

# [MS-ASWBXML]: ActiveSync WAP Binary XML (WBXML) Algorithm

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## Revision Summary

Date	Revision History	Revision Class	Comments
12/03/2008	1.0.0	Major	Initial Release.
04/10/2009	2.0.0	Major	Updated technical content and applicable product releases.
07/15/2009	3.0.0	Major	Revised and edited for technical content.
11/04/2009	4.0.0	Major	Updated and revised the technical content.
02/10/2010	5.0.0	Major	Updated and revised the technical content.
05/05/2010	6.0.0	Major	Updated and revised the technical content.
08/04/2010	7.0	Major	Significantly changed the technical content.
11/03/2010	8.0	Major	Significantly changed the technical content.
03/18/2011	8.1	Minor	Clarified the meaning of the technical content.
08/05/2011	9.0	Major	Significantly changed the technical content.
10/07/2011	10.0	Major	Significantly changed the technical content.
01/20/2012	11.0	Major	Significantly changed the technical content.
04/27/2012	11.1	Minor	Clarified the meaning of the technical content.

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Preliminary

# 1 Introduction

The ActiveSync WAP Binary XML (WBXML) Algorithm incorporates **Wireless Application Protocol (WAP) Binary XML (WBXML)** functionality into the ActiveSync protocols by mapping ActiveSync **XML schema** elements to numeric code page values. This enables ActiveSync clients to encode **XML** requests into WBXML for transmission to an ActiveSync server.

Section 2 of this specification is normative and can contain the terms MAY, SHOULD, MUST, MUST NOT, and SHOULD NOT as defined in RFC 2119. Section 1.6 is also normative but cannot contain those terms. All other sections and examples in this specification are informative.

## 1.1 Glossary

The following terms are defined in [\[MS-GLOS\]](#):

**Hypertext Transfer Protocol (HTTP)**  
**Secure Sockets Layer (SSL)**  
**XML**

The following terms are defined in [\[MS-OXGLOS\]](#):

**contact**  
**WBXML code page**  
**Wireless Application Protocol (WAP) Binary XML (WBXML)**  
**XML namespace**  
**XML schema**

The following terms are specific to this document:

**WBXML token:** A single-byte code that represents a specific XML tag.

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

## 1.2 References

References to Microsoft Open Specifications documentation do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

### 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](mailto:dochelp@microsoft.com). We will assist you in finding the relevant information. Please check the archive site, <http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

[MS-ASCMD] Microsoft Corporation, "[ActiveSync Command Reference Protocol Specification](#)".

[MS-ASHTTP] Microsoft Corporation, "[ActiveSync HTTP Protocol Specification](#)".

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.rfc-editor.org/rfc/rfc2119.txt>

[WBXML1.2] Martin, B., and Jano, B., Eds., "WAP Binary XML Content Format", W3C Note, June 1999, <http://www.w3.org/1999/06/NOTE-wbxml-19990624>

## 1.2.2 Informative References

- [MS-ASAIRS] Microsoft Corporation, "[ActiveSync AirSyncBase Namespace Protocol Specification](#)".
- [MS-ASCAL] Microsoft Corporation, "[ActiveSync Calendar Class Protocol Specification](#)".
- [MS-ASCNTC] Microsoft Corporation, "[ActiveSync Contact Class Protocol Specification](#)".
- [MS-ASEMAIL] Microsoft Corporation, "[ActiveSync E-Mail Class Protocol Specification](#)".
- [MS-ASNOTE] Microsoft Corporation, "[ActiveSync Notes Class Protocol Specification](#)".
- [MS-ASPROV] Microsoft Corporation, "[ActiveSync Provisioning Protocol Specification](#)".
- [MS-ASRM] Microsoft Corporation, "[ActiveSync Rights Management Protocol Specification](#)".
- [MS-ASTASK] Microsoft Corporation, "[ActiveSync Tasks Class Protocol Specification](#)".
- [MS-GLOS] Microsoft Corporation, "[Windows Protocols Master Glossary](#)".
- [MS-OXGLOS] Microsoft Corporation, "[Exchange Server Protocols Master Glossary](#)".

## 1.3 Overview

This algorithm maps ActiveSync XML schema elements to numeric code page values for use by the ActiveSync protocols, enabling ActiveSync clients to encode WBXML requests for transmission to an ActiveSync server.

This algorithm provides **WBXML tokens** and **WBXML code pages** that allow clients and servers to compress the XML tags in request and response messages. WBXML code pages are hard-coded on the server and cannot be changed by the client. The WBXML code pages correspond to **XML namespaces**.

## 1.4 Relationship to Protocols and Other Algorithms

The XML namespaces that are used by this algorithm are described in the ActiveSync protocol specifications, as shown in the following table.

The WBXML code page numbers in the table are listed in decimal format.

WBXML code page	Specification
WBXML code page 0: AirSync	<a href="#">[MS-ASCMD]</a> section 2.2.2.19
WBXML code page 1: Contacts	<a href="#">[MS-ASCNTC]</a>
WBXML code page 2: Email	<a href="#">[MS-ASEMAIL]</a>
WBXML code page 3: AirNotify	(no longer used)
WBXML code page 4: Calendar	<a href="#">[MS-ASCAL]</a>
WBXML code page 5: Move	<a href="#">[MS-ASCMD]</a> section 2.2.2.10
WBXML code page 6: ItemEstimate	<a href="#">[MS-ASCMD]</a> section 2.2.2.7

WBXML code page	Specification
WBXML code page 7: FolderHierarchy	[MS-ASCMD] sections <a href="#">2.2.2.2</a> , <a href="#">2.2.2.3</a> , <a href="#">2.2.2.4</a> , and <a href="#">2.2.2.5</a>
WBXML code page 8: MeetingResponse	<a href="#">[MS-ASCMD]</a> section 2.2.2.9
WBXML code page 9: Tasks	<a href="#">[MS-ASTASK]</a>
WBXML code page 10: ResolveRecipients	<a href="#">[MS-ASCMD]</a> section 2.2.2.13
WBXML code page 11: ValidateCert	<a href="#">[MS-ASCMD]</a> section 2.2.2.20
WBXML code page 12: Contacts2	[MS-ASCNTC]
WBXML code page 13: Ping	<a href="#">[MS-ASCMD]</a> section 2.2.2.11
WBXML code page 14: Provision	<a href="#">[MS-ASPROV]</a>
WBXML code page 15: Search	<a href="#">[MS-ASCMD]</a> section 2.2.2.14
WBXML code page 16: GAL	[MS-ASCMD] sections <a href="#">2.2.2.13</a> and <a href="#">2.2.2.14</a>
WBXML code page 17: AirSyncBase	<a href="#">[MS-ASAIRS]</a>
WBXML code page 18: Settings	<a href="#">[MS-ASCMD]</a> section 2.2.2.16
WBXML code page 19: DocumentLibrary	[MS-ASCMD] sections <a href="#">2.2.2.8</a> and <a href="#">2.2.2.14</a>
WBXML code page 20: ItemOperations	[MS-ASCMD] sections <a href="#">2.2.2.8</a>
WBXML code page 21: ComposeMail	[MS-ASCMD] sections <a href="#">2.2.2.15</a> , <a href="#">2.2.2.17</a> , and <a href="#">2.2.2.18</a>
WBXML code page 22: Email2	[MS-AEMAIL]
WBXML code page 23: Notes	<a href="#">[MS-ASNOTE]</a>
WBXML code page 24: Rights Management	<a href="#">[MS-ASRM]</a>

## 1.5 Applicability Statement

WBXML is used as a compact transmission format for mobile clients, which typically have little memory and bandwidth. WBXML encoding of XML tags is appropriate for all messages sent and received by using the ActiveSync protocols.

## 1.6 Standards Assignments

This algorithm uses the global WBXML tokens listed in the following table.

Token name	Token	Reference
SWITCH_PAGE	0	<a href="#">[WBXML1.2]</a>
END	1	<a href="#">[WBXML1.2]</a>
ENTITY	2	<a href="#">[WBXML1.2]</a>
STR_I	3	<a href="#">[WBXML1.2]</a>
LITERAL	4	<a href="#">[WBXML1.2]</a>

Token name	Token	Reference
EXT_I_0	40	<a href="#">[WBXML1.2]</a>
EXT_I_1	41	<a href="#">[WBXML1.2]</a>
EXT_I_2	42	<a href="#">[WBXML1.2]</a>
PI	43	<a href="#">[WBXML1.2]</a>
LITERAL_C	44	<a href="#">[WBXML1.2]</a>
EXT_T_0	80	<a href="#">[WBXML1.2]</a>
EXT_T_1	81	<a href="#">[WBXML1.2]</a>
EXT_T_2	82	<a href="#">[WBXML1.2]</a>
STR_T	83	<a href="#">[WBXML1.2]</a>
LITERAL_A	84	<a href="#">[WBXML1.2]</a>
EXT_0	C0	<a href="#">[WBXML1.2]</a>
EXT_1	C1	<a href="#">[WBXML1.2]</a>
EXT_2	C2	<a href="#">[WBXML1.2]</a>
OPAQUE	C3	<a href="#">[WBXML1.2]</a>
LITERAL_AC	C4	<a href="#">[WBXML1.2]</a>



## 2 Algorithm Details

### 2.1 ActiveSync WBXML Algorithm Details

ActiveSync messages are transported as HTTP **POST** messages, as specified in [\[MS-ASHTTP\]](#), where the body of the message contains WBXML formatted data. The WBXML data encodes the XML required by the command being communicated in the message. The ActiveSync commands are specified in [\[MS-ASCMD\]](#).

This section specifies the algorithm to encode XML request and response messages into WBXML format and to decode WBXML data into XML request and response messages. This algorithm is used by clients and servers.

#### 2.1.1 Abstract Data Model

None.

#### 2.1.2 Initialization

The XML tags in both request and response messages are encoded by using WBXML tokenization, as specified in [\[WBXML1.2\]](#). WBXML uses WBXML code pages to map XML tags to WBXML tokens. WBXML parsers **MUST** use the WBXML code pages specified in the following sections.

##### 2.1.2.1 Code Pages

This algorithm supports the following WBXML code pages.

Code page	XML namespace
0	AirSync
1	Contacts
2	Email
3	AirNotify
4	Calendar
5	Move
6	ItemEstimate
7	FolderHierarchy
8	MeetingResponse
9	Tasks
10	ResolveRecipients
11	ValidateCert
12	Contacts2
13	Ping

Code page	XML namespace
14	Provision
15	Search
16	Gal
17	AirSyncBase
18	Settings
19	DocumentLibrary
20	ItemOperations
21	ComposeMail
22	Email2
23	Notes
24	RightsManagement

#### 2.1.2.1.1 Code Page 0: AirSync

The tags and tokens in WBXML code page 0 are listed in the following table.

Tag name	Token
<b>Sync</b>	0x05
<b>Responses</b>	0x06
<b>Add</b>	0x07
<b>Change</b>	0x08
<b>Delete</b>	0x09
<b>Fetch</b>	0x0A
<b>SyncKey</b>	0x0B
<b>ClientId</b>	0x0C
<b>ServerId</b>	0x0D
<b>Status</b>	0x0E
<b>Collection</b>	0x0F
<b>Class</b>	0x10
<b>CollectionId</b>	0x12
<b>GetChanges</b>	0x13
<b>MoreAvailable</b>	0x14

Tag name	Token
<b>WindowSize</b>	0x15
<b>Commands</b>	0x16
<b>Options</b>	0x17
<b>FilterType</b>	0x18
<b>Conflict</b>	0x1B
<b>Collections</b>	0x1C
<b>ApplicationData</b>	0x1D
<b>DeletesAsMoves</b>	0x1E
<b>Supported</b>	0x20
<b>SoftDelete</b>	0x21
<b>MIMESupport</b>	0x22
<b>MIMETruncation</b>	0x23
<b>Wait</b>	0x24
<b>Limit</b>	0x25
<b>Partial</b>	0x26
<b>ConversationMode</b> <a href="#">&lt;1&gt;</a>	0x27
<b>MaxItems</b> <a href="#">&lt;2&gt;</a>	0x28
<b>HeartbeatInterval</b> <a href="#">&lt;3&gt;</a>	0x29

#### 2.1.2.1.2 Code Page 1: Contacts

The tags and tokens in WBXML code page 1 are listed in the following table.

Tag name	Token
<b>Anniversary</b>	0x05
<b>AssistantName</b>	0x06
<b>AssistantPhoneNumber</b>	0x07
<b>Birthday</b>	0x08
<b>Business2PhoneNumber</b>	0x0C
<b>BusinessAddressCity</b>	0x0D
<b>BusinessAddressCountry</b>	0x0E
<b>BusinessAddressPostalCode</b>	0x0F

Tag name	Token
<b>BusinessAddressState</b>	0x10
<b>BusinessAddressStreet</b>	0x11
<b>BusinessFaxNumber</b>	0x12
<b>BusinessPhoneNumber</b>	0x13
<b>CarPhoneNumber</b>	0x14
<b>Categories</b>	0x15
<b>Category</b>	0x16
<b>Children</b>	0x17
<b>Child</b>	0x18
<b>CompanyName</b>	0x19
<b>Department</b>	0x1A
<b>Email1Address</b>	0x1B
<b>Email2Address</b>	0x1C
<b>Email3Address</b>	0x1D
<b>FileAs</b>	0x1E
<b>FirstName</b>	0x1F
<b>Home2PhoneNumber</b>	0x20
<b>HomeAddressCity</b>	0x21
<b>HomeAddressCountry</b>	0x22
<b>HomeAddressPostalCode</b>	0x23
<b>HomeAddressState</b>	0x24
<b>HomeAddressStreet</b>	0x25
<b>HomeFaxNumber</b>	0x26
<b>HomePhoneNumber</b>	0x27
<b>JobTitle</b>	0x28
<b>LastName</b>	0x29
<b>MiddleName</b>	0x2A
<b>MobilePhoneNumber</b>	0x2B
<b>OfficeLocation</b>	0x2C
<b>OtherAddressCity</b>	0x2D

Tag name	Token
OtherAddressCountry	0x2E
OtherAddressPostalCode	0x2F
OtherAddressState	0x30
OtherAddressStreet	0x31
PagerNumber	0x32
RadioPhoneNumber	0x33
Spouse	0x34
Suffix	0x35
Title	0x36
WebPage	0x37
YomiCompanyName	0x38
YomiFirstName	0x39
YomiLastName	0x3A
Picture	0x3C
Alias<4>	0x3D
WeightedRank<5>	0x3E

### 2.1.2.1.3 Code Page 2: Email

The tags and tokens in WBXML code page 2 are listed in the following table.

Tag name	Token
DateReceived	0x0F
DisplayTo	0x11
Importance	0x12
MessageClass	0x13
Subject	0x14
Read	0x15
To	0x16
Cc	0x17
From	0x18
ReplyTo	0x19

Tag name	Token
<b>AllDayEvent</b>	0x1A
<b>Categories</b> <6>	0x1B
<b>Category</b> <7>	0x1C
<b>DTStamp</b>	0x1D
<b>EndTime</b>	0x1E
<b>InstanceType</b>	0x1F
<b>BusyStatus</b>	0x20
<b>Location</b>	0x21
<b>MeetingRequest</b>	0x22
<b>Organizer</b>	0x23
<b>RecurrenceId</b>	0x24
<b>Reminder</b>	0x25
<b>ResponseRequested</b>	0x26
<b>Recurrences</b>	0x27
<b>Recurrence</b>	0x28
<b>Recurrence_Type</b>	0x29
<b>Recurrence_Until</b>	0x2A
<b>Recurrence_Occurrences</b>	0x2B
<b>Recurrence_Interval</b>	0x2C
<b>Recurrence_DayOfWeek</b>	0x2D
<b>Recurrence_DayOfMonth</b>	0x2E
<b>Recurrence_WeekOfMonth</b>	0x2F
<b>Recurrence_MonthOfYear</b>	0x30
<b>StartTime</b>	0x31
<b>Sensitivity</b>	0x32
<b>TimeZone</b>	0x33
<b>GlobalObjId</b>	0x34
<b>ThreadTopic</b>	0x35
<b>InternetCPID</b>	0x39
<b>Flag</b>	0x3A

Tag name	Token
Status	0x3B
ContentClass	0x3C
FlagType	0x3D
CompleteTime	0x3E
DisallowNewTimeProposal<8>	0x3F

#### 2.1.2.1.4 Code Page 3: AirNotify

WBXML code page 3 is no longer in use.

#### 2.1.2.1.5 Code Page 4: Calendar

The tags and tokens in WBXML code page 4 are listed in the following table.

Tag name	Token
TimeZone	0x05
AllDayEvent	0x06
Attendees	0x07
Attendee	0x08
Email	0x09
Name	0x0A
BusyStatus	0x0D
Categories	0x0E
Category	0x0F
DtStamp	0x11
EndTime	0x12
Exception	0x13
Exceptions	0x14
Deleted	0x15
ExceptionStartTime	0x16
Location	0x17
MeetingStatus	0x18
OrganizerEmail	0x19
OrganizerName	0x1A

Tag name	Token
Recurrence	0x1B
Type	0x1C
Until	0x1D
Occurrences	0x1E
Interval	0x1F
DayOfWeek	0x20
DayOfMonth	0x21
WeekOfMonth	0x22
MonthOfYear	0x23
Reminder	0x24
Sensitivity	0x25
Subject	0x26
StartTime	0x27
UID	0x28
AttendeeStatus	0x29
AttendeeType	0x2A
DisallowNewTimeProposal<9>	0x33
ResponseRequested<10>	0x34
AppointmentReplyTime<11>	0x35
ResponseType<12>	0x36
CalendarType<13>	0x37
IsLeapMonth<14>	0x38
FirstDayOfWeek<15>	0x39
OnlineMeetingConfLink<16>	0x3A
OnlineMeetingExternalLink<17>	0x3B

#### 2.1.2.1.6 Code Page 5: Move

The tags and tokens in WBXML code page 5 are listed in the following table.

Tag name	Token
MoveItems	0x05



Tag name	Token
<b>Move</b>	0x06
<b>SrcMsgId</b>	0x07
<b>SrcFldId</b>	0x08
<b>DstFldId</b>	0x09
<b>Response</b>	0x0A
<b>Status</b>	0x0B
<b>DstMsgId</b>	0x0C

#### 2.1.2.1.7 Code Page 6: ItemEstimate

The tags and tokens in WBXML code page 6 are listed in the following table.

Tag name	Token
<b>GetItemEstimate</b>	0x05
<b>Version</b> <a href="#">&lt;18&gt;</a>	0x06
<b>Collections</b>	0x07
<b>Collection</b>	0x08
<b>Class</b> <a href="#">&lt;19&gt;</a>	0x09
<b>CollectionId</b>	0x0A
<b>DateTime</b> <a href="#">&lt;20&gt;</a>	0x0B
<b>Estimate</b>	0x0C
<b>Response</b>	0x0D
<b>Status</b>	0x0E

#### 2.1.2.1.8 Code Page 7: FolderHierarchy

The tags and tokens in WBXML code page 7 are listed in the following table.

Tag name	Token
<b>DisplayName</b>	0x07
<b>ServerId</b>	0x08
<b>ParentId</b>	0x09
<b>Type</b>	0x0A
<b>Status</b>	0x0C

Tag name	Token
<b>Changes</b>	0x0E
<b>Add</b>	0x0F
<b>Delete</b>	0x10
<b>Update</b>	0x11
<b>SyncKey</b>	0x12
<b>FolderCreate</b>	0x13
<b>FolderDelete</b>	0x14
<b>FolderUpdate</b>	0x15
<b>FolderSync</b>	0x16
<b>Count</b>	0x17

#### 2.1.2.1.9 Code Page 8: MeetingResponse

The tags and tokens in WBXML code page 8 are listed in the following table.

Tag name	Token
<b>CalendarId</b>	0x05
<b>CollectionId</b>	0x06
<b>MeetingResponse</b>	0x07
<b>RequestId</b>	0x08
<b>Request</b>	0x09
<b>Result</b>	0x0A
<b>Status</b>	0x0B
<b>UserResponse</b>	0x0C
<b>InstanceId</b>	0x0E

#### 2.1.2.1.10 Code Page 9: Tasks

The tags and tokens in WBXML code page 9 are listed in the following table.

Tag name	Token
<b>Categories</b>	0x08
<b>Category</b>	0x09
<b>Complete</b>	0x0A

Tag name	Token
DateCompleted	0x0B
DueDate	0x0C
UtcDueDate	0x0D
Importance	0x0E
Recurrence	0x0F
Recurrence_Type	0x10
Recurrence_Start	0x11
Recurrence_Until	0x12
Recurrence_Occurrences	0x13
Recurrence_Interval	0x14
Recurrence_DayOfMonth	0x15
Recurrence_DayOfWeek	0x16
Recurrence_WeekOfMonth	0x17
Recurrence_MonthOfYear	0x18
Recurrence_Regenerate	0x19
Recurrence_DeadOccur	0x1A
ReminderSet	0x1B
ReminderTime	0x1C
Sensitivity	0x1D
StartDate	0x1E
UtcStartDate	0x1F
Subject	0x20
OrdinalDate	0x22
SubOrdinalDate	0x23
CalendarType<21>	0x24
IsLeapMonth<22>	0x25
FirstDayOfWeek<23>	0x26

#### 2.1.2.1.11 Code Page 10: ResolveRecipients

The tags and tokens in WBXML code page 10 are listed in the following table.

Tag name	Token
<b>ResolveRecipients</b>	0x05
<b>Response</b>	0x06
<b>Status</b>	0x07
<b>Type</b>	0x08
<b>Recipient</b>	0x09
<b>DisplayName</b>	0x0A
<b>EmailAddress</b>	0x0B
<b>Certificates</b>	0x0C
<b>Certificate</b>	0x0D
<b>MiniCertificate</b>	0x0E
<b>Options</b>	0x0F
<b>To</b>	0x10
<b>CertificateRetrieval</b>	0x11
<b>RecipientCount</b>	0x12
<b>MaxCertificates</b>	0x13
<b>MaxAmbiguousRecipients</b>	0x14
<b>CertificateCount</b>	0x15
<b>Availability</b> <24>	0x16
<b>StartTime</b> <25>	0x17
<b>EndTime</b> <26>	0x18
<b>MergedFreeBusy</b> <27>	0x19
<b>Picture</b> <28>	0x1A
<b>MaxSize</b> <29>	0x1B
<b>Data</b> <30>	0x1C
<b>MaxPictures</b> <31>	0x1D

#### 2.1.2.1.12 Code Page 11: ValidateCert

The tags and tokens in WBXML code page 11 are listed in the following table.

Tag name	Token
<b>ValidateCert</b>	0x05

Tag name	Token
<b>Certificates</b>	0x06
<b>Certificate</b>	0x07
<b>CertificateChain</b>	0x08
<b>CheckCRL</b>	0x09
<b>Status</b>	0x0A

#### 2.1.2.1.13 Code Page 12: Contacts2

The tags and tokens in WBXML code page 12 are listed in the following table.

Tag name	Token
<b>CustomerId</b>	0x05
<b>GovernmentId</b>	0x06
<b>IMAddress</b>	0x07
<b>IMAddress2</b>	0x08
<b>IMAddress3</b>	0x09
<b>ManagerName</b>	0x0A
<b>CompanyMainPhone</b>	0x0B
<b>AccountName</b>	0x0C
<b>NickName</b>	0x0D
<b>MMS</b>	0x0E

#### 2.1.2.1.14 Code Page 13: Ping

The tags and tokens in WBXML code page 13 are listed in the following table.

Tag name	Token
<b>Ping</b>	0x05
<b>AutdState</b> (Not used)	0x06
<b>Status</b>	0x07
<b>HeartbeatInterval</b>	0x08
<b>Folders</b>	0x09
<b>Folder</b>	0x0A
<b>Id</b>	0x0B

Tag name	Token
<b>Class</b>	0x0C
<b>MaxFolders</b>	0x0D

### 2.1.2.1.15 Code Page 14: Provision

The tags and tokens in WBXML code page 14 are listed in the following table.

Tag name	Token
<b>Provision</b>	0x05
<b>Policies</b>	0x06
<b>Policy</b>	0x07
<b>PolicyType</b>	0x08
<b>PolicyKey</b>	0x09
<b>Data</b>	0x0A
<b>Status</b>	0x0B
<b>RemoteWipe</b>	0x0C
<b>EASProvisionDoc</b>	0x0D
<b>DevicePasswordEnabled</b>	0x0E
<b>AlphanumericDevicePasswordRequired</b>	0x0F
<b>DeviceEncryptionEnabled</b>	0x10
<b>RequireStorageCardEncryption</b> (equivalent to <b>DeviceEncryptionEnabled</b> )	0x10
<b>PasswordRecoveryEnabled</b>	0x11
<b>AttachmentsEnabled</b>	0x13
<b>MinDevicePasswordLength</b>	0x14
<b>MaxInactivityTimeDeviceLock</b>	0x15
<b>MaxDevicePasswordFailedAttempts</b>	0x16
<b>MaxAttachmentSize</b>	0x17
<b>AllowSimpleDevicePassword</b>	0x18
<b>DevicePasswordExpiration</b>	0x19
<b>DevicePasswordHistory</b>	0x1A
<b>AllowStorageCard</b>	0x1B
<b>AllowCamera</b>	0x1C

Tag name	Token
<b>RequireDeviceEncryption</b>	0x1D
<b>AllowUnsignedApplications</b>	0x1E
<b>AllowUnsignedInstallationPackages</b>	0x1F
<b>MinDevicePasswordComplexCharacters</b>	0x20
<b>AllowWiFi</b>	0x21
<b>AllowTextMessaging</b>	0x22
<b>AllowPOPIMAPEmail</b>	0x23
<b>AllowBluetooth</b>	0x24
<b>AllowIrDA</b>	0x25
<b>RequireManualSyncWhenRoaming</b>	0x26
<b>AllowDesktopSync</b>	0x27
<b>MaxCalendarAgeFilter</b>	0x28
<b>AllowHTMLEmail</b>	0x29
<b>MaxEmailAgeFilter</b>	0x2A
<b>MaxEmailBodyTruncationSize</b>	0x2B
<b>MaxEmailHTMLBodyTruncationSize</b>	0x2C
<b>RequireSignedSMIMEMessages</b>	0x2D
<b>RequireEncryptedSMIMEMessages</b>	0x2E
<b>RequireSignedSMIMEAlgorithm</b>	0x2F
<b>RequireEncryptionSMIMEAlgorithm</b>	0x30
<b>AllowSMIMEEncryptionAlgorithmNegotiation</b>	0x31
<b>AllowSMIMESoftCerts</b>	0x32
<b>AllowBrowser</b>	0x33
<b>AllowConsumerEmail</b>	0x34
<b>AllowRemoteDesktop</b>	0x35
<b>AllowInternetSharing</b>	0x36
<b>UnapprovedInROMApplicationList</b>	0x37
<b>ApplicationName</b>	0x38
<b>ApprovedApplicationList</b>	0x39
<b>Hash</b>	0x3A

### 2.1.2.1.16 Code Page 15: Search

The tags and tokens in WBXML code page 15 are listed in the following table.

Tag name	Token
<b>Search</b>	0x05
<b>Store</b>	0x07
<b>Name</b>	0x08
<b>Query</b>	0x09
<b>Options</b>	0x0A
<b>Range</b>	0x0B
<b>Status</b>	0x0C
<b>Response</b>	0x0D
<b>Result</b>	0x0E
<b>Properties</b>	0x0F
<b>Total</b>	0x10
<b>EqualTo</b>	0x11
<b>Value</b>	0x12
<b>And</b>	0x13
<b>Or</b> <32>	0x14
<b>FreeText</b>	0x15
<b>DeepTraversal</b>	0x17
<b>LongId</b>	0x18
<b>RebuildResults</b>	0x19
<b>LessThan</b>	0x1A
<b>GreaterThan</b>	0x1B
<b>UserName</b>	0x1E
<b>Password</b>	0x1F
<b>ConversationId</b>	0x20
<b>Picture</b> <33>	0x21
<b>MaxSize</b> <34>	0x22
<b>MaxPictures</b> <35>	0x23

Note that WBXML tokens 0x06 and 0x16 are not used.



### 2.1.2.1.17 Code Page 16: GAL

The tags and tokens in WBXML code page 16 are listed in the following table.

Tag name	Token
<b>DisplayName</b>	0x05
<b>Phone</b>	0x06
<b>Office</b>	0x07
<b>Title</b>	0x08
<b>Company</b>	0x09
<b>Alias</b>	0x0A
<b>FirstName</b>	0x0B
<b>LastName</b>	0x0C
<b>HomePhone</b>	0x0D
<b>MobilePhone</b>	0x0E
<b>EmailAddress</b>	0x0F
<b>Picture</b> <a href="#">&lt;36&gt;</a>	0x10
<b>Status</b> <a href="#">&lt;37&gt;</a>	0x11
<b>Data</b> <a href="#">&lt;38&gt;</a>	0x12

### 2.1.2.1.18 Code Page 17: AirSyncBase

The tags and tokens in WBXML code page 17 are listed in the following table.

Tag name	Token
<b>BodyPreference</b>	0x05
<b>Type</b>	0x06
<b>TruncationSize</b>	0x07
<b>AllOrNone</b>	0x08
<b>Body</b>	0x0A
<b>Data</b>	0x0B
<b>EstimatedDataSize</b>	0x0C
<b>Truncated</b>	0x0D
<b>Attachments</b>	0x0E
<b>Attachment</b>	0x0F

Tag name	Token
<b>DisplayName</b>	0x10
<b>FileReference</b>	0x11
<b>Method</b>	0x12
<b>ContentId</b>	0x13
<b>ContentLocation</b>	0x14 (not used)
<b>IsInline</b>	0x15
<b>NativeBodyType</b>	0x16
<b>ContentType</b>	0x17
<b>Preview</b> <a href="#">&lt;39&gt;</a>	0x18
<b>BodyPartPreference</b> <a href="#">&lt;40&gt;</a>	0x19
<b>BodyPart</b> <a href="#">&lt;41&gt;</a>	0x1A
<b>Status</b> <a href="#">&lt;42&gt;</a>	0x1B

#### 2.1.2.1.19 Code Page 18: Settings

The tags and tokens in WBXML code page 18 are listed in the following table.

Tag name	Token
<b>Settings</b>	0x05
<b>Status</b>	0x06
<b>Get</b>	0x07
<b>Set</b>	0x08
<b>Oof</b>	0x09
<b>OofState</b>	0x0A
<b>StartTime</b>	0x0B
<b>EndTime</b>	0x0C
<b>OofMessage</b>	0x0D
<b>AppliesToInternal</b>	0x0E
<b>AppliesToExternalKnown</b>	0x0F
<b>AppliesToExternalUnknown</b>	0x10
<b>Enabled</b>	0x11
<b>ReplyMessage</b>	0x12

Tag name	Token
BodyType	0x13
DevicePassword	0x14
Password	0x15
DeviceInformaton	0x16
Model	0x17
IMEI	0x18
FriendlyName	0x19
OS	0x1A
OSLanguage	0x1B
PhoneNumber	0x1C
UserInformation	0x1D
EmailAddresses	0x1E
SmtpAddress	0x1F
UserAgent	0x20
EnableOutboundSMS<43>	0x21
MobileOperator<44>	0x22
PrimarySmtpAddress<45>	0x23
Accounts<46>	0x24
Account<47>	0x25
AccountId<48>	0x26
AccountName<49>	0x27
UserDisplayName<50>	0x28
SendDisabled<51>	0x29
RightsManagementInformation<52>	0x2B

#### 2.1.2.1.20 Code Page 19: DocumentLibrary

The tags and tokens in WBXML code page 19 are listed in the following table.

Tag name	Token
LinkId	0x05
DisplayName	0x06

Tag name	Token
<b>IsFolder</b>	0x07
<b>CreationDate</b>	0x08
<b>LastModifiedDate</b>	0x09
<b>IsHidden</b>	0x0A
<b>ContentLength</b>	0x0B
<b>ContentType</b>	0x0C

### 2.1.2.1.21 Code Page 20: ItemOperations

The tags and tokens in WBXML code page 20 are listed in the following table.

Tag name	Token
<b>ItemOperations</b>	0x05
<b>Fetch</b>	0x06
<b>Store</b>	0x07
<b>Options</b>	0x08
<b>Range</b>	0x09
<b>Total</b>	0x0A
<b>Properties</b>	0x0B
<b>Data</b>	0x0C
<b>Status</b>	0x0D
<b>Response</b>	0x0E
<b>Version</b>	0x0F
<b>Schema</b>	0x10
<b>Part</b>	0x11
<b>EmptyFolderContents</b>	0x12
<b>DeleteSubFolders</b>	0x13
<b>UserName</b>	0x14
<b>Password</b>	0x15
<b>Move</b> <a href="#">&lt;53&gt;</a>	0x16
<b>DstFldId</b> <a href="#">&lt;54&gt;</a>	0x17
<b>ConversationId</b> <a href="#">&lt;55&gt;</a>	0x18

Tag name	Token
<b>MoveAlways</b> <56>	0x19

#### 2.1.2.1.22 Code Page 21: ComposeMail

The tags and tokens in WBXML code page 21<57> are listed in the following table.

Tag name	Token
<b>SendMail</b>	0x05
<b>SmartForward</b>	0x06
<b>SmartReply</b>	0x07
<b>SaveInSentItems</b>	0x08
<b>ReplaceMime</b>	0x09
<b>Source</b>	0x0B
<b>FolderId</b>	0x0C
<b>ItemId</b>	0x0D
<b>LongId</b>	0x0E
<b>InstanceId</b>	0x0F
<b>Mime</b>	0x10
<b>ClientId</b>	0x11
<b>Status</b>	0x12
<b>AccountId</b> <58>	0x13

#### 2.1.2.1.23 Code Page 22: Email2

The tags and tokens in WBXML code page 22<59> are listed in the following table.

Tag name	Token
<b>UmCallerID</b>	0x05
<b>UmUserNotes</b>	0x06
<b>UmAttDuration</b>	0x07
<b>UmAttOrder</b>	0x08
<b>ConversationId</b>	0x09
<b>ConversationIndex</b>	0x0A
<b>LastVerbExecuted</b>	0x0B

Tag name	Token
<b>LastVerbExecutionTime</b>	0x0C
<b>ReceivedAsBcc</b>	0x0D
<b>Sender</b>	0x0E
<b>CalendarType</b>	0x0F
<b>IsLeapMonth</b>	0x10
<b>AccountId</b> <a href="#">&lt;60&gt;</a>	0x11
<b>FirstDayOfWeek</b> <a href="#">&lt;61&gt;</a>	0x12
<b>MeetingMessageType</b> <a href="#">&lt;62&gt;</a>	0x13

#### 2.1.2.1.24 Code Page 23: Notes

The tags and tokens in WBXML code page 23 [<63>](#) are listed in the following table.

Tag name	Token
<b>Subject</b>	0x05
<b>MessageClass</b>	0x06
<b>LastModifiedDate</b>	0x07
<b>Categories</b>	0x08
<b>Category</b>	0x09

#### 2.1.2.1.25 Code Page 24: RightsManagement

The tags and tokens in WBXML code page 24 [<64>](#) are listed in the following table.

Tag name	Token
<b>RightsManagementSupport</b>	0x05
<b>RightsManagementTemplates</b>	0x06
<b>RightsManagementTemplate</b>	0x07
<b>RightsManagementLicense</b>	0x08
<b>EditAllowed</b>	0x09
<b>ReplyAllowed</b>	0x0A
<b>ReplyAllAllowed</b>	0x0B
<b>ForwardAllowed</b>	0x0C
<b>ModifyRecipientsAllowed</b>	0x0D

Tag name	Token
<b>ExtractAllowed</b>	0x0E
<b>PrintAllowed</b>	0x0F
<b>ExportAllowed</b>	0x10
<b>ProgrammaticAccessAllowed</b>	0x11
<b>RMOwner</b>	0x12
<b>ContentExpiryDate</b>	0x13
<b>TemplateID</b>	0x14
<b>TemplateName</b>	0x15
<b>TemplateDescription</b>	0x16
<b>ContentOwner</b>	0x17
<b>RemoveRightsManagementDistribution</b>	0x18

### 2.1.3 Processing Rules

The processing rules for this algorithm are specified in [\[WBXML1.2\]](#).

This algorithm uses the following features that are specified in [\[WBXML1.2\]](#):

- WBXML tokens to encode XML tags
- WBXML code pages to support multiple XML namespaces
- Inline strings
- Opaque data

This algorithm does not use the following features that are specified in [\[WBXML1.2\]](#):

- String tables
- Entities
- Processing instructions
- Attribute encoding

### 3 Algorithm Examples

The following example shows the WBXML encoding of a server response that contains a new **contact (3)** and provides a byte-by-byte description of the encoding.

The following XML represents a server response to a request to create a new contact.

```
<?xml version="1.0" encoding="utf-8"?>
<Sync xmlns="AirSync" xmlns:airsyncbase="AirSyncBase" xmlns:contacts="Contacts">
  <Collections>
    <Collection>
      <Class>Contacts</Class>
      <SyncKey>2</SyncKey>
      <CollectionId>2</CollectionId>
      <Status>1</Status>
      <Commands>
        <Add>
          <ServerId>2:1</ServerId>
          <ApplicationData>
            <airsyncbase:Body>
              <airsyncbase:Type>1</airsyncbase:Type>
              <airsyncbase:EstimatedDataSize>0</airsyncbase:EstimatedDataSize>
              <airsyncbase:Truncated>1</airsyncbase:Truncated>
            </airsyncbase:Body>
            <contacts:FileAs>Funk, Don</contacts:FileAs>
            <contacts:FirstName>Don</contacts:FirstName>
            <contacts:LastName>Funk</contacts:LastName>
            <airsyncbase:NativeBodyType>1</airsyncbase:NativeBodyType>
          </ApplicationData>
        </Add>
      </Commands>
    </Collection>
  </Collections>
</Sync>
```

The ActiveSync WAP Binary XML (WBXML) Algorithm encodes this XML as the following WBXML encoding.

```
03 01 6A 00 45 5C 4F 50 03 43 6F 6E 74 61 63 74 73 00 01 4B 03 32 00 01 52 03 32 00 01 4E 03
31 00 01 56 47 4D 03 32 3A 31 00 01 5D 00 11 4A 46 03 31 00 01 4C 03 30 00 01 4D 03 31 00 01
01 00 01 5E 03 46 75 6E 6B 2C 20 44 6F 6E 00 01 5F 03 44 6F 6E 00 01 69 03 46 75 6E 6B 00 01
00 11 56 03 31 00 01 01 01 01 01 01
```

The following table explains each byte in the WBXML encoding.

Bytes	Description
03	Version number – WBXML version 1.3
01	Unknown public identifier
6A	Charset = UTF-8
00	String table length
45	<airsync:Sync>, with content (0x05 + 0x40)



Bytes	Description
5C	<airsync:Collections>, with content
4F	<airsync:Collection>, with content
50	<airsync:Class>, with content
03	Inline string follows
43 6F 6E 74 61 63 74 73 00	"contacts" (the 00 is the end of the string)
01	</airsync:Class>
4B	<airsync:SyncKey>, with content
03	Inline string follows
32 00	"2"
01	</airsync:SyncKey>
52	<airsync:CollectionID>, with content
03	Inline string follows
32 00	"2"
01	</airsync:CollectionID>
4E	<airsync:Status>, with content
03	Inline string follows
31 00	"1"
01	</airsync:Status>
56	<airsync:Commands>, with content
47	<airsync:Add>, with content
4D	<airsync:ServerId>, with content
03	Inline string follows
32 3A 31 00	"2:1"
01	</airsync:ServerId>
5D	<airsync:ApplicationData>, with content
00 11	Select WBXML code page 17 (AirSyncBase)
4A	<airsyncbase:Body>, with content
46	<airsyncbase:Type>, with content
03	Inline string follows
31 00	"1"

Bytes	Description
01	</airsynibase:Type>
4C	<airsynibase:EstimatedDataSize>, with content
03	Inline string follows
30 00	"0"
01	</airsynibase:EstimatedDataSize>
4D	<airsynibase:Truncated>, with content
03	Inline string follows
31 00	"1"
01	</airsynibase:Truncated>
01	</airsynibase:Body>
00 01	Select WBXML code page 1 (Contacts)
5E	<contacts:FileAs>, with content
03	Inline string follows
46 75 6E 6B 2C 20 44 6F 6E 00	"Funk, Don"
01	</contacts:FileAs>
5F	<contacts:FirstName>, with content
03	Inline string follows
44 6F 6E 00	"Don"
01	</contacts:FirstName>
69	<contacts:LastName>, with content
03	Inline string follows
46 75 6E 6B 00	"Funk"
01	</contacts:LastName>
00 11	Select WBXML code page 17 (AirSyncBase)
56	<airsynibase:NativeBodyType>, with content
03	Inline string follows
31 00	"1"
01	</airsynibase:NativeBodyType>
01	</airsync:ApplicationData>
01	</airsync:Add>

Bytes	Description
01	</airsync:Commands>
01	</airsync:Collection>
01	</airsync:Collections>
01	</airsync:Sync>

## 4 Security

### 4.1 Security Considerations for Implementers

In most cases, all communication between the client and server happens across an **HTTP** connection secured by the **Secure Sockets Layer (SSL)** protocol. The SSL connection is assumed to be secure enough to transmit confidential data, such as user credentials and sensitive e-mail. The SSL certificate on the server is assumed to be trusted by the client application.

### 4.2 Index of Security Parameters

None.

## 5 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Microsoft® Exchange Server 2007 Service Pack 1 (SP1)
- Microsoft® Exchange Server 2010
- Microsoft® Exchange Server 15 Technical Preview

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product 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 2.1.2.1.1:](#) The **ConversationMode** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<2> Section 2.1.2.1.1:](#) The **MaxItems** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<3> Section 2.1.2.1.1:](#) The **HeartbeatInterval** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<4> Section 2.1.2.1.2:](#) The **Alias** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<5> Section 2.1.2.1.2:](#) The **WeightedRank** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<6> Section 2.1.2.1.3:](#) The **Categories** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<7> Section 2.1.2.1.3:](#) The **Category** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<8> Section 2.1.2.1.3:](#) The **DisallowNewTimeProposal** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<9> Section 2.1.2.1.5:](#) The **DisallowNewTimeProposal** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<10> Section 2.1.2.1.5:](#) The **ResponseRequested** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<11> Section 2.1.2.1.5:](#) The **AppointmentReplyTime** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<12> Section 2.1.2.1.5:](#) The **ResponseType** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<13> Section 2.1.2.1.5:](#) The **CalendarType** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<14> Section 2.1.2.1.5:](#) The **IsLeapMonth** tag is not supported when the MS-ASProtocolVersion header is set to 12.1.

[<15> Section 2.1.2.1.5:](#) The **FirstDayOfWeek** tag is not supported when the MS-ASProtocolVersion header is set to 12.1 or 14.0.

[<16> Section 2.1.2.1.5:](#) The **OnlineMeetingConfLink** tag is not supported when the MS-ASProtocolVersion header is set to 12.1 or 14.0.

[<17> Section 2.1.2.1.5:](#) The **OnlineMeetingExternalLink** tag is not supported when the MS-ASProtocolVersion header is set to 12.1 or 14.0.

[<18> Section 2.1.2.1.7:](#) The **Version** tag is supported only when the MS-ASProtocolVersion header is set to 12.1.

[<19> Section 2.1.2.1.7:](#) The **Class** tag is supported only when the MS-ASProtocolVersion header is set to 12.1. When the MS-ASProtocolVersion header is set to 14.0 or 14.1, the **Class** tag defined in WBXML code page 0 is used.

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[<64> Section 2.1.2.1.25:](#) WBXML code page 24 is not supported when the MS-ASProtocolVersion header is set to 12.1 or 14.0.



## 6 Change Tracking

This section identifies changes that were made to the [MS-ASWBXML] protocol document between the January 2012 and April 2012 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

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 or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

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 **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.
- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated**.

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact [protocol@microsoft.com](mailto:protocol@microsoft.com).

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
<a href="#">2.1.2.1.2</a> <a href="#">Code Page 1: Contacts</a>	Revised multiple tag names in the table of tags.	N	Content updated.
<a href="#">2.1.2.1.3</a> <a href="#">Code Page 2: Email</a>	Replaced "CC" with "Cc" and "FlagStatus" with "Status" in the table of tags.	N	Content updated.
<a href="#">2.1.2.1.5</a> <a href="#">Code Page 4: Calendar</a>	Revised multiple tag names in the table of tags.	N	Content updated.
<a href="#">2.1.2.1.10</a> <a href="#">Code Page 9: Tasks</a>	Replaced "UTCDueDate" with "UtcDueDate" and "UTCStartDate" with "UtcStartDate" in the table of tags.	N	Content updated.
<a href="#">2.1.2.1.22</a> <a href="#">Code Page 21: ComposeMail</a>	Replaced "MIME" with "Mime" in the table of tags.	N	Content updated.

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