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

Revision Summary			
Author	Date	Version	Comments
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1 Introduction

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 because it is offline or because there is a high network cost 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 the server to the 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
OAB data file
OAB manifest
OAB Web distribution
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 that is not identical to the previous one increments the sequence number by one.

Web Distribution Point (WDP): The location on the server where **offline address book (OAB)** files are published for Web distribution. The **Uniform 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-LCID] Microsoft Corporation, "Windows Language Code Identifier (LCID) Reference", March 2007, http://msdn.microsoft.com/en-us/library/cc233965.aspx.

[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.

[RFC4234] Crocker, D., Ed. and Overell, P., "Augmented BNF for Syntax Specifications: ABNF", RFC 4234, October 2005, http://www.ietf.org/rfc/rfc4234.txt.

1.2.2 Informative References

None.

1.3 Structure Overview

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. The format of the OAB manifest is XML, and contains it one entry for each data file in the OAB. The entries are organized hierarchically.

The client uses the Autodiscover Publishing and Lookup protocol, as specified in [MS-OXDSCLI], 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 by using the standard HTTP/1.1 protocol, as specified in [RFC2616]. The manifest file contains information about the **Offline Address List (OAL)** data sequence number, and the names of the data files that are published to a given WDP. The detailed structure of the manifest file is specified in section 2.

After the client retrieves and parses the manifest file, it 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 [RFC2616]:

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

1.4 Relationship to Protocols and Other Structures

- Clients discover the **URI** of the **WDP** by using the Autodiscover Publishing and Lookup protocol [MS-OXDSCLI].
- From the WDP URI, clients construct the manifest URI and use the HTTP/1.1 protocol [RFC2616] 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** that are generated as specified in to [MS-OXOAB].
- The OAB Retrieval protocol relies on the HTTP 1.1 protocol, as specified in [RFC2616], to deliver the manifest and data OAB files from the server to the client. It also relies on HTTPS, as specified in [RFC2818], for data protection services.

1.5 Applicability Statement

In order to use the **OAB Web distribution** algorithm specified in this document, a set of OAB files has to be generated in the format specified in [MS-OXOAB], 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-OXDSCLI].

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 specified 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 the Address List object, prepended with "\".

[MS-OXOABK] specifies address list 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 in this section.

The client could internally maintain an integer value to store the sequence number of the last successfully downloaded **OAL** data. This enables it to determine whether the server has any data that is newer than the data that is available on the client side. This internal value is 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 is 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<=**M<=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. The **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='53fb16d6dcdf1a559b8649e9b269eee84b85c91b' langid='0409'
type='windows'>
                  f867b9e0-d01e-43e3-8708-ba86a1c77dff-lng0409-2.lzx
            </Template>
            <Template seq='2' ver='7' size='5794' uncompressedsize='25620'
SHA='53fb16d6dcdf1a559b8649e9b269eee84b85c91b' 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='53fb16d6dcdf1a559b8649e9b269eee84b85c91b' langid='0409'
type='windows'>
                  2e3eaccd-85a0-4abe-84f8-603a49801bb6-lng0409-4.lzx
            </Template>
            <Template seq='4' ver='7' size='5794' uncompressedsize='25620'
SHA='53fb16d6dcdf1a559b8649e9b269eee84b85c91b' 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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