boolean" default="false" use="optional"/>
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<xsd:element name="dataField" type="CT_DataField"/>
<xsd:complexType name="CT_DataField">
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<xsd:attribute name="uniqueName" type="x:ST_Xstring" use="optional"/>
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<xsd:enumeration value="percentOfParentRow"/>
<xsd:enumeration value="percentOfParentCol"/>
<xsd:enumeration value="percentOfRunningTotal"/>
<xsd:enumeration value="rankAscending"/>
<xsd:enumeration value="rankDescending"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_DataBarDirection">
<xsd:restriction base="xsd:string">
<xsd:enumeration value="context"/>
<xsd:enumeration value="leftToRight"/>
<xsd:enumeration value="rightToLeft"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_DataBarAxisPosition">
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<xsd:enumeration value="automatic"/>
<xsd:enumeration value="middle"/>
<xsd:enumeration value="none"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_CfvoType">
<xsd:restriction base="xsd:string">
<xsd:enumeration value="num"/>
<xsd:enumeration value="percent"/>
<xsd:enumeration value="max"/>
<xsd:enumeration value="min"/>
<xsd:enumeration value="formula"/>
<xsd:enumeration value="percentile"/>
<xsd:enumeration value="autoMin"/>
<xsd:enumeration value="autoMax"/>
</xsd:restriction>
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<xsd:complexType name="CT_Cfvo">
<xsd:sequence>
<xsd:element ref="xm:f" minOccurs="0" maxOccurs="1"/>
<xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
</xsd:sequence>
<xsd:attribute name="type" type="ST_CfvoType" use="required"/>
<xsd:attribute name="gte" type="xsd:boolean" use="optional" default="true"/>
</xsd:complexType>
<xsd:complexType name="CT_CfRule">
<xsd:sequence>
<xsd:element ref="xm:f" minOccurs="0" maxOccurs="3"/>
<xsd:element name="colorScale" type="CT_ColorScale" minOccurs="0" maxOccurs="1"/>
<xsd:element name="dataBar" type="CT_DataBar" minOccurs="0" maxOccurs="1"/>
<xsd:element name="iconSet" type="CT_IconSet" minOccurs="0" maxOccurs="1"/>
<xsd:element name="dxf" type="x:CT_Dxf" minOccurs="0" maxOccurs="1"/>
<xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
</xsd:sequence>
<xsd:attribute name="type" type="x:ST_CfType" use="optional"/>
<xsd:complexType name="CT_IconSet">
  <xsd:sequence>
    <xsd:element name="cfvo" type="CT_Cfvo" minOccurs="2" maxOccurs="unbounded"/>
    <xsd:element name="cfIcon" type="CT_CfIcon" minOccurs="0" maxOccurs="5"/>
  </xsd:sequence>
  <xsd:attribute name="iconSet" type="ST_IconSetType" use="optional" default="3TrafficLights1"/>
  <xsd:attribute name="showValue" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="percent" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="reverse" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="custom" type="xsd:boolean" use="optional" default="false"/>
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<xsd:complexType name="CT_ColorScale">
  <xsd:sequence>
    <xsd:element name="cfvo" type="CT_Cfvo" minOccurs="2" maxOccurs="unbounded"/>
    <xsd:element name="color" type="x:CT_Color" minOccurs="2" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="CT_DataBar">
  <xsd:sequence>
    <xsd:element name="cfvo" type="CT_Cfvo" minOccurs="2" maxOccurs="2"/>
    <xsd:element name="fillColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="borderColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="negativeFillColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="negativeBorderColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="axisColor" type="x:CT_Color" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="minLength" type="xsd:unsignedInt" use="optional" default="10"/>
  <xsd:attribute name="maxLength" type="xsd:unsignedInt" use="optional" default="90"/>
  <xsd:attribute name="showValue" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="border" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="gradient" type="xsd:boolean" use="optional" default="true"/>
  <xsd:attribute name="direction" type="ST_DataBarDirection" use="optional" default="context"/>
  <xsd:attribute name="negativeBarColorSameAsPositive" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="negativeBarBorderColorSameAsPositive" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="axisPosition" type="ST_DataBarAxisPosition" use="optional" default="automatic"/>
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<xsd:element name="pivotField" type="CT_PivotField"/>
<xsd:complexType name="CT_PivotField">
  <xsd:attribute name="fillDownLabels" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="ignore" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>

<xsd:element name="pivotTableDefinition" type="CT_PivotTableDefinition"/>
<xsd:complexType name="CT_PivotTableDefinition">
  <xsd:sequence>
    <xsd:attribute name="pivotEdits" type="CT_PivotEdits" minOccurs="0" maxOccurs="1"/>
    <xsd:attribute name="pivotChanges" type="CT_PivotChanges" minOccurs="0" maxOccurs="1"/>
    <xsd:attribute name="conditionalFormats" type="CT_ConditionalFormats" minOccurs="0"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="visualTotalsForSets" type="xsd:boolean" use="optional" default="false"/>
<xsd:element name="calculatedMembersInFilters" type="xsd:boolean" use="optional" default="false"/>
<xsd:element name="altText" type="x:ST_Xstring" use="optional"/>
<xsd:element name="altTextSummary" type="x:ST_Xstring" use="optional"/>
<xsd:element name="autoApply" type="xsd:boolean" use="optional" default="false"/>
<xsd:element name="allocationMethod" type="ST_AllocationMethod" use="optional" default="equalAllocation"/>
<xsd:element name="weightExpression" type="x:ST_Xstring" use="optional"/>
<xsd:element name="hideValuesRow" type="xsd:boolean" use="optional" default="false"/>
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<xsd:attribute name="supportSubqueryNonVisual" type="xsd:boolean" use="optional" default="false"/>
<xsd:attribute name="supportSubqueryCalcMem" type="xsd:boolean" use="optional" default="false"/>
<xsd:attribute name="supportAddCalcMems" type="xsd:boolean" use="optional" default="false"/>
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</xsd:sequence>
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<xsd:attribute name="embeddedDataId" use="optional" type="x:ST_Xstring"/>
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<xsd:complexType name="CT_Table">
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<xsd:attribute name="altTextSummary" type="x:ST_Xstring" use="optional"/>
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<xsd:element name="CT_CfIcon" type="CT_CfIcon"/>
<xsd:complexType name="CT_CfIcon">
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<xsd:attribute name="iconId" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
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<xsd:enumeration value="3Arrows"/>
<xsd:enumeration value="3ArrowsGray"/>
<xsd:enumeration value="3Flags"/>
<xsd:enumeration value="3TrafficLights1"/>
<xsd:enumeration value="3TrafficLights2"/>
<xsd:enumeration value="3TrafficLights3"/>
<xsd:enumeration value="3Stars"/>
<xsd:enumeration value="3Triangles"/>
<xsd:enumeration value="4Arrows"/>
<xsd:enumeration value="4ArrowsGray"/>
<xsd:enumeration value="4RedToBlack"/>
<xsd:enumeration value="4Rating"/>
<xsd:enumeration value="5Arrows"/>
<xsd:enumeration value="5ArrowsGray"/>
<xsd:enumeration value="5Rating"/>  
xsd:enumeration value="5Quarters"/>
<xsd:enumeration value="3Signs"/>
<xsd:enumeration value="3Symbols"/>
<xsd:enumeration value="3Symbols2"/>
<xsd:enumeration value="4TrafficLights"/>
<xsd:enumeration value="5Arrows"/>
<xsd:enumeration value="5TrafficLights"/>
<xsd:enumeration value="5TrafficLightsGray"/>
<xsd:enumeration value="5Rating"/>
<xsd:enumeration value="5Quarters"/>
<xsd:enumeration value="3Triangles"/>
<xsd:enumeration value="5Boxes"/>
<xsd:enumeration value="NoIcons"/>
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</xsd:simpleType>
<xsd:complexType name="CT_PivotEdits">
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<xsd:element name="userEdit" type="CT_PivotUserEdit" minOccurs="1" maxOccurs="1"/>
<xsd:element name="tupleItems" type="CT_TupleItems" minOccurs="1" maxOccurs="1"/>
<xsd:element name="pivotArea" type="x:CT_PivotArea" minOccurs="1" maxOccurs="1"/>
<xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
</xsd:sequence>
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<xsd:element name="tupleItems" type="CT_TupleItems" minOccurs="1" maxOccurs="1"/>
<xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
</xsd:sequence>
<xsd:attribute name="allocationMethod" type="ST_AllocationMethod" default="equalAllocation"/>
<xsd:attribute name="weightExpression" type="x:ST_Xstring" use="optional"/>
</xsd:complexType>
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<xsd:choice minOccurs="1" maxOccurs="1">
<xsd:element ref="xm:f" minOccurs="1" maxOccurs="1"/>
<xsd:element name="editValue" type="CT_PivotEditValue" minOccurs="1" maxOccurs="1"/>
</xsd:choice>
</xsd:complexType>
<xsd:complexType name="CT_PivotEditValue">
<xsd:simpleContent>
<xsd:extension base="x:ST_Xstring">
<xsd:attribute name="valueType" use="required" type="ST_PivotEditValueType"/>
</xsd:extension>
</xsd:simpleContent>
</xsd:complexType>
<xsd:simpleType name="ST_PivotEditValueType">
<xsd:restriction base="xsd:string">
<xsd:enumeration value="number"/>
<xsd:enumeration value="dateTime"/>
<xsd:enumeration value="string"/>
<xsd:enumeration value="boolean"/>
<xsd:enumeration value="error"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="CT_TupleItems">
<xsd:sequence>
<xsd:element name="tupleItem" type="x:ST_Xstring" minOccurs="1" maxOccurs="unbounded"/>
</xsd:sequence>
</xsd:complexType>
<xsd:simpleType name="ST_AllocationMethod">
<xsd:restriction base="xsd:string">
<xsd:enumeration value="equalAllocation"/>
<xsd:enumeration value="equalIncrement"/>
<xsd:enumeration value="weightedAllocation"/>
<xsd:enumeration value="weightedIncrement"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="CT_SlicerStyle">
<xsd:sequence>
<xsd:element name="slicerStyleElements" type="CT_SlicerStyleElements" minOccurs="0" maxOccurs="1"/>
</xsd:sequence>
<xsd:attribute name="name" type="xsd:string" use="required"/>
</xsd:complexType>
<xsd:complexType name="CT_SlicerStyleElement">
  <xsd:attribute name="type" type="ST_SlicerStyleType" use="required"/>
  <xsd:attribute name="dxfId" type="x:ST_DxfId" use="optional"/>
</xsd:complexType>

<xsd:simpleType name="ST_SlicerStyleType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="unselectedItemWithData"/>
    <xsd:enumeration value="selectedItemWithData"/>
    <xsd:enumeration value="unselectedItemWithNoData"/>
    <xsd:enumeration value="selectedItemWithNoData"/>
    <xsd:enumeration value="hoveredUnselectedItemWithData"/>
    <xsd:enumeration value="hoveredSelectedItemWithData"/>
    <xsd:enumeration value="hoveredUnselectedItemWithNoData"/>
    <xsd:enumeration value="hoveredSelectedItemWithNoData"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:element name="slicerStyles" type="CT_SlicerStyles"/>

<xsd:complexType name="CT_OleItem">
  <xsd:sequence>
    <xsd:element name="values" type="x:CT_DdeValues" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="icon" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="advise" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="preferPic" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>

<xsd:element name="oleItem" type="CT_OleItem"/>

<xsd:complexType name="CT_PivotHierarchy">
  <xsd:attribute name="ignore" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>

<xsd:element name="cacheField" type="CT_CacheField"/>

<xsd:complexType name="CT_CacheField">
  <xsd:attribute name="ignore" type="xsd:boolean" default="false" use="optional"/>
</xsd:complexType>

<xsd:complexType name="CT_ConditionalFormats">
  <xsd:sequence>
    <xsd:element name="conditionalFormat" minOccurs="1" maxOccurs="unbounded" type="CT_ConditionalFormat"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="optional"/>
</xsd:complexType>

<xsd:complexType name="CT_ConditionalFormat">
  <xsd:sequence>
    <xsd:element name="pivotAreas" type="x:CT_PivotAreas" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extList" minOccurs="0" maxOccurs="1" type="x:CT_ExtensionList"/>
  </xsd:sequence>
  <xsd:attribute name="scope" type="x:ST_Scope" default="selection" use="optional"/>
  <xsd:attribute name="type" type="x:ST_Type" default="none" use="optional"/>
  <xsd:attribute name="priority" use="optional" type="xsd:unsignedInt"/>
  <xsd:attribute name="id" type="x:ST_Guid" use="required"/>
</xsd:complexType>

<xsd:complexType name="CT_SlicerStyles">
  <xsd:sequence>
    <xsd:element name="slicerStyle" type="CT_SlicerStyle" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="defaultSlicerStyle" type="xsd:string" use="required"/>
</xsd:complexType>

<xsd:complexType name="CT_SlicerStyleElements">
  <xsd:sequence>
    <xsd:element name="slicerStyleElement" type="CT_SlicerStyleElement" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="id" type="x:ST_Guid"/>

<xsd:complexType name="CT_IgnoredErrors">
  <xsd:sequence>
  </xsd:sequence>
</xsd:complexType>

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<xsd:element name="ignoredError" type="CT_IgnoredError" minOccurs="0" maxOccurs="unbounded"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="CT_IgnoredError">
  <xsd:sequence>
    <xsd:element ref="xm:sqref" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="evalError" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="twoDigitTextYear" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="numberStoredAsText" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="formula" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="formulaRange" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="unlockedFormula" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="emptyCellReference" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="listDataValidation" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="calculatedColumn" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
<xsd:complexType name="CT_ProtectedRanges">
  <xsd:sequence>
    <xsd:element name="protectedRange" type="CT_ProtectedRange" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="CT_ProtectedRange">
  <xsd:sequence maxOccurs="1">
    <xsd:element ref="xm:sqref" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="password" type="x:ST_UnsignedShortHex" use="optional"/>
  <xsd:attribute name="algorithmName" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="hashValue" type="xsd:base64Binary" use="optional"/>
  <xsd:attribute name="saltValue" type="xsd:base64Binary" use="optional"/>
  <xsd:attribute name="spinCount" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="name" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="securityDescriptor" type="xsd:string" use="optional"/>
</xsd:complexType>
<xsd:element name="iconFilter" type="CT_IconFilter"/>
<xsd:complexType name="CT_IconFilter">
  <xsd:attribute name="iconSet" type="ST_IconSetType" use="required"/>
  <xsd:attribute name="iconId" type="xsd:unsignedInt" use="required"/>
</xsd:complexType>
<xsd:element name="filter" type="CT_Filter"/>
<xsd:complexType name="CT_Filter">
  <xsd:attribute name="val" type="x:ST_Xstring"/>
</xsd:complexType>
<xsd:element name="customFilters" type="CT_CustomFilters"/>
<xsd:complexType name="CT_CustomFilters">
  <xsd:sequence>
    <xsd:element name="customFilter" type="CT_CustomFilter" minOccurs="1" maxOccurs="2"/>
  </xsd:sequence>
  <xsd:attribute name="and" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
<xsd:complexType name="CT_CustomFilter">
  <xsd:attribute name="operator" type="x:ST_FilterOperator" default="equal" use="optional"/>
  <xsd:attribute name="val" type="x:ST_Xstring"/>
</xsd:complexType>
<xsd:element name="sortCondition" type="CT_SortCondition"/>
<xsd:complexType name="CT_SortCondition">
  <xsd:attribute name="descending" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="sortBy" type="x:ST_SortBy" use="optional" default="value"/>
  <xsd:attribute name="ref" type="x:ST_Ref" use="required"/>
  <xsd:attribute name="customList" type="x:ST_Xstring" use="optional"/>
  <xsd:attribute name="dxfId" type="x:ST_DxfId" use="optional"/>
<xsd:attribute name="iconSet" type="ST_IconSetType" use="optional" default="3Arrows"/>
<xsd:attribute name="iconId" type="xsd:unsignedInt" use="optional"/>
</xsd:complexType>
<xsd:element name="sortCondition" type="CT_SortCondition"/>
<xsd:complexType name="CT_CacheSourceExt">
  <xsd:sequence>
    <xsd:element ref="sourceConnection" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="sourceConnection" type="CT_SourceConnection"/>
<xsd:complexType name="CT_DatastoreItem">
  <xsd:sequence>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="id" type="x:ST_Xstring" use="required"/>
</xsd:complexType>
<xsd:element name="formControlPr" type="CT_FormControlPr"/>
<xsd:complexType name="CT_ListItems">
  <xsd:sequence>
    <xsd:element name="item" type="CT_ListItem" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="CT_ListItem">
  <xsd:attribute name="val" type="xsd:string" use="required"/>
</xsd:complexType>
<xsd:complexType name="CT_FormControlPr">
  <xsd:sequence>
    <xsd:element name="itemLst" type="CT_ListItems" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="objectType" type="ST_ObjectType" use="optional"/>
  <xsd:attribute name="checked" type="ST_Checked" use="optional"/>
  <xsd:attribute name="colored" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="dropLines" type="xsd:unsignedInt" use="optional" default="8"/>
  <xsd:attribute name="dropStyle" type="ST_DropStyle" use="optional"/>
  <xsd:attribute name="dx" type="xsd:unsignedInt" use="optional" default="80"/>
  <xsd:attribute name="firstButton" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="fmlaGroup" type="x:ST_Formula" use="optional"/>
  <xsd:attribute name="fmlaLink" type="x:ST_Formula" use="optional"/>
  <xsd:attribute name="fmlaRange" type="x:ST_Formula" use="optional"/>
  <xsd:attribute name="fmlaTxbx" type="x:ST_Formula" use="optional"/>
  <xsd:attribute name="horiz" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="justLastX" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="lockText" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="max" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="min" type="xsd:unsignedInt" use="optional" default="0"/>
  <xsd:attribute name="multiSel" type="xsd:string" use="optional"/>
  <xsd:attribute name="noThreeD" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="noThreeD2" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="page" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="sel" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="selType" type="ST_SelType" use="optional" default="single"/>
  <xsd:attribute name="textHAlign" type="ST_TextHAlign" use="optional" default="left"/>
  <xsd:attribute name="textVAlign" type="ST_TextVAlign" use="optional" default="top"/>
  <xsd:attribute name="widthMin" type="xsd:unsignedInt" use="optional"/>
  <xsd:attribute name="editVal" type="ST_EditValidation" use="optional"/>
  <xsd:attribute name="multiLine" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="verticalBar" type="xsd:boolean" use="optional" default="false"/>
  <xsd:attribute name="passwordEdit" type="xsd:boolean" use="optional" default="false"/>
</xsd:complexType>
<xsd:simpleType name="ST_ObjectType">
  <xsd:restriction base="xsd:token">
  </xsd:restriction>
</xsd:simpleType>
<xsd:enumeration value="Button"/>
<xsd:enumeration value="CheckBox"/>
<xsd:enumeration value="Drop"/>
<xsd:enumeration value="GBox"/>
<xsd:enumeration value="Label"/>
<xsd:enumeration value="List"/>
<xsd:enumeration value="Radio"/>
<xsd:enumeration value="Scroll"/>
<xsd:enumeration value="Spin"/>
<xsd:enumeration value="EditBox"/>
<xsd:enumeration value="Dialog"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_Checked">
<xsd:restriction base="xsd:token">
<xsd:enumeration value="Unchecked"/>
<xsd:enumeration value="Checked"/>
<xsd:enumeration value="Mixed"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_DropStyle">
<xsd:restriction base="xsd:token">
<xsd:enumeration value="combo"/>
<xsd:enumeration value="comboedit"/>
<xsd:enumeration value="simple"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_SelType">
<xsd:restriction base="xsd:token">
<xsd:enumeration value="single"/>
<xsd:enumeration value="multi"/>
<xsd:enumeration value="extended"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_TextHAlign">
<xsd:restriction base="xsd:string">
<xsd:enumeration value="left"/>
<xsd:enumeration value="center"/>
<xsd:enumeration value="right"/>
<xsd:enumeration value="justify"/>
<xsd:enumeration value="distributed"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_TextVAlign">
<xsd:restriction base="xsd:string">
<xsd:enumeration value="top"/>
<xsd:enumeration value="center"/>
<xsd:enumeration value="bottom"/>
<xsd:enumeration value="justify"/>
<xsd:enumeration value="distributed"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:simpleType name="ST_EditValidation">
<xsd:restriction base="xsd:token">
<xsd:enumeration value="text"/>
<xsd:enumeration value="integer"/>
<xsd:enumeration value="number"/>
<xsd:enumeration value="reference"/>
<xsd:enumeration value="formula"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:element name="slicers" type="CT_Slicers"/>
<xsd:complexType name="CT_Slicers">
<xsd:sequence>
<xsd:element name="slicer" type="CT_Slicer" minOccurs="1" maxOccurs="unbounded"/>
</xsd:sequence>
</xsd:complexType>
<xsd:complexType name="CT_Slicer">
<xsd:sequence>
</xsd:complexType>

5.6 http://schemas.microsoft.com/office/spreadsheetml/2011/1/ac Schema

5.7 http://schemas.microsoft.com/office/drawing/2012/timeslicer Schema

 xmlns:xdr14="http://xldr14SchemaUri"
 xmlns:a="http://schemas.openxmlformats.org/drawingml/2006/main"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    schemaLocation="oart14docprop.xsd"/>
  <xsd:import namespace="http://schemas.openxmlformats.org/drawingml/2006/main"
    schemaLocation="oartdocprop.xsd"/>
    schemaLocation="orel.xsd"/>
  <xsd:complexType name="CT_ApplicationNonVisualDrawingProps">
    <xsd:attribute name="macro" type="xsd:string" use="optional"/>
    <xsd:attribute name="fPublished" type="xsd:boolean" use="optional" default="false"/>
  </xsd:complexType>
  <xsd:complexType name="CT_ContentPartNonVisual">
    <xsd:sequence>
      <xsd:element name="cNvPr" type="a:CT_NonVisualDrawingProps" minOccurs="1" maxOccurs="1"/>
      <xsd:element name="cNvContentPartPr" type="a14:CT_NonVisualInkContentPartProperties" minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
  </xsd:complexType>
  <xsd:complexType name="CT_ContentPart">
    <xsd:sequence>
      <xsd:element name="nvContentPartPr" type="CT_ContentPartNonVisual" minOccurs="0" maxOccurs="1"/>
      <xsd:element name="nvPr" type="CT_ApplicationNonVisualDrawingProps" minOccurs="0" maxOccurs="1"/>
      <xsd:element name="xfrm" type="a:CT_Transform2D" minOccurs="0" maxOccurs="1"/>
      <xsd:element name="extLst" type="a:CT_OfficeArtExtensionList" minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
    <xsd:attribute ref="r:id" use="required"/>
    <xsd:attribute name="bwMode" type="a:ST_BlackWhiteMode" use="optional" default="auto"/>
  </xsd:complexType>
  <xsd:element name="contentPart" type="CT_ContentPart"/>
</xsd:schema>


 elementFormDefault="qualified" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns:x="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
 xmlns:xl="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
 xmlns:x1b="http://schemas.microsoft.com/office/2006/01/xlBasic"">
    schemaLocation="orel.xsd"/>
  <xsd:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
    schemaLocation="xlbasicTypes.xsd"/>
  <xsd:complexType name="CT_AbsolutePath">
    <xsd:attribute name="url" use="required" type="x:ST_Xstring"/>
  </xsd:complexType>
  <xsd:element name="absPath" type="CT_AbsolutePath"/>
</xsd:schema>

<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    elementFormDefault="qualified">
        schemaLocation="xlbasictypes.xsd"/>
        schemaLocation="xlworkbook.xsd"/>
        schemaLocation="xlsheet.xsd"/>
        schemaLocation="xlpivot.xsd"/>
        schemaLocation="xlextconns.xsd"/>
    <xsd:complexType name="CT_ModelTimeGroupings">
        <xsd:sequence>
            <xsd:element name="modelTimeGrouping" minOccurs="1" maxOccurs="unbounded" type="CT_ModelTimeGrouping"/>
        </xsd:sequence>
    </xsd:complexType>
    <xsd:element name="modelTimeGroupings" type="CT_ModelTimeGroupings"/>
    <xsd:complexType name="CT_ModelTimeGrouping">
        <xsd:sequence>
            <xsd:element name="calculatedTimeColumn" minOccurs="1" maxOccurs="unbounded" type="CT_CalculatedTimeColumn"/>
        </xsd:sequence>
        <xsd:attribute name="tableName" type="x:ST_Xstring" use="required"/>
        <xsd:attribute name="columnName" type="x:ST_Xstring" use="required"/>
        <xsd:attribute name="columnId" type="x:ST_Xstring" use="required"/>
    </xsd:complexType>
    <xsd:complexType name="CT_CalculatedTimeColumn">
        <xsd:attribute name="columnName" type="x:ST_Xstring" use="required"/>
        <xsd:attribute name="columnId" type="x:ST_Xstring" use="required"/>
        <xsd:attribute name="contentType" type="ST_ModelTimeGroupingContentType" use="required"/>
        <xsd:attribute name="isSelected" type="xsd:boolean" use="required"/>
    </xsd:complexType>
    <xsd:simpleType name="ST_ModelTimeGroupingContentType">
        <xsd:restriction base="x:ST_Xstring">
            <xsd:enumeration value="years"/>
            <xsd:enumeration value="quarters"/>
            <xsd:enumeration value="monthsindex"/>
            <xsd:enumeration value="months"/>
            <xsd:enumeration value="daysindex"/>
            <xsd:enumeration value="days"/>
            <xsd:enumeration value="hours"/>
            <xsd:enumeration value="minutes"/>
            <xsd:enumeration value="seconds"/>
        </xsd:restriction>
    </xsd:simpleType>
</xsd:schema>

5.11 http://schemas.microsoft.com/office/spreadsheetml/2015/02/main Schema

<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns="http://schemas.microsoft.com/office/spreadsheetml/2015/02/main"
    targetNamespace="http://schemas.microsoft.com/office/spreadsheetml/2015/02/main"
    elementFormDefault="qualified">
    <xsd:import namespace="http://schemas.microsoft.com/office/spreadsheetml/2015/02/main"
        schemaLocation="xlbasictypes.xsd"/>
    <xsd:attribute name="formatCode16" type="x:ST_Xstring"/>
</xsd:schema>
5.12 http://schemas.microsoft.com/office/spreadsheetml/2016/revision10 Schema

```xml
<xsd:schema

targetNamespace="http://schemas.microsoft.com/office/spreadsheetml/2016/revision10"

elementFormDefault="qualified"

xmlns="http://schemas.microsoft.com/office/spreadsheetml/2016/revision10"

xmlns:xsd="http://www.w3.org/2001/XMLSchema"

xmlns:x="http://schemas.openxmlformats.org/spreadsheetml/2006/main"

<xsd:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"

schemaLocation="xlbasictypes.xsd"/>

<xsd:attribute name="uid" type="x:ST_Guid"/>

<xsd:attribute name="uidLastSave" type="x:ST_Guid"/>

</xsd:schema>
```

5.13 http://schemas.microsoft.com/office/spreadsheetml/2016/revision9 Schema

```xml
<xsd:schema

targetNamespace="http://schemas.microsoft.com/office/spreadsheetml/2016/revision9"

elementFormDefault="qualified"

xmlns="http://schemas.microsoft.com/office/spreadsheetml/2016/revision9"

xmlns:xsd="http://www.w3.org/2001/XMLSchema"

xmlns:x="http://schemas.openxmlformats.org/spreadsheetml/2006/main"

<xsd:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"

schemaLocation="xlbasictypes.xsd"/>

<xsd:attribute name="uid" type="x:ST_Guid"/>

</xsd:schema>
```


```xml
<xsd:schema

targetNamespace="http://schemas.microsoft.com/office/spreadsheetml/2016/revision6"

elementFormDefault="qualified"

xmlns="http://schemas.microsoft.com/office/spreadsheetml/2016/revision6"

xmlns:xsd="http://www.w3.org/2001/XMLSchema"

xmlns:x="http://schemas.openxmlformats.org/spreadsheetml/2006/main"

<xsd:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"

schemaLocation="xlbasictypes.xsd"/>

<xsd:attribute name="uid" type="x:ST_Guid"/>

<xsd:attribute name="coauthVersionLast" type="xsd:unsignedInt"/>

<xsd:attribute name="coauthVersionMax" type="xsd:unsignedInt"/>

</xsd:schema>
```

5.15 http://schemas.microsoft.com/office/spreadsheetml/2014/revision Schema

```xml
<xsd:schema targetNamespace="http://schemas.microsoft.com/office/spreadsheetml/2014/revision"

elementFormDefault="qualified"

xmlns="http://schemas.microsoft.com/office/spreadsheetml/2014/revision"

xmlns:xsd="http://www.w3.org/2001/XMLSchema"

xmlns:xr6="http://schemas.microsoft.com/office/spreadsheetml/2016/revision6"

xmlns:xr10="http://schemas.microsoft.com/office/spreadsheetml/2016/revision10"

<xsd:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"

schemaLocation="xlbasictypes.xsd"/>

<xsd:attribute name="uid" type="x:ST_Guid"/>

<xsd:attribute name="coauthVersionLast" type="xsd:unsignedInt"/>

<xsd:attribute name="coauthVersionMax" type="xsd:unsignedInt"/>

</xsd:schema>
```
5.16 http://schemas.microsoft.com_office/spreadsheetml/2015/revision2 Schema

5.17 http://schemas.microsoft.com_office/spreadsheetml/2016/revision3 Schema

5.18 http://schemas.microsoft.com_office/spreadsheetml/2016/revision5 Schema

targetNamespace="http://schemas.microsoft.com/office/spreadsheetml/2016/pivotdefaultlayout"

elementFormDefault="qualified">
  xsi:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
  schemaLocation="xlbasictypes.xsd"/>
  schemaLocation="orel.xsd"/>
  xsi:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
  schemaLocation="xlworkbook.xsd"/>
  xsi:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
  schemaLocation="xlisheet.xsd"/>
  xsi:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
  schemaLocation="xlpivot.xsd"/>
  xsi:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
  schemaLocation="xlextconns.xsd"/>
  xsi:element name="pivotTableDefinition16" type="CT_PivotTableDefinition16"/>
  xsi:complexType name="CT_PivotTableDefinition16">
    xsi:attribute name="EnabledSubtotalsDefault" type="xsd:boolean" use="optional"
    default="true"/>
    xsi:attribute name="SubtotalsOnTopDefault" type="xsd:boolean" use="optional"
    default="true"/>
    xsi:attribute name="InsertBlankRowDefault" type="xsd:boolean" use="optional"
    default="false"/>
  </xsd:complexType>
</xsd:schema>

5.20 http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2 Schema

<xsd:schema
  targetNamespace="http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2"
  elementFormDefault="qualified"
  xmlns:x="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
  xmlns="http://schemas.microsoft.com/office/spreadsheetml/2017/richdata2"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  xsi:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
  schemaLocation="xlbasictypes.xsd"/>
  schemaLocation="xl14.xsd"/>
  xsi:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main"
  schemaLocation="xlisheet.xsd"/>
  xsi:element name="filterColumn" type="CT_RichFilterColumn"/>
  xsi:complexType name="CT_RichFilterColumn">
    xsi:choice minOccurs="0" maxOccurs="1">
      xsi:element name="filters" type="CT_RichFilters"/>
      xsi:element name="top10" type="CT_RichTop10"/>
      xsi:element name="customFilters" type="CT_CustomRichFilters"/>
      xsi:element name="dynamicFilter" type="CT_DynamicRichFilter"/>
      xsi:element name="extLst" type="x:CT_ExtensionList"/>
    </xsd:choice>
  </xsd:complexType>
  xsi:complexType name="CT_RichFilters">
    xsi:sequence">
      xsi:element name="filter" type="CT_RichFilter" minOccurs="0" maxOccurs="unbounded"/>
      xsi:element name="dateGroupItem" type="CT_RichDateGroupItem" minOccurs="0"
      maxOccurs="unbounded"/>
    </xsd:sequence>
  </xsd:complexType>
  xsi:complexType name="CT_RichTop10">
    xsi:attribute name="key" type="x:ST_RichFilterKey" use="optional"/>
    xsi:attribute name="val" type="x:ST_Xstring" use="optional"/>
  </xsd:complexType>
  xsi:complexType name="CT_ExtensionList">
    xsi:sequence">
      xsi:complexType name="CT_RichFilter">
        xsi:attribute name="key" type="x:ST_RichFilterKey" use="optional"/>
        xsi:attribute name="val" type="x:ST_Xstring" use="optional"/>
      </xsd:complexType>
      xsi:complexType name="CT_CustomRichFilters">
        xsi:sequence">
          xsi:complexType name="CT_RichFilter">
            xsi:attribute name="key" type="x:ST_RichFilterKey" use="optional"/>
            xsi:attribute name="val" type="x:ST_Xstring" use="optional"/>
          </xsd:complexType>
        </xsd:sequence>
      </xsd:complexType>
    </xsd:sequence>
  </xsd:complexType>
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</xsd:sequence>
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</xsd:extension>
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<xsd:restriction base="x:ST_Xstring"/>
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<xsd:extension base="x2:CT_SortCondition">
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<xsd:complexType name="CT_SupportingPropertyBags">
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<xsd:element name="spbArrays" minOccurs="0" maxOccurs="1" type="CT_SupportingPropertyBagArrayData"/>
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<xsd:element name="extList" minOccurs="0" maxOccurs="1" type="x:CT_ExtensionList"/>
<xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
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<xsd:complexType name="CT_SupportingPropertyBag">
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<xsd:element name="v" minOccurs="1" maxOccurs="unbounded" type="CT_SupportingPropertyBagValue"/>
<xsd:attribute name="s" type="xsd:unsignedInt" use="required"/>
<xsd:complexType name="CT_ArrayData">
  <xsd:sequence>
    <xsd:element name="a" minOccurs="0" maxOccurs="unbounded" type="CT_Array"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="required"/>
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<xsd:complexType name="CT_Array">
  <xsd:sequence>
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  </xsd:sequence>
  <xsd:attribute name="r" type="xsd:unsignedInt" use="required"/>
  <xsd:attribute name="c" type="xsd:unsignedInt" use="optional" default="1"/>
</xsd:complexType>

<xsd:complexType name="CT_ArrayValue">
  <xsd:simpleContent>
    <xsd:extension base="x:ST_Xstring">
      <xsd:attribute name="t" type="ST_ArrayValueType" use="optional" default="d"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:simpleType name="ST_ArrayValueType">
  <xsd:restriction base="x:ST_Xstring">
    <xsd:enumeration value="d"/>
    <xsd:enumeration value="i"/>
    <xsd:enumeration value="b"/>
    <xsd:enumeration value="e"/>
    <xsd:enumeration value="s"/>
    <xsd:enumeration value="r"/>
    <xsd:enumeration value="a"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:element name="richStyleSheet" type="CT_RichStylesheet"/>

<xsd:complexType name="CT_RichStylesheet">
  <xsd:sequence>
    <xsd:element name="dxfs" type="x:CT_Dxfs" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="richProperties" type="CT_RichFormatProperties" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="richStyles" type="CT_RichStyles" minOccurs="0" maxOccurs="1"/>
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

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    <xsd:element name="rPr" minOccurs="1" maxOccurs="unbounded" type="CT_RichFormatProperty"/>
  </xsd:sequence>
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<xsd:complexType name="CT_RichFormatProperty">
  <xsd:attribute name="n" type="x:ST_Xstring" use="required"/>
  <xsd:attribute name="t" type="ST_RichFormatPropertyType" use="required"/>
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    <xsd:enumeration value="n"/>
    <xsd:enumeration value="i"/>
    <xsd:enumeration value="s"/>
  </xsd:restriction>
</xsd:simpleType>

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</xsd:complexType>

<xsd:complexType name="CT_RichStyle">
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    <xsd:element name="rpv" minOccurs="0" maxOccurs="unbounded" type="CT_RichStylePropertyValue"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="CT_RichValueData">
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    <xsd:element name="rv" minOccurs="0" maxOccurs="unbounded" type="CT_RichValue" />
    <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
  <xsd:attribute name="count" type="xsd:unsignedInt" use="required" />
</xsd:complexType>

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    <xsd:element name="fb" minOccurs="0" maxOccurs="1" type="CT_RichValueFallback" />
    <xsd:element name="v" minOccurs="1" maxOccurs="unbounded" type="CT_Value" />
  </xsd:sequence>
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</xsd:complexType>

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    <xsd:extension base="x:ST_Xstring" />
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="rvStructures" type="CT_RichValueStructures" />

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      <xsd:attribute name="t" type="ST_RichValueFallbackType" use="optional" default="n" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

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    <xsd:enumeration value="e" />
    <xsd:enumeration value="s" />
    <xsd:enumeration value="r" />
    <xsd:enumeration value="a" />
    <xsd:enumeration value="spb" />
  </xsd:restriction>
</xsd:complexType>

<xsd:complexType name="CT_RichValueStructures">
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  </xsd:sequence>
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</xsd:complexType>

<xsd:complexType name="CT_RichValueStructure">
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  </xsd:sequence>
  <xsd:attribute name="t" type="xsd:string" use="required" />
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<xsd:complexType name="CT_Key">
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  <xsd:attribute name="t" type="ST_RichValueValueType" use="optional" default="d" />
</xsd:complexType>

<xsd:simpleType name="ST_RichValueValueType">
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    <xsd:enumeration value="d" />
    <xsd:enumeration value="b" />
    <xsd:enumeration value="e" />
    <xsd:enumeration value="s" />
    <xsd:enumeration value="r" />
    <xsd:enumeration value="a" />
    <xsd:enumeration value="spb" />
  </xsd:restriction>
</xsd:simpleType>

<xsd:element name="rvb" type="CT_RichValueBlock" />
</xsd:complexType>

  <xsd:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main" schemaLocation="xlbasictypes.xsd"/>
  <xsd:element name="calcFeatures" type="CT_CalcFeatures"/>
  <xsd:complexType name="CT_CalcFeatures">
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      <xsd:element name="feature" minOccurs="1" maxOccurs="unbounded" type="CT_CalcFeature"/>
    </xsd:sequence>
  </xsd:complexType>
  <xsd:complexType name="CT_CalcFeature">
    <xsd:attribute name="name" type="xsd:string" use="required"/>
  </xsd:complexType>
</xsd:schema>


  <xsd:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main" schemaLocation="xlbasictypes.xsd"/>
  <xsd:import namespace="http://schemas.openxmlformats.org/spreadsheetml/2006/main" schemaLocation="xlsst.xsd"/>
  <xsd:element name="personList" type="CT_PersonList"/>
  <xsd:complexType name="CT_PersonList">
    <xsd:sequence>
      <xsd:element name="person" minOccurs="0" maxOccurs="unbounded" type="CT_Person"/>
      <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
  </xsd:complexType>
  <xsd:complexType name="CT_Person">
    <xsd:sequence>
      <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
    <xsd:attribute name="displayName" type="x:ST_Xstring" use="required"/>
    <xsd:attribute name="id" type="x:ST_Guid" use="required"/>
    <xsd:attribute name="userId" type="x:ST_Xstring" use="optional"/>
    <xsd:attribute name="providerId" type="x:ST_Xstring" use="optional"/>
  </xsd:complexType>
  <xsd:element name="ThreadedComments" type="CT_ThreadedComments"/>
  <xsd:complexType name="CT_ThreadedComments">
    <xsd:sequence>
      <xsd:element name="threadedComment" minOccurs="0" maxOccurs="unbounded" type="CT_ThreadedComment"/>
      <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
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  </xsd:complexType>
  <xsd:complexType name="CT_ThreadedComment">
    <xsd:sequence>
      <xsd:element name="text" type="x:ST_Xstring" minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:schema>
<xsd:element name="mentions" type="CT_ThreadedCommentMentions" minOccurs="0" maxOccurs="1"/>
  <xsd:element name="extLst" type="x:CT_ExtensionList" minOccurs="0" maxOccurs="1"/>
</xsd:sequence>
  <xsd:attribute name="ref" type="x:ST_Ref" use="optional"/>
  <xsd:attribute name="dT" type="xsd:dateTime" use="optional"/>
  <xsd:attribute name="personId" type="x:ST_Guid" use="required"/>
  <xsd:attribute name="id" type="x:ST_Guid" use="required"/>
  <xsd:attribute name="parentId" type="x:ST_Guid" use="optional"/>
  <xsd:attribute name="done" type="xsd:boolean" use="optional"/>
</xsd:complexType>
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</xsd:complexType>
</xsd:schema>
6 Appendix B: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include updates to those products.

- Microsoft Office Excel 2007
- Microsoft Excel 2010
- Microsoft Excel 2013
- Microsoft Excel 2016
- Microsoft Excel 2019 Preview

Exceptions, if any, are noted in this section. If an update version, service pack or Knowledge Base (KB) number appears with a product name, the behavior changed in that update. The new behavior also applies to subsequent updates unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms "SHOULD" or "SHOULD NOT" implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term "MAY" implies that the product does not follow the prescription.

<1> Section 2.2: This namespace was introduced in Excel 2013.
<2> Section 2.2: This namespace was introduced in Excel 2010.
<3> Section 2.2: This namespace was introduced in Excel 2010.
<4> Section 2.2: This namespace was introduced in Excel 2013.
<5> Section 2.2: This namespace was introduced in Excel 2013.
<6> Section 2.5.4: This attribute is available only in Excel 2016.
<7> Section 2.6.3: Office Excel 2007, Excel 2010, and Excel 2013 do not always write the correct value into this field. Although the value of this field is validated on load, it is not used at run time.
<8> Section 2.6.3: Office Excel 2007, Excel 2010, and Excel 2013 do not always write the correct value into this field. Although the value of this field is validated on load, it is not used at run time.
<9> Section 2.6.10: The following table shows the different versions of function accuracy that Excel 2010 and Excel 2013 supports.

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Functions are calculated using the current application’s algorithms.</td>
</tr>
<tr>
<td>1</td>
<td>Functions are calculated using algorithms implemented in Office Excel 2007.</td>
</tr>
<tr>
<td>2</td>
<td>Functions are calculated using algorithms implemented in Excel 2010.</td>
</tr>
</tbody>
</table>

<10> Section 2.6.24: Office Excel 2007 does not support multiple uses of the same OLAP measure in one cache hierarchy, and does not discard the associated cache hierarchy when ignore is TRUE.


<12> Section 2.6.30: Office Excel 2007 does not ignore these complex types.
Section 2.6.31: Office Excel 2007 does not support multiple uses of the same OLAP measure in one PivotTable view, and does not ignore this pivot field when ignore is TRUE.

Section 2.6.34: The 2007 Microsoft Office system does not load a file in which this field contains a value that it does not recognize, or is not recognized by the underlying operating system. The 2007 Office system recognizes the following language tags.

<table>
<thead>
<tr>
<th>Language</th>
<th>Locale</th>
<th>Language tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afrikaans</td>
<td>South Africa</td>
<td>af-ZA</td>
</tr>
<tr>
<td>Albanian</td>
<td>Albania</td>
<td>sq-AL</td>
</tr>
<tr>
<td>Alsatian</td>
<td>France</td>
<td>gsw-FR</td>
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<tr>
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<td>Ethiopia</td>
<td>am-ET</td>
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<td>ba-RU</td>
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<15> **Section 2.6.47:** Office Excel 2007 does not ignore the ancestor `CT_PivotHierarchy` element.

<16> **Section 2.6.48:** Office Excel 2007 does not ignore the ancestor `CT_CacheField` element.

<17> **Section 2.6.63:** Excel 2010 and Excel 2013 requires that the corresponding `ListItem` ([ISO/IEC29500-4:2016] section 14.4.2.36) be present.

<18> **Section 2.6.65:** Excel 2010 loads and roundtrips this value for scroll bars and spin boxes, but it does not support its functionality.

<19> **Section 2.6.65:** Excel 2010 requires that the corresponding `FmlaRange` ([ISO/IEC29500-4:2016] section 14.4.2.29) be present.

<20> **Section 2.6.65:** Excel 2010 and Excel 2013 ignore this attribute. This attribute is being deprecated.

<21> **Section 2.6.65:** This attribute is being deprecated in Excel 2010. Its functionality will be replaced with attribute `noThreeD`.

<22> **Section 2.6.65:** Excel 2010 loads and roundtrips this value, but it only supports its functionality for scroll bar form controls when run in a dialog box.

<23> **Section 2.6.65:** Excel 2010 does not support this attribute.

<24> **Section 2.6.65:** Excel 2010 does not support this attribute.

<25> **Section 2.7.16:** Excel 2010 uses this value only when the drop-down control is run in a dialog box, in all other cases the drop-down control behaves as a standard combo box.
7 Change Tracking

This section identifies changes that were made to this document since the last release. Changes are classified as Major, Minor, or None.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements.
- A document revision that captures changes to protocol functionality.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **None** means that no new technical changes were introduced. Minor editorial and formatting changes may have been made, but the relevant technical content is identical to the last released version.

The changes made to this document are listed in the following table. For more information, please contact dochelp@microsoft.com.

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