

[MS-OXWOAB]: Offline Address Book (OAB) Retrieval Protocol Specification

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1 Introduction

This document specifies a new file format.

A server might choose to represent properties of known recipients and make them available in an address book to its clients. When the client cannot reach the server due to being offline or having high network costs to access the server, the client might keep a local copy of the address book. This document specifies the Offline Address Book (OAB) v4 Web-based retrieval mechanism, which is a way of delivering an offline address book from server to client.

As part of OAB Web distribution, the server publishes an OAB manifest document. This document specifies the format of this manifest.

1.1 Glossary

The following terms are defined in [MS-OXGLOS]:

address book
Address Book object
Augmented Backus-Naur Form (ABNF)
address list
distinguished name (DN)
GUID
offline address book (OAB)
Uniform Resource Identifier (URI)
XML

The following terms are specific to this document:

Offline Address List (OAL): A portion of data in an **offline address book (OAB)** that is related to a single **address list**.

OAL data sequence number: The integer number associated with **Offline Address List (OAL)** data that represents the generation number of this data. The initial sequence number is 1. Every subsequent data generation that produces a data set not identical to the previous one increments the sequence number by one.

OAB Web distribution: A distribution mechanism specific to Offline Address Book (OAB) v4 as specified in [MS-OXOAB] when OAB data files and manifest are published as a collection of files that can be downloaded by client applications using the HTTP 1.1 protocol.

OAB data file: A file that contains Offline Address Book (OAB) v4-specific data, as specified in [MS-OXOAB].

OAB manifest: A file that contains information about data files in the v4 OAB and has fixed, well-known name "oab.xml". By discovering the **Web Distribution Point (WDP)** URI and downloading the manifest, a client application gets all information necessary to download any published data file in given WDP as needed.

Web Distribution Point (WDP): The location on the server where OAB files are published for web distribution. The **Unified Resource Identifier (URI)** of the WDP is discoverable by the client via the Autodiscover Publishing and Lookup protocol as specified in [MS-OXDSCLI].

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

1.2.1 Normative References

[FIP180-1] Federal Information Processing Standards Publication, "Secure Hash Standard", FIPS PUB 180-1, April 1995, <http://www.itl.nist.gov/fipspubs/fip180-1.htm>.

[MS-OXDSCLI] Microsoft Corporation, "Autodiscover Publishing and Lookup Protocol Specification", April 2008.

[MS-OXGLOS] Microsoft Corporation, "Office Exchange Protocols Master Glossary", April 2008.

[MS-OXOAB] Microsoft Corporation, "Offline Address Book (OAB) Format and Schema Protocol Specification", April 2008.

[MS-OXOABK] Microsoft Corporation, "Address Book Object Protocol Specification", April 2008.

[MS-OXOABKT] Microsoft Corporation, "Address Book User Interface Templates Protocol Specification", April 2008.

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

[RFC2616] Fielding, R., et al, "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999, <http://www.ietf.org/rfc/rfc2616.txt>.

[RFC3986] Berners-Lee, T., Fielding, R., and Masinter, L., "Uniform Resource Identifier (URI): Generic Syntax", RFC 3986, January 2005, <http://www.ietf.org/rfc/rfc3986.txt>.

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[RFC4234] Crocker, D., Ed. and Overell, P., "Augmented BNF for Syntax Specifications: ABNF", RFC 4234, October 2005, <http://www.ietf.org/rfc/rfc4234.txt>. <http://www.w3.org/TR/2006/REC-xml-20060816/>, C. M., Maler, E., and Yergeau, F., "Extensible Markup Language (XML) 1.0 (Fourth Edition)", <http://www.w3.org/TR/REC-xml/>.

1.2.2 Informative References

[MS-LCID] Microsoft Corporation, "Windows Language Code Identifier (LCID) Reference", March 2007, <http://go.microsoft.com/fwlink/?LinkId=112265>.

1.3 Structure Overview (Synopsis)

The **OAB manifest** is used by clients to identify the current version of data published by the server and build the **URIs** of data files to download. It has XML format and contains one entry for each data file in the OAB, organized hierarchically.

The client uses the Autodiscover Publishing and Lookup protocol to discover the **Web Distribution Point (WDP)** URI, and then constructs a manifest URI by appending the well-known name "oab.xml" as specified in the following ABNF:

```
manifestURI = wdpUri "/"oab.xml"
```

It then retrieves the manifest file using the standard HTTP/1.1 protocol. The manifest file contains information about the **Offline Address List (OAL)** data sequence number, and names of the data files published to a given WDP. The detailed structure of the manifest file is described in section 2.

After retrieving and parsing the manifest file, the client finds out what OALs are associated with this OAB. Each OAL in the OAB can be retrieved by the client independently.

For each file that has to be retrieved, the client constructs the URI according to the following definition, and retrieves it using the HTTP/1.1 protocol:

```
dataFileURI = wdpUri "/" file
```

1.4 Relationship to Protocols and Other Structures

- Clients discover the URI of the WDP using Autodiscover Publishing and Lookup protocol.
- From the WDP URI, clients construct the manifest URI and use the [RFC2616] HTTP/1.1 protocol to retrieve the manifest file.

- Based on data in the manifest, clients use the Offline Address Book (OAB) Retrieval protocol to retrieve and consume OAB data files generated according to [MS-EXOAB].
- The OAB Retrieval protocol relies on the HTTP 1.1 protocol as defined in [RFC2616] to deliver the manifest and data OAB files from the server to the client. It also relies on HTTPS as defined in [RFC2818] for data protection services.

1.5 *Applicability Statement*

In order to use the OAB Web distribution algorithm described in this document, a set of OAB files has to be generated in the format specified in [MS-EXOAB], the files have to be published on an HTTP 1.1 server, and the URI of the WDP has to be published via the Autodiscover Publishing and Lookup protocol as specified in [MS-EXDSCL].

1.6 *Versioning and Localization*

The OAB retrieval protocol has only one version.

1.7 *Vendor-Extensible Fields*

None.

2 Structures

2.1 *Manifest File Structure*

The manifest file contains a well-formed XML document, as defined in [XML1], and has the following ABNF structure, as per the specification of Augmented BNF semantics [RFC4234]:

```

manifestDocument      = prolog oabElement
prolog                = "<?xml" VersionInfo UTF8EncodingDecl "?>"
VersionInfo           = "version" Eq (XMLQUOTE VersionNum XMLQUOTE)
VersionNum            = "1.0"
Eq                    = "="
UTF8EncodingDecl     = "encoding" Eq XMLQUOTE "UTF-8" XMLQUOTE
oabElement            = oabSTag oabContent oabETag
oabSTag               = "<OAB>"
oabETag              = "</OAB>"
oabContent            = 1* oalElement
oalElement           = oalSTag S oalAttributes *S ">" oalContent oalETag
oalSTag              = "<OAL"
oalETag              = "</OAL>"
oalAttributes        = idAttribute S dnAttribute S nameAttribute
idAttribute           = "id=" XMLQUOTE guidString XMLQUOTE
dnAttribute           = "dn=" XMLQUOTE addresslist-legacy-dn XMLQUOTE
nameAttribute        = "name=" XMLQUOTE nestedUnicodeRdn XMLQUOTE
guidString            = 8HEX "-" 4HEX "-" 4HEX "-" 4HEX "-" 12HEX
nestedUnicodeRdn     = 1*16 ( "\" unicodeRdn )
                       ; the total length is limited to
                       ; 1024 characters

```

```

unicodeRdn           = 1*1023 (NON-ZERO-OCTET)
NON-ZERO-OCTET      = %x01-FF      ; Any octet (8-bit data unit) except for 0
oalContent          = fullElement 1*templateElement *diffElement
fullElement         = "<Full " S seq S ver S size S uncompressedSize S SHA
                    ">" file "</Full>"
templateElement    = "<Template " S seq S ver S size S uncompressedSize S
                    SHA S langid S type ">" file "</Template>"
diffElement        = "<Diff " S seq S ver S size S uncompressedSize S SHA
                    ">" file "</Diff>"
seq                = "seq=" XMLQUOTE 1*DIGIT XMLQUOTE
                    ; limited to values from 0 to 2147483648
ver               = "ver=" XMLQUOTE 1*DIGIT XMLQUOTE
                    ; limited to values from 0 to 2147483648
size              = "size=" XMLQUOTE 1*DIGIT XMLQUOTE
uncompressedSize  = "uncompressedSize =" XMLQUOTE 1*DIGIT XMLQUOTE
SHA               = "SHA=" XMLQUOTE 40HEX XMLQUOTE
langid            = "langid =" XMLQUOTE 1*DIGIT XMLQUOTE
type              = "type=" XMLQUOTE ("mac" / "windows") XMLQUOTE
file              = *( NONDOT / DOT) 1* NONDOT
compressedFile    = file ".lzx"
addresslist-legacy-dn = "/guid=" 32(HEX) / "/" / legacy-dn
legacy-dn         = org org-unit 1*13(container) object-rdn
                    ; legacy-dns are limited to 16 levels

org               = "/o=" rdn
org-unit          = "/ou=" rdn
container         = "/cn=" rdn
object-rdn        = "/cn=" rdn
rdn               = ( non-space-teletex ) /
                    ( non-space-teletex *62(teletex-char)
                    non-space-teletex )
                    ; rdn values are limited to 64 characters and
                    ; the number of rdns is limited to 16 but the
                    ; total cumulative length of rdn characters in
                    ; a legacy-dn is limited to 256.

teletex-char      = " " / non-space-teletex
non-space-teletex = "!" / XMLQUOTE / "%" / "&" / "\" / "(" / ")" /
                    "*" / "+" / "," / "-" / "." / "0" / "1" /
                    "2" / "3" / "4" / "5" / "6" / "7" / "8" /
                    "9" / ":" / "<" / "=" / ">" / "?" / "@" /
                    "A" / "B" / "C" / "D" / "E" / "F" / "G" /
                    "H" / "I" / "J" / "K" / "L" / "M" / "N" /
                    "O" / "P" / "Q" / "R" / "S" / "T" / "U" /
                    "V" / "W" / "X" / "Y" / "Z" / "[" / "]" /
                    "_" / "a" / "b" / "c" / "d" / "e" / "f" /
                    "g" / "h" / "i" / "j" / "k" / "l" / "m" /
                    "n" / "o" / "p" / "q" / "r" / "s" / "t" /
                    "u" / "v" / "w" / "x" / "y" / "z" / "|"

DIGIT              = %x30-39
HEX                = DIGIT
                    / "A" / "B" / "C" / "D" / "E" / "F"
                    / "a" / "b" / "c" / "d" / "e" / "f"
S                  = 1*(%x20 / %x09 / %x0D / %x0A)
ALPHA              = %x41-5A / %x61-7A ; A-Z / a-z
XMLQUOTE          = DQUOTE / "'"
DOT                = "."
NONDOT             = DIGIT / ALPHA / "-"

```

2.1.1 oabElement

The oabElement in the document structure represents a top-level container in the hierarchy of the XML document, and MUST contain one or more oalElement entities. The oabElement does not have any attributes.

2.1.2 oalElement

The oalElement is a container in the hierarchy of the XML document that contains XML nodes of types fullElement, templateElement, and diffElement and represents an OAL that is part of the OAB. The oalElement MUST have the following attributes:

- id, as specified in idAttribute element - A string representation of randomly chosen GUIDs that uniquely represents the current OAL. This id remains the same through all subsequent OAB generations.
- dn – The **distinguished name (DN)** of the OAL
- name – The name of Address List object, prepended with “\”.

[MS-OXOABK] specifies Address List objects in detail.

2.1.3 fullElement

Each oalElement MUST contain exactly one fullElement. The fullElement provides information about the compressed full details file, as specified in section 1.3.1 of [MS-OXOAB]. The following elements MUST be specified:

- Seq – The OAL data sequence number.
- Ver – The version of the data file, as specified in [MS-OXOAB].
- Size – The size in bytes of the data file on the WDP.
- Uncompressedsize – The size in bytes of the data file after decompression.
- SHA – The SHA1 checksum of the compressed file, calculated as specified in [FIP180-1].
- file – The name of the data file on WDP.

2.1.4 templateElement

Each oalElement MUST contain at least one templateElement. The templateElement provides information about the compressed template file, as specified in [MS-OXOAB]. The following elements MUST be specified:

- Seq – This OAL data sequence number. It is kept in sync with sequence number of fullElement.
- Ver – The version of the data file, as specified in [MS-OXOAB].
- Size – The size in bytes of the data file on WDP.
- Uncompressedsize – The size in bytes of the data file after decompression.
- SHA – The SHA1 checksum of the compressed file, calculated as specified in [FIP180-1].
- langid – The template language identifier, as specified in [MS-LCID].
- type – A string representing the client platform, currently “windows” or “mac”, as specified in [MS-OXOABKT].
- file – The name of the data file on WDP.

2.1.5 diffElement

Each oalElement MAY contain zero or more diffElements. The diffElement provides information about the OAB v4 differential details file, as specified in section 1.3.1 of [MS-OXOAB]. The following elements MUST be specified:

- Seq – This OAL data sequence number.
- Ver – The version of the resulting data file that will be produced by applying this differential file.
- Size – The size in bytes of data file on WDP.
- Uncompressedsize – The size in bytes of data file after decompression.
- SHA – The SHA1 checksum of the compressed file, calculated as specified in [FIP180-1].
- file – The name of the data file on WDP.

2.1.6 seq Element

As each fullElement, templateElement, and diffElement contains a Seq element, this enables certain optimizations for the client, as described below.

The client could internally maintain an integer value to store the sequence number of the last successfully downloaded OAL data. This allows it to determine if the server has any data newer than the data that is available on the client side, see 1.3.1.7. This internal value will be referred to as **clientSequenceNumber**. If the client implementation maintains **clientSequenceNumber**, the client also has to store the OAL id to identify OAL in future versions of the manifest, and the last downloaded full details file, to be able to build a new version of the data file by applying differential files to the older file.

As a result of parsing the manifest, the client finds the sequence number of the full OAL data file available on the server. This value will be referred to as **serverSequenceNumber**. If **serverSequenceNumber** ≥ 2 , there are zero or more differential details files with sequential sequence numbers from M to **serverSequenceNumber**, where $2 \leq M \leq \text{serverSequenceNumber}$. The number of differential details files depends on the server implementation.

If for a particular OAL the client has a copy of the full details file with the data sequence number **clientSequenceNumber**, and the manifest has differential details files from **clientSequenceNumber** to **serverSequenceNumber**, the client can choose to download the differential detail files from **clientSequenceNumber** + 1 to **serverSequenceNumber** and apply them to the previously downloaded full details file to get to the latest version. Otherwise, the client can download a single full details file **serverSequenceNumber** to get up to date.

3 Structure Examples

The following is an example of the manifest file and corresponding WDP content. OAB contains two address lists – “Global Address List” represented by the second OAL element, and “All Rooms”, represented by the first OAL element. Both address lists include two templates, both for language with id=0409, such as English, for both “mac” and “windows” platforms. Both have a full details data file and a differential details files. The first OAL, however, has the data sequence number 2 and only one differential file. The second OAL has data sequence number 4 and three differential files.

```
<?xml version="1.0" encoding="UTF-8"?>
<OAB>
  <OAL id='f867b9e0-d01e-43e3-8708-ba86a1c77dff'
dn='/guid=F8E7206B268E404B9519453F0F184D24' name='\All Rooms'>
  <Full seq='2' ver='32' size='554' uncompressedsize='1165'
SHA='d626d8d782332b7e8d689eea266ee315c31f19da'>
    f867b9e0-d01e-43e3-8708-ba86a1c77dff-data-2.lzx
  </Full>
  <Template seq='2' ver='7' size='5794' uncompressedsize='25620'
SHA='53fb16d6dcdfla559b8649e9b269eee84b85c91b' langid='0409'
type='windows'>
    f867b9e0-d01e-43e3-8708-ba86a1c77dff-lng0409-2.lzx
  </Template>
  <Template seq='2' ver='7' size='5794' uncompressedsize='25620'
SHA='53fb16d6dcdfla559b8649e9b269eee84b85c91b' langid='0409' type='mac'>
    f867b9e0-d01e-43e3-8708-ba86a1c77dff-mac0409-2.lzx
  </Template>
  <Diff seq='2' ver='32' size='132' uncompressedsize='1165'
SHA='f53ec568b6fc3e4adce0e7d7dfd51ace604a9234'>
    f867b9e0-d01e-43e3-8708-ba86a1c77dff-binpatch-2.lzx
  </Diff>
</OAL>
  <OAL id='2e3eaccd-85a0-4abe-84f8-603a49801bb6' dn='/' name='\Global
Address List'>
  <Full seq='4' ver='32' size='574' uncompressedsize='1872'
SHA='91c1d0fa378dc961f9e8aafb17a9569767e21c73'>
    2e3eaccd-85a0-4abe-84f8-603a49801bb6-data-4.lzx
  </Full>
  <Template seq='4' ver='7' size='5794' uncompressedsize='25620'
SHA='53fb16d6dcdfla559b8649e9b269eee84b85c91b' langid='0409'
type='windows'>
    2e3eaccd-85a0-4abe-84f8-603a49801bb6-lng0409-4.lzx
  </Template>
  <Template seq='4' ver='7' size='5794' uncompressedsize='25620'
SHA='53fb16d6dcdfla559b8649e9b269eee84b85c91b' langid='0409' type='mac'>
    2e3eaccd-85a0-4abe-84f8-603a49801bb6-mac0409-4.lzx
  </Template>
  <Diff seq='4' ver='32' size='132' uncompressedsize='1872'
SHA='49d0d0c8185dd93ba7df0fbc6b532049ba5a29c5'>
    2e3eaccd-85a0-4abe-84f8-603a49801bb6-binpatch-4.lzx
  </Diff>
  <Diff seq='2' ver='32' size='136' uncompressedsize='1197'
SHA='7e391a3fd934310489f87576ad6b6e1fd6fc1590'>
    2e3eaccd-85a0-4abe-84f8-603a49801bb6-binpatch-2.lzx
```

```
</Diff>
<Diff seq='3' ver='32' size='138' uncompressedsize='1544'
SHA='3eb5108d87e366681eb27be395f3ef7d9525c63f'>
    2e3eaccd-85a0-4abe-84f8-603a49801bb6-binpatch-3.lzx
</Diff>
</OAL>
</OAB>
```

4 Security Considerations

The manifest file contains the results of the SHA-1 hashing calculation; however, the SHA-1 hash value is used as an optional means of checksum verification of the downloaded file, and should not be used as a security feature. In particular, it does not prevent deliberate data tampering.

5 Appendix A: Office/Exchange Behavior

The information in this specification is applicable to the following versions of Office/Exchange:

- Office 2007 with Service Pack 1 applied
- Exchange 2007 with Service Pack 1 applied

Exceptions, if any, are noted below. Unless otherwise specified, any statement of optional behavior in this specification prescribed using the terms SHOULD or SHOULD NOT implies Office/Exchange behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies Office/Exchange does not follow the prescription.

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