

[MS-OXOABK]: Address Book Object Protocol Specification

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1 Introduction

An **address book** is a repository of information about **Address Book objects**, many of which have information that can be retrieved by messaging clients to display to messaging users, or to enable users to address e-mail **messages** to other e-mail-enabled users and entities that are represented by these objects. The objects in the address book are organized in a way that makes it possible for users to locate and look up information about these objects.

The client retrieves data about a number of different Address Book objects from one of two possible data sources. The client retrieves data from the **Name Service Provider Interface (NSPI)** server by using the protocol as specified in [\[MS-NSPI\]](#). Alternatively, the client retrieves data from an **offline address book (OAB)**, as specified in [\[MS-OXOAB\]](#). These include **properties on mail users, distribution lists, resources, address book containers** and the **address book hierarchy table**. The client chooses the data source based on whatever source is available, or based on user settings.

The Address Book Object protocol specification defines the following:

- The properties of various Address Book objects.
- How the properties of Address Book objects interrelate.

1.1 Glossary

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

.jpg
address book
address book distinguished name (ABDN)
address book container
address book hierarchy table
Address Book object
address list
address type
ambiguous name resolution (ANR)
alias
ASCII
Augmented Backus-Naur Form (ABNF)
binary large object (BLOB)
button control
code page
common name
contact
Coordinated Universal Time (UTC)
departmental group
display template
distinguished name (DN)
distribution list
entry ID
flags
folder
Global Address List (GAL)
GUID
header
hierarchy table

identifier
little-endian
locale
mail user
mail tip
mailbox
meeting request
message
message database (MDB)
messaging object
MIME
Name Service Provider Interface (NSPI)
named property
offline address book (OAB)
parameter
Permanent Entry ID
property
property ID
property tag
property type
public folder
recipient
Recipient object
relative distinguished name (RDN)
remote procedure call (RPC)
resource
Resource object
Rich Text Format (RTF)
S/MIME
Simple Mail Transfer Protocol (SMTP)
sort order
store
table
template
Transport Neutral Encapsulation Format (TNEF)
Unicode
Uniform Resource Locator (URL)
UTF-16LE (Unicode Transformation Format, 16-bits, Little-Endian)

The following terms are specific to this document:

Department object: An **Address Book object** that describes a department within an organization.

Ephemeral Entry ID: A **property** of an **Address Book object** that can be used to uniquely identify the object.

Minimal Entry ID (MId): A **property** of an **Address Book object** that can be used to uniquely identify the object.

Organization object: An **Address Book object** that describes an entire organization.

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

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. Please check the archive site, <http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

[ASF] Microsoft Corporation, "Advanced Systems Format (ASF) Specification", December 2004, http://download.microsoft.com/download/7/9/0/790fecaa-f64a-4a5e-a430-0bccdab3f1b4/ASF_Specification.doc

[MS-NSPI] Microsoft Corporation, "Name Service Provider Interface (NSPI) Protocol Specification", April 2008, [http://msdn.microsoft.com/en-us/library/dd942204\(PROT.10\).aspx](http://msdn.microsoft.com/en-us/library/dd942204(PROT.10).aspx)

[MS-OXABREF] Microsoft Corporation, "[Address Book Name Service Provider Interface \(NSPI\) Referral Protocol Specification](#)", April 2008.

[MS-OXCDATA] Microsoft Corporation, "[Data Structures](#)", April 2008.

[MS-OXCMAIL] Microsoft Corporation, "[RFC2822 and MIME to E-Mail Object Conversion Protocol Specification](#)", April 2008.

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

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

[MS-OXPFOAB] Microsoft Corporation, "[Offline Address Book \(OAB\) Public Folder Retrieval Protocol Specification](#)", April 2008.

[MS-OXPROPS] Microsoft Corporation, "[Exchange Server Protocols Master Property List](#)", April 2008.

[MS-OXWOAB] Microsoft Corporation, "[Offline Address Book \(OAB\) Retrieval File Format](#)", April 2008.

[MS-RPCE] Microsoft Corporation, "Remote Procedure Call Protocol Extensions", July 2006, <http://msdn.microsoft.com/en-us/library/cc243560.aspx>

[RFC1034] Mockapetris, P., "DOMAIN NAMES – CONCEPTS AND FACILITIES", RFC 1034, November 1987, <http://www.ietf.org/rfc/rfc1034.txt>

[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>

[RFC2876] Pawling, J., "Use of the KEA and SKIPJACK Algorithms in CMS", RFC 2876, July 2000, <ftp://ftp.rfc-editor.org/in-notes/rfc2876.txt>

[RFC3174] Eastlake 3rd, D., and Jones, P., "US Secure Hash Algorithm 1 (SHA1)", RFC 3174, September 2001, <http://www.ietf.org/rfc/rfc3174.txt>

[RFC3280] Housley, R., Polk, W., Ford, W., and Solo, D., "Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile", RFC 3280, April 2002, <http://www.ietf.org/rfc/rfc3280.txt>

[RFC3851] Ramsdell, B., Ed., "Secure/Multipurpose Internet Mail Extensions (S/MIME) Version 3.1 Message Specification", RFC 3851, July 2004, <ftp://ftp.rfc-editor.org/in-notes/rfc3851.txt>

[RFC3852] Housley, R., "Cryptographic Message Syntax (CMS)", RFC 3852, July 2004, <http://www.ietf.org/rfc/rfc3852.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

[MS-OXGLOS] Microsoft Corporation, "[Exchange Server Protocols Master Glossary](#)", April 2008.

1.3 Overview

An address book is a collection of Address Book objects. There are many types of objects in an address book, many of which can be added as an addressee to an outbound message to be the destination. Every object in the address book has various properties, and the values of these properties contain information that is used by messaging clients to route the message correctly or to display information about the Address Book object to a messaging user.

The address book also contains one or more address book containers, each of which describes an **address list**. An address list is a collection of Address Book objects that can be rendered in a **table** to be browsed by a messaging user. A collection of address book containers, each representing an address list, is arranged in an address book hierarchy table.

The address book can be stored remotely on a Name Service Provider Interface (NSPI) server and accessed through NSPI calls by using the NSPI protocol, as specified in [\[MS-NSPI\]](#), or can be stored locally on the client computer as an offline address book (OAB) by using the OAB Format and Schema protocol, as specified in [\[MS-OXOAB\]](#).

1.4 Relationship to Other Protocols

This specification relies on an understanding of how NSPI calls are transmitted to the server by using the underlying **remote procedure call (RPC)** transport, which uses the Name Service Provider Interface (NSPI) protocol, as specified in [\[MS-NSPI\]](#), and an understanding of the Offline Address Book (OAB) Format and Schema protocol, as specified in [\[MS-OXOAB\]](#).

The specification also relies on an understanding of how to locate and establish a connection with an NSPI server by using the Name Service Provider Interface (NSPI) Referral protocol [\[MS-OXABREF\]](#), and an understanding of how to obtain an offline address book by using either the Offline Address Book Web Retrieval protocol [\[MS-OXWOAB\]](#) or the Offline Address Book Public Folder Retrieval protocol [\[MS-OXPFOAB\]](#). The Address Book User Interface Templates protocol, as specified in [\[MS-OXOABKT\]](#), is needed to render information about an Address Book object to a messaging user, which relies on an understanding of this Address Book Object protocol specification.

1.5 Prerequisites/Preconditions

This Address Book Object protocol specification assumes that either the messaging client has been referred to an NSPI server by using the Name Service Provider Interface (NSPI) Referral protocol, as specified in [\[MS-OXABREF\]](#), and established a connection to a server that supports the Name Service Provider Interface (NSPI) protocol, as specified in [\[MS-NSPI\]](#), or that the messaging client has access to an offline address book (OAB), as specified in [\[MS-OXOAB\]](#).

1.6 Applicability Statement

This Address Book Object protocol is used to access information about Address Book objects in an organization. Messaging clients use this protocol to determine the destination for outbound messages that are addressed to these objects, and to display information about these objects to a messaging user.

1.7 Versioning and Capability Negotiation

None.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

2 Messages

The following sections specify the properties of Address Book objects and their formats.

Unless otherwise specified, all numeric values in this protocol are in **little-endian** format.

Unless otherwise specified, all **Unicode** string representations are in **UTF-16LE** format.

2.1 Transport

This protocol uses the Name Service Provider Interface (NSPI) protocol, as specified in [\[MS-NSPI\]](#), as the underlying transport protocol when handling address books online by using an NSPI server, or the Offline Address Book (OAB) Format and Schema protocol, as specified in [\[MS-OXOAB\]](#), as the underlying structure when handling address books by using a local OAB.

2.2 Message Syntax

When messaging clients are using an NSPI server, the properties described in this specification are returned and given to various NSPI functions of the Name Service Provider Interface (NSPI) protocol, as specified in [\[MS-NSPI\]](#). The use of NSPI calls depends on the object type and its associated property list. As a collection, the entire set of NSPI calls enables messaging clients to access and browse address lists, and manipulate or obtain data on Address Book objects in that list.

Alternatively, these structures are maintained in an offline address book (OAB) by using the Offline Address Book (OAB) Format and Schema protocol, as specified in [\[MS-OXOAB\]](#). The OAB is a collection of address lists, each of which contains Address Book objects and their properties. Messaging clients use the Offline Address Book (OAB) Format and Schema protocol, as specified in [\[MS-OXOAB\]](#), to access and browse the address lists and to obtain data on the Address Book objects in those lists.

There are many types of Address Book objects, including, but not limited to, mail users, distribution lists, address book containers, **Resource objects**, **Department objects**, **Organization objects**, and **templates**. This protocol does not require values for all properties that are defined for any object type, nor does it limit the properties to those of their own type or those listed in this specification. When a data source, such as an OAB or an NSPI server, includes properties that are not in this set, the format and meaning of the property is defined by the implementation of that data source.

In all the properties of type **PtypString** that are listed in this document, a request to an NSPI server of that property with type **PtypString8** or **PtypString** is permitted. If a conversion is required, the string will be converted to the type requested by the client, as specified in [\[MS-NSPI\]](#).

In all the properties of type **PtypString** that are listed in this document, an OAB that includes a value for that string property **MUST** contain exactly one string representation. The internal representation of strings in an OAB that use the Offline Address Book (OAB) Format and Schema protocol is specified in [\[MS-OXOAB\]](#). A client that looks up the value for a string property **MUST** convert the value to the string type that is native to the client before it interprets the value of the property.

2.2.1 Definitions

The following sections describe structures that are used by various Address Book object properties.

2.2.1.1 Distinguished Names for Objects

Address book distinguished names (ABDNs) are used to uniquely identify objects in the address book. Throughout the rest of this specification, the term **distinguished name (DN)** is used to refer to an address book distinguished name. Each Address Book object MUST have a unique DN value, expressed as a NULL terminated **ASCII** string. The DN is stored in the [PidTagEmailAddress](#) property. The DN is also embedded in the distinguished name field of the **Permanent Entry ID**, as specified in [\[MS-NSPI\]](#). DNs are structured as shown in the following **Augmented Backus-Naur Form (ABNF)** definition, as specified in [\[RFC4234\]](#).

```

dn = organization-dn /
    addresslist-dn /
    x500-dn
organization-dn= org-rdn
addresslist-dn  = "/guid=" container-guid /
    gal-addrlist-dn
container-guid= 32(HEXDIG)
gal-addrlist-dn = "/"
x500-dn        = x500-container-dn object-rdn
                ; x500-dns are limited to 16 levels
x500-container-dn = org-rdn org-unit-rdn 0*13(container-rdn)
org-rdn         = "/o=" rdn
org-unit-rdn   = "/ou=" rdn
container-rdn  = "/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
                ; the number of rdns is limited to 16 but the
                ; total cumulative length of rdn characters in
                ; An x500-dn is limited to 256.
teletex-char = SP / non-space-teletex
non-space-teletex= "!" / DQUOTE / "%" / "&" / "\" / "(" / ")" /
    "*" / "+" / "," / "-" / "." / "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" / "|"

```

In general, the distinguished names for all Address Book objects MUST follow the *dn* format. The DNs for different types of objects MUST follow more strict *dn* formats, depending on their type, according to the following table.

Object type	DN format	Notes
Address book container	<i>addresslist-dn</i>	
Global Address List container	<i>gal-addrlist-dn</i>	

Object type	DN format	Notes
Mail user	<i>x500-dn</i>	The <i>org-rdn</i> string is the mail user's organization.
Organization	<i>organization-dn</i>	
Message database	<i>x500-dn</i>	The <i>x500-container-dn</i> is the mailbox server.
Mailbox server	<i>x500-dn</i>	The RDN in the <i>object-rdn</i> is the name of the mailbox server.
Room container reference	<i>x500-dn</i> with no <i>container-rdn</i>	The RDN of the <i>object-rdn</i> matches the <i>container-guid</i> of the address book container.
All other Address Book objects	<i>dn</i>	

When the DN of an Address Book object that is obtained from an NSPI server matches the DN of an Address Book object that is obtained from an offline address book, the objects represent the same entity. For such an object to be visible on both data sources, the properties available in the offline address book SHOULD <1> be a subset of the properties in the NSPI server, MAY <2> include additional properties, and SHOULD <3><4> have the same value when present on both data sources.

2.2.2 Properties that Apply to Containers in the Address Book Hierarchy Table

An address book is a collection of Address Book objects, each of which is contained in any number of address lists. The address book is arranged as a hierarchy of address book containers. Each address book container, in turn, describes an address list that contains many Address Book objects.

When using an offline address book (OAB), messaging clients obtain information about the address book hierarchy and its address book containers by using the Offline Address Book Retrieval File Format, as specified in [MS-OXWOAB], and the Offline Address Book Public Folder Retrieval protocol, as specified in [MS-OXPFOAB]. Because an OAB maintains its own structure for the **hierarchy table**, none of the properties of address book containers described in this document apply to the OAB.

When using an NSPI server, messaging clients call **NspiGetSpecialTable**, as specified in [MS-NSPI], to obtain the address book hierarchy table. The hierarchy table is a set of rows, each of which describes one address book container. The NSPI server MUST return the following properties for each container in the hierarchy, in the order listed:

- [PidTagEntryId](#)
- [PidTagContainerFlags](#)
- [PidTagDepth](#)
- [PidTagAddressBookContainerId](#)
- [PidTagDisplayName](#)
- [PidTagAddressBookIsMaster](#)
- [PidTagAddressBookParentEntryId](#) (optional, and MUST be the seventh column if it is included)

For every row returned, all of these properties except [PidTagAddressBookParentEntryId](#) MUST be present and have a value prescribed under its definition.

In addition, the [PidTagEntryId](#) MUST be in the form of a Permanent Entry ID, as specified in [\[MS-NSPI\]](#), with its **DisplayType** having the value DT_CONTAINER, as specified in [\[MS-NSPI\]](#), and its DN following the *addresslist-dn* format specification, as specified in section [2.2.1.1](#). When the object is the Global Address List container, its DN MUST follow the *gal-addrlist-dn* format specification.

2.2.2.1 PidTagContainerFlags

The [PidTagContainerFlags](#) property of type **PtypInteger32** contains a bitmask of **flags** that describe capabilities of an address book container.

The following flags are defined for the [PidTagContainerFlags](#) bitmask. The [PidTagContainerFlags](#) MUST NOT contain any other flags. These flags are listed in the following table.

Name	Value	Description
AB_RECIPIENTS	0x00000001	The container holds Address Book objects. This flag does not indicate whether any objects are actually present in the container. This flag MUST be set for all containers and distribution lists that are returned by the NSPI server.
AB_SUBCONTAINERS	0x00000002	The container holds child containers. This flag does not indicate whether any sub-containers are actually present in the container.
AB_UNMODIFIABLE	0x00000008	It is not possible to add or remove Address Book objects from the container. This flag MUST be set for containers that are returned by the NSPI server.

For distribution lists that are obtained from an NSPI server, this property MUST be present, and its value MUST be AB_RECIPIENTS.

Because this property applies to a container in the hierarchy table, it is not present on objects in the offline address book (OAB). An OAB has its own structure for maintaining the hierarchy, using the Offline Address Book (OAB) Retrieval File Format, as specified in [\[MS-OXWOAB\]](#), and the Offline Address Book (OAB) Public Folder Retrieval protocol, as specified in [\[MS-OXPFOAB\]](#).

2.2.2.2 PidTagDepth

The [PidTagDepth](#) property of type **PtypInteger32** represents the relative level of depth of a container in a hierarchy table. Objects in the hierarchy table that share the same [PidTagDepth](#) value SHOULD be considered peer containers by clients if they are adjacent or if they are separated only by containers that have equivalent or larger depth values.

Because this property applies to a container in the hierarchy table, it is not present on objects in an offline address book (OAB). An OAB has its own structure for maintaining the hierarchy, using the Offline Address Book (OAB) Public Folder Retrieval protocol, as specified in [\[MS-OXWOAB\]](#) and [\[MS-OXPFOAB\]](#).

2.2.2.3 PidTagAddressBookContainerId

The [PidTagAddressBookContainerId](#) property of type **PtypInteger32**, like the [PidTagEntryId](#) property, identifies a container on an NSPI server. It is a **Minimal Entry ID**. A value of zero represents the Global Address List. This value is used in other NSPI calls (such as **NspiResolveNamesW**) to identify which container the NSPI call applies. If the value is non-zero, it

is only a valid representation of the specific container. This representation lasts for the time that the connection to the NSPI server lasts, or, after disconnection and reconnection to the same or another NSPI server that is using **NspiBind**, as long as the new server identifies itself as having the same **GUID** in its return value for *pServerGuid*, as specified in [\[MS-NSPI\]](#).

Because this property applies to a container in the hierarchy table, it is not present on objects in an offline address book (OAB). An OAB has its own structure for maintaining the hierarchy, using the Offline Address Book (OAB) Public Folder Retrieval protocol, as specified in [\[MS-OXWOAB\]](#) and [\[MS-OXPFOAB\]](#).

2.2.2.4 PidTagAddressBookIsMaster

The [PidTagAddressBookIsMaster](#) property of type **PtypBoolean** is **TRUE** if it is possible to create Address Book objects in that container, and **FALSE** otherwise. The value does not pertain to parent containers or sub-containers of this container.

Because this property applies to a container in the hierarchy table, it is not present on objects in an offline address book (OAB). An OAB has its own structure for maintaining the hierarchy, using the Offline Address Book (OAB) Public Folder Retrieval protocol, as specified in [\[MS-OXWOAB\]](#) and [\[MS-OXPFOAB\]](#).

2.2.2.5 PidTagAddressBookParentEntryId

The [PidTagAddressBookParentEntryId](#) property of type **PtypBinary** is the **entry ID** of the parent container in a hierarchy of address book containers. This property is not present if no parent container exists. Messaging clients use this to expand and collapse a hierarchy of address book containers in an address book hierarchy table.

Because this property applies to a container in the hierarchy table, it is not present on objects in an offline address book (OAB). An OAB has its own structure for maintaining the hierarchy, using the Offline Address Book (OAB) Public Folder Retrieval protocol, as specified in [\[MS-OXWOAB\]](#) and [\[MS-OXPFOAB\]](#).

2.2.3 Properties that Apply to All Address Book Objects

Address Book objects are listed in an offline address book (OAB) by the Offline Address Book (OAB) Format and Schema protocol [\[MS-OXOAB\]](#) or accessed on a NSPI server by using various Name Service Provider Interface (NSPI) protocol [\[MS-NSPI\]](#) calls. Each object represents any addressable entity, including, but not limited to, mail user, distribution list, Department object, Organization object, address book container, or Resource object.

It is possible to set any Address Book object as an addressee of an outbound message to be sent by a messaging client. A mail user is an example, and it can contain an e-mail address to be used for messaging. A distribution list is a special type of Address Book object that represents a collection of other Address Book objects, can be an addressee of an outbound message, and MAY [<5>](#) have additional properties and operations, such as the ability to determine the distribution list membership. Mail user objects are further broken down into other subtypes, such as rooms, equipment, messaging forums, or other types.

The Department object and the Organization object are types of Address Book objects that are required to support a hierarchical address book view that messaging clients need.

All Address Book objects that are obtained from an offline address book or an NSPI server MUST define values for the following properties:

- [PidTagDisplayName](#)

- [PidTagEmailAddress](#)
- [PidTagObjectType](#)
- [PidTagDisplayType](#)

In addition, all Address Book objects that are obtained from an NSPI server MUST define values for the following property:

- [PidTag7BitDisplayName](#)

In addition, all Address Book objects that are obtained from an NSPI server MUST define values for the following properties, which MUST NOT be defined for any objects in an offline address book:

- [PidTagEntryId](#)
- [PidTagTemplateid](#)
- [PidTagRecordKey](#)
- [PidTagSearchKey](#)
- [PidTagInstanceKey](#)
- [PidTagAddressBookContainerId](#)
- [PidTagInitialDetailsPane](#)
- [PidTagTransmittableDisplayName](#)
- [PidTagAddressType](#)
- [PidTagAddressBookObjectDistinguishedName](#)

In addition, an offline address book MUST NOT define values for the following properties:

- [PidTagDepth](#)
- [PidTagContainerFlags](#)

An NSPI server MUST define values for the following properties for distribution lists and define no values for other object types:

- [PidTagContainerContents](#)
- [PidTagContainerFlags](#)

An offline address book does not contain the following properties, but you must generate a value for them when implementing this protocol:

- [PidTag7BitDisplayName](#)
- [PidTagDepth](#)
- [PidTagContainerFlags](#)

If either an NSPI server or offline address book does not conform to these rules, and to the descriptions of the properties in the following sections, client behavior is undefined.

2.2.3.1 PidTagDisplayName

The [PidTagDisplayName](#) property of type **PtypString** represents a displayable form of the Address Book object. When the Address Book object is a mail user, the [PidTagDisplayName](#) string property is the name of the mail user, usually the mail user's full name. When the object is a distribution list, [PidTagDisplayName](#) is the name of the distribution list that would be displayed when addressing messages to that distribution list. When the object is a department object, [PidTagDisplayName](#) is the name of that department. When the object is any other Address Book object, [PidTagDisplayName](#) is the displayable name of that object.

[PidTagDisplayName](#) is also one of the columns that are returned for the set of address book containers in the address book hierarchy table. The [PidTagDisplayName](#) value for each row in the hierarchy table represents the name of the address book container of that row.

2.2.3.2 PidTagEntryId

The [PidTagEntryId](#) property of type **PtypBinary** is used to identify many different types of **messaging objects**, including objects that are not in an address book. The formats of the [PidTagEntryId](#) property for non-addressing messaging objects are specified in [\[MS-OXCDATA\]](#). These other formats do not apply to any objects in an offline address book (OAB) or NSPI server.

The [PidTagEntryId](#) property of type **PtypBinary** identifies an Address Book object on an NSPI server, and represents either the Permanent Entry ID or the **Ephemeral Entry ID**, as specified in [\[MS-NSPI\]](#). Messaging clients use it to open the object and to perform operations on it, such as obtaining other properties. The types of operations that can be performed is specified in [\[MS-NSPI\]](#). When the object is in Permanent Entry ID format, its DN MUST match the value for [PidTagEmailAddress](#) and MUST follow the *dn* format specification that is particular to the type of object, as described in section [2.2.1.1](#).

The Offline Address Book (OAB) Format and Schema protocol specification [\[MS-OXOAB\]](#) does not include values for [PidTagEntryId](#) for Address Book objects in its data structure. Instead, the [PidTagEmailAddress](#) property identifies objects in an OAB.

2.2.3.3 PidTagTemplateid

The [PidTagTemplateid](#) property of type **PtypBinary** contains the [PidTagEntryId](#), expressed as a Permanent Entry ID format. This value MUST be present for all Address Book objects on an NSPI server, its DN MUST match the value for [PidTagEmailAddress](#), and its DN MUST follow the *dn* format specification particular to the type of object, as described in section [2.2.1.1](#).

The [PidTagTemplateid](#) property is not present on objects in an offline address book.

2.2.3.4 PidTagRecordKey

The [PidTagRecordKey](#) property of type **PtypBinary** contains a unique binary-comparable **identifier** for a specific Address Book object. It MUST be present on all objects on a NSPI server and MUST match [PidTagTemplateid](#).

The [PidTagRecordKey](#) property is not present on objects in an offline address book.

2.2.3.5 PidTagSearchKey

The [PidTagSearchKey](#) property of type **PtypBinary** is a binary value formed by concatenating the ASCII string "EX: " followed by the DN for the object converted to all upper case, followed by a zero

byte value. This value MUST be present for all Address Book objects on an NSPI server and MUST follow this form.

The [PidTagSearchKey](#) property is not present on objects in an offline address book.

2.2.3.6 PidTagInstanceKey

The [PidTagInstanceKey](#) property of type **PtypBinary**, like the [PidTagEntryId](#) property, identifies an object on an NSPI server. It is a Minimal Entry ID, represented as a 4 byte binary value, in little-endian byte order.

The [PidTagInstanceKey](#) property is not present on objects in an offline address book.

2.2.3.7 PidTag7BitDisplayName

The [PidTag7BitDisplayName](#) property of type **PtypString** contains a displayable form of the Address Book object that can be rendered in the client user's own **code page**.

2.2.3.8 PidTagTransmittableDisplayName

The [PidTagTransmittableDisplayName](#) property of type **PtypString** contains an Address Book object's display name that is transmitted with the message. It MUST be present on all objects on an NSPI server, and its value MUST match the value for [PidTagDisplayName](#).

The [PidTagTransmittableDisplayName](#) property is not present on objects in an offline address book.

2.2.3.9 PidTagAddressBookPhoneticDisplayName

The [PidTagAddressBookPhoneticDisplayName](#) property of type **PtypString** is the phonetic representation of the [PidTagDisplayName](#) property. [<6>](#)

2.2.3.10 PidTagObjectType

The [PidTagObjectType](#) property of type **PtypInteger32** contains a value that specifies the type of an object.

The [PidTagObjectType](#) property MUST be present for all Address Book objects and MUST have one of the values listed in the following table.

Name	Value	Description
MAILUSER	0x00000006	A mail user, or any Address Book object that is not a distribution list or forum.
DISTLIST	0x00000008	A distribution list.
folder	0x00000003	A messaging forum, such as a bulletin board service or a public or shared folder .

2.2.3.11 PidTagDisplayType

The [PidTagDisplayType](#) property of type **PtypInteger32** contains a value that indicates how to display an Address Book object in a table or as an addressee on a message. Messaging clients use this to display an icon, bold the item, or apply some other display element to make it easy for a user

who is viewing the object to distinguish its type. In addition, the property [PidTagDisplayTypeEx](#) provides a means to further refine the display.

[PidTagDisplayType](#) MUST have one of the following values of Display Type, as specified in [\[MS-NSPI\]](#), according to the object's type: DT_MAILUSER, DT_DISTLIST, DT_FORUM, DT_AGENT, DT_ORGANIZATION, DT_PRIVATE_DISTLIST, or DT_REMOTE_MAILUSER.

2.2.3.12 PidTagDisplayTypeEx

The [PidTagDisplayTypeEx](#) property of type **PtypInteger32** contains a value that indicates how to display an Address Book object in a table or as a **recipient** on a message. Messaging clients use this to display an icon, bold the item, or apply some other display element to make it easy for a user who is viewing the object to distinguish its type. This property contains more detailed information about the object's display information than [PidTagDisplayType](#). In addition to the display information contained in [PidTagDisplayType](#), it distinguishes between additional object types. When the object comes from a remote server, it also includes information about the type of object on that remote server, as well as the type on the local server.

The [PidTagDisplayTypeEx](#) property of type **PtypInteger32** also includes information that indicates whether it is possible to share information from the user's own mailbox to the entity represented by this Address Book object.

The [PidTagDisplayTypeEx](#) is a bitmask of flags and values, and has the following structure:

r (1 bit): 1 indicates that the value in **dtRemote** is the remote display type. The number 0 (zero) means that **dtRemote** is undefined. This represents the high order bit.

s (1 bit): 1 indicates that the mailbox server supports sharing to the entity that this Address Book object represents. The number 0 (zero) means it does not.

reserved (14 bits): Undefined. It MUST contain all zeroes and MUST be ignored by clients.

dtRemote (1 byte): Display type of the Address Book object in the remote forest. This is undefined if **r** is 0 (zero). If **r** is 1, it contains one of the values listed in the following table.

dtLocal (1 byte): Display type of the Address Book object in the messaging user's local forest. It contains one of the values listed in the following table.

dtLocal and/or **dtRemote** MUST have one of the following values of Display Type, as defined in [\[MS-NSPI\]](#), according to the object's type: DT_MAILUSER, DT_DISTLIST, DT_FORUM, DT_AGENT, DT_ORGANIZATION, DT_PRIVATE_DISTLIST, DT_REMOTE_MAILUSER, or one of the values listed in the following table.

Name	Value	Description
DT_ROOM	0x00000007	A conference room. It is possible for messaging clients to send meeting requests to this Address Book object to book the room.
DT_EQUIPMENT	0x00000008	Equipment. It is possible for messaging clients to send meeting requests to this Address Book object to reserve the equipment.
DT_SEC_DISTLIST	0x00000009	A distribution list used as a security group on the server.

2.2.3.13 PidTagAddressType

The [PidTagAddressType](#) property of type **PtypString** contains the Address Book object's e-mail **address type**. It MUST have the value "EX" for all objects on an NSPI server.

The [PidTagAddressType](#) property is not present on objects in an offline address book.

2.2.3.14 PidTagEmailAddress

The [PidTagEmailAddress](#) property of type **PtypString** contains the Address Book object's e-mail address, expressed in X500 format, using the *dn* format specification that is particular to the type of object, as defined in [2.2.1.1](#). This property MUST be present for every Address Book object. Its value MUST match the DN of the Permanent Entry ID for the object if the object is present on an NSPI server. Its DN MUST follow the *dn* format specification particular to the type of object, as defined in section [2.2.1.1](#).

2.2.3.15 PidTagAddressBookObjectDistinguishedName

The [PidTagAddressBookObjectDistinguishedName](#) property of type **PtypString** contains the distinguished name (DN) of the Address Book object in DN format, as specified in section [2.2.1.1](#). If present, its DN MUST follow the *dn* format specification that is particular to the type of object, as specified in section [2.2.1.1](#). Its value, if present, MUST match the value for [PidTagEmailAddress](#). This value MUST be present on all Address Book objects on an NSPI server.

2.2.3.16 PidTagCreationTime

The [PidTagCreationTime](#) property of type **PtypTime** contains the creation date and time for the Address Book object in **Coordinated Universal Time (UTC)**.

2.2.3.17 PidTagLastModificationTime

The [PidTagLastModificationTime](#) property of type **PtypTime** contains the date and time that the Address Book object was last modified in UTC.

2.2.3.18 PidTagSendRichInfo

The [PidTagSendRichInfo](#) property of type **PtypBoolean** contains **TRUE** if the e-mail-enabled entity represented by the Address Book object can receive all message content, including **Rich Text Format (RTF)** and other embedded objects. When sending mail by using the RFC2822 and **MIME** to the E-mail Object Conversion protocol, as specified in [\[MS-OXCMAIL\]](#), the [PidTagSendRichInfo](#) property specifies whether to encode the message in MIME or in **Transport Neutral Encapsulation Format (TNEF)**, as specified in [\[MS-OXCMAIL\]](#).

2.2.3.19 PidTagSendInternetEncoding

The [PidTagSendInternetEncoding](#) property of type **PtypInteger32** contains a bitmask of message encoding preferences for mail sent to an e-mail-enabled entity that is represented by this Address Book object. When sending mail by using the RFC2822 and MIME to the E-mail Object Conversion protocol, as specified in [\[MS-OXCMAIL\]](#), the [PidTagSendInternetEncoding](#) property specifies the format of the MIME body, as specified in [\[MS-OXCMAIL\]](#).

2.2.3.20 PidTagAccount

The [PidTagAccount](#) property of type **PtypString** contains the Address Book object's **alias**, which is an alternative name by which the object can be identified.

2.2.3.21 PidTagSmtetAddress

The [PidTagSmtetAddress](#) property of type **PtypString** is the Address Book object's **Simple Mail Transfer Protocol (SMTP)** address.

2.2.3.22 PidTagAddressBookTargetAddress

The [PidTagAddressBookTargetAddress](#) property of type **PtypString** contains the foreign system e-mail address of an Address Book object. If present, it MUST be prefixed with the address type of the foreign address, followed by a colon (":"), followed by the foreign e-mail address expressed in that address type. For Simple Mail Transfer Protocol (SMTP) addresses, it is "SMTP:" followed by the foreign SMTP address.

2.2.3.23 PidTagAddressBookProxyAddresses

The [PidTagAddressBookProxyAddresses](#) property of type **PtypMultipleString** contains alternate e-mail addresses for the Address Book object. Each string MUST be prefixed by an e-mail type, followed by a colon (":"), followed by the e-mail address in a format for that e-mail type. For an SMTP address, the string MUST start with the string "SMTP:" or "SMTP:" followed by an SMTP address. The first string starting with the uppercase string "SMTP:" MUST match the [PidTagSmtetAddress](#) property for the Address Book object.

2.2.3.24 PidTagAddressBookSeniorityIndex

The [PidTagAddressBookSeniorityIndex](#) property of type **PtypInteger32** contains a signed integer that specifies the seniority order of Address Book objects that represent members of a department and are referenced by a Department object or **departmental group**, with larger values specifying members that are more senior. It also specifies the **sort order** of Department objects or departmental groups that represent child departments of another parent department in a hierarchy of departments and are referenced by the parent's Department object or departmental group, in descending order.

2.2.3.25 PidTagAddressBookObjectGuid

The [PidTagAddressBookObjectGuid](#) property of type **PtypBinary** is a GUID that uniquely identifies an Address Book object.

2.2.3.26 PidTagAddressBookSenderHintTranslations

The [PidTagAddressBookSenderHintTranslations](#) property <7> of type **PtypMultipleString** contains the **locale** ID and translations of the default **mail tip**. For example, "en-US:Hello" or "es:Hola".

2.2.3.27 PidTagAddressBookDeliveryContentLength

The [PidTagAddressBookDeliveryContentLength](#) property <8> of type **PtypInteger32** specifies the maximum size of a message that a recipient can receive.

2.2.3.28 PidTagAddressBookModerationEnabled

The [PidTagAddressBookModerationEnabled](#) property <9> of type **PtypBoolean** contains **TRUE** if moderation is enabled for the mail user or distribution list; otherwise, the property contains **FALSE**.

2.2.3.29 PidTagAddressBookDistributionListMemberCount

The [PidTagAddressBookDistributionListMemberCount](#) property <10> of type **PtypInteger32** contains the total number of recipients in the distribution list. This value includes the members of all the distribution lists that are members of the distribution list.

2.2.3.30 PidTagAddressBookDistributionListExternalMemberCount

The **PidTagAddressBookDistributionListExternalMemberCount** property <11> of type **PtypInteger32** contains the number of external recipients in the distribution list.

2.2.3.31 PidTagComment

The [PidTagComment](#) property of type **PtypString** contains a comment about the purpose or content of the Address Book object.

2.2.3.32 PidTagMappingSignature

The [PidTagMappingSignature](#) property of type **PtypBinary** MUST be present on all Address Book objects on an NSPI server and MUST contain the following 16 bytes:

```
0xDC, 0xA7, 0x40, 0xC8, 0xC0, 0x42, 0x10, 0x1A, 0xB4, 0xB9, 0x08, 0x00, 0x2B, 0x2F, 0xE1,  
0x82
```

The [PidTagMappingSignature](#) property is not present on objects in an offline address book.

2.2.3.33 PidTagInitialDetailsPane

The [PidTagInitialDetailsPane](#) property of type **PtypInteger32** indicates which page of a **display template** to display first. It MUST be present on all Address Book objects on an NSPI server, and MUST have the value 0 (zero).

2.2.3.34 PidTagAddressBookExtensionAttribute1 through PidTagAddressBookExtensionAttribute15

These properties are used to store custom values. These properties of type **PtypString** are defined and populated by the organization that is to be added to display templates.

2.2.3.35 PidTagAddressBookDisplayTypeExtended

This property is limited to **Recipient objects**. The [PidTagAddressBookDisplayTypeExtended](#) property SHOULD be present on objects on an NSPI server or an offline address book. <12>

2.2.4 Properties that Apply to Mail User Objects

2.2.4.1 PidTagSurname

The [PidTagSurname](#) property of type **PtypString** contains the mail user's family name.

2.2.4.2 PidTagGivenName

The [PidTagGivenName](#) property of type **PtypString** contains the mail user's given name.

2.2.4.3 PidTagNickname

The [PidTagNickname](#) property of type **PtypString** contains the mail user's nickname.

2.2.4.4 PidTagDisplayNamePrefix

The [PidTagDisplayNamePrefix](#) property of type **PtypString** contains the mail user's honorific title.

2.2.4.5 PidTagInitials

The [PidTagInitials](#) property of type **PtypString** contains the initials for parts of the full name of the mail user.

2.2.4.6 PidTagGeneration

The [PidTagGeneration](#) property of type **PtypString** contains a generational abbreviation that follows the full name of the mail user.

2.2.4.7 PidTagTitle

The [PidTagTitle](#) property of type **PtypString** contains the mail user's job title.

2.2.4.8 PidTagOfficeLocation

The [PidTagOfficeLocation](#) property of type **PtypString** contains the mail user's office location.

2.2.4.9 PidTagDepartmentName

The [PidTagDepartmentName](#) property of type **PtypString** contains a name for the department in which the mail user works.

2.2.4.10 PidTagCompanyName

The [PidTagCompanyName](#) property of type **PtypString** contains the mail user's company name.

2.2.4.11 PidTagAssistant

The [PidTagAssistant](#) property of type **PtypString** contains the name of the mail user's administrative assistant.

2.2.4.12 PidTagManagerName

The [PidTagManagerName](#) property of type **PtypString** contains the name of the mail user's manager.

2.2.4.13 PidTagAddressBookManagerDistinguishedName

The [PidTagAddressBookManagerDistinguishedName](#) property of type **PtypString** contains the distinguished name (DN) of the mail user's manager.

2.2.4.14 PidTagAddressBookPhoneticGivenName

The [PidTagAddressBookPhoneticGivenName](#) property of type **PtypString** is the phonetic representation of the [PidTagGivenName](#) property. <13>

2.2.4.15 PidTagAddressBookPhoneticSurname

The [PidTagAddressBookPhoneticSurname](#) property of type **PtypString** is the phonetic representation of the [PidTagSurname](#) property.<14>

2.2.4.16 PidTagAddressBookPhoneticCompanyName

The [PidTagAddressBookPhoneticCompanyName](#) property of type **PtypString** is the phonetic representation of the [PidTagCompanyName](#) property.<15>

2.2.4.17 PidTagAddressBookPhoneticDepartmentName

The [PidTagAddressBookPhoneticDepartmentName](#) property of type **PtypString** is the phonetic representation of the [PidTagDepartmentName](#) property.<16>

2.2.4.18 PidTagPostalAddress

The [PidTagPostalAddress](#) property of type **PtypString** contains the mail user's postal address.

2.2.4.19 PidTagStreetAddress

The [PidTagStreetAddress](#) property of type **PtypString** contains the mail user's street address.

2.2.4.20 PidTagPostOfficeBox

The [PidTagPostOfficeBox](#) property of type **PtypString** contains the number or identifier of the mail user's post office box.

2.2.4.21 PidTagLocality

The [PidTagLocality](#) property of type **PtypString** contains the name of the mail user's locality, such as the town or city.

2.2.4.22 PidTagStateOrProvince

The [PidTagStateOrProvince](#) property of type **PtypString** contains the name of the mail user's state or province.

2.2.4.23 PidTagPostalCode

The [PidTagPostalCode](#) property of type **PtypString** contains the postal code for the mail user's postal address.

2.2.4.24 PidTagCountry

The [PidTagCountry](#) property of type **PtypString** contains the name of the mail user's country/region.

2.2.4.25 PidTagHomeAddressStreet

The [PidTagHomeAddressStreet](#) property of type **PtypString** contains the mail user's home street address.

2.2.4.26 PidTagHomeAddressPostOfficeBox

The [PidTagHomeAddressPostOfficeBox](#) property of type **PtypString** contains the number or identifier of the mail user's home post office box.

2.2.4.27 PidTagHomeAddressCity

The [PidTagHomeAddressCity](#) property of type **PtypString** contains the name of the mail user's home locality, such as the town or city.

2.2.4.28 PidTagHomeAddressStateOrProvince

The [PidTagHomeAddressStateOrProvince](#) property of type **PtypString** contains the name of the mail user's home state or province.

2.2.4.29 PidTagHomeAddressPostalCode

The [PidTagHomeAddressPostalCode](#) property of type **PtypString** contains the postal code for the mail user's home postal address.

2.2.4.30 PidTagHomeAddressCountry

The [PidTagHomeAddressCountry](#) property of type **PtypString** contains the name of the mail user's home country/region.

2.2.4.31 PidTagOtherAddressStreet

The [PidTagOtherAddressStreet](#) property of type **PtypString** contains the mail user's other street address.

2.2.4.32 PidTagOtherAddressPostOfficeBox

The [PidTagOtherAddressPostOfficeBox](#) property of type **PtypString** contains the number or identifier of the mail user's other post office box.

2.2.4.33 PidTagOtherAddressCity

The [PidTagOtherAddressCity](#) property of type **PtypString** contains the name of the mail user's other locality, such as the town or city.

2.2.4.34 PidTagOtherAddressStateOrProvince

The [PidTagOtherAddressStateOrProvince](#) property of type **PtypString** contains the name of the mail user's other state or province.

2.2.4.35 PidTagOtherAddressPostalCode

The [PidTagOtherAddressPostalCode](#) property of type **PtypString** contains the postal code for the mail user's other postal address.

2.2.4.36 PidTagOtherAddressCountry

The [PidTagOtherAddressCountry](#) property of type **PtypString** contains the name of the mail user's other country/region.

2.2.4.37 PidTagPrimaryTelephoneNumber

The [PidTagPrimaryTelephoneNumber](#) property of type **PtypString** contains the mail user's primary telephone number.

2.2.4.38 PidTagBusinessTelephoneNumber

The [PidTagBusinessTelephoneNumber](#) property of type **PtypString** contains the primary telephone number of the mail user's place of business.

2.2.4.39 PidTagHomeTelephoneNumber

The [PidTagHomeTelephoneNumber](#) property of type **PtypString** contains the primary telephone number of the mail user's home.

2.2.4.40 PidTagBusiness2TelephoneNumber

The [PidTagBusiness2TelephoneNumber](#) property of type **PtypString** contains a secondary telephone number at the mail user's place of business.

2.2.4.41 PidTagBusiness2TelephoneNumbers

The [PidTagBusiness2TelephoneNumbers](#) property of type **PtypMultipleString** contains secondary telephone numbers at the mail user's place of business.

2.2.4.42 PidTagHome2TelephoneNumber

The [PidTagHome2TelephoneNumber](#) property of type **PtypString** contains a secondary telephone number at the mail user's home.

2.2.4.43 PidTagHome2TelephoneNumbers

The [PidTagHome2TelephoneNumbers](#) property of type **PtypMultipleString** contains secondary telephone numbers at the mail user's home.

2.2.4.44 PidTagCallbackTelephoneNumber

The [PidTagCallbackTelephoneNumber](#) property of type **PtypString** contains a telephone number to reach the mail user.

2.2.4.45 PidTagMobileTelephoneNumber

The [PidTagMobileTelephoneNumber](#) property of type **PtypString** contains the mail user's cellular telephone number.

2.2.4.46 PidTagRadioTelephoneNumber

The [PidTagRadioTelephoneNumber](#) property of type **PtypString** contains the mail user's radio telephone number.

2.2.4.47 PidTagCarTelephoneNumber

The [PidTagCarTelephoneNumber](#) property of type **PtypString** contains the mail user's car telephone number.

2.2.4.48 PidTagOtherTelephoneNumber

The [PidTagOtherTelephoneNumber](#) property of type **PtypString** contains an alternate telephone number for the mail user.

2.2.4.49 PidTagPagerTelephoneNumber

The [PidTagPagerTelephoneNumber](#) property of type **PtypString** contains the mail user's pager telephone number.

2.2.4.50 PidTagPrimaryFaxNumber

The [PidTagPrimaryFaxNumber](#) property of type **PtypString** contains the telephone number of the mail user's primary fax machine.

2.2.4.51 PidTagBusinessFaxNumber

The [PidTagBusinessFaxNumber](#) property of type **PtypString** contains the telephone number of the mail user's business fax machine.

2.2.4.52 PidTagHomeFaxNumber

The [PidTagHomeFaxNumber](#) property of type **PtypString** contains the telephone number of the mail user's home fax machine.

2.2.4.53 PidTagCompanyMainTelephoneNumber

The [PidTagCompanyMainTelephoneNumber](#) property of type **PtypString** contains the main telephone number of the mail user's company.

2.2.4.54 PidTagTelecommunicationsDeviceForDeafTelephoneNumber

The [PidTagTelecommunicationsDeviceForDeafTelephoneNumber](#) property of type **PtypString** contains the mail user's telecommunication device for the deaf (TTY/TDD) telephone number.

2.2.4.55 PidTagTelexNumber

The [PidTagTelexNumber](#) property of type **PtypString** contains the mail user's telex number.

2.2.4.56 PidTagIsdnNumber

The [PidTagIsdnNumber](#) property of type **PtypString** contains the mail user's ISDN-capable telephone number.

2.2.4.57 PidTagAssistantTelephoneNumber

The [PidTagAssistantTelephoneNumber](#) property of type **PtypString** contains the telephone number of the mail user's administrative assistant.

2.2.4.58 PidTagKeyword

The [PidTagKeyword](#) property of type **PtypString** contains a keyword that identifies the mail user to the mail user's system administrator.

2.2.4.59 PidTagGovernmentIdNumber

The [PidTagGovernmentIdNumber](#) property of type **PtypString** contains a government identifier for the mail user.

2.2.4.60 PidTagMessageHandlingSystemCommonName

The [PidTagMessageHandlingSystemCommonName](#) property of type **PtypString** contains the **common name** of a messaging user for use in a message **header**. This property is read-only.

2.2.4.61 PidTagLanguage

The [PidTagLanguage](#) property of type **PtypString** contains a value that indicates the language in which the messaging user is writing messages.

2.2.4.62 PidTagLocation

The [PidTagLocation](#) property of type **PtypString** contains the location of the mail user in a format that is useful to the mail user's organization.

2.2.4.63 PidTagOrganizationalIdNumber

The [PidTagOrganizationalIdNumber](#) property of type **PtypString** contains an identifier for the mail user used within the mail user's organization.

2.2.4.64 PidTagUserCertificate

The [PidTagUserCertificate](#) property of type **PtypBinary** has been deprecated. This property MUST be ignored by clients.

2.2.4.65 PidTagAddressBookX509Certificate

The [PidTagAddressBookX509Certificate](#) property of type **PtypMultipleBinary** specifies ASN.1 DER encoded X.509 certificates for the mail user. Each binary value MUST be an ASN.1 DER encoded X.509 certificate, as specified in [\[RFC3280\]](#).

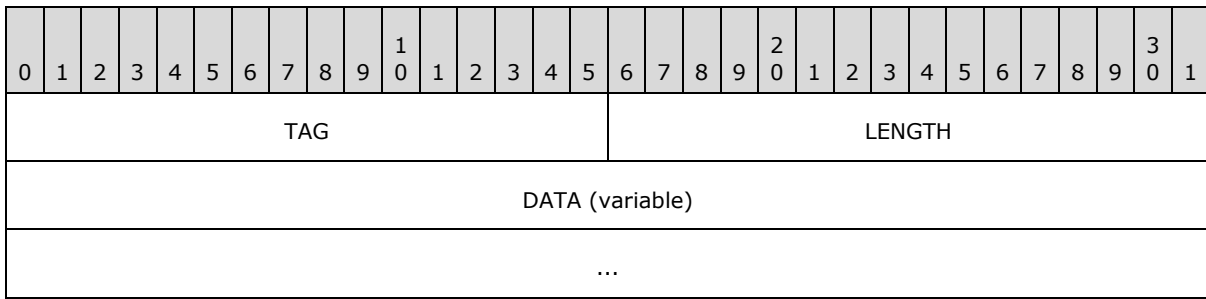
2.2.4.66 PidTagUserX509Certificate

The [PidTagUserX509Certificate](#) property of type **PtypMultipleBinary** specifies a list certificates for the mail user. Each binary value MUST be either an ASN.1 DER encoded SignedData Type **binary large object (BLOB)** which contains the user's certificates and is signed with the user's certificate, as specified in [\[RFC3852\]](#), or a binary property as specified in the following paragraph.

To determine which of these choices each binary value is, the application MUST examine the first byte of each binary value. If the first byte has the value 0x30, it is an ASN.1 DER encoded SignedData Type BLOB. Otherwise, the binary value MUST be interpreted according to the format specified in this section. The client and the server SHOULD use the [PidTagUserX509Certificate](#) instead of [PidTagAddressBookX509Certificate](#) when looking for certificates.

Non-ASN.1 Binary Value Format

If the binary value is not an ASN.1 DER encoded SignedData Type BLOB, then it MUST be a BLOB containing a set of security settings as specified in sections [2.2.4.66.1](#) through [2.2.4.66.12](#), one after another, in a continuous block of data. All settings in these sections MUST appear at most once in the binary value unless stated otherwise. Each security setting has the following format:



TAG (2 bytes): An unsigned value that identifies this particular security setting. If the **TAG** found in a security setting is not among the ones listed in sections [2.2.4.66.1](#) through [2.2.4.66.12](#), the client and the server MUST ignore these settings.

LENGTH (2 bytes): The total length of the security setting, including the **TAG** field, the **LENGTH** field, and the **DATA** field.

DATA (variable): Contains the data associated with this security setting. Its length, in bytes, can be computed from the value of the **LENGTH** field. The following sections specify the security settings that appear in a non-ASN.1 certificate.

2.2.4.66.1 Property Version

The **TAG** for this setting is 0x0001. The **LENGTH** for this setting MUST be 0x0008. The **DATA** specifies the version of the certificate. The unsigned **PtypInteger32 DATA** MUST be 0x00000001. This setting MUST be part of each **PtypBinary** value.

2.2.4.66.2 Encryption Type

The **TAG** for this setting is 0x0006. The **LENGTH** for this setting MUST be 0x0008. The unsigned **PtypInteger32 DATA** specifies the type of encryption to be used with this certificate. A value of 0x00000001 specifies that the encryption type is **S/MIME**, as specified in [\[RFC3852\]](#). A **DATA** value of 0x00000006 specifies that the encryption type is Fortezza, as specified in [\[RFC2876\]](#). All other values do not have any defined meaning and MUST be ignored by both the server and the client. This setting MUST be part of each **PtypBinary** value.

2.2.4.66.3 Defaults

The **TAG** for this setting is 0x0020. The **LENGTH** for this setting MUST be 0x0008. The **DATA** is a 4-byte bit field, which can contain any combination of the following bit values:

Bit	Meaning
0x00000001	This is the default certificate for S/MIME.
0x00000002	This is the default certificate for all formats. If this bit is set, then 0x00000001 MUST be set.

Any other bit flags set on this setting MUST be ignored. This setting MUST be part of each **PtypBinary** value.

2.2.4.66.4 ASCII Display Name

The **TAG** for this setting is 0x000B. The **LENGTH** for this setting MUST be larger than 4. The **DATA** field contains the user-readable name, as a NULL terminated ASCII string. Either the ASCII display name or the Unicode display name (as specified in section [2.2.4.66.5](#)) SHOULD be part of the binary value, but not both. [<17>](#)

2.2.4.66.5 Unicode Display Name

The **TAG** for this setting is 0x0051. The **LENGTH** for this setting MUST be larger than 4. The **DATA** field contains the user-readable name, as a NULL-terminated Unicode string. Either the Unicode display name or the ASCII display name SHOULD be part of the certificate, but not both. [<18>](#)

2.2.4.66.6 KeyExSHA1Hash

The **TAG** for this setting is 0x0022. The **LENGTH** for this setting MUST be larger than 4. The **DATA** field contains the SHA1 Hash, as specified in [\[RFC3174\]](#), to look up the encryption certificate in the certificate **store** on the user's computer. The certificate that matches this hash SHOULD be used when sending encrypted mail to the **contact**.

For a given **PtypBinary** value in [PidTagUserX509Certificate](#), if the KeyExSHA1Hash setting is present, then KeyExchangeCertificate MUST NOT be present.

The client and the server SHOULD use the KeyExchangeCertificate setting instead of the KeyExSHA1Hash setting.

2.2.4.66.7 SignSHA1Hash

The **TAG** for this optional setting is 0x0009. The **LENGTH** for this setting MUST be larger than 4. The **DATA** field contains the SHA1 Hash, as specified in [\[RFC3174\]](#), to look up the signing certificate in the certificate store on the user's computer. [<19>](#)

For a given **PtypBinary** value in [PidTagUserX509Certificate](#), if the SignSHA1Hash setting is present, then SignCertificate MUST NOT be present.

The client and the server SHOULD use the SignCertificate setting instead of the SignSHA1Hash setting.

2.2.4.66.8 KeyExchangeCertificate

The **TAG** for this setting is 0x0003. The **LENGTH** for this setting MUST be larger than 4. The **DATA** field contains an ASN.1 DER encoded X.509 certificate, as specified in [\[RFC3280\]](#). This certificate SHOULD be used when sending encrypted S/MIME mail to the contact.

For a given **PtypBinary** value in [PidTagUserX509Certificate](#), if the KeyExchangeCertificate setting is present, then KeyExSHA1Hash MUST NOT be present. If KeyExSHA1Hash is not present, then KeyExchangeCertificate MUST be present.

The client and the server SHOULD use the KeyExchangeCertificate setting instead of the KeyExSHA1Hash setting.

2.2.4.66.9 SignCertificate

The **TAG** for this optional setting is 0x0008. The **LENGTH** for this setting MUST be larger than 4. The **DATA** field contains an ASN.1 DER encoded X.509 certificate, as specified in [\[RFC3280\]](#). [<20>](#)

For a given **PtypBinary** value in [PidTagUserX509Certificate](#), if the SignCertificate setting is present, then SignSHA1Hash MUST NOT be present.

The client and the server SHOULD use the SignCertificate setting instead of the SignSHA1Hash setting.

2.2.4.66.10 ChainCertificate

The **TAG** for this optional setting is 0x0004. The **LENGTH** for this setting MUST be larger than 4. This setting can appear multiple times in the **PtypBinary** value to provide multiple certificates to use in the building of chains. The **DATA** field contains an ASN.1 DER encoded X.509 certificate, as specified in [\[RFC3280\]](#). If present, these optional certificates SHOULD be used to build the chain of trust for the certificate specified by KeyExchangeCertificate.

2.2.4.66.11 AsymmetricCapabilities

The **TAG** for this setting is 0x0002. The **LENGTH** for this setting MUST be larger than 4. The **DATA** field contains the ASN.1 DER encoded **sMIMECapabilities** type, as specified in [\[RFC3851\]](#). This setting MUST be part of the **PtypBinary** value.

2.2.4.66.12 SavedTime

The **TAG** for this optional setting is 0x000D. The **LENGTH** for this setting MUST be 0x000C. The **DATA** MUST be a **PtypFloatingTime** that specifies the time (in UTC) when the certificate was added to the contact.

2.2.4.67 PidTagAddressBookHomeMessageDatabase

The [PidTagAddressBookHomeMessageDatabase](#) property of type **PtypString** of a mail user is the DN, expressed in the *x500-dn* format specification described in section [2.2.1.1](#), of an Address Book object that represents the mail user's message database. The *x500-container-dn* portion of the DN is an *x500-dn* string that references an Address Book object that represents the mail user's mailbox server. The RDN in the *object-rdn* of the *x500-dn* for the mailbox server's Address Book object is the host-name, as described in [\[RFC1034\]](#), of the server that contains the mail user's message database.

2.2.4.68 PidTagAddressBookNetworkAddress

The [PidTagAddressBookNetworkAddress](#) property of type **PtypMultipleString** of an Address Book object of a mailbox server contains a list of names by which a server is known to the various transports in use by the network. Each **PtypString** is an RPC protocol sequence, as specified in [\[MS-RPCE\]](#), followed by a colon (":"), followed by the host-name of the server under that RPC protocol sequence.

2.2.4.69 PidTagHobbies

The [PidTagHobbies](#) property of type **PtypString** contains the names of the mail user's hobbies.

2.2.4.70 PidTagProfession

The [PidTagProfession](#) property of type **PtypString** contains the name of the mail user's line of business.

2.2.4.71 PidTagReferredByName

The [PidTagReferredByName](#) property of type **PtypString** contains the name of the mail user's referral.

2.2.4.72 PidTagSpouseName

The [PidTagSpouseName](#) property of type **PtypString** contains the name of the mail user's spouse/partner.

2.2.4.73 PidTagGender

The [PidTagGender](#) property of type **PtypInteger16** contains a value that represents the mail user's gender. If present, it **MUST** contain one of the following values:

Value	Description
0x0000	No gender is specified.
0x0001	Specifies a gender of female.
0x0002	Specifies a gender of male.

2.2.4.74 PidTagComputerNetworkName

The [PidTagComputerNetworkName](#) property of type **PtypString** contains the name of the mail user's computer network.

2.2.4.75 PidTagCustomerId

The [PidTagCustomerId](#) property of type **PtypString** contains the mail user's customer identification number.

2.2.4.76 PidTagFtpSite

The [PidTagFtpSite](#) property of type **PtypString** contains the mail user's File Transfer Protocol (FTP) site address.

2.2.4.77 PidTagPersonalHomePage

The [PidTagPersonalHomePage](#) property of type **PtypString** contains the Web address (**URL**) of the mail user's personal home page.

2.2.4.78 PidTagBusinessHomePage

The [PidTagBusinessHomePage](#) property of type **PtypString** contains the Web address (URL) of the mail user's business home page.

2.2.4.79 PidTagBirthday

The [PidTagBirthday](#) property of type **PtypTime** contains the date of the mail user's birthday at 12:00 A.M. UTC.

2.2.4.80 PidTagWeddingAnniversary

The [PidTagWeddingAnniversary](#) property of type **PtypTime** contains the date of the mail user's wedding anniversary at 12:00 A.M. UTC.

2.2.4.81 PidTagAddressBookOrganizationalUnitRootDistinguishedName

The [PidTagAddressBookOrganizationalUnitRootDistinguishedName](#) property of type **PtypString** contains the distinguished name (DN) of the Organization object of the mail user's organization. When this property is not present, clients obtain the mail user's organization as described in section [2.2.7.<21>](#)

2.2.4.82 PidTagThumbnailPhoto

The [PidTagThumbnailPhoto<22>](#) property of type **PtypBinary**, if present, MUST contain an image of the mail user's photo in **.jpg** format.

2.2.4.83 PidTagSpokenName

The [PidTagSpokenName](#) property [<23>](#) of type **PtypBinary**, if present, MUST contain an Advanced Systems Format binary media object, as specified in [\[ASF\]](#) section 9.5, that contains a recording of the mail user's name pronunciation. The major media type MUST be set to 73647561-0000-0010-8000-00AA00389B71, the media subtype MUST be set to 00000001-0000-0010-8000-00AA00389B71, and the format type MUST be set to 05589f81-c356-11ce-bf01-00aa0055595a.

2.2.4.84 PidTagAddressBookAuthorizedSenders

The [PidTagAddressBookAuthorizedSenders](#) property [<24>](#) of type **PtypObject** indicates whether delivery restrictions exist for this recipient. A value other than null indicates that delivery restrictions exist for this recipient. The address book does not contain the lists of senders that are allowed for this recipient; it only indicates whether such restrictions exist.

2.2.4.85 PidTagAddressBookUnauthorizedSenders

The [PidTagAddressBookUnauthorizedSenders](#) property [<25>](#) of type **PtypObject** indicates whether delivery restrictions exist for this recipient. A value other than null indicates that delivery restrictions exist for this recipient. The address book does not contain the lists of senders that are prohibited for this recipient; it only indicates whether such restrictions exist.

2.2.4.86 PidTagAddressBookDistributionListMemberSubmitAccepted

The [PidTagAddressBookDistributionListMemberSubmitAccepted](#) property [<26>](#) of type **PtypObject** indicates whether delivery restrictions exist for this recipient. A value other than null indicates that delivery restrictions exist for this recipient. The address book does not contain the lists of the group of senders that are allowed for this recipient; it only indicates whether such restrictions exist.

2.2.4.87 PidTagAddressBookDistributionListMemberSubmitRejected

The [PidTagAddressBookDistributionListMemberSubmitRejected](#) property [<27>](#) of type **PtypObject** indicates whether delivery restrictions exist for this recipient. A value other than null indicates that delivery restrictions exist for this recipient. The address book does not contain the lists of the group of senders that are prohibited for this recipient; it only indicates whether such restrictions exist.

2.2.5 Properties That Reference Other Address Book Objects

Some Address Book objects contain references to other Address Book objects, in the form of a table, through various properties.

For details about accessing these tables from an NSPI server, see [\[MS-NSPI\]](#) section 3.1.1.3.2.2. Each of these properties is of type **PtypEmbeddedTable**, as specified in [\[MS-NSPI\]](#). For example, a mail user in an organization reports to a manager, who is also listed in that address book as another mail user. In this case, a property of type **PtypEmbeddedTable** and [PidTagAddressBookManager](#) (section [2.2.5.1](#)) references the manager. In general, a property of type **PtypEmbeddedTable** references any number of other Address Book objects. Properties of type **PtypEmbeddedTable** are made available on an NSPI server by using a property value-based explicit table, through the call **NspiGetMatches**, and modified through **NspiModLinkAtt**, as specified in [\[MS-NSPI\]](#).

These tables are represented in an offline address book as a property either of type **PtypString** (for tables that consist of at most one reference) or of type **PtypMultipleString** (for tables that can consist of many references), as specified in [\[MS-OXOAB\]](#). Each string value represents the DN of another Address Book object. For example, a mail user in an organization reports to a manager who is also listed in the address book as another mail user. In this case, the [PidTagAddressBookManager](#) property, with a **property type** of **PtypString**, contains the DN of the manager.

2.2.5.1 PidTagAddressBookManager

The [PidTagAddressBookManager](#) property of type **PtypEmbeddedTable** of a mail user contains one row that references the mail user's manager.

2.2.5.2 PidTagAddressBookReports

The [PidTagAddressBookReports](#) property of type **PtypEmbeddedTable** of a mail user lists all the mail user's direct reports.

2.2.5.3 PidTagAddressBookIsMemberOfDistributionList

The [PidTagAddressBookIsMemberOfDistributionList](#) property of type **PtypEmbeddedTable** of an Address Book object lists all the distribution lists for which this object is a member.

2.2.5.4 PidTagAddressBookOwnerBackLink

The [PidTagAddressBookOwnerBackLink](#) property of type **PtypEmbeddedTable** of a mail user lists the distribution lists that this mail user owns.

2.2.5.5 PidTagAddressBookPublicDelegates

The [PidTagAddressBookPublicDelegates](#) property of type **PtypEmbeddedTable** contains a list of mail users who are allowed to send mail on behalf of the mailbox owner.

2.2.5.6 PidTagAddressBookHierarchicalShowInDepartments

The [PidTagAddressBookHierarchicalShowInDepartments](#) property of type **PtypEmbeddedTable** of a mail user lists all the Department objects of which this mail user is a member.

2.2.6 Properties That Apply to Distribution Lists

2.2.6.1 PidTagAddressBookMember

The [PidTagAddressBookMember](#) property of type **PtypEmbeddedTable** of a distribution list contains the members of the distribution list. If the distribution list is also a departmental group (as specified by the [PidTagAddressBookHierarchicalIsHierarchicalGroup](#) property), the [PidTagAddressBookMember](#) property contains the members of the department and the child departmental groups in the hierarchy of departments.

2.2.6.2 PidTagAddressBookOwner

The [PidTagAddressBookOwner](#) property of type **PtypEmbeddedTable** of a distribution list contains one row that references the distribution list's owner.

2.2.6.3 PidTagContainerContents

The [PidTagContainerContents](#) property of type **PtypEmbeddedTable** of a distribution list is always empty. An NSPI server MUST define this value for distribution lists. It is not present for all other objects.

2.2.6.4 PidTagAddressBookFolderPathname

The [PidTagAddressBookFolderPathname](#) property of type **PtypString** has been deprecated and MUST be ignored by clients.

2.2.6.5 PidTagAddressBookHierarchicalIsHierarchicalGroup

The [PidTagAddressBookHierarchicalIsHierarchicalGroup](#) property of type **PtypBoolean** is **TRUE** if the distribution list represents a departmental group. Members within this departmental group that are also distribution lists with the [PidTagAddressBookHierarchicalIsHierarchicalGroup](#) property set to **TRUE** represent the child department of this departmental group in a hierarchy of departments. Other members represent members of this departmental group. If the distribution list is not a departmental group, the [PidTagAddressBookHierarchicalIsHierarchicalGroup](#) property can be **FALSE** or absent.

2.2.7 Properties That Apply to Organization Objects

An Organization object is an Address Book object that represents an organization, and contains properties that are specific to an organization. A mail user's Organization object is obtained by using the [PidTagAddressBookOrganizationalUnitRootDistinguishedName](#) property of the mail user. <28> <29> When this property is not present on a mail user, messaging clients access the Organization object of a mail user by extracting the *org-rdn* string from the mail user's DN, which is in the format of an X500 address and the *x500-dn* format specification as specified in section 2.2.1.1. Messaging clients use the resulting *org-rdn* string as a DN of the mail user's organization, which is in the *organization-dn* format specification. After the Organization object is obtained, if present, messaging clients are able to perform operations as they would on any other Address Book object.

2.2.7.1 PidTagAddressBookRoomContainers

The [PidTagAddressBookRoomContainers](#) property of type **PtypMultipleString** contains a list of DNs that represent the address book containers that hold Resource objects, such as conference rooms and equipment. Messaging clients use this list to determine which containers contain mainly Resource objects in order to do special handling on these containers, such as displaying a different

column set when browsing address lists that are represented by these containers, or for features that require selecting from a set of rooms or equipment.

The DNs in the [PidTagAddressBookRoomContainers](#) property each use the *x500-dn* format specification as specified in section [2.2.1.1](#), with the additional requirement that there is no *container-rdn* in its *x500-dn* and that the RDN of the *object-rdn* follows the *container-guid* format specification. When the RDN is extracted from the DN, it represents the GUID of the address book container that this is referencing. Messaging clients compare this GUID to the GUID of another address book container by extracting that GUID from the *container-guid* of the other container's DN, which follows the *addresslist-dn* format specification. If the GUIDs are the same, then the other address book container is a room container.

2.2.7.2 PidTagAddressBookHierarchicalRootDepartment

The [PidTagAddressBookHierarchicalRootDepartment](#) property of type **PtypEmbeddedTable** is a reference to either the root Department object or the root departmental group in the department hierarchy for the organization. [<30>](#) The table has either zero or one row, which references a Department object or departmental group. If either the Organization object is missing, or this property is missing or the property value is empty, the NSPI server does not have a department hierarchy for that organization.

2.2.8 Properties That Apply to Department Objects

A Department object is an Address Book object that represents a department within an organization, and contains properties that are specific to a Department object. Department objects are distinct from departmental groups, which are a specific type of distribution list with all its properties. A server [MAY <31>](#) represent a department hierarchy by using either Department objects or departmental groups, and **MUST NOT** mix the representations.

Messaging clients obtain the root of the department hierarchy by using the property [PidTagAddressBookHierarchicalRootDepartment](#) of the Organization object (which **MAY** be either a Department object or a departmental group), or by obtaining the root department that is not specific to any organization, which **MUST** be a Department object, and which has a DN that is specified by using the *organization-dn* format specification, as specified in [2.2.1.1](#), with a value of `"/o=FF46312B-D8AE-406C-B8E6-BC1A22A4C69E"`.

2.2.8.1 PidTagAddressBookHierarchicalChildDepartments

The [PidTagAddressBookHierarchicalChildDepartments](#) property of type **PtypEmbeddedTable** on a Department object references the child departments in a hierarchy of departments.

2.2.8.2 PidTagAddressBookHierarchicalParentDepartment

The [PidTagAddressBookHierarchicalParentDepartment](#) property of type **PtypEmbeddedTable** on a Department object references all the departments to which this department is a child.

2.2.8.3 PidTagAddressBookHierarchicalDepartmentMembers

The [PidTagAddressBookHierarchicalDepartmentMembers](#) property of type **PtypEmbeddedTable** of a Department object lists all the mail users that belong to this department.

2.2.9 Properties That Apply to Resource Objects

2.2.9.1 PidTagAddressBookRoomCapacity

The [PidTagAddressBookRoomCapacity](#) property of type **PtypInteger32** represents the maximum occupancy of the room.

2.2.9.2 PidTagAddressBookRoomDescription

The [PidTagAddressBookRoomDescription](#) property of type **PtypString** represents a description of the Resource object.

2.2.10 Properties That Have Special Purposes

2.2.10.1 PidTagAnr

The [PidTagAnr](#) property of type **PtypString** is a special property that is not actually a property on the Address Book objects themselves. Rather, this property is used by messaging clients as a property value to a *Filter* to the NSPI call **NspiGetMatches** (see [\[MS-NSPI\].<32>](#)). Messaging clients pass this property as a target string to **NspiGetMatches** to identify objects in an address list that are a possible match for the target string. This operation is known as **ambiguous name resolution (ANR)**, as specified in [\[MS-NSPI\]](#). NSPI servers respond by returning the Minimal Entry IDs (MIDs) of all Address Book objects that are possible matches against the target string. This protocol does not prescribe the choice of ANR results of an NSPI server. [<33>](#)

An offline address book (OAB) does not contain this property for any Address Book objects. It is up to messaging clients to determine how to perform name matching among the objects in an OAB.

2.2.10.2 PidTagAddressBookManageDistributionList

The [PidTagAddressBookManageDistributionList](#) object property is a **property tag** for use in display templates for distribution lists. When [PidTagAddressBookManageDistributionList](#) is the **dwType** property tag in a **button control** to a **CNTRL** structure of a display template, it tells messaging clients to include a button to enable UI to edit the members of a distribution list. See [\[MS-OXOABKT\]](#) for details about the button control for a template. This is not a property of objects in an address book.

2.2.11 Named Properties

This document does not specify any **named properties**. Offline address books and NSPI servers are free to expose any named properties in their implementation.

3 Protocol Details

3.1 Client Details

3.1.1 Abstract Data Model

The address book contains one or more address book containers. The collection of address book containers is arranged in an address book hierarchy table. An address book container represents an address list, which is a collection of Address Book objects that are rendered in a table and browsed by a messaging user. Among other things, messaging users are able to scroll through this table of objects, set positioning based on a name typed by a messaging user, perform searches, and perform ambiguous name resolution (ANR) against the names in that address list. ANR means that the user types part of a name, and the address book identifies potential matches for that name.

Messaging users are able to display information about an Address Book object from the table, an object obtained through ANR, or a recipient on a message. The information displayed is obtained from a display template that is supplied in the address book, and depends on the type of Address Book object being displayed.

Among the many types of objects, an address book typically includes the following object types:

- Mail users, each of which describes a person or entity that can receive e-mail messages.
- Distribution lists, each of which is a collection of other mail users, distribution lists, or other Address Book objects that can receive e-mail messages.
- Resource objects, which can be reserved, such as a room or equipment.
- Organization objects, each of which describes an organization.
- Department objects, which describe the departmental structure of an organization.
- Address book containers, each of which represents an address list that contains Address Book objects that can be viewed as a table.
- Templates, each of which describes a physical view that can be used to show details on other Address Book objects to a messaging user, as specified in [\[MS-OXOABKT\]](#).

3.1.2 Timers

None.

3.1.3 Initialization

Initialization is accomplished in one of three ways: through an NSPI connection to a server via NSPI, through the contents of an offline address book, or both.

3.1.3.1 Initialization Through NSPI connection

Initialization is accomplished via **NspiBind**, as specified in [\[MS-NSPI\]](#), and MUST occur before any Address Book objects can be accessed through NSPI calls.

3.1.3.2 Initialization Through an Offline Address Book

Messaging clients obtain address lists in an offline address book by using the Offline Address Book (OAB) Public Folder Retrieval protocol, as specified in [\[MS-OXWOAB\]](#) and [\[MS-OXPFOAB\]](#). Each address list, in turn, contains information about objects in that address list, using the Offline Address Book (OAB) Format and Schema protocol, as specified in [\[MS-OXOAB\]](#). After one or more address lists from an OAB are obtained, messaging clients navigate any of the address lists to perform the lookups that are required to perform these operations, as specified in [\[MS-OXOAB\]](#).

3.1.4 Higher-Layer Triggered Events

It is possible for messaging clients to obtain a hierarchy of address book containers, browse the Address Book objects in an address list that is represented by an address book container, obtain information about an Address Book object, and perform ambiguous name resolution (ANR) to find Address Book objects that match a target string.

3.1.4.1 Obtaining a Hierarchy of Address Book Containers

When using an NSPI server, messaging clients obtain the hierarchy by using **NspiGetSpecialTable**, as specified in [\[MS-NSPI\]](#). The table returns several rows of containers, and for each row, returns the properties [PidTagDisplayName](#), [PidTagEntryId](#), [PidTagContainerFlags](#), [PidTagDepth](#), [PidTagAddressBookContainerId](#), [PidTagAddressBookIsMaster](#), and [PidTagAddressBookParentEntryId](#), which are needed to determine the hierarchy of containers.

The hierarchy table in an offline address book is obtained by using the Offline Address Book (OAB) Public Folder Retrieval protocol, as specified in [\[MS-OXWOAB\]](#) and [\[MS-OXPFOAB\]](#).

3.1.4.2 Browsing an Address Book

After the hierarchy of containers is obtained, and a single container is chosen by a messaging user, it is possible for the messaging user to browse the address list that is represented by the container.

When browsing an address list for an offline address book, it is up to the messaging client to perform the lookups that are necessary to present a browsable view of the address list, by using the Offline Address Book (OAB) Format and Schema protocol, as specified in [\[MS-OXOAB\]](#).

When browsing an address list from an NSPI server, messaging clients use the call **NspiQueryRows** to obtain a set of rows to display to the messaging user. Messaging clients choose the properties they want to render, but would ordinarily request [PidTagEntryId](#), [PidTagDisplayName](#), [PidTagSmtpAddress](#), and [PidTagTitle](#), among other properties that the messaging client deems useful for displaying to the user.

It is possible to scroll to certain approximate positions in the address book view. When using NSPI, this is accomplished by modifying the **STAT** structure, which describes a table position, as specified in [\[MS-NSPI\]](#), and calling **NspiUpdateStat**. Messaging clients usually follow up by calling **NspiQueryRows** to display rows starting at the new position.

It is possible for the user to type a certain name, and have the address list view scroll to the first display name typed, like a rolodex. When using NSPI, this is accomplished through the call **NspiSeekEntries**, as specified in [\[MS-NSPI\]](#). The result updates positioning information in the **STAT** structure, as specified in [\[MS-NSPI\]](#), and returns a screen full of Address Book objects.

3.1.4.3 Obtaining Properties on an Address Book Object

In order to obtain properties for an Address Book object from an offline address book (OAB), the messaging client needs to have a distinguished name (DN) for the object, or the object's SMTP address. This means that the messaging client will need to keep track of the DN after any lookup in the OAB, and will need to make sure that the DN or SMTP address is maintained for the addressee of a message when messages are sent or received through a messaging server. Incoming messages can contain either the SMTP address or the DN of message addressees. The messaging server provides the SMTP address or the DN of the addressee. The Offline Address Book (OAB) Format and Schema protocol specification [\[MS-OXOAB\]](#) describes how this information is organized and structured. After the information for the Address Book object is located, it is possible for the client to retrieve the value of any property in that record. For example, to obtain properties such as the business telephone number and SMTP address, the client looks up [PidTagBusinessTelephoneNumber](#) and [PidTagSmtpAddress](#) in the record.

In order to obtain properties for an Address Book object on an NSPI server, the messaging client needs to either have a DN, a Minimal Entry ID (MId), or the object's SMTP address. Certain NSPI calls that return Address Book object information, including, but not limited to, **NspiQueryRows**, **NspiSeekEntries**, or **NspiGetMatches**, include the DN or Minimal Entry ID in its [PidTagEntryId](#), or as a return value of the call. Clients call **NspiDNToMId** to obtain the Minimal Entry ID from a DN. To obtain a DN from an SMTP address, messaging clients construct a string that starts with "=SMTP:" followed by the SMTP address as the *paStr* or *paWStr* **parameter** to the call **NspiResolveNames** or **NspiResolveNamesW**, as specified in [\[MS-NSPI\]](#), and extract it from the [PidTagEntryId](#) property that is returned, as specified in the Permanent Entry ID structure, as specified in [\[MS-NSPI\]](#).

After the Minimal Entry ID is known, clients use it as the **CurrentRec** member of the **STAT** structure passed to **NspiGetProps**, as specified in [\[MS-NSPI\]](#). It is possible for clients to specify any number of properties in the *pPropTags* parameter to **NspiGetProps** that the client wants to request. For example, to request properties such as the business phone number and SMTP address, the client includes the **property IDs** [PidTagBusinessTelephoneNumber](#) and [PidTagSmtpAddress](#) in the *pPropTags* parameter.

3.1.4.4 Performing Ambiguous Name Resolution

Messaging clients perform ambiguous name resolution (ANR) when a user is addressing a message and types only part of a name. The role of the address book in this case is to identify the best possible matches for the name entered, and if there is more than one good match, present the list of possible Address Book objects to the user.

When performing ANR by using an offline address book, it is up to the messaging client to decide the best method for name matching among Address Book objects. The client is free to use whatever means to decide on good matches on any choice of properties by using the Offline Address Book (OAB) Format and Schema protocol, as specified in [\[MS-OXOAB\]](#).

When performing ANR by using an NSPI server, the client calls **NspiResolveNames** or **NspiResolveNamesW** and passes the target string in the parameter *paStr* or *paWStr*, as specified in [\[MS-NSPI\]](#). If there is exactly one match, the row that corresponds to the target string will contain the properties that were requested for that match. If there is more than one match, it is possible to obtain the set of possible matches by calling **NspiGetMatches**, as specified in [\[MS-NSPI\]](#), by using a *Filter* with the property [PidTagAnr](#), and the value for [PidTagAnr](#) as the target string for ANR. [<34>](#) The set of matches, along with the requested properties for the matches, will be returned. Messaging clients usually display the returned results in a dialog to the user, so the user is able to select the best match from the list of results.

3.1.5 Message Processing Events and Sequencing Rules

None.

3.1.6 Timer Events

None.

3.1.7 Other Local Events

None.

3.2 Server Details

3.2.1 Abstract Data Model

A messaging client uses an offline address book (OAB), an NSPI server, or both, to access an address book. A client obtains one or more address lists from an OAB by using the Offline Address Book Web and Public Folder Retrieval protocols, as specified in [\[MS-OXWOAB\]](#) and in [\[MS-OXPFOAB\]](#). Usually, the client downloads the contents of address lists from the OAB onto the local computer into one or more files. Messaging clients access information about the Address Book objects that are contained in an address list from an OAB by using the Offline Address Book (OAB) Format and Schema protocol, as specified in [\[MS-OXOAB\]](#). Alternatively, the client accesses information about objects in an address book by using an NSPI server, using the Name Service Provider Interface (NSPI) protocol, as specified in [\[MS-NSPI\]](#). Because both data sources represent the same address book, information about an Address Book object that is contained on both an NSPI server and in an OAB SHOULD [<35>](#) be identical, with the OAB containing a subset of the information that is available on the NSPI server. [<36>](#) Because the [PidTagEmailAddress](#), which matches the DN for an Address Book object, is used to identify that object, the value for [PidTagEmailAddress](#) MUST match for an object that is contained in both data sources.

The role of the server that contains an OAB is to supply all the necessary information about the Address Book objects by using the Offline Address Book (OAB) Format and Schema protocol, as specified in [\[MS-OXOAB\]](#), and deliver that information to the client by using the Offline Address Book (OAB) Public Folder Retrieval protocol, as specified in [\[MS-OXWOAB\]](#) and [\[MS-OXPFOAB\]](#). The server provides periodic updates to the OAB, as necessary. The updating mechanism is specified in [\[MS-OXOAB\]](#). After the information is delivered to the client, the server plays no role.

The role of the NSPI server is to service the requests of the client, by using the Name Service Provider Interface (NSPI) protocol, as specified in [\[MS-NSPI\]](#).

3.2.2 Timers

None.

3.2.3 Initialization

None.

3.2.4 Higher-Layer Triggered Events

None.

3.2.5 Message Processing Events and Sequencing Rules

None.

3.2.6 Timer Events

None.

3.2.7 Other Local Events

None.

4 Protocol Examples

This section describes the call sequence for obtaining two string properties, [PidTagDisplayName](#) ([MS-OXPROPS] section 2.748) and [PidTagGivenName](#) ([MS-OXPROPS] section 2.793), for a mail user whose distinguished name (DN) is "/o=First Organization/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/CN=Recipients/CN=user1." Figure 1 shows the call sequence between the client and the server.

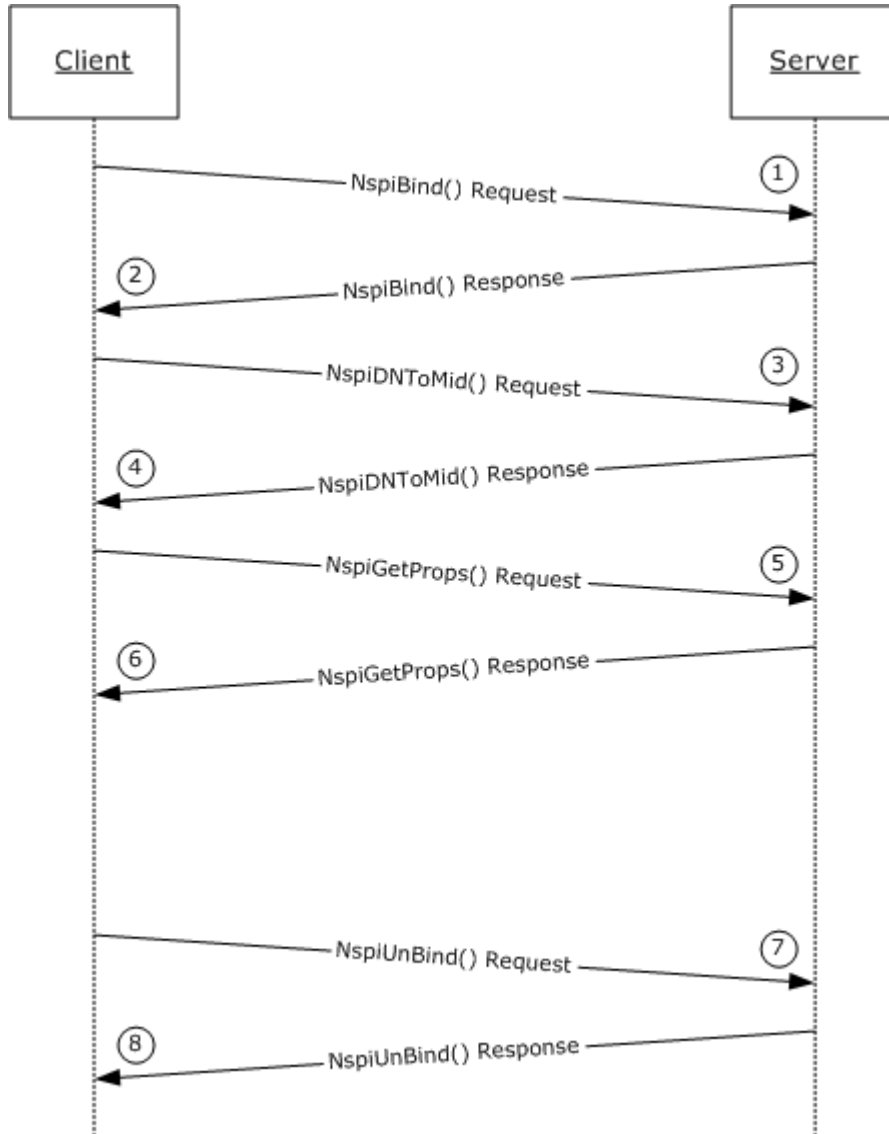


Figure 1: Call sequence

Note This figure shows relevant information only, not all parameters. For more details about the parameters, see [\[MS-NSPI\]](#).

1. Client initiates a session to the NSPI server by calling **NspiBind**. The messaging client sends in the following values to the server:

Note Only relevant information, and not all parameters, are shown. For more details about the parameters, see [\[MS-NSPI\]](#).

```
dwFlags
0x00000000DWORD
pStat
hIndex0x00000000unsigned long
ContainerID0x00000000unsigned long
CurrentRec0x00000000unsigned long
Delta0x00000000long
NumPos0x00000000unsigned long
TotalRecs0x00000000unsigned long
CodePage0x000004e4unsigned long
TemplateLocale0x00000409unsigned long
SortLocale0x00000409unsigned long
pServerGuid
pointer to an array of 16 unsigned chars to be returned by the server
```

2. The server responds to the **NspiBind** call with return code Success and a valid server GUID.

Typical parameters are as follows:

```
pServerGuid
[0x0]0xab 0xbc 0x8b 0x86 0x79 0x33 0xc4 0x48 0xa1 0xef
[0xa]0x1b 0x53 0xe6 0x3b 0xdc 0x46
contextHandle
< a token that will be used by the NspiUnbind call >
```

3. The client requests the Minimal Entry ID (MId) for the distinguished name "/o=First Organization/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/CN=Recipients/CN=user1" by calling **NspiDNToMId** with parameters that typically are as follows:

```
_pNames
Count0x00000001DWORD
Stringschar **
[0x0]char *
"/o=First Organization/ou=Exchange Administrative Group
(FYDIBOHF23SPDLT)/cn=Recipients/cn=user1"
ppMIds
<a pointer to a valid memory location of type PropertyTagArray_r ** for server to
return Mid >
```

4. The server responds with return code Success with a value of 0x00001927 for a MId that typically is as follows:

```
Count0x00000001DWORD
Stringschar **
```

```

[0x0]char *
"/o=First Organization/ou=Exchange Administrative Group
(FYDIBOHF23SPDLT)/cn=Recipients/cn=user1"
ppMids
cValues      0x00000001  DWORD
  aulPropTag      DWORD[]
    [0x0]
      0x00001927  DWORD

```

5. The client requests two string properties, [PidTagDisplayName](#) ([MS-OXPROPS] section 2.748) and [PidTagGivenName](#) ([MS-OXPROPS] section 2.793), by calling **NspiGetProps** with parameters that typically are as follows:

Note The MID 0x00001927 value that was obtained in step 4 is used as the **CurrentRec** field of *pStat*.

```

hRpc< a valid RPC handle>void *
dwFlags0x00000000DWORD
pStat
hIndex0x00000000unsigned long
ContainerID0x00000000unsigned long
CurrentRec0x00001927unsigned long
Delta0x00000000long
NumPos0x00000000unsigned long
TotalRecs0x00000000unsigned long
CodePage0x000004b0unsigned long
TemplateLocale0x00000409unsigned long
SortLocale0x00000409unsigned long
pPropTags_SPropTagArray_r *
{
cValues0x00000002 DWORD
aulPropTag=<a pointer to an array of proptags>
}
aulPropTagunsigned long []
[0x0]PidTagDisplayName unsigned long
[0x1]PidTagGivenName unsigned long
ppRow_SRow_r * *
< memory location for server return values>

```

6. The server responds to **NspiGetProps** with return code Success. In this example, the server has returned the string value "user1" for both the properties requested and the return values typically are as follows:

```

dwFlags0x00000000DWORD
pStat
{
hIndex0x00000000unsigned long
ContainerID0x00000000unsigned long
CurrentRec0x00001927unsigned long
Delta0x00000000long
NumPos0x00000000unsigned long
TotalRecs0x00000000unsigned long
CodePage0x000004b0unsigned long
TemplateLocale0x00000409unsigned long

```

```

SortLocale0x00000409unsigned long
}
pPropTags_SPropTagArray_r *
{
cValues0x00000002 DWORD
auiPropTag=<a pointer to an array of proptags>
}
auiPropTagunsigned long []
[0x0]PidTagDisplayName unsigned long
[0x1]PidTagGivenName unsigned long

ppRows_SRowSet_r * *
{
cRows0x00000001DWORD
aRow=<a pointer to an array of rows>
}

```

In this example, the server has returned a total of 0x1 row denoted as [0x0] that typically is as follows:

```

aRow[0x0]_SRow_r *
{
cValues0x00000002DWORD
lpProps=<a pointer to an array of columns>
}

```

In this example, the server has returned a column set of 2 properties and each column will be as follows:

```

[0x0]_SPropValue_r
{
[0x0]
ulPropTagPidTagDisplayNameunsigned long
Value
lpszA = "user1"char *
[0x1]
ulPropTag PidTagGivenName unsigned long
Value
lpszA = "user1" char *
}

```

Note The client may invoke additional NSPI calls to access other information from the server before calling NSPIUnbind.

7. The client terminates the connection by calling **NspiUnbind** with a token that the server returned in response to **NspiBind** call.

```

contextHandleNSPI_HANDLE *
<a token which was sent by the server in the NspiBind call >
dwFlags
0x00000000unsigned long

```


8. The server responds with return code 0x00000001 and destroys the token that the client passed in.

5 Security

5.1 Security Considerations for Implementers

There are no special security considerations specific to the Address Book Object protocol. General security considerations pertaining to the underlying NSPI RPC-based transport apply [\[MS-NSPI\]](#).

5.2 Index of Security Parameters

None.

6 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products:

- Microsoft® Office Outlook® 2003
- Microsoft® Exchange Server 2003
- Microsoft® Office Outlook® 2007
- Microsoft® Exchange Server 2007
- Microsoft® Outlook® 2010
- Microsoft® Exchange Server 2010

Exceptions, if any, are noted below. If a service pack number appears with the product version, behavior changed in that service pack. 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 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 product does not follow the prescription.

<1> [Section 2.2.1.1](#): The offline address book that is implemented in Exchange 2003, Exchange 2007, and Exchange 2010 contains all the properties listed in the appendixes of [\[MS-OXOAB\]](#). This can include some properties that are not present on some implementations of an NSPI server.

<2> [Section 2.2.1.1](#): The offline address book version 4 implementation in Exchange 2003, Exchange 2007, and Exchange 2010 includes a property **PidTagOfflineAddressBookTruncatedProperties** that is not included in objects in a NSPI server. This property is specified in [\[MS-OXOAB\]](#).

<3> [Section 2.2.1.1](#): The values for string and binary properties might be truncated in an offline address book according to the limitations specified in [\[MS-OXOAB\]](#).

<4> [Section 2.2.1.1](#): The properties in an offline address book might have a different value if the value on a NSPI server has changed since the offline address book was created, or if the NSPI server was restored from a backup after the offline address book was created. In such a case, the NSPI server and the offline address book are said to be "out of sync". That is, the data in each source reflects a different time period.

<5> [Section 2.2.3](#): The Exchange 2003, Exchange 2007, and Exchange 2010 NSPI servers include the additional properties specified in section [2.2.6](#). Certain properties can be restricted from access by clients, such as a distribution lists where the members are hidden.

<6> [Section 2.2.3.9](#): The [PidTagAddressBookPhoneticDisplayName](#) property is not used in Office Outlook 2003 clients or Exchange 2003 servers.

<7> [Section 2.2.3.26](#): The [PidTagAddressBookSenderHintTranslations](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<8> [Section 2.2.3.27](#): The [PidTagAddressBookDeliveryContentLength](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<9> [Section 2.2.3.28](#): The [PidTagAddressBookModerationEnabled](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<10> [Section 2.2.3.29](#): The [PidTagAddressBookDistributionListMemberCount](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<11> [Section 2.2.3.30](#): The **PidTagAddressBookDistributionListExternalMemberCount** property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<12> [Section 2.2.3.35](#): The [PidTagAddressBookDisplayTypeExtended](#) property is not used in Office Outlook 2003 clients or Exchange 2003 servers.

<13> [Section 2.2.4.14](#): The [PidTagAddressBookPhoneticGivenName](#) property is not used in Office Outlook 2003 clients or Exchange 2003 servers.

<14> [Section 2.2.4.15](#): The [PidTagAddressBookPhoneticSurname](#) property is not used in Office Outlook 2003 clients or Exchange 2003 servers.

<15> [Section 2.2.4.16](#): The [PidTagAddressBookPhoneticCompanyName](#) property is not used by Office Outlook 2003 clients or Exchange 2003 servers.

<16> [Section 2.2.4.17](#): The [PidTagAddressBookPhoneticDepartmentName](#) property is not used by Office Outlook 2003 clients or Exchange 2003 servers.

<17> [Section 2.2.4.66.4](#): The [PidTagAddressBookPhoneticDisplayName](#) property is not used in Office Outlook 2003 clients or Exchange 2003 servers.

<18> [Section 2.2.4.66.5](#): The [PidTagAddressBookPhoneticDisplayName](#) property is not used in Office Outlook 2003 clients or Exchange 2003 servers.

<19> [Section 2.2.4.66.7](#): The [PidTagAddressBookPhoneticDisplayName](#) property is not used in Office Outlook 2003 clients or Exchange 2003 servers.

<20> [Section 2.2.4.66.9](#): The [PidTagAddressBookPhoneticDisplayName](#) property is not used in Office Outlook 2003 clients or Exchange 2003 servers.

<21> [Section 2.2.4.81](#): The [PidTagAddressBookOrganizationalUnitRootDistinguishedName](#) property is not used in Office Outlook 2003 clients.

<22> [Section 2.2.4.82](#): The [PidTagThumbnailPhoto](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<23> [Section 2.2.4.83](#): The [PidTagSpokenName](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<24> [Section 2.2.4.84](#): The [PidTagAddressBookAuthorizedSenders](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<25> [Section 2.2.4.85](#): The [PidTagAddressBookUnauthorizedSenders](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<26> [Section 2.2.4.86](#): The [PidTagAddressBookDistributionListMemberSubmitAccepted](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<27> [Section 2.2.4.87](#): The [PidTagAddressBookDistributionListMemberSubmitRejected](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<28> [Section 2.2.7:](#) The [PidTagAddressBookOrganizationalUnitRootDistinguishedName](#) property is not used in Office Outlook 2003 clients.

<29> [Section 2.2.7:](#) The [PidTagAddressBookSenderHintTranslations](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<30> [Section 2.2.7.2:](#) Office Outlook 2003 clients do not recognize departmental groups. If the department hierarchy is represented by using departmental groups, these clients run as if the [PidTagAddressBookHierarchicalRootDepartment](#) property is not present, and there is no hierarchical representation of the departments.

<31> [Section 2.2.8:](#) If a server represents a department hierarchy by using both Department objects and departmental groups, Office Outlook 2003 will only make use of the hierarchy that is represented by the Department objects, and Office Outlook 2007 and Outlook 2010 will only make use of the hierarchy that is represented by the departmental groups. A single hierarchy cannot be represented by a combination of the two schemas.

<32> [Section 2.2.10.1:](#) Office Outlook 2003, Office Outlook 2007, and Outlook 2010 specify an ambiguous name resolution search by setting up a *Filter* to **NspiGetMatches**, as specified in [\[MS-NSPI\]](#). The *Filter* is a **Restriction_r** structure, whose members are set up according to the following table.

Member	Value
Filter.rt	0x00000004 (same as RES_PROPERTY as specified in [MS-OXCDATA])
Filter.res.resProperty.relop	0x00000004 (same as RELOP_EQ as specified in [MS-OXCDATA])
Filter.res.resProperty.ulPropTag	PidTagAnr (PtypString8 or PtypString)
Filter.res.resProperty.lpProp.ulPropTag	Same as Filter.res.resProperty.ulPropTag
Filter.res.resProperty.lpProp.Value.lpszA	Target string in code page of pStat.CodePage, if PtypString8 specified.
Filter.res.resProperty.lpProp.Value.lpszW	Target string in Unicode, if PtypString specified.

<33> [Section 2.2.10.1:](#) Office Outlook 2003, Office Outlook 2007, and Outlook 2010 perform a lookup of SMTP addresses by constructing a specific target string for ambiguous name resolution (ANR) that is understood by Exchange 2003, Exchange 2007, and Exchange 2010 NSPI servers. When the target string starts with "=SMTP: " and is followed by a valid SMTP address, the NSPI server returns exactly one match, if any are found. The match will be an address book entry that has the target string as a valid SMTP address. Such a target string can be specified as a [PidTagAnr](#) property **restriction** to **NspiGetMatches**, described in section [2.2.3.26](#). Such a target string is also understood by the *paStr* parameter to **NspiResolveNames** or the *paWStr* parameter to **NspiResolveNamesW**.

<34> [Section 3.1.4.4:](#) The [PidTagAddressBookSenderHintTranslations](#) property is not used by Office Outlook 2003, Office Outlook 2007, Exchange 2003, or Exchange 2007.

<35> [Section 3.2.1:](#) The properties in an offline address book might have a different value if the value on a NSPI server has changed since the offline address book was created, or if the NSPI server was restored from a backup after the offline address book was created. In such a case, the NSPI server and the offline address book are said to be "out of sync". That is, the data in each source reflects a different time period.

<36> [Section 3.2.1](#): The offline address book that is implemented in Exchange 2003, Exchange 2007, and Exchange 2010 contains all the properties listed in the appendixes of [\[MS-OXOAB\]](#). This can include some properties that are not present on some implementations of an NSPI server.

7 Change Tracking

This section identifies changes that were made to the [MS-OXOABK] protocol document between the August 2010 and November 2010 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.
- Changes made for template compliance.
- Removal of a document from the documentation set.

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 revision 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.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change Type
2.2.4.83 PidTagSpokenName	48421 Updated name of reference from [MSDN-ASF] to [ASF] and changed link destination to specification download.	N	Content updated.

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