

[MS-OXNSPI]: Exchange Server Name Service Provider Interface (NSPI) Protocol Specification

Intellectual Property Rights Notice for Open Specifications Documentation

- **Technical Documentation.** Microsoft publishes Open Specifications documentation for protocols, file formats, languages, standards as well as overviews of the interaction among each of these technologies.
- **Copyrights.** This documentation is covered by Microsoft copyrights. Regardless of any other terms that are contained in the terms of use for the Microsoft website that hosts this documentation, you may make copies of it in order to develop implementations of the technologies described in the Open Specifications and may distribute portions of it in your implementations using these technologies or your documentation as necessary to properly document the implementation. You may also distribute in your implementation, with or without modification, any schema, IDL's, or code samples that are included in the documentation. This permission also applies to any documents that are referenced in the Open Specifications.
- **No Trade Secrets.** Microsoft does not claim any trade secret rights in this documentation.
- **Patents.** Microsoft has patents that may cover your implementations of the technologies described in the Open Specifications. Neither this notice nor Microsoft's delivery of the documentation grants any licenses under those or any other Microsoft patents. However, a given Open Specification may be covered by Microsoft's Open Specification Promise (available here: <http://www.microsoft.com/interop/osp>) or the Community Promise (available here: <http://www.microsoft.com/interop/cp/default.mspx>). If you would prefer a written license, or if the technologies described in the Open Specifications are not covered by the Open Specifications Promise or Community Promise, as applicable, patent licenses are available by contacting iplq@microsoft.com.
- **Trademarks.** The names of companies and products contained in this documentation may be covered by trademarks or similar intellectual property rights. This notice does not grant any licenses under those rights.
- **Fictitious Names.** The example companies, organizations, products, domain names, e-mail addresses, logos, people, places, and events depicted in this documentation are fictitious. No association with any real company, organization, product, domain name, email address, logo, person, place, or event is intended or should be inferred.

Reservation of Rights. All other rights are reserved, and this notice does not grant any rights other than specifically described above, whether by implication, estoppel, or otherwise.

Tools. The Open Specifications do not require the use of Microsoft programming tools or programming environments in order for you to develop an implementation. If you have access to Microsoft programming tools and environments you are free to take advantage of them. Certain Open Specifications are intended for use in conjunction with publicly available standard specifications and network programming art, and assumes that the reader either is familiar with the aforementioned material or has immediate access to it.

Revision Summary

Date	Revision History	Revision Class	Comments
06/10/2011	0.1	New	Released new document.
08/05/2011	1.0	Major	Significantly changed the technical content.

Table of Contents

1 Introduction	6
1.1 Glossary	6
1.2 References	7
1.2.1 Normative References	7
1.2.2 Informative References	7
1.3 Overview	8
1.4 Relationship to Other Protocols	8
1.5 Prerequisites/Preconditions	8
1.6 Applicability Statement	9
1.7 Versioning and Capability Negotiation	9
1.8 Vendor-Extensible Fields	9
1.9 Standards Assignments	9
2 Messages	10
2.1 Transport	10
2.2 Constant Value Definitions	10
2.2.1 Permitted Property Type Values	10
2.2.2 Permitted Error Code Values	12
2.2.3 Display Type Values	13
2.2.4 Default Language Code Identifier	13
2.2.5 Required Code Pages	14
2.2.6 Permanent Entry ID GUID	14
2.2.7 Positioning Minimal Entry IDs	14
2.2.8 Ambiguous Name Resolution Minimal Entry IDs	15
2.2.9 Table Sort Orders	15
2.2.10 Retrieve Property Flags	15
2.2.11 NspiGetSpecialTable Flags	16
2.2.12 NspiQueryColumns Flag	16
2.2.13 NspiGetTemplateInfo Flags	16
2.2.14 NspiModLinkAtt Flags	17
2.3 Common Data Types	17
2.3.1 Property Values	18
2.3.1.1 FlatUID_r Structure	18
2.3.1.2 PropertyTagArray_r Structure	18
2.3.1.3 Binary_r Structure	19
2.3.1.4 ShortArray_r Structure	19
2.3.1.5 LongArray_r Structure	19
2.3.1.6 StringArray_r Structure	20
2.3.1.7 BinaryArray_r Structure	20
2.3.1.8 FlatUIDArray_r Structure	20
2.3.1.9 WStringArray_r Structure	20
2.3.1.10 DateTimeArray_r Structure	21
2.3.1.11 PROP_VAL_UNION Structure	21
2.3.1.12 PropertyValue_r Structure	23
2.3.2 PropertyRow_r Structure	23
2.3.3 PropertyRowSet_r Structure	24
2.3.4 Restrictions	24
2.3.4.1 AndRestriction_r Restriction, OrRestriction_r Restriction	24
2.3.4.2 NotRestriction_r Restriction	25
2.3.4.3 ContentRestriction_r Restriction	25

2.3.4.4	PropertyRestriction_r Restriction.....	26
2.3.4.5	ExistRestriction_r Restriction.....	26
2.3.4.6	RestrictionUnion_r Restriction	26
2.3.4.7	Restriction_r Restriction	27
2.3.5	Property Name/Property ID Structures.....	27
2.3.5.1	PropertyName_r Structure	27
2.3.5.2	PropertyNameSet_r Structure	28
2.3.6	String Arrays	28
2.3.6.1	StringsArray_r.....	28
2.3.6.2	WStringsArray_r.....	28
2.3.7	STAT	29
2.3.8	EntryIDs	30
2.3.8.1	MinimalEntryID	30
2.3.8.2	EphemeralEntryID	31
2.3.8.3	PermanentEntryID	32
2.3.9	NSPI_HANDLE.....	33
3	Protocol Details.....	34
3.1	Server Details	34
3.1.1	Abstract Data Model	34
3.1.1.1	Required Properties	34
3.1.1.2	String Handling	35
3.1.1.2.1	Required Native Categorizations.....	35
3.1.1.2.2	Required Code Page Support	35
3.1.1.2.3	Conversion Rules for String Values Specified by the Server to the Client	36
3.1.1.2.4	Conversion Rules for String Values Specified by the Client to the Server	36
3.1.1.2.5	String Comparison.....	37
3.1.1.2.5.1	Unicode String Comparison.....	37
3.1.1.2.5.2	8-Bit String Comparison	37
3.1.1.2.6	String Sorting	38
3.1.1.3	Tables	38
3.1.1.3.1	Status-Based Tables	38
3.1.1.3.2	Explicit Tables.....	38
3.1.1.3.2.1	Restriction-Based Explicit Tables	39
3.1.1.3.2.2	Property Value-Based Explicit Tables.....	39
3.1.1.3.3	Specific Instantiations of Special Tables	39
3.1.1.3.3.1	Address Book Hierarchy Table	39
3.1.1.3.3.2	Address Creation Table	39
3.1.1.4	Positioning in a Table	39
3.1.1.4.1	Absolute Positioning	40
3.1.1.4.2	Fractional Positioning.....	40
3.1.1.5	Object Identity	41
3.1.1.6	Ambiguous Name Resolution	42
3.1.2	Timers	42
3.1.3	Initialization	42
3.1.4	Message Processing Events and Sequencing Rules.....	43
3.1.4.1	NspiBind (Opnum 0)	44
3.1.4.2	NspiUnbind (Opnum 1).....	46
3.1.4.3	NspiGetSpecialTable (Opnum 12)	46
3.1.4.4	NspiUpdateStat (Opnum 2).....	48
3.1.4.5	NspiQueryColumns (Opnum 16)	49
3.1.4.6	NspiGetPropList (Opnum 8).....	50
3.1.4.7	NspiGetProps (Opnum 9)	51

3.1.4.8	NspiQueryRows (Opnum 3)	53
3.1.4.9	NspiSeekEntries (Opnum 4)	56
3.1.4.10	NspiGetMatches (Opnum 5)	59
3.1.4.11	NspiResortRestriction (Opnum 6)	62
3.1.4.12	NspiCompareMIds (Opnum 10)	64
3.1.4.13	NspiDNToMId (Opnum 7)	65
3.1.4.14	NspiModProps (Opnum 11)	66
3.1.4.15	NspiModLinkAtt (Opnum 14)	67
3.1.4.16	NspiResolveNames (Opnum 19)	69
3.1.4.17	NspiResolveNamesW (Opnum 20)	71
3.1.4.18	NspiGetTemplateInfo (Opnum 13)	73
3.2	Client Details	74
3.2.1	Abstract Data Model	74
3.2.2	Timers	74
3.2.3	Initialization	74
3.2.4	Message Processing Events and Sequencing Rules	75
3.2.5	Timer Events	75
3.2.6	Other Local Events	75
4	Protocol Examples	76
5	Security	82
5.1	Security Considerations for Implementers	82
5.2	Index of Security Parameters	83
6	Appendix A: Full IDL	84
7	Appendix B: Product Behavior	92
8	Change Tracking	93
9	Index	95

1 Introduction

The Exchange Server Name Service Provider Interface (NSPI) Protocol provides a way for messaging clients to access and manipulate address data that is stored by a server. This protocol consists of an abstract data model and a single **remote procedure call (RPC)** interface to manipulate data in that model.

1.1 Glossary

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

- ambiguous name resolution (ANR)**
- code page**
- distinguished name (DN)**
- GUID**
- Hypertext Transfer Protocol (HTTP)**
- Interface Definition Language (IDL)**
- Kerberos**
- language code identifier (LCID)**
- Lightweight Directory Access Protocol (LDAP)**
- little-endian**
- name service provider interface (NSPI)**
- Network Data Representation (NDR)**
- NT LAN Manager (NTLM) Authentication Protocol**
- opnum**
- remote procedure call (RPC)**
- RPC protocol sequence**
- RPC transport**
- Transmission Control Protocol (TCP)**
- Unicode**
- universally unique identifier (UUID)**

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

- address book**
- address book container**
- address book hierarchy table**
- Address Book object**
- address creation template**
- display template**
- endpoint**
- entry ID**
- EntryID**
- Minimal Entry ID**
- Permanent Entry ID**
- property type**
- security provider**
- UTF-16LE**

The following terms are specific to this document:

address creation table: A table containing information about the templates that an address book server supports for creating new e-mail addresses.

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.

[C706] The Open Group, "DCE 1.1: Remote Procedure Call", C706, August 1997, <http://www.opengroup.org/public/pubs/catalog/c706.htm>

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

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

[MS-OXCFOLD] Microsoft Corporation, "[Folder Object Protocol Specification](#)".

[MS-OXOABK] Microsoft Corporation, "[Address Book Object Protocol Specification](#)".

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

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

[MS-RPCE] Microsoft Corporation, "[Remote Procedure Call Protocol Extensions](#)".

[MS-UCODEREF] Microsoft Corporation, "[Windows Protocols Unicode Reference](#)".

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

1.2.2 Informative References

[MS-GLOS] Microsoft Corporation, "[Windows Protocols Master Glossary](#)".

[MS-KILE] Microsoft Corporation, "[Kerberos Protocol Extensions](#)".

[MS-NLMP] Microsoft Corporation, "[NT LAN Manager \(NTLM\) Authentication Protocol Specification](#)".

[MS-NSPI] Microsoft Corporation, "[Name Service Provider Interface \(NSPI\) Protocol Specification](#)".

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

[RFC1510] Kohl, J., and Neuman, C., "The Kerberos Network Authentication Service (V5)", RFC 1510, September 1993, <http://www.ietf.org/rfc/rfc1510.txt>

[RFC4120] Neuman, C., Yu, T., Hartman, S., and Raeburn, K., "The Kerberos Network Authentication Service (V5)", RFC 4120, July 2005, <http://www.ietf.org/rfc/rfc4120.txt>

[RFC4511] Sermersheim, J., "Lightweight Directory Access Protocol (LDAP): The Protocol", RFC 4511, June 2006, <http://www.rfc-editor.org/rfc/rfc4511.txt>

1.3 Overview

Messaging clients that implement a browsable **address book** need a way to communicate with an address data store in order to access and manipulate that data. This protocol enables communication between a messaging client and a data store.

This protocol is a protocol layer that uses the remote procedure call (RPC) protocol as a transport, with a series of interface methods as described in this document, that clients can use to communicate with a server. The server will use **Lightweight Directory Access Protocol (LDAP)** and **NSPI** to retrieve data that is returned to the client.

The following figure shows a graphical representation of a typical communication sequence between a messaging client and a server.

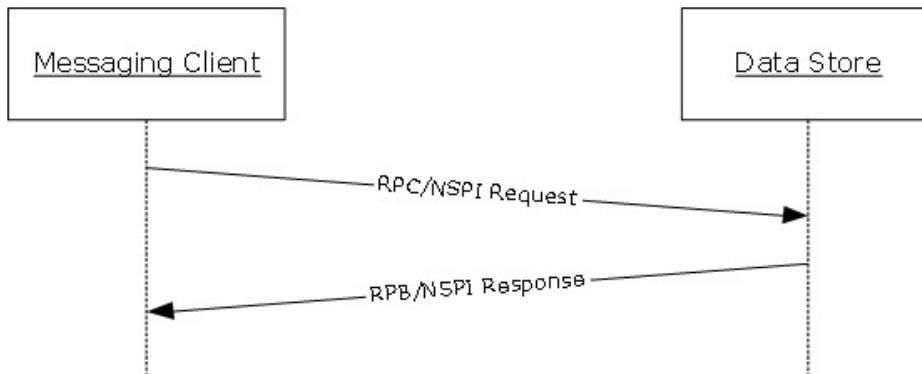


Figure 1: Exchange Server NSPI Protocol message sequence

1.4 Relationship to Other Protocols

The Exchange Server NSPI Protocol depends on the following protocols:

- The Remote Procedure Call (RPC) Protocol, as described in [\[C706\]](#) and [\[MS-RPCE\]](#), as a transport.
- The Kerberos Network Authentication Service (V5), as described in [\[MS-KILE\]](#), [\[RFC1510\]](#), and [\[RFC4120\]](#) for client authentication.
- The **NT LAN Manager (NTLM) Authentication Protocol**, as described in [\[MS-NLMP\]](#), for client authentication.
- The Address Book Object Protocol, as described in [\[MS-OXOABK\]](#), for property definitions.
- The Address Book User Interface Templates Protocol, as described in [\[MS-OXOABKT\]](#), for the definition of address book templates.
- The Lightweight Directory Access Protocol (LDAP), as described in [\[RFC4511\]](#).
- The Name Service Provider Interface (NSPI) Protocol, as described in [\[MS-NSPI\]](#).

1.5 Prerequisites/Preconditions

The client implementation has to have the network address of the server. This network address satisfies the requirements of a network address for the underlying transport of remote procedure call (RPC). This allows the client to initiate communication with the server by using the RPC Protocol.

The client and Exchange NSPI server are required to share at least one **security provider** in common for the **RPC transport**. This allows the server to authenticate the client.

The credentials of the client have to be recognized by the server. These credentials are obtained from the shared security provider. The mechanism for obtaining these credentials is specific to the protocol of the security provider that is used.

The server has to have determined any local policies as described in sections [2](#), [3](#), and [5](#). This allows the server to provide consistent behavior for all communications in the protocol.

The server has to be configured to support the required **code pages** and **language code identifiers (LCIDs)**, as described in sections [2.2.4](#) and [2.2.5](#). This allows the server to provide the minimal required string conversions and sort orders.

The server has to be started and fully initialized before the protocol can start.

1.6 Applicability Statement

The Exchange Server NSPI Protocol is appropriate for messaging clients that implement online access to address books for browsing and viewing of **Address Book objects** that are stored in a data store.

1.7 Versioning and Capability Negotiation

This document covers versioning issues in the following areas:

- **Supported Transports:** This protocol uses multiple **RPC protocol sequences**, as specified in section [2.1](#).
- **Protocol Versions:** This protocol has a single interface version. This version is defined in section [2.1](#).
- **Security and Authentication Methods:** This protocol supports the NTLM and **Kerberos** authentication methods.
- **Localization:** This protocol passes text strings in various methods. Localization considerations for such strings are specified in section [3.1.1.2](#).
- **Capability Negotiation:** The Exchange Server NSPI Protocol does not support negotiation. There is only one interface version.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

Parameter	Value	Reference
Interface UUID	F5CC5A18-4264-101A-8C59-08002B2F8426	[C706] section A.2.5

2 Messages

The following sections specify transport methods of Exchange Server NSPI Protocol messages and common Exchange Server NSPI Protocol data types.

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

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

2.1 Transport

All remote procedure call (RPC) protocols use RPC dynamic **endpoints (2)**, as specified in [\[C706\]](#).

The Exchange Server NSPI Protocol uses the following RPC protocol sequences:

- RPC over Named Pipes
- RPC over **HTTP**
- RPC over **TCP**

The protocol allows a server to be configured to use a specific port for RPC over TCP. The mechanism for configuring a server to use a specific port is not constrained by the Exchange Server NSPI Protocol. The mechanism for a client to discover this configured TCP port is not constrained by the Exchange Server NSPI Protocol.

This protocol MUST use the UUID F5CC5A18-4264-101A-8C59-08002B2F8426. The protocol MUST use the RPC version number 56.0.

This protocol configures the RPC runtime to perform a strict **Network Data Representation (NDR)** data consistency check at target level 5.0, as specified in [\[MS-RPCE\]](#).

This protocol uses security information as specified in [\[MS-RPCE\]](#). The server MUST register one or both of the NT LAN Manager (NTLM) Authentication Protocol or Kerberos security providers. Additionally, the server MUST register the negotiation security provider.

The protocol does not require mutual authentication. the client and Exchange NSPI server MUST use an authentication mechanism that is capable of authenticating the client to the server. The protocol does not require that the client be capable of authenticating the server.

The protocol uses the underlying RPC Protocol to retrieve the identity of the client that made the method call, as specified in [\[MS-RPCE\]](#). The server MAY use this identity to perform access checks, as described in section [5](#) of this document.

The server MAY enforce limits on the maximum RPC packet size that it will accept.

2.2 Constant Value Definitions

This section defines common values that are used in multiple messages.

2.2.1 Permitted Property Type Values

The **property type** values specified in this section are used to specify property types. They appear in various places in the Exchange Server NSPI Protocol. All Exchange NSPI servers MUST recognize and be capable of accepting and returning these property types. Values that represent property types are defined in [\[MS-OXCADATA\]](#).

The values specified in [MS-OXCADATA] are 16-bit integers. The Exchange Server NSPI Protocol uses the same numeric values but expressed as 32-bit integers. The high-order 16 bits of the 32-bit representation that is used by the Exchange Server NSPI Protocol are always 0x0000. The following table lists the permitted values for the Exchange Server NSPI Protocol.

Value name	Value as defined in [MS-OXCADATA]	Value as used in the Exchange Server NSPI Protocol
PtypInteger16	0x0002	0x00000002
PtypInteger32	0x0003	0x00000003
PtypBoolean	0x000B	0x0000000B
PtypString8	0x001E	0x0000001E
PtypBinary	0x0102	0x00000102
PtypString	0x001F	0x0000001F
PtypGuid	0x0048	0x00000048
PtypTime	0x0040	0x00000040
PtypErrorCode	0x000A	0x0000000A
PtypMultipleInteger16	0x1002	0x00001002
PtypMultipleInteger32	0x1003	0x00001003
PtypMultipleString8	0x101E	0x0000101E
PtypMultipleBinary	0x1102	0x00001102
PtypMultipleString	0x101F	0x0000101F
PtypMultipleGuid	0x1048	0x00001048
PtypMultipleTime	0x1040	0x00001040

In addition to the property types that are defined in [MS-OXCADATA], all Exchange NSPI servers and clients MUST recognize and be capable of accepting and returning the property types that are listed in the following table.

Property type name and value	Description
PtypEmbeddedTable ([MS-OXCADATA] section 2.11.1.4) 0x0000000D	Single 32-bit value, referencing an address list.
PtypNull ([MS-OXCADATA] section 2.11.1) 0x00000001	Clients MUST NOT specify this property type in any method's input parameters. The server MUST specify this property type in any method's output parameters to indicate that a property has a value that cannot be expressed in the Exchange Server NSPI Protocol.
PtypUnspecified ([MS-OXCADATA] section 2.11.1)	Clients specify this property type in a method's input parameter to indicate that the client will accept any property type the server chooses

Property type name and value	Description
0x00000000	when returning propvalues. Servers MUST NOT specify this property type in any method's output parameters except the method NspiGetIDsFromNames .

All clients and servers MUST NOT use any other property types.

2.2.2 Permitted Error Code Values

The error code values listed in this section are used to specify status from an NSPI method. They appear as return codes from NSPI methods and as values of properties with property type **PtypErrorCode** ([\[MS-OXCDATA\]](#) section 2.11.1). All Exchange NSPI servers MUST recognize and be capable of accepting and returning these error codes. The values that represent the error codes are defined in [\[MS-OXCDATA\]](#) section 2.4. The following are the permitted error code values for the Exchange Server NSPI Protocol:

- Success
- ErrorsReturned
- GeneralFailure
- NotSupported
- InvalidObject
- OutOfResources
- NotFound
- LogonFailed
- TooComplex
- InvalidCodepage
- InvalidLocale
- TooBig
- TableTooBig
- InvalidBookmark
- AmbiguousRecipient
- AccessDenied
- NotEnoughMemory
- InvalidParameter

All clients and servers MUST NOT use any other error codes.

2.2.3 Display Type Values

The values listed in this section are used to specify display types. They appear in various places in the Exchange Server NSPI Protocol as object properties and as part of **EntryIDs**. Except where otherwise specified in the following table, all Exchange NSPI servers MUST recognize and be capable of accepting and returning these display types. The following table lists the permitted display type values for the Exchange Server NSPI Protocol.

Display type name and value	Description
DT_MAILUSER 0x00000000	A typical messaging user.
DT_DISTLIST 0x00000001	A distribution list.
DT_FORUM 0x00000002	A forum, such as a bulletin board service or a public or shared folder.
DT_AGENT 0x00000003	An automated agent, such as Quote-Of-The-Day or a weather chart display.
DT_ORGANIZATION 0x00000004	An Address Book object defined for a large group, such as helpdesk, accounting, coordinator, or department. Department objects usually have this display type.
DT_PRIVATE_DISTLIST 0x00000005	A private, personally administered distribution list.
DT_REMOTE_MAILUSER 0x00000006	An Address Book object known to be from a foreign or remote messaging system.
DT_CONTAINER 0x00000100	An address book hierarchy table container. An Exchange NSPI server MUST NOT return this display type except as part of an EntryID of an object in the address book hierarchy table.
DT_TEMPLATE 0x00000101	A display template object. An Exchange NSPI server MUST NOT return this display type.
DT_ADDRESS_TEMPLATE 0x00000102	An address creation template . An Exchange NSPI server MUST NOT return this display type except as part of an EntryID of an object in the Address Creation Table.
DT_SEARCH 0x00000200	A search template. An Exchange NSPI server MUST NOT return this display type.

All clients and servers MUST NOT use any other display types.

2.2.4 Default Language Code Identifier

The language code identifier (LCID) specified in this section is associated with the minimal required sort order for **Unicode** strings. It appears in input parameters to Exchange Server NSPI Protocol methods. It affects Exchange NSPI server string handling, as specified in section [3.1.1.2](#). The following table lists and describes the default LCID for this protocol.

Default LCID name and value	Description
NSPI_DEFAULT_LOCALE 0x00000409	Represents the default LCID that is used for comparison of Unicode string representations.

2.2.5 Required Code Pages

The required code pages listed in this section are associated with the string handling in the Exchange Server NSPI Protocol, and they appear in input parameters to methods in the Exchange Server NSPI Protocol. They affect Exchange NSPI server string handling, as specified in section [3.1.1.2](#). The following table lists the required code pages.

Code page name and value	Description
CP_TELETEX 0x00004F25	Represents the Teletex code page.
CP_WINUNICODE 0x000004B0	Represents the Unicode code page.

2.2.6 Permanent Entry ID GUID

The following table lists the **Permanent Entry ID** that is associated with the Exchange Server NSPI Protocol.

Permanent Entry ID name and value	Description
GUID_NSPI {0xDC, 0xA7, 0x40, 0xC8, 0xC0, 0x42, 0x10, 0x1A, 0xB4, 0xB9, 0x08, 0x00, 0x2B, 0x2F, 0xE1, 0x82}	Represents the Exchange Server NSPI Protocol in Permanent Entry IDs.

2.2.7 Positioning Minimal Entry IDs

The positioning **Minimal Entry IDs** are used to specify objects in the address book as a function of their positions in tables. They appear as Minimal Entry IDs in the **CurrentRec** field of the [STAT](#) structure, as specified in section [2.3.7](#). The following table lists the possible values.

Minimal Entry ID name and value	Description
MID_BEGINNING_OF_TABLE 0x00000000	Specifies the position before the first row in the current address book container .
MID_END_OF_TABLE 0x00000002	Specifies the position after the last row in the current address book container.
MID_CURRENT 0x00000001	Specifies the current position in a table. This Minimal Entry ID is only valid in the NspiUpdateStat method. In all other cases, it is an invalid Minimal Entry ID, guaranteed to not specify any object in the address book.

2.2.8 Ambiguous Name Resolution Minimal Entry IDs

Ambiguous name resolution (ANR) Minimal Entry IDs are used to specify the outcome of the ANR process. They appear in return data from the **NspiResolveNames** method, as specified in section [3.1.4.16](#), and the **NspiResolveNamesw** method, as specified in section [3.1.4.17](#). The following table lists the possible values.

Minimal Entry ID name and value	Description
MID_UNRESOLVED 0x00000000	The ANR process was unable to map a string to any objects in the address book.
MID_AMBIGUOUS 0x00000001	The ANR process mapped a string to multiple objects in the address book.
MID_RESOLVED 0x00000002	The ANR process mapped a string to a single object in the address book.

2.2.9 Table Sort Orders

The following table lists the values that are used to specify a specific sort orders for tables. These values appear in the **SortType** field of the [STAT](#) data structure, as specified in section [2.3.7](#).

Sort type name and value	Description
SortTypeDisplayName 0x00000000	The table is sorted ascending on the PidTagDisplayName property, as specified in [MS-OXCFOLD] section 2.2.2.2.3. All Exchange NSPI servers MUST support this sort order for at least one LCID.
SortTypePhoneticDisplayName 0x00000003	The table is sorted ascending on the PidTagAddressBookPhoneticDisplayName property, as specified in [MS-OXOABK] section 2.2.3.9. Exchange NSPI servers SHOULD support this sort order. Exchange NSPI servers MAY support this only for some LCIDs.
SortTypeDisplayName_RO 0x000003E8	The table is sorted ascending on the PidTagDisplayName property. The client MUST set this value only when using the NspiGetMatches method to open a nonwritable table on an object-valued property.
SortTypeDisplayName_W 0x000003E9	The table is sorted ascending on the PidTagDisplayName property. The client MUST set this value only when using the NspiGetMatches method to open a writable table on an object-valued property.

2.2.10 Retrieve Property Flags

The following table lists the property flag values that are used to specify optional behavior to a server. They appear as bit flags in methods that return property values to the client (**NspiGetPropList**, **NspiGetProps**, and **NspiQueryRows**).

Property flag name and value	Description
fSkipObjects 0x00000001	Client requires that the server MUST NOT include proptags with the PtypEmbeddedTable property type in any lists of proptags that the server creates on behalf of the client.

Property flag name and value	Description
fEphID 0x00000002	Client requires that the server MUST return Entry ID values in Ephemeral Entry ID form.

2.2.11 NspiGetSpecialTable Flags

NspiGetSpecialTable flag values are used to specify optional behavior to a server. They appear as bit flags in the **NspiGetSpecialTable** method. The following table lists the possible values.

Flag name and value	Description
NspiAddressCreationTemplates 0x00000002	Specifies that the server MUST return the table of the available address creation templates. Specifying this flag causes the server to ignore the NspiUnicodeStrings flag.
NspiUnicodeStrings 0x00000004	Specifies that the server MUST return all strings as Unicode representations rather than as multibyte strings in the client's code page.

2.2.12 NspiQueryColumns Flag

The **NspiQueryColumns** flag value is used to specify optional behavior to a server. It appears as a bit flag in the **NspiQueryColumns** method. The following table lists the value for this flag.

Flag name and value	Description
NspiUnicodeProptypes 0x80000000	Specifies that the server MUST return all proptags that specify values with string representations as having the PtypString property type. The default behavior is that the server MUST return all proptags specifying values with string representations as having the PtypString8 property type.

2.2.13 NspiGetTemplateInfo Flags

The **NspiGetTemplateInfo** flag values are used to specify optional behavior to a server. They appear as bit flags in the **NspiGetTemplateInfo** method. The following table lists the possible values.

Flag name and value	Description
TI_TEMPLATE 0x00000001	Specifies that the server is to return the value that represents a template.
TI_SCRIPT 0x00000004	Specifies that the server is to return the value of the script that ia associated with a template.
TI_EMT 0x00000010	Specifies that the server is to return the e-mail type that ia associated with a template.
TI_HELPFILE_NAME 0x00000020	Specifies that the server is to return the name of the help file that ia associated with a template.
TI_HELPFILE_CONTENTS	Specifies that the server is to return the contents of the help file that ia

Flag name and value	Description
0x00000040	associated with a template.

2.2.14 NspiModLinkAtt Flags

The **NspiModLinkAtt** flag value is used to specify optional behavior to a server. It appears as a bit flag in the **NspiModLinkAtt** method. The following table lists the value of the flag.

Flag name and Value	Description
fDelete 0x00000001	Specifies that the server is to remove values when modifying. The default behavior is that the server adds values when modifying.

2.3 Common Data Types

This protocol enables the **ms_union** extension, as specified in [\[MS-RPCE\]](#).

This protocol requests that the RPC runtime, via the **strict_context_handle** attribute, rejects the use of context handles created by a method of a different RPC interface than this one, as specified in [\[MS-RPCE\]](#).

In addition to the RPC base types and definitions specified in [\[C706\]](#) and [\[MS-RPCE\]](#), the Exchange Server NSPI Protocol uses additional data types.

The following table summarizes the types that are defined in this specification.

Data type name	Description
FlatUID_r	Byte order specified GUIDs
PropertyTagArray_r	Property value structure
Binary_r	Property value structure
ShortArray_r	Property value structure
LongArray_r	Property value structure
StringArray_r	Property value structure
BinaryArray_r	Property value structure
FlatUIDArray_r	Property value structure
WStringArray_r	Property value structure
DateTimeArray_r	Property value structure
PROP_VAL_UNION	Property value structure
PropertyValue_r	Property value structure
PropertyRow_r	Table row structure
PropertyRowSet_r	Table rows structure

Data type name	Description
AndRestriction_r	Table restriction structure
OrRestriction_r	Table restriction structure
NotRestriction_r	Table restriction structure
ContentRestriction_r	Table restriction structure
PropertyRestriction_r	Table restriction structure
ExistRestriction_r	Table restriction structure
RestrictionUnion_r	Table restriction structure
Restriction_r	Table restriction structure
PropertyName_r	Address book property specifier
PropertyNameSet_r	Collection of PropertyName_r structures
StringsArray_r	Collection of 8-bit character strings
WStringsArray_r	Collection of Unicode strings
STAT	Table status structure
MinimalEntryID	Address Book object identification
EphemeralEntryID	Address Book object identification
PermanentEntryID	Address Book object identification
NSPI_HANDLE	RPC context handle

2.3.1 Property Values

The following structures are used to represent specific property values.

2.3.1.1 FlatUID_r Structure

The **FlatUID_r** structure is an encoding of the **FlatUID** data structure defined in [\[MS-OXCDATA\]](#) section 2.5.2. The semantic meaning is unchanged from the **FlatUID** data structure.

```
typedef struct {
    BYTE ab[16];
} FlatUID_r;
```

ab: Encodes the ordered bytes of the **FlatUID** data structure.

2.3.1.2 PropertyTagArray_r Structure

The **PropertyTagArray_r** structure is an encoding of the **PropTagArray** data structure defined in [\[MS-OXCDATA\]](#) section 2.10.2. The permissible number of proptag values in the

PropertyTagArray_r structure exceeds that of the **PropTagArray** data structure. The semantic meaning is otherwise unchanged from the **PropTagArray** data structure.

```
typedef struct PropertyTagArray_r {
    DWORD cValues;
    [range(0,100001), size_is(cValues+1), length_is(cValues)]
    DWORD aulPropTag[];
} PropertyTagArray_r;
```

cValues: Encodes the **Count** field of **PropTagArray**. This field MUST NOT exceed 100,000.

aulPropTag: Encodes the **PropertyTags** field of **PropTagArray**.

2.3.1.3 Binary_r Structure

The **Binary_r** structure encodes an array of uninterpreted bytes.

```
typedef struct Binary_r {
    [range(0,2097152)] DWORD cb;
    [size_is(cb)] BYTE* lpb;
} Binary_r;
```

cb: The number of uninterpreted bytes represented in this structure. This value MUST NOT exceed 2,097,152.

lpb: The uninterpreted bytes.

2.3.1.4 ShortArray_r Structure

The **ShortArray_r** structure encodes an array of 16-bit integers.

```
typedef struct ShortArray_r {
    [range(0,100000)] DWORD cValues;
    [size_is(cValues)] short int* lpi;
} ShortArray_r;
```

cValues: The number of 16-bit integer values represented in the **ShortArray_r** structure. This value MUST NOT exceed 100,000.

lpi: The 16-bit integer values.

2.3.1.5 LongArray_r Structure

The **LongArray_r** structure encodes an array of 32-bit integers.

```
typedef struct _LongArray_r {
    [range(0,100000)] DWORD cValues;
    [size_is(cValues)] long* lpl;
} LongArray_r;
```

cValues: The number of 32-bit integers represented in this structure. This value MUST NOT exceed 100,000.

lpl: The 32-bit integer values.

2.3.1.6 StringArray_r Structure

The **StringArray_r** structure encodes an array of references to 8-bit character strings.

```
typedef struct _StringArray_r {
    [range(0,100000)] DWORD cValues;
    [string, size_is(cValues)] char** lpszA;
} StringArray_r;
```

cValues: The number of 8-bit character string references represented in the **StringArray_r** structure. This value MUST NOT exceed 100,000.

lpszA: The 8-bit character string references. The strings referred to are NULL-terminated.

2.3.1.7 BinaryArray_r Structure

The **BinaryArray_r** structure is an array of [Binary_r](#) data structures.

```
typedef struct _BinaryArray_r {
    [range(0,100000)] DWORD cValues;
    [size_is(cValues)] Binary_r* lpbinary;
} BinaryArray_r;
```

cValues: The number of **Binary_r** data structures represented in the **BinaryArray_r** structure. This value MUST NOT exceed 100,000.

lpbin: The **Binary_r** data structures.

2.3.1.8 FlatUIDArray_r Structure

The **FlatUIDArray_r** structure encodes an array of [FlatUID_r](#) data structures.

```
typedef struct _FlatUIDArray_r {
    [range(0,100000)] DWORD cValues;
    [size_is(cValues)] FlatUID_r** lpguid;
} FlatUIDArray_r;
```

cValues: The number of **FlatUID_r** structures represented in the **FlatUIDArray_r** structure. This value MUST NOT exceed 100,000.

lpguid: The **FlatUID_r** data structures.

2.3.1.9 WStringArray_r Structure

The **WStringArray_r** structure encodes an array of references to Unicode strings.

```

typedef struct _WStringArray_r {
    [range(0,100000)] DWORD cValues;
    [string, size_is(cValues)] wchar_t** lpszW;
} WStringArray_r;

```

cValues: The number of Unicode character string references represented in the **WStringArray_r** structure. This value MUST NOT exceed 100,000.

lpszW: The Unicode character string references. The strings referred to are NULL-terminated.

2.3.1.10 DateTimeArray_r Structure

The **DateTimeArray_r** structure encodes an array of [FILETIME](#) structures.

```

typedef struct _DateTimeArray_r {
    [range(0,100000)] DWORD cValues;
    [size_is(cValues)] FILETIME* lpft;
} DateTimeArray_r;

```

cValues: The number of **FILETIME** data structures represented in the **DateTimeArray_r** structure. This value MUST NOT exceed 100,000.

lpft: The **FILETIME** data structures.

2.3.1.11 PROP_VAL_UNION Structure

The **PROP_VAL_UNION** structure encodes a single instance of any type of property value. It is an aggregation data structure, allowing a single parameter to an NSPI method to contain any type of property value.

```

typedef
[switch_type(long)]
union _PV_r {
    [case(0x00000002)]
        short int i;
    [case(0x00000003)]
        long l;
    [case(0x0000000B)]
        unsigned short int b;
    [case(0x0000001E)]
        [string] char* lpszA;
    [case(0x00000102)]
        Binary_r bin;
    [case(0x0000001F)]
        [string] wchar_t* lpszW;
    [case(0x00000048)]
        FlatUID_r* lpguid;
    [case(0x00000040)]
        FILETIME ft;
    [case(0x0000000A)]
        long err;
    [case(0x00001002)]
        ShortArray_r MVi;
}

```

```

    [case(0x00001003)]
        LongArray_r MVl;
    [case(0x0000101E)]
        StringArray_r MVszA;
    [case(0x00001102)]
        BinaryArray_r MVbin;
    [case(0x00001048)]
        FlatUIDArray_r MVguid;
    [case(0x0000101F)]
        WStringArray_r MVszW;
    [case(0x00001040)]
        DateTimeArray_r MVft;
    [case(0x00000001, 0x0000000D)]
        long lReserved;
} PROP_VAL_UNION;

```

i: PROP_VAL_UNION contains an encoding of the value of a property that can contain a single 16-bit integer value.

I: PROP_VAL_UNION contains an encoding of the value of a property that can contain a single 32-bit integer value.

b: PROP_VAL_UNION contains an encoding of the value of a property that can contain a single Boolean value. The client and server MUST NOT set this to values other than 1 or 0.

lpszA: PROP_VAL_UNION contains an encoding of the value of a property that can contain a single 8-bit character string value. This value is NULL-terminated.

bin: PROP_VAL_UNION contains an encoding of the value of a property that can contain a single binary data value. The number of bytes that can be encoded in this structure is 2,097,152.

lpszW: PROP_VAL_UNION contains an encoding of the value of a property that can contain a single Unicode string value. This value is NULL-terminated.

lpguid: PROP_VAL_UNION contains an encoding of the value of a property that can contain a single GUID value. The value is encoded as a [FlatUID_r](#) data structure.

ft: PROP_VAL_UNION contains an encoding of the value of a property that can contain a single 64-bit integer value. The value is encoded as a **FILETIME** structure.

err: PROP_VAL_UNION contains an encoding of the value of a property that can contain a single **PtypErrorCode** value.

MVi: PROP_VAL_UNION contains an encoding of the values of a property that can contain multiple 16-bit integer values. The number of values that can be encoded in this structure is 100,000.

MVI: PROP_VAL_UNION contains an encoding of the values of a property that can contain multiple 32-bit integer values. The number of values that can be encoded in this structure is 100,000.

MVszA: PROP_VAL_UNION contains an encoding of the values of a property that can contain multiple 8-bit character string values. These string values are NULL-terminated. The number of values that can be encoded in this structure is 100,000.

MVbin: PROP_VAL_UNION contains an encoding of the values of a property that can contain multiple binary data values. The number of bytes that can be encoded in each value of this structure is 2,097,152. The number of values that can be encoded in this structure is 100,000.

MVguid: PROP_VAL_UNION contains an encoding of the values of a property that can contain multiple GUID values. The values are encoded as **FlatUID_r** data structures. The number of values that can be encoded in this structure is 100,000.

MVsZW: PROP_VAL_UNION contains an encoding of the values of a property that can contain multiple Unicode string values. These string values are NULL-terminated. The number of values that can be encoded in this structure is 100,000.

MVft: PROP_VAL_UNION contains an encoding of the value of a property that can contain multiple 64-bit integer values. The values are encoded as **FILETIME** structures. The number of values that can be encoded in this structure is 100,000.

IReserved: Reserved. All clients and servers MUST set this value to the constant 0x00000000.

2.3.1.12 PropertyValue_r Structure

The **PropertyValue_r** structure is an encoding of the **PropertyValue** data structure, as specified in [\[MS-OXCDATA\]](#) section 2.11.2.2.

For property values with uninterpreted byte values, the permissible number of bytes in the **PropertyValue_r** structure exceeds that of the **PropertyValue** data structure. For property values with multiple values, the permissible number of values in the **PropertyValue_r** structure exceeds that of the **PropertyValue** data structure. The semantic meaning is otherwise unchanged from the **PropertyValue** data structure.

```
typedef struct _PropertyValue_r {
    DWORD ulPropTag;
    DWORD ulReserved;
    [switch_is((long)(ulPropTag & 0x0000FFFF))]
        PROP_VAL_UNION Value;
} PropertyValue_r;
```

ulPropTag: Encodes the proptag of the property whose value is represented by the **PropertyValue_r** data structure.

ulReserved: Reserved. All clients and servers MUST set this value to the constant 0x00000000.

Value: Encodes the actual value of the property represented by the **PropertyValue_r** data structure. The type value held is specified by the property type of the proptag in the **ulPropTag** field.

2.3.2 PropertyRow_r Structure

The **PropertyRow_r** structure is an encoding of the **StandardPropertyRow** data structure, as specified in [\[MS-OXCDATA\]](#) section 2.8.1.3. The semantic meaning is unchanged from the **StandardPropertyRow** data structure.

```
typedef struct _PropertyRow_r {
    DWORD Reserved;
    [range(0,100000)] DWORD cValues;
```

```
    [size_is(cValues)] PropertyValue_r* lpProps;
} PropertyRow_r;
```

Reserved: Reserved. All clients and servers MUST set this value to the constant 0x00000000.

cValues: The number of **PropertyValue_r** structures represented in the **PropertyRow_r** structure. This value MUST NOT exceed 100,000.

lpProps: Encodes the **ValueArray** field of the **StandardPropertyRow** data structure.

2.3.3 PropertyRowSet_r Structure

The **PropertyRowSet_r** structure is an encoding of the **PropertyRowSet** data structure, as specified in [\[MS-OXCDATA\]](#) section 2.8.2.2.

The permissible number of **PropertyRows** in the **PropertyRowSet_r** data structure exceeds that of the **PropertyRowSet** data structure. The semantic meaning is otherwise unchanged from the **PropertyRowSet** data structure.

```
typedef struct _PropertyRowSet_r {
    [range(0,100000)] DWORD cRows;
    [size_is(cRows)] PropertyRow_r aRow[];
} PropertyRowSet_r;
```

cRows: Encodes the **RowCount** field of the **PropertyRowSet** data structures. This value MUST NOT exceed 100,000.

aRow: Encodes the **Rows** field of the **PropertyRowSet** data structure.

2.3.4 Restrictions

The following structures are used to represent restrictions of a table, as defined in [\[MS-OXCDATA\]](#) section 2.12.

2.3.4.1 AndRestriction_r Restriction, OrRestriction_r Restriction

The **AndRestriction_r**, **OrRestriction_r** restriction types share a single RPC encoding. The **AndOrRestriction_r** structure is an encoding of the both the **AndRestriction** data structure and the **OrRestriction** data structure, as specified in [\[MS-OXCDATA\]](#) sections [2.12.1.2](#) and [2.12.2.2](#). These two data structures share the same data layout, so a single encoding is included in the Exchange Server NSPI Protocol. The sense of the data structure's use is derived from the context of its inclusion in the **RestrictionUnion_r** data structure, as specified in section [2.3.4.7](#).

The permissible number of restriction structures in the **AndRestriction_r** and **OrRestriction_r** data structures exceeds that of the **AndRestriction** and **OrRestriction** structures. The semantic meaning is otherwise unchanged from the **AndRestriction** and **OrRestriction** data structures, as context dictates.

```
typedef struct _AndOrRestriction_r {
    [range(0,100000)] DWORD cRes;
    [size_is(cRes)] Restriction_r* lpRes;
} AndRestriction_r,
```



```
OrRestriction_r;
```

cRes: Encodes the **RestrictCount** field of the **AndRestriction** and **OrRestriction** data structures. This value MUST NOT exceed 100,000.

lpRes: Encodes the **Restricts** field of the **AndRestriction** and **OrRestriction** data structures.

2.3.4.2 NotRestriction_r Restriction

The **NotRestriction_r** structure is an encoding of the **NotRestriction** data structure, as specified in [\[MS-OXCDATA\]](#) section 2.12.3.2. The semantic meaning is unchanged from the **NotRestriction** data structure.

```
typedef struct _NotRestriction_r {  
    Restriction_r* lpRes;  
} NotRestriction_r;
```

lpRes: Encodes the **Restriction** field of the **NotRestriction** data structure.

2.3.4.3 ContentRestriction_r Restriction

The **ContentRestriction_r** structure is an encoding of the **ContentRestriction** data structure, as specified in [\[MS-OXCDATA\]](#) section 2.12.4.2. The semantic meaning is unchanged from the **ContentRestriction** data structure.

```
typedef struct _ContentRestriction_r {  
    DWORD ulFuzzyLevel;  
    DWORD ulPropTag;  
    PropertyValue_r lpProp;  
} ;
```

ulFuzzyLevel: Encodes the **FuzzyLevelLow** and **FuzzyLevelHigh** fields of the **ContentRestriction** data structure.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
FuzzyLevelLow										FuzzyLevelHigh										R1											

FuzzyLevelLow: Encodes the **FuzzyLevelLow** field of the **ContentRestriction** data structure.

FuzzyLevelHigh: Encodes the **FuzzyLevelHigh** field of the **ContentRestriction** data structure.

R1: Reserved. All clients and servers MUST set this value to the constant 0x00.

ulPropTag: Encodes the **PropertyTag** field of the **ContentRestriction** data structure.

lpProp: Encodes the **TaggedValue** field of the **ContentRestriction** data structure.

2.3.4.4 PropertyRestriction_r Restriction

The **PropertyRestriction_r** structure is an encoding of the **PropertyRestriction** data structure, as specified in [\[MS-OXCDATA\]](#) section 2.12.5.2. The semantic meaning is unchanged from the **PropertyRestriction** data structure.

```
typedef struct _PropertyRestriction_r {
    DWORD relop;
    DWORD ulPropTag;
    PropertyValue_r* lpProp;
} PropertyRestriction_r;
```

relop: Encodes the **RelOp** field of the **PropertyRestriction** data structure.

ulPropTag: Encodes the **PropTag** field of the **PropertyRestriction** data structure.

lpProp: Encodes the **TaggedValue** field of the **PropertyRestriction** data structure.

2.3.4.5 ExistRestriction_r Restriction

The **ExistRestriction_r** structure is an encoding of the **ExistRestriction** data structure, as specified in [\[MS-OXCDATA\]](#) section 2.12.9.2. The semantic meaning is unchanged from the **ExistRestriction** data structure.

```
typedef struct _ExistRestriction_r {
    DWORD ulReserved1;
    DWORD ulPropTag;
    DWORD ulReserved2;
} ExistRestriction_r;
```

ulReserved1: Reserved. All clients and servers MUST set this value to the constant 0x00000000.

ulPropTag: Encodes the **PropTag** field of the **ExistRestriction** data structure.

ulReserved2: Reserved. All clients and servers MUST set this value to the constant 0x00000000.

2.3.4.6 RestrictionUnion_r Restriction

The **RestrictionUnion_r** structure encodes a single instance of any type of restriction. It is an aggregation data structure, allowing a single parameter to an NSPI method to contain any type of restriction data structure.

```
typedef
[switch_type(long)]
union _RestrictionUnion_r {
    [case(0x00000000)]
        AndRestriction_r resAnd;
    [case(0x00000001)]
        OrRestriction_r resOr;
    [case(0x00000002)]
        NotRestriction_r resNot;
    [case(0x00000003)]
        ContentRestriction_r resContent;
```

```

    [case(0x00000004)]
        PropertyRestriction_r resProperty;
    [case(0x00000008)]
        ExistRestriction_r resExist;
} RestrictionUnion_r;

```

resAnd: **RestrictionUnion_r** contains an encoding of an **AndRestriction**.

resOr: **RestrictionUnion_r** contains an encoding of an **OrRestriction**.

resNot: **RestrictionUnion_r** contains an encoding of a **NotRestriction**.

resContent: **RestrictionUnion_r** contains an encoding of a **ContentRestriction**.

resProperty: **RestrictionUnion_r** contains an encoding of a **PropertyRestriction**.

resExist: **RestrictionUnion_r** contains an encoding of an **ExistRestriction**.

2.3.4.7 Restriction_r Restriction

The **Restriction_r** structure is an encoding of the **Restriction** filters, as specified in [\[MS-OXCDATA\]](#) section 2.12.

The permissible number of **Restriction** structures encoded in **AndRestriction_r** and **OrRestriction_r** data structures recursively included in the **Restriction_r** data type exceeds that of the **AndRestriction_r** and **OrRestriction_r** data structures recursively included in the **Restriction** filters. The semantic meaning is otherwise unchanged from the **Restriction** filters.

```

typedef struct _Restriction_r {
    DWORD rt;
    [switch_is((long)rt)] RestrictionUnion_r res;
} Restriction_r;

```

rt: Encodes the **RestrictType** field common to all restriction structures.

res: Encodes the actual restriction specified by the type in the **rt** field.

2.3.5 Property Name/Property ID Structures

The following structures are used to represent named properties, as specified in [\[MS-OXCDATA\]](#) section 2.6.

2.3.5.1 PropertyName_r Structure

The **PropertyName_r** structure is an encoding of the **PropertyName** data structure, as specified in [\[MS-OXCDATA\]](#) section 2.6.2. The semantic meaning is unchanged from the **PropertyName** data structure.

```

typedef struct PropertyName_r {
    FlatUID_r* lpguid;
    DWORD ulReserved;
    long lID;
} PropertyName_r;

```

lpguid: Encodes the GUID field of the **PropertyName** data structure. This field is encoded as a **FlatUID_r** data structure.

ulReserved: Reserved. All clients and servers MUST set this value to the constant 0x00000000.

IID: Encodes the **IID** field of the **PropertyName** data structure. In addition to the definition of the **LID** field, this field is always present in the **PropertyName_r** data structure; it is not optional.

2.3.5.2 PropertyNameSet_r Structure

The **PropertyNameSet_r** structure is used to aggregate a number of **PropertyName_r** structures into a single data structure.

```
typedef struct PropertyNameSet_r {
    [range(0,100000)] DWORD cNames;
    [size_is(cNames)] PropertyName_r aNames[];
} PropertyNameSet_r;
```

cNames: The number of **PropertyName_r** structures in this aggregation. The value MUST NOT exceed 100,000.

aNames: The list of **PropertyName_r** structures in this aggregation.

2.3.6 String Arrays

The following structures are used to aggregate a number of strings into a single data structure.

2.3.6.1 StringsArray_r

The **StringsArray_r** structure is used to aggregate a number of character type strings into a single data structure.

```
typedef struct _StringsArray {
    [range(0,100000)] DWORD Count;
    [string, size_is(Count)] char* Strings[];
} StringsArray_r;
```

Count: The number of character string structures in this aggregation. The value MUST NOT exceed 100,000.

Strings: The list of character type strings in this aggregation. The strings in this list are NULL-terminated.

2.3.6.2 WStringsArray_r

The **WStringsArray_r** structure is used to aggregate a number of **wchar_t** type strings into a single data structure.

```
typedef struct _WStringsArray {
```

```

    [range(0,100000)] DWORD Count;
    [string, size_is(Count)] wchar_t* Strings[];
} WStringsArray_r;

```

Count: The number of character strings structures in this aggregation. The value MUST NOT exceed 100,000.

Strings: The list of **wchar_t** type strings in this aggregation. The strings in this list are NULL-terminated.

2.3.7 STAT

The **STAT** structure is used to specify the state of a table and location information that applies to that table. It appears as both an input parameter and an output parameter in many NSPI methods.

```

typedef struct {
    DWORD SortType;
    DWORD ContainerID;
    DWORD CurrentRec;
    long Delta;
    DWORD NumPos;
    DWORD TotalRecs;
    DWORD CodePage;
    DWORD TemplateLocale;
    DWORD SortLocale;
} STAT;

```

SortType: This field contains a **DWORD** [\[MS-DTYP\]](#) value that represents a sort order. The client sets this field to specify the sort type of this table. Possible values are specified in section [2.2.9](#). The server MUST NOT modify this field.

ContainerID: This field contains a Minimal Entry ID. The client sets this field to specify the Minimal Entry ID of the address book container that this **STAT** structure represents. The client obtains these Minimal Entry IDs from the server's address book hierarchy table. The server MUST NOT modify this field in any NSPI method except the **NspiGetMatches** method.

CurrentRec: This field contains a Minimal Entry ID. The client sets this field to specify a beginning position in the table for the start of an NSPI method. The server sets this field to report the end position in the table after processing an NSPI method.

Delta: This field contains a long value. The client sets this field to specify an offset from the beginning position in the table for the start of an NSPI method. If the NSPI method returns a success value, the server MUST set this field to 0.

NumPos: This field contains a **DWORD** value that specifies a position in the table. The client sets this field to specify a fractional position for the beginning position in the table for the start of an NSPI method, as specified in section [3.1.1.4.2](#). The server sets this field to specify the approximate fractional position at the end of an NSPI method. This value is a zero index; the first element in a table has the numeric position 0. Although the protocol places no boundary or requirements on the accuracy of the approximation the server reports, it is recommended that implementations maximize the accuracy of the approximation to improve usability of the server for clients.

TotalRecs: This field contains a **DWORD** value that specifies the number of rows in the table. The client sets this field to specify a fractional position for the beginning position in the table for the start of an NSPI method, as specified in section [3.1.1.4.2](#). The server sets this field to specify the total number of rows in the table. Unlike the **NumPos** field, the server **MUST** report this number accurately; an approximation is insufficient.

CodePage: This field contains a **DWORD** value that represents a code page. The client sets this field to specify the code page the client uses for non-Unicode strings. The server **MUST** use this value during string handling, as specified in section [3.1.1.2](#). The server **MUST NOT** modify this field.

TemplateLocale: This field contains a **DWORD** value that represents a language code identifier (LCID). The client sets this field to specify the LCID associated with the template the client wants the server to return. The server **MUST NOT** modify this field.

SortLocale: This field contains a **DWORD** value that represents an LCID. The client sets this field to specify the LCID that it wants the server to use when sorting any strings. The server **MUST** use this value during sorting, as specified in section [3.1.1.2](#). The server **MUST NOT** modify this field.

2.3.8 EntryIDs

Each object in the address book is identified by one or more EntryIDs, as specified in section [3.1.1.5](#). The following table lists the three types of EntryIDs.

EntryID name	Description
MinimalEntryID	A minimal identifier
EphemeralEntryID	An ephemeral identifier
PermanentEntryID	A permanent identifier

2.3.8.1 MinimalEntryID

A Minimal Entry ID is a single **DWORD** value that identifies a specific object in the address book. Minimal Entry IDs with values less than 0x00000010 are used by clients as signals to trigger specific behaviors in specific NSPI methods. Except in those places where the protocol defines a specific behavior for these Minimal Entry IDs, the server **MUST** treat these Minimal Entry IDs as Minimal Entry IDs that do not specify an object in the address book. Specific values used in this way are defined in sections [2.2.7](#) and [2.2.8](#).

Minimal Entry IDs are created and assigned by Exchange NSPI server. The algorithm used by a server to create a Minimal Entry ID is not restricted by this protocol. A Minimal Entry ID is valid only to servers that respond to an NspiBind method, as specified in section [3.1.4.1](#), with the same server GUID as that used by the server that created the Minimal Entry ID. It is not possible for a client to predict a Minimal Entry ID.

This type is declared as follows:

```
typedef DWORD MinEntryID;
```

2.3.8.2 EphemeralEntryID

The **EphemeralEntryID** structure identifies a specific object in the address book. Additionally, it encodes the server that issued the Ephemeral Entry ID and enough information for a client to make a decision as to how to display the object to an end user.

A server **MUST NOT** change an object's Ephemeral Entry ID during the lifetime of an NSPI session.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ID Type										R1						R2						R3									
ProviderUID																															
...																															
...																															
...																															
R4																															
Display Type																															
MId																															

ID Type (1 byte): The type of this ID. The value is the constant 0x87. The server uses the presence of this value to identify this EntryID as an Ephemeral Entry ID rather than a Permanent Entry ID.

R1 (1 byte): Reserved. All clients and servers **MUST** set this value to the constant 0x00.

R2 (1 byte): Reserved. All clients and servers **MUST** set this value to the constant 0x00.

R3 (1 byte): Reserved. All clients and servers **MUST** set this value to the constant 0x00.

ProviderUID (16 bytes): A **FlatUID_r** value, as specified in section [2.3.1.1](#), that contains the **GUID** of the server that issued this Ephemeral Entry ID. A server **MUST** treat any value other than its own GUID as an error condition.

R4 (4 bytes): Reserved. All clients and servers **MUST** set this value to the constant 0x00000001.

Display Type (4 bytes): The display type of the object specified by this Ephemeral Entry ID. This value is expressed in little-endian format. Valid values for this field are specified in section [2.2.3](#). The display type is not considered part of the object's identity; it is set in the **EphemeralEntryID** structure by the server as a convenience to clients. The server **MUST** set this field when this data structure is returned in an output parameter. A server **MUST** ignore values of this field on input parameters.

MId (4 bytes): The Minimal Entry ID of this object, as specified in section [2.3.8.1](#). This value is expressed in little-endian format.

2.3.8.3 PermanentEntryID

The **PermanentEntryID** structure identifies a specific object in the address book. Additionally, it encodes the constant Exchange Server NSPI Protocol interface (via the **ProviderUID** field) and enough information for a client to make a decision as to how to display the object to an end user.

Permanent Entry IDs are transmitted in the protocol as values with the **PtypBinary** property type.

A server MAY allow an object's **distinguished name (DN)** to change. If this happens, the server SHOULD map a Permanent Entry ID that contains the original **DN** to the object with the new DN. When returning a **PermanentEntryID** structure to satisfy a query from a client, a server MUST use the most current version of an object's DN.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31								
ID Type										R1										R2										R3									
ProviderUID																																							
...																																							
...																																							
...																																							
R4																																							
Display Type String																																							
Distinguished Name (variable)																																							
...																																							

ID Type (1 byte): The type of this ID. The value is the constant 0x00. The server uses the presence of this value to identify this EntryID as a Permanent Entry ID rather than an Ephemeral Entry ID.

R1 (1 byte): Reserved. All clients and servers MUST set this value to the constant 0x00.

R2 (1 byte): Reserved. All clients and servers MUST set this value to the constant 0x00.

R3 (1 byte): Reserved. All clients and servers MUST set this value to the constant 0x00.

ProviderUID (16 bytes): A **FlatUID_r** value that contains the constant GUID specified in Permanent Entry ID GUID, as specified in section 2.2.6). A server MUST treat any other value as an error condition.

R4 (4 bytes): Reserved. All clients and servers MUST set this value to the constant 0x00000001.

Display Type String (4 bytes): The display type of the object specified by this Permanent Entry ID. This value is expressed in little-endian format. Valid values for this field are specified in section

[2.2.3](#)). The display type is not considered part of the object's identity; it is set in the **PermanentEntryID** field by the server as a convenience to clients. A server MUST set this field when this data structure is returned in an output parameter. A server MUST ignore values of this field on input parameters.

Distinguished Name (variable): The DN of the object specified by this Permanent Entry ID. The value is expressed as a DN, as specified in [\[MS-OXOABK\]](#) section 2.2.1.1.

2.3.9 NSPI_HANDLE

The **NSPI_HANDLE** handle is an RPC context handle that is used to share a session between method calls.

The RPC context handle is specified in [\[C706\]](#) section 2.3.1.

This type is declared as follows:

```
typedef [context_handle] void* NSPI_HANDLE;
```

3 Protocol Details

The client side of this protocol is simply a pass-through. That is, no additional timers or other state is required on the client side of this protocol. Calls made by the higher-layer protocol or application are passed directly to the transport, and the results returned by the transport are passed directly back to the higher-layer protocol or application.

The client MUST call the NSPI [NspiBind](#) method in order to obtain an RPC context handle to be used in all other NSPI methods. The NSPI [NspiUnbind](#) method destroys this context handle. Therefore, it is not possible to call any methods other than **NspiBind** immediately after a call to **NspiUnbind**. The final method a client MUST call is **NspiUnbind**.

3.1 Server Details

This protocol enables address book access to a directory data store. This includes address book hierarchy table discovery, address creation template table discovery, address book container access and browsing, and read and modification of individual address book entries. In addition to the abstract data model specified here, this specification uses the address book data model, as specified in [\[MS-OXOABK\]](#), for the server of this protocol. This specification uses the definitions of object properties specified in [\[MS-OXPROPS\]](#).

3.1.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

3.1.1.1 Required Properties

For every object in the address book, the server MUST minimally maintain the following properties, which are defined in [\[MS-OXPROPS\]](#):

- **PidTagObjectType**
- **PidTagInitialDetailsPane**
- **PidTagAddressBookDisplayNamePrintable**
- **PidTagAddressBookContainerId**
- **PidTagEntryId**
- **PidTagInstanceKey**
- **PidTagSearchKey**
- **PidTagRecordKey**
- **PidTagAddressType**
- **PidTagEmailAddress**
- **PidTagDisplayType**

- **PidTagTemplateid**
- **PidTagTransmittableDisplayName**
- **PidTagDisplayName**
- **PidTagMappingSignature**
- **PidTagAddressBookObjectDistinguishedName**

The server MUST maintain the following properties, which are defined in [MS-OXPROPS], for every object that has a **PidTagObjectType** property with the **DISTLIST** value, as specified in [\[MS-OXOABK\]](#):

- **PidTagContainerContents**
- **PidTagContainerFlags**

3.1.1.2 String Handling

A server holds values of properties for objects. Some of these values are strings. The Exchange Server NSPI Protocol allows string values to be represented as 8-bit character strings or Unicode strings. All string valued properties held by a server are categorized as either natively of property type **PtypString** or natively of property type **PtypString8**. Those properties natively of property type **PtypString8** are further categorized as either case-sensitive or case-insensitive.

3.1.1.2.1 Required Native Categorizations

Unless otherwise specified in this document, the Exchange Server NSPI Protocol does not constrain the categorization of properties, and clients and servers MUST NOT require specific categorizations. However, because the protocol intends for clients to be able to persist sorted string values across multiple NSPI connections to a server, a server MUST NOT modify its native categorization for string properties after the categorization has been determined, as doing so would lead to inconsistent behavior of NSPI methods across multiple NSPI sessions.

The following table lists those properties categorization for which is specified by the Exchange Server NSPI Protocol, and the categorization of those properties.

Property name	String categorization
PidTagDisplayName	PtypString
PidTagAddressBookPhoneticDisplayName	PtypString
PidTagAddressBookDisplayNamePrintable	PtypString8 , case sensitive

3.1.1.2.2 Required Code Page Support

While processing an NSPI method, a server associates a code page with all strings expressed as parameters in the method. The server MUST at a minimum be able to convert string representations between the Unicode code page **CP_WINUNICODE** and the TELETEX code page **CP_TELETEX**. Clients specify a code page for 8-bit strings in input parameters to server methods. This protocol does not specify conversion rules. However, because the protocol allows for clients to be able to reliably access data that has been so converted, after a server uses an algorithm, it MUST NOT modify its algorithm for converting between string representations in different code pages. Doing so would lead to inconsistent behavior of NSPI methods across multiple NSPI sessions.

3.1.1.2.3 Conversion Rules for String Values Specified by the Server to the Client

When returning string values as output parameters for methods where the method allows for both Unicode and 8-bit character representations, the server MUST adhere to the following conversion rules.

If the native type of a property is **PtypString** and the client has requested that property with the type **PtypString8**, the server MUST convert the Unicode representation to an 8-bit character representation in the code page specified by the **CodePage** field of the *pStat* parameter prior to returning the value.

If the native type of a property is **PtypString** and the client has requested that property with the type **PtypString**, the server MUST return the Unicode representation unmodified.

If the native type of a property is **PtypString8** and the client has requested that property with the type **PtypString**, the server MUST convert the 8-bit character representation to a Unicode representation prior to returning the value. The 8-bit character representation is considered to be in the code page CP_TELETEX.

If the native type of a property is **PtypString8** and the client has requested that property with the type **PtypString8**, the server MUST return the 8-bit character representation unmodified.

Servers MAY undertake other conversions and substitutions for specific properties.

The following table lists NSPI methods that are capable of returning string values in both Unicode and 8-bit character representations, and the methods for which the conversion rules are applicable.

Method name	Description
NspiGetTemplateInfo	String values can be returned in the output parameter <i>ppData</i> .
NspiGetSpecialTable	String values can be returned in the output parameter <i>ppRows</i> .
NspiGetProps	String values can be returned in the output parameter <i>ppRows</i> .
NspiQueryRows	String values can be returned in the output parameter <i>ppRows</i> .
NspiGetMatches	String values can be returned in the output parameter <i>ppRows</i> .
NspiSeekEntries	String values can be returned in the output parameter <i>ppRows</i> .
NspiResolveNames	String values can be returned in the output parameter <i>ppRows</i> .
NspiResolveNamesW	String values can be returned in the output parameter <i>ppRows</i> .

3.1.1.2.4 Conversion Rules for String Values Specified by the Client to the Server

When accepting strings as input parameters for methods where the method allows for both Unicode and 8-bit character representations, the server MUST follow these conversion rules:

If the native type of a property is **PtypString8** and the client has specified a property value with the type **PtypString**, the server MUST convert the Unicode representation to an 8-bit character representation in the code page specified by the **CodePage** field of the *pStat* parameter prior to processing the method.

If the native type of a property is **PtypString8** and the client has specified a property value with the type **PtypString8**, the server MUST leave the 8-bit character representation unmodified while processing the method.

If the native type of a property is **PtypString** and the client has specified a property value with the type **PtypString8**, the server MUST convert the 8-bit character representation to a Unicode representation prior to processing the method. The 8-bit character representation is considered to be in the code page specified by the **CodePage** field of the *pStat* parameter.

If the native type of a property is **PtypString** and the client has specified a property value with the type **PtypString**, the server MUST leave the Unicode representation unmodified while processing the method.

The following table lists NSPI methods that are capable of specifying input parameters that contain string values in both Unicode and 8-bit character representations, and methods for which these conversion rules are applicable.

Method name	Description
NspiModProps	String values can be specified in the input parameter <i>pRow</i> .
NspiSeekEntries	String values can be specified in the input parameter <i>pTarget</i> .
NspiGetMatches	String values can be specified in the input parameter <i>Filter</i> .
NspiResolveNames	String values can be specified in the input parameter <i>paStr</i> .
NspiResolveNamesW	String values can be specified in the input parameter <i>paWStr</i> .

3.1.1.2.5 String Comparison

Servers MUST implement comparison between string values. This comparison yields the normal semantics of **less than**, **equal to**, and **greater than**.

3.1.1.2.5.1 Unicode String Comparison

Servers MUST compare Unicode representations of strings as specified in [\[MS-UCODEREF\]](#). All methods in which a server is required to perform such Unicode string comparison include LCID as part of the input parameters. The server SHOULD compare the strings using the closest supported LCID. The Exchange Server NSPI Protocol does not constrain how a server chooses this closest supported LCID. However, because the protocol intends for clients to be able to persist sorted string values across multiple NSPI connections to a server, a server SHOULD NOT modify its algorithm for choosing the closest LCID after an algorithm has been implemented because doing so would lead to inconsistent behavior of NSPI methods across multiple NSPI sessions. The server MUST minimally support the **LCID NSPI_DEFAULT_LOCALE** flag, as specified in section [2.2.4](#). When making comparisons of Unicode string values, if the server uses LCID **NSPI_DEFAULT_LOCALE**, the server MUST also use the **NSPI_DEFAULT_LOCALE_COMPARE_FLAGS** flag for the comparison. Otherwise, the server MUST use the **NSPI_NON_DEFAULT_LOCALE_COMPARE_FLAGS** flag.

3.1.1.2.5.2 8-Bit String Comparison

When making comparisons of 8-bit character string values, the server MUST compare according to the following series of steps:

If the strings are categorized as case-sensitive, the server MUST implement a case-sensitive buffer comparison. If the strings are case-insensitive, the server MUST implement a case-insensitive buffer comparison. The Exchange Server NSPI Protocol does not constrain how a server implements these comparison functions. However, because the protocol intends for clients to be able to persist sorted string values across multiple NSPI connections to a server, a server MUST NOT modify its algorithm for either of these buffer comparison functions, because doing so would lead to inconsistent behavior of NSPI methods across multiple NSPI sessions.

If the buffer representing one of the string values is shorter than the buffer representing the other string value, then the server considers the string value represented by the shorter buffer to be less than the string represented by the longer buffer. No further comparison steps are taken.

- If the buffers representing the two string values have equal lengths, the comparison function implemented by the server MUST determine that one buffer is less than the other, or that the buffers are equal.

If the comparison function determines that one of the buffers is less than the other, then the server considers the string value represented by the lesser buffer to be less than the string value represented by the greater buffer. No further comparison steps are taken.

If the comparison function determines that the two buffers are equal, the server considers the two string values to be equal.

3.1.1.2.6 String Sorting

Every server MUST support sorting on Unicode string representations for the **PidTagDisplayName** property. If the server supports the **SortTypePhoneticDisplayName** property, it MUST also support sorting on Unicode string representation for the **PidTagAddressBookPhoneticDisplayName** property. The server MUST minimally support the LCID **NSPI_DEFAULT_LOCALE** flag. This sorting conforms to that specified in [\[MS-UCODEREF\]](#) and section [3.1.1.2.6](#) in this specification.

3.1.1.3 Tables

In order to achieve the primary goal of the Exchange Server NSPI Protocol (browsing address book containers), the protocol defines a data model based on tables. Two types of tables are used in the data model for the Exchange Server NSPI Protocol.

3.1.1.3.1 Status-Based Tables

The first type of table specified by the Exchange Server NSPI Protocol is the Status-Based Table. This table directly represents an address book container. A Status-Based Table is specified in the protocol by the use of a **STAT** data structure. The data structure identifies an address book container, the order of objects in the address book container as exposed by the table, and positioning in the address book container.

The server is not required to maintain any state for a Status-Based Table; the state of the table is entirely specified by the fields of the **STAT** data structure, which is passed back and forth between the client and the server. Therefore, a single client can have multiple instances of an "open" address book container, each specified by a separate **STAT** structure.

3.1.1.3.2 Explicit Tables

The second type of table specified by the Exchange Server NSPI Protocol is the Explicit Table. This table is implemented as a list of Minimal Entry IDs. The list is instantiated in the protocol either as

an array of **DWORDS** or as a **PropertyTagArray_r** structure. This kind of table is used to implement Restriction-Based Explicit Tables and Property Value-Based Explicit Tables.

3.1.1.3.2.1 Restriction-Based Explicit Tables

When a restriction on a table is specified to the server via the **NspiGetMatches** method, the server locates all the objects that meet the restriction criteria, and the list of the Minimal Entry IDs of those objects is constructed. This list is passed back to the client. Therefore, these Explicit Tables are "snapshots" of the base table. That is, if an object is placed in an Explicit Table, even if the object is deleted from the server, the Minimal Entry ID that specifies that object will still be in the Explicit Table.

3.1.1.3.2.2 Property Value-Based Explicit Tables

When a specific object in the address book and a property on that object is specified to the server via the **NspiGetMatches** method, the server reads the values of that property and constructs a list of Minimal Entry IDs based on a mapping between the values and other objects in the address book. This is not possible on all properties, only on those properties for which the server can establish a reference between the value of the property and some object in the address book. The Exchange Server NSPI Protocol does not constrain how a server establishes this reference. Clients can identify the properties that the server can map by trying to obtain such a table. The server MUST return an error when it cannot make such a mapping, as specified in section [3.1.4.10](#).

3.1.1.3.3 Specific Instantiations of Special Tables

The Exchange Server NSPI Protocol requires servers to maintain two special tables, in addition to any tables they maintain for normal browsing. The two required special tables are specified in the following two sections.

3.1.1.3.3.1 Address Book Hierarchy Table

Each server MUST maintain an **address book hierarchy table**, as specified in [\[MS-OXOABK\]](#) section 3.1.4.1.

3.1.1.3.3.2 Address Creation Table

Each server MUST maintain an **address creation table** to clients, as specified in [\[MS-OXOABKT\]](#).

3.1.1.4 Positioning in a Table

In order to achieve the primary goal of the Exchange Server NSPI Protocol (browsing address lists), in addition to the concept of tables, a server MUST support the concept of position in Status-Based and Explicit Tables. Each such table has a Current Position, which specifies a specific row in the table. Methods such as **NspiQueryRows** return values based on the Current Position in the table, and methods such as **NspiUpdateStat** and **NspiQueryRows** modify the Current Position. Positioning in an Explicit Table is defined specifically in the semantics of the NSPI methods that operate on them.

When specifying position in a **STAT** structure-based table, the client sets the **CurrentRec**, **Delta**, **ContainerID**, **SortType**, and **SortLocale** fields of the **STAT** structure to specify to the server the **Current Position** in the table at the beginning of an NSPI method. The server sets the **CurrentRec**, **NumPos**, and **TotalRecs** fields to specify to the client the Current Position in the table at the end of an NSPI method. There are two ways for the client to specify position in a **STAT** structure-based table in the Exchange Server NSPI Protocol: Absolute Positioning and Fractional Positioning.

3.1.1.4.1 Absolute Positioning

The first form of specifying position in a **STAT** structure-based table is called Absolute Positioning. The client specifies this type of positioning by setting any value in the field **CurrentRec** field other than **MID_CURRENT**. The server uses the following steps to identify the Current Position specified by the client:

1. First, the server MUST determine the LCID that it supports that is closest to the LCID specified by **SortLocale**. The server MAY choose this closest LCID in any way.
2. The server sorts the objects in the address book container specified by **ContainerID** by the sort type specified in the **SortType** field and the LCID specified in step 1 of section [3.1.1.4.2](#).
3. The server identifies the number of objects in the sorted table. The server reports this in the **TotalRecs** field of the **STAT** structure.
4. The server locates the object specified by the **CurrentRec** field. If the server cannot locate the object, the **Current Position** in the table is undefined. The server MUST support the special Minimal Entry ID **MID_BEGINNING_OF_TABLE** and **MID_END_OF_TABLE**, as specified in section [2.2.7](#).
5. The server verifies that the object located in step 4 is in the container specified by the **ContainerID** field. If the server cannot verify this, the **Current Position** in the table is undefined.
6. The server moves the **Current Position** by the number of rows specified by the absolute value of the **Delta** field of the **STAT** structure. If the value of **Delta** is negative, the **Current Position** is moved toward the beginning of the table. If the value of **Delta** is positive, the **Current Position** is moved toward the end of the table. A **Delta** with the value 0 results in no change to the **Current Position**.
7. If applying the **Delta** as described in step 6 would move the **Current Position** to be before the first row of the table, the server sets the **Current Position** to the first row of the table and sets the **CurrentRec** to the Minimal Entry ID of the object that occupies the first row of the table.
8. If applying the **Delta** as described in step 6 would move the **Current Position** to be after the end of the table, the server sets the **Current Position** to a location one row past the last valid row of the table and sets the **CurrentRec** to the value **MID_END_OF_TABLE**.
9. The server sets the field **CurrentRec** to the Minimal Entry ID of the object occupying the row specified by the **Current Position**.

The server identifies the numeric row of the **Current Position** in the sorted table. This numeric row is 0-based. That is, the first valid row in the table has the numeric position 0. This is the **Numeric Position** of the **Current Position** of the table. The server reports this in the **NumPos** field of the **STAT** structure. The server MAY report an approximate value for the **Numeric Position**. Although the protocol places no boundary or requirements on the accuracy of the approximate value the server returns, it is recommended that implementations maximize the accuracy of the approximation to improve usability of the Exchange NSPI server for clients.

3.1.1.4.2 Fractional Positioning

The second form of specifying position in a **STAT** structure-based table is called Fractional Positioning. The client specifies this type of positioning by setting the field **CurrentRec** to the value **MID_CURRENT**. Fractional positioning is defined as only an approximation in the Exchange Server NSPI Protocol. The server MAY be inaccurate both in locating a row based on fractional positioning

and in reporting the resultant actual fractional position. The server uses the following steps to identify the Current Position specified by the client:

1. First, the server identifies the LCID it supports that is closest to the LCID specified by the **SortLocale** field. The server MAY choose this closest LCID in any way.
2. The server sorts the objects in the address book container specified by the **ContainerID** field by the sort type specified in the **SortType** field and the LCID specified in step 1 of section [3.1.1.2](#)).
3. The server identifies the number of objects in the sorted table. The server reports this in the **TotalRecs** field of the **STAT** structure.
4. The server calculates the **Intended Numeric Position** in the table as the **TotalRecs** multiplied by the **NumPos** field of the **STAT** structure divided by the value of **TotalRecs** as specified by the client. The value is truncated to its integral part.
5. If the **Intended Numeric Position** thus calculated is greater than **TotalRecs**, the intended **Intended Numeric Position** is **TotalRecs** (that is, the last row in the table).

After the server has identified the **Intended Numeric Position**, the server sets **Numeric Position** to an approximation of that value. Although the protocol places no boundary or requirements on the accuracy of the approximation the server uses to set the **Numeric Position**, it is recommended that implementations maximize accuracy of the approximation to improve usability of the server for clients.

1. The server moves the Current Position to the row chosen in step 6.
2. The server moves the Current Position by the number of rows specified by the absolute value of the **Delta** field of the **STAT** structure. If the value of **Delta** is negative, the Current Position is moved toward the beginning of the table. If the value of **Delta** is positive, the Current Position is moved toward the end of the table. A **Delta** field with the value 0 results in no change to the Current Position.
3. If applying the **Delta** as described in step 8 would move the Current Position to be before the beginning of the table, the server sets the Current Position to the beginning of the table and sets the **CurrentRec** field to the Minimal Entry ID of the object occupying the first row of the table.
4. If applying **Delta** as described in step 8 would move the Current Position to be after the end of the table, the server sets the Current Position to a location one row past the last valid row of the table and sets the **CurrentRec** to the value **MID_END_OF_TABLE**.
5. The server sets the field **CurrentRec** to the Minimal Entry ID of the object occupying the row specified by the Current Position.
6. The server identifies the numeric row of the Current Position in the sorted table. This numeric row is 0-based. That is, the first valid row in the table has the numeric position 0. This is the **Numeric Position** of the Current Position of the table. The server reports this in the **NumPos** field of the **STAT** structure.

3.1.1.5 Object Identity

Objects maintained by the server need to be identified in the Exchange Server NSPI Protocol. The Exchange Server NSPI Protocol makes use of the following three kinds of identifiers, differentiated primarily by their intended lifespan:

- **Permanent Identifier:** Specifies a specific object across all NSPI sessions. The display type of the object is included in the Permanent Identifier.

- **Ephemeral Identifier:** Specifies a specific object in a single NSPI session. The display type of the object is included in the Ephemeral Identifier. A server MUST NOT change an object's Ephemeral Identifier during the lifetime of an NSPI session. If a server uses the same NSPI session GUID (that is, the GUID returned by the server in the *pServerGuid* output parameter of the **NspiBind** method) for multiple NSPI sessions, the server MUST use the same Ephemeral Identifier for the same specific object in both sessions.
- **Minimal Identifier:** Specifies a specific object in a single NSPI session. A server MUST NOT change an object's Minimal Entry ID during the lifetime of an NSPI session. If a server uses the same NSPI session GUID (that is, the GUID returned by the server in the *pServerGuid* output parameter of the **NspiBind** method) for multiple NSPI sessions, the server MUST use the same Minimal Identifier for the same specific object in all sessions.

3.1.1.6 Ambiguous Name Resolution

Ambiguous name resolution (ANR) is a process by which a server maps a string to a specific object in a specific address book container. The string is provided by the client and is interpreted by the server as specified in section [3.1.1.2](#).

The specific algorithm used to map the string to an object is not prescribed by this protocol and is left to each server instance to define as local policy. The intended usage is an end user of a computer program entering free-form text and finding a unique object in an address book most closely matching the user's requirements. The specific result of an ANR process is a Minimal Entry ID. There are three possible outcomes to the ANR process:

1. If the server is unable to map the string to any objects in the address book, the result of the ANR process is the Minimal Entry ID with the value **MID_UNRESOLVED**.
2. If the server is able to map the string to more than one object in the address book, the result of the ANR process is the Minimal Entry ID with the value **MID_AMBIGUOUS**.
3. If the server is able to map the string to exactly one object in the address book, the result of the ANR process is the Minimal Entry ID with the value **MID_RESOLVED**.

The server MUST map the NULL string to the Minimal Entry ID **MID_UNRESOLVED**.

The server MUST map a zero-length string to the Minimal Entry ID **MID_UNRESOLVED**.

3.1.2 Timers

This protocol does not introduce any timers. For details about any transport-level timers, see [\[MS-RPCE\]](#).

3.1.3 Initialization

Each server MUST have at least one unique GUID, used to identify an NSPI session, as specified in section [3.1.4.1](#). The server MUST acquire this GUID before it is prepared to respond to Exchange Server NSPI Protocol methods. The protocol does not constrain how a server acquires this GUID. The server MUST maintain this GUID for the duration of an NSPI session. Although the protocol places no further boundary or requirements on the time period for which the server maintains this GUID, it is recommended that implementations maximize this time period to improve the usability of the server for clients.

Each server maintains a set of Address Book objects and containers, as specified in [\[MS-OXOABK\]](#). The Exchange Server NSPI Protocol does not constrain how a server obtains its initial data set, nor

does it constrain the contents of this initial data set. How a server obtains this data is an implementation-specific detail.

When a server is prepared to respond to Exchange Server NSPI Protocol methods, it creates an RPC listening endpoint, as specified in section [2.1](#).

3.1.4 Message Processing Events and Sequencing Rules

This protocol MUST indicate to the RPC runtime that it is to perform a strict NDR data consistency check at target level 5.0, as specified in [\[MS-RPCE\]](#).

This protocol MUST indicate to the RPC runtime that it is to perform a strict NDR data consistency check at target level 6.0, as specified in [\[MS-RPCE\]](#).

This protocol MUST indicate to the RPC runtime via the **strict_context_handle** property that it is to reject use of context handles created by a method of a different RPC interface than this one, as specified in [\[MS-RPCE\]](#).

This protocol MUST indicate to the RPC runtime via the **type_strict_context_handle** property that it is to reject use of context handles created by a method that creates a different type of context handle, as specified in [\[MS-RPCE\]](#).

This interface includes the methods listed in the following table.

Method name	Description
NspiBind	Initiates a session with the server. Opnum: 0
NspiUnbind	Concludes a session with the server. Opnum: 1
NspiUpdateStat	Updates the logical position in a specified table. Opnum: 2
NspiQueryRows	Returns information about a set of rows in a table. Opnum: 3
NspiSeekEntries	Seeks forward in a specified table and update the logical position in that table. Opnum: 4
NspiGetMatches	Restricts a specific table based on input parameters and return the resultant Explicit Table. Opnum: 5
NspiResortRestriction	Changes the sort order of an Explicit Table. Opnum: 6
NspiDNToMId	Translates a DN to a Minimal Entry ID. Opnum: 7
NspiGetPropList	Returns a list of all the properties which exist on a specific object in the address book. Opnum: 8
NspiGetProps	Returns a list of properties and their values for a specific object in the address

Method name	Description
	book. Opnum: 9
NspiCompareMIds	Compares the position of two rows in a table. Opnum: 10
NspiModProps	Modifies a property of a row in the address book. Opnum: 11
NspiGetSpecialTable	Retrieves the address book hierarchy table of the server, or retrieve the address creation table from the server. Opnum: 12
NspiGetTemplateInfo	Retrieves addressing or display templates from the server. Opnum: 13
NspiModLinkAtt	Modifies a property of a row in the address book. Applies only to rows that support the PtypEmbeddedTable property type. Opnum: 14
NspiResolveNames	Performs ANR on a set of provided names. The names are specified in the code page of the client. Opnum: 19
NspiResolveNamesW	Performs ANR on a set of provided names. The names are specified in the Unicode character set. Opnum: 20

No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [MS-RPCE].

The server MUST return the value **NotEnoughMemory** if unable to complete processing a method due to errors allocating memory.

The server MUST return the value **OutOfResources** if unable to complete processing a method due to lack of some nonmemory resource.

The server MUST return the value **GeneralFailure** if unable to complete processing a method for reasons other than those specified here or in the methods details.

The server MUST return the value **Success** if it completes without some other return value being specified in the method details.

Note Gaps in the opnum numbering sequence represent opnums that are reserved for local use. The server behavior is undefined, because it does not affect interoperability.

3.1.4.1 NspiBind (Opnum 0)

The **NspiBind** method initiates a session between a client and the server.

```
long NspiBind(
    [in] handle_t hRpc,
    [in] DWORD dwFlags,
    [in] STAT* pStat,
```

```
[in, out, unique] FlatUID_r* pServerGuid,  
[out, ref] NSPI_HANDLE* contextHandle  
);
```

hRpc: An RPC binding handle parameter, as specified in [\[C706\]](#) section 2.

dwFlags: A **DWORD** [\[MS-DTYP\]](#) value that contains a set of bit flags. The server MUST ignore values other than the bit flag **fAnonymousLogin**.

pStat: A pointer to a **STAT** block that describes a logical position in a specific address book container. This parameter is used to specify both input parameters from the client and return values from the server.

pServerGuid: The value NULL or a pointer to a GUID value that is associated with the specific server.

contextHandle: An RPC context handle, as specified in section [2.3.9](#).

Return Values: The server returns a **LONG** [\[MS-DTYP\]](#) value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value **CP_WINUNICODE**, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
2. If the server returns any return value other than "Success", the server MUST return a NULL for the output parameter *pServerGuid*.
3. The server MAY make additional validations including but not limited to limiting the number of concurrent connections to any specific client or checking the data access rights of the client. If these checks fail, the server MUST return "LogonFailed".
4. A value of "fAnonymousLogin" in the input parameter *dwFlags* indicates that the server did not validate that the client is an authenticated user. The server MAY ignore this request.
5. Subject to constraint 4, the server MAY authenticate the client. How a server authenticates a client is an implementation-specific detail.
6. The **CodePage** field of the input parameter *pStat* specifies the codepage to use in this session. If the server will not service connections using that codepage, the server MUST return the error code "InvalidCodepage".

Subject to the prior constraints, if the input parameter *pServerGuid* is not NULL, the server MUST set the output parameter *pServerGuid* to a GUID associated with the server. The server MAY use a different GUID for each RPC connection. Each server MUST use a different GUID.

- If no other return code has been set, the server MUST return the value "Success".

3.1.4.2 NspiUnbind (Opnum 1)

The **NspiUnbind** method destroys the context handle. No other action is taken.

```
DWORD NspiUnbind(  
    [in, out] NSPI_HANDLE* contextHandle,  
    [in] DWORD Reserved  
);
```

contextHandle: An RPC context handle as specified in section [2.3.9](#).

Reserved: A **DWORD** [\[MS-DTYP\]](#) value reserved for future use. MUST be ignored by the server.

Return Values: The server returns a **DWORD** value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the input parameter *contextHandle* is NULL, the server MUST return the value 2.
2. If the server successfully destroys the context handle, the server MUST return the value 1.
3. If no other return code has been set, the server MUST return the value 2.
4. The server MUST set the output parameter *contextHandle* to NULL.

3.1.4.3 NspiGetSpecialTable (Opnum 12)

The **NspiGetSpecialTable** method returns the rows of a special table to the client. The special table can be an address book hierarchy table or an address creation table.

```
long NspiGetSpecialTable(  
    [in] NSPI_HANDLE hRpc,  
    [in] DWORD dwFlags,  
    [in] STAT* pStat,  
    [in, out] DWORD* lpVersion,  
    [out] PropertyRowSet_r** ppRows  
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

dwFlags: A **DWORD** [\[MS-DTYP\]](#) value that contains a set of bit flags. The server MUST ignore values other than the bit flags **NspiAddressCreationTemplates** and **NspiUnicodeStrings**.

pStat: A pointer to a **STAT** block that describes a logical position in a specific address book container. This parameter is used to both specify input parameters from the client and return values from the server.

lpVersion: A reference to a **DWORD**. On input, holds the value of the version number of the address book hierarchy table that the client has.

ppRows: A **PropertyRowSet_r** structure. On return, holds the rows for the table that the client is requesting.

Return Values: The server returns a **LONG** [MS-DTYP] value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the input parameter *dwFlags* does not contain the value "NspiUnicodeStrings", and the input parameter *dwFlags* does not contain the value "NspiAddressCreationTemplates", and the **CodePage** field of the input parameter *pStat* contains the value **CP_WINUNICODE**, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or whether the server changes its state.
2. If the server returns any return value other than "Success", the server MUST return a NULL for the output parameter *ppRows*.
3. The server MAY make additional validations, as described in section [5](#). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
4. If the input parameter *dwFlags* contains both the value "NspiAddressCreationTemplates" and the value "NspiUnicodeStrings", the server MUST ignore the value "NspiUnicodeStrings" and proceed as if the parameter *dwFlags* contained only the value "NspiAddressCreationTemplates".
5. If the input parameter *dwFlags* does not contain the value "NspiAddressCreationTemplates", the client is requesting the rows of the server's address book hierarchy table, as specified in section [3.1.1.3.3.1](#).
6. If the client is requesting the rows of the server's address book hierarchy table and the server is not maintaining an address book hierarchy table, the server MUST return the error code "OutOfResources".
7. If the client is requesting the rows of the server's address book hierarchy table, the input parameter *lpVersion* contains a version number. If the version number of the address book hierarchy table the server is holding matches this version number, the server MUST proceed as if the address book hierarchy table had no rows.
8. If the client is requesting the rows of the server's address book hierarchy table and the server returns the value "Success", the server MUST set the output parameter *lpVersion* to the version of the server's address book hierarchy table.
9. If the input parameter *dwFlags* contains the value "NspiAddressCreationTemplates", the client is requesting the rows of an address creation table, as specified in section [3.1.1.3.3.2](#).
10. There is no constraint on the parameter *lpVersion* if the client is requesting the rows of an address creation table.
11. If the client is requesting the rows of an address creation table, the **TemplateLocale** field of the input parameter *pStat* specifies the LCID for which the client requires an address creation table. If the server does not maintain an address creation table for that LCID, the server MUST proceed as if it maintained an address creation table with no rows for that LCID. That is, the server MUST NOT return an error code if it does not maintain an address creation table for that LCID.

- 12.If the input parameter *dwFlags* contains the value "NspiUnicodeStrings" and the client is requesting the rows of the server's address book hierarchy table, the server MUST express string-valued properties in the table as Unicode values, as specified in section [3.1.1.2](#).
- 13.If the input parameter *dwFlags* does not contain the value "NspiUnicodeStrings" and the client is requesting the rows of the server's hierarchy table, and the **CodePage** field of the input parameter *pStat* does not contain the value **CP_WINUNICODE**, the server MUST express string-valued properties as 8-bit strings in the code page specified by the field **CodePage** in the input parameter *pStat*. For more details, see section [3.1.1.2](#).
- 14.Subject to the prior constraints, the server returns the rows of the table requested by the client in the output parameter *ppRows*.
- 15.If no error condition has been specified by the previous constraints, the server MUST return the value "Success".

3.1.4.4 NspiUpdateStat (Opnum 2)

The **NspiUpdateStat** method updates the **STAT** block that represents position in a table to reflect positioning changes requested by the client.

```
long NspiUpdateStat(
    [in] NSPI_HANDLE hRpc,
    [in] DWORD Reserved,
    [in, out] STAT* pStat,
    [in, out, unique] long* plDelta
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

Reserved: A **DWORD** [\[MS-DTYP\]](#) value. Reserved for future use. Ignored by the server.

pStat: A pointer to a **STAT** block describing a logical position in a specific address book container. This parameter is used to specify both input parameters from the client and return values from the .

plDelta: The value NULL or a pointer to a **LONG** [\[MS-DTYP\]](#) value that indicates movement within the address book container specified by the input parameter *pStat*.

Return Values: The server returns a long value specifying the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value **CP_WINUNICODE**, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or whether the server changes its state.
2. If the server returns any return value other than "Success", the server MUST NOT modify the output parameter *pStat*.

3. The server MAY make additional validations, as described in section 5. If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
4. If the server is unable to locate the address book container specified by the **ContainerID** field in the input parameter *pStat*, the server MUST return the return value **InvalidBookmark**.
5. The server locates the initial position row in the table specified by the **ContainerID** field of the input parameter *pStat* as follows:

If the row specified by the **CurrentRec** field of the input parameter *pStat* is not **MID_CURRENT**, the server locates that row as the initial position row. If the row cannot be found, the server MUST return the error "NotFound".

- If the row specified by the **CurrentRec** field of the input parameter *pStat* is **MID_CURRENT**, the server locates the initial position row using the fractional position specified in the **NumPos** field of the input parameter *pStat* as specified in section 3.1.1.4.2.
- After locating the initial position row in the current table, the server locates the final position row by moving forward or backward in the table from the current position row as specified in the **Delta** field of the input parameter *pStat*, with the constraints specified in section 3.1.1.4 with respect to movement beyond the beginning or end of a table.
- If the input parameter *pDelta* is not null, the server MUST set it to the actual number of rows between the initial position row and the final position row.
- The server MUST set the **CurrentRec** field of the parameter *pStat* to the Minimal Entry ID of the current row in the current address book container.
- The server MUST set the **NumPos** field of the parameter *pStat* to the approximate numeric position of the current row of the current address book container according to section 3.1.1.4.2.
- The server MUST set the **TotalRecs** field of the parameter *pStat* to the number of rows in the current address book container according to section 3.1.1.4.2.
- The server MUST leave all other fields of the parameter *pStat* unchanged.
- If no error condition has been specified by the previous constraints, the server MUST return "Success".

3.1.4.5 NspiQueryColumns (Opnum 16)

The **NspiQueryColumns** method returns a list of all the properties that the server is aware of. It returns this list as an array of proptags.

```
long NspiQueryColumns(
    [in] NSPI_HANDLE hRpc,
    [in] DWORD Reserved,
    [in] DWORD dwFlags,
    [out] PropertyTagArray_r** ppColumns
);
```

hRpc: An RPC context handle, as specified in section 2.3.9.

Reserved: A **DWORD** [MS-DTYP] value reserved for future use. Ignored by the server.

dwFlags: A **DWORD** value that contains a set of bit flags. The server MUST ignore values other than the bit flag **NspiUnicodeProptypes**.

ppColumns: A reference to a **PropertyTagArray_r** structure. On return, contains a list of proptags.

Return Values: The server returns a **LONG** [MS-DTYP] value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the server returns any return value other than "Success", the server MUST return a NULL for the output parameter *ppColumns*.
2. The server MAY make additional validations. as described in section [5](#). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
3. If the input parameter *dwFlags* contains the bit flag **NspiUnicodeProptypes**, then the server MUST report the property type of all string valued properties as **PtypString**.
4. If the input parameter *dwFlags* does not contain the bit flag **NspiUnicodeProptypes**, the server MUST report the property type of all string valued properties as **PtypString8**.
5. Subject to the prior constraints, the server MUST construct a list of all the properties it is aware of and return that list as an **SPropTagArray** in the output parameter *ppColumns*. The protocol does not constrain the order of this list.
6. If no error condition has been specified by the previous constraints, the server MUST return the value "Success".

3.1.4.6 NspiGetPropList (Opnum 8)

The **NspiGetPropList** method returns a list of all the properties that have values on a specified object.

```
long NspiGetPropList(  
    [in] NSPI_HANDLE hRpc,  
    [in] DWORD dwFlags,  
    [in] DWORD dwMId,  
    [in] DWORD CodePage,  
    [out] PropertyTagArray_r** ppPropTags  
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

dwFlags: A **DWORD** [\[MS-DTYP\]](#) value that contains a set of bit flags. The server MUST ignore values other than the bit flag **fSkipObjects**.

dwMId: A **DWORD** value that contains a Minimal Entry ID.

CodePage: The code page in which the client wants the server to express string values properties.

ppPropTags: A **PropertyTagArray_r** value. On return, it holds a list of properties.

Return Values: The server returns a long value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the server returns any return value other than "Success", the server MUST return a NULL for the output parameter *ppPropTags*.
2. The server MAY make additional validations, as described in section 5. If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.

If the input parameter *CodePage* does not specify a code page the server supports, the server MUST return the return value **InvalidCodepage**.

1. If the input parameter *dwMId* does not specify an object in the address book, the server MUST return the value **GeneralFailure**.
2. If the input parameter *dwFlags* contains the bit flag **fSkipObjects**, the server MUST NOT return any proptags with the **PtypEmbeddedTable** property type in the output parameter *ppPropTags*.
3. If the input parameter *CodePage* is **CP_WINUNICODE**, the server MUST return all string valued properties as having the **PtypString** property type.
4. If the input parameter *CodePage* is not **CP_WINUNICODE**, the server MUST return all string valued properties as having the **PtypString8** property type.
5. Subject to the previous constraints, the server constructs a list of all proptags that correspond to values on the object specified in the input parameter *dwMId*. The server MUST return this list in the output parameter *ppPropTags*. The protocol does not constrain the order of this list.
6. If no error condition has been specified by the previous constraints, the server MUST return the value "Success".

3.1.4.7 NspiGetProps (Opnum 9)

The **NspiGetProps** method returns an address book row that contains a set of the properties and values that exist on an object.

```
long NspiGetProps (
    [in] NSPI_HANDLE hRpc,
    [in] DWORD dwFlags,
    [in] STAT* pStat,
    [in, unique] PropertyTagArray_r* pPropTags,
    [out] PropertyRow_r** ppRows
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

dwFlags: A **DWORD** [\[MS-DTYP\]](#) value that contains a set of bit flags. The server MUST ignore values other than the bit flags **fEphID** and **fSkipObjects**.

pStat: A pointer to a **STAT** block that describes a logical position in a specific address book container. This parameter is used to both specify input parameters from the client and return values from the server.

pPropTags: The value NULL or a reference to a **PropertyTagArray_r** value. Contains list of the proptags of the properties that the client wants to be returned.

ppRows: A reference to a **PropertyRow_r** value. Contains the address book container row the server returns in response to the request.

Return Values: The server returns a long value specifying the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* is set to the value **CP_WINUNICODE** and the type of the proptags in the input parameter *pPropTags* is **PtypString8**, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
2. If the server returns any return values other than "ErrorsReturned" or "Success", the server MUST return a NULL for the output parameter *ppRows*.
3. The server MAY make additional validations, as described in section [5](#). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
4. If the server is unable to locate the address book container specified by the **ContainerID** field in the input parameter *pStat*, the server MUST return the return value "InvalidBookmark".
5. The server constructs a list of proptags for which it will return property values as follows:
6. If the input parameter *pPropTags* is not NULL, the client is requesting the server return only those properties and their values in the output parameter *ppRows*. The server MUST use this list.
7. If the input parameter *pPropTags* is NULL, the client is requesting that the server constructs a list of proptags on its behalf. The server MUST construct a proptag list that is exactly the same list that would be returned to the client in the *pPropTags* output parameter of the **NspiGetPropList** method, as specified in section [3.1.4.6](#), using the following parameters as inputs to the **NspiGetPropList** method:
 - The **NspiGetProps** parameter *hRpc* is used as the **NspiGetPropList** parameter *hRpc*.
 - The **NspiGetProps** parameter *dwFlags* is used as the **NspiGetPropList** parameter *dwFlags*.
 - The **CurrentRec** field of the **NspiGetProps** parameter *pStat* is used as the **NspiGetPropList** parameter *dwMId*.
 - The **CodePage** field of the **NspiGetProps** parameter *pStat* is used as the **NspiGetPropList** parameter *CodePage*.

If a call to the **NspiGetPropList** method with these parameters and relaxed constraints would return anything other than "Success", the server MUST return that error code as the return value for the **NspiGetProps** method.

1. If the length of the list of proptags for which the server will return property values is excessive, the server MUST return the return value "TableBig". The Exchange Server NSPI Protocol does not prescribe what constitutes an excessive length.
2. If input parameter *dwFlags* contains the bit flag **fEphID** and the **PidTagEntryId** property is present in the list of proptags, the server MUST return the values of the **PidTagEntryId** property in the Ephemeral Entry ID format, as specified in section [2.3.8.2](#).
3. If input parameter *dwFlags* does not contain the bit flag **fEphID** and the **PidTagEntryId** property is present in the list of proptags, the server MUST return the values of the **PidTagEntryId** property in the Permanent Entry ID format, as specified in section [2.3.8.3](#).
4. The server MUST return string-valued properties in the code page specified in **CodePage** field of the input parameter *pStat*, as specified in section [3.1.1.2](#).
5. If the server can locate the object specified in the **CurrentRec** field of the input parameter *pStat*, the server MUST return values associated with this object.
6. If the server is unable to locate the object specified in the **CurrentRec** field of the input parameter *pStat*, the server MUST proceed as if the object was located but had no values for any properties.
7. If a property in the proptag list has no value on the object specified by the **CurrentRec** field, the server MUST return the error code ErrorsReturned. The server MUST set the **aulPropTag** member corresponding to the proptag with no value with the proptag that has no value with the **PtypErrorCode** property type. Subject to the prior constraints, the server constructs a list of properties and their values as a single **PropertyRow_r** structure with a one-to-one order preserving correspondence between the values in the proptag list specified by input parameters and the returned properties and values in the **RowSet**. If there are duplicate properties in the proptag list, the server MUST create duplicate values in the parameter **RowSet**. The server MUST return this **RowSet** in the output parameter *ppRows*.
8. If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.8 NspiQueryRows (Opnum 3)

The **NspiQueryRows** method returns to the client a number of rows from a specified table. The server MUST return no more rows than the number specified in the input parameter *Count*. Although the protocol places no further boundary or requirements on the minimum number of rows the server returns, implementations SHOULD return as many rows as possible subject to this maximum limit to improve usability of the server for clients.

```
long NspiQueryRows(  
    [in] NSPI_HANDLE hRpc,  
    [in] DWORD dwFlags,  
    [in, out] STAT* pStat,  
    [in, range(0,100000)] DWORD dwEtableCount,  
    [in, unique, size_is(dwEtableCount)]  
        DWORD* lpEtable,  
    [in] DWORD Count,  
    [in, unique] PropertyTagArray_r* pPropTags,
```

```
[out] PropertyRowSet_r** ppRows  
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

dwFlags: A **DWORD** [\[MS-DTYP\]](#) value that contains a set of bit flags. The server MUST ignore values other than the bit flags **fEphID** and **fSkipObjects**.

pStat: A pointer to a **STAT** block that describes a logical position in a specific address book container. This parameter is used to specify both input parameters from the client and return values from the server.

dwEtableCount: A **DWORD** value that contains the number values in the input parameter *IpEtable*. This value is limited to 100,000.

IpEtable: An array of **DWORD** values, representing an Explicit Table, as specified in section [3.1.1.3.2](#).

Count: A **DWORD** value that contains the number of rows the client is requesting.

pPropTags: The value NULL or a reference to a [PropertyTagArray_r](#) value, containing a list of the proptags of the properties that client requires to be returned for each row returned.

ppRows: A reference to a **PropertyRowSet_r** value. Contains the address book container rows that the server returns in response to the request.

Return Values: The server returns a long value specifying the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value CP_WINUNICODE, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or whether the server changes its state.
2. If the input parameter *IpEtable* is NULL and the input parameter *Count* is 0, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
3. If the server returns any return values other than "Success", the server MUST return a NULL for the output parameter *ppRows* and MUST NOT modify the output parameter *pStat*.
4. The server MAY make additional validations, as described in section [5](#). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.

5. If the input parameter *lpETable* is NULL and the server is unable to locate the address book container specified by the **ContainerID** field in the input parameter *pStat*, the server MUST return the return value "InvalidBookmark".
6. The server constructs a list of proptags for which it will return property values as follows:
 - If the input parameter *pPropTags* is not NULL, the client is requesting the server return only those properties and their values in the output parameter *ppRows*. The server MUST use this list.
 - If the input parameter *pPropTags* is NULL, the client is requesting that the server construct a list of proptags on its behalf. This server MUST use the following proptag list (using proptags defined in [\[MS-OXPROPS\]](#)), in this order:

```
{PidTagAddressBookContainerId,
PidTagObjectType,
PidTagDisplayType,
PidTagDisplayName with the Property Type PtypString8,
PidTagPrimaryTelephoneNumber with the Property Type PtypString8,
PidTagDepartmentName with the Property Type PtypString8,
PidTagOfficeLocation with the Property Type PtypString8}
```

1. If the input parameter *lpETable* is NULL, the server MUST use the table specified by the input parameter *pStat* when constructing the return parameter *ppRows*.
2. If the input parameter *lpETable* is not NULL, it contains an Explicit Table. The server MUST use that table when constructing the return parameter *ppRows*.
3. The client MUST NOT specify the value 0 for the input parameter *Count* if the input parameter *lpETable* is not NULL.
4. If there are any rows that satisfy the client's query, the server MUST return at least one row.
5. The server MUST return as many rows as possible, up to the number value specified in the input parameter *Count*. The server MAY return fewer for any reason.
6. The server MUST return rows in the order they exist in the table being used.
7. If the server is using the table specified by the input parameter *pStat*, the server MUST process rows starting from the current position in the table specified in that parameter (including any values of the **Delta** field).
8. If the server is using the table specified by the input parameter *lpETable*, the server MUST process rows starting from the beginning of the table.
9. The server constructs a **RowSet**. Each row in the **RowSet** corresponds to a row in the table specified by input parameters. The rows in the **RowSet** are in a one-to-one order preserving correspondence with the rows in the table specified by input parameters. The Rows placed into the **RowSet** are exactly those rows that would be returned to the client in the *ppRows* output parameter of the **NspiGetProps** method, as specified in section [3.1.4.7](#), using the following parameters:

- The **NspiQueryRows** parameter *hRpc* is used as the **NspiGetProps** parameter *hRpc*.
- The **NspiQueryRows** parameter *dwFlags* is used as the **NspiGetProps** parameter *dwFlags*.
- The **NspiQueryRows** parameter *pStat* is used as the **NspiGetProps** parameter *pStat*. The **CurrentRec** field is set to the Minimal Entry ID of the row being returned.
- The list of proptags the server constructs as specified by constraint 5 is used as the **NspiGetProps** parameter *pPropTags*.

If a call to the **NspiGetProps** method with these parameters would return any value other than "Success" or "ErrorsReturned", the server MUST return that error code as the return value for the **NspiQueryRows** method. Otherwise, the server MUST return the **RowSet** constructed in the output parameter *ppRows*.

1. If the server has no rows that satisfy this query, the server MUST place an **PropertyRpw_r** Set with 0 rows in the output parameter *ppRows*. The server MUST return the return value "Success".
2. If the server is using the table specified by the input parameter *pStat*, the server MUST update the status of the table. This update MUST be exactly the same update that would occur via the **NspiUpdateStat** method with the following parameters:
 - The **NspiQueryRows** parameter *hRpc* is used as the **NspiUpdateStat** parameter *hRpc*.
 - The value 0 is used as **NspiUpdateStat** parameter *Reserved*.
 - The **NspiQueryRows** parameter *pStat* is used as the **NspiGetProps** parameter *pStat*. The number of rows returned in the **NspiQueryRows** output parameter *ppRows* is added to the **Delta** field.
 - The value NULL is used as the **NspiUpdateStat** parameter *lpDelta*. The list of proptags the server constructs as specified by constraint 5 is used as the **NspiGetProps** parameter *pPropTags*.
3. If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.9 NspiSeekEntries (Opnum 4)

The **NspiSeekEntries** method searches for and sets the logical position in a specific table to the first entry greater than or equal to a specified value. Optionally, it might also return information about rows in the table.

```
long NspiSeekEntries(
    [in] NSPI_HANDLE hRpc,
    [in] DWORD Reserved,
    [in, out] STAT* pStat,
    [in] PropertyValue_r* pTarget,
    [in, unique] PropertyTagArray_r* lpETable,
    [in, unique] PropertyTagArray_r* pPropTags,
    [out] PropertyRowSet_r** ppRows
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

Reserved: A **DWORD** [\[MS-DTYP\]](#) value that is reserved for future use. Ignored by the server.

pStat: A pointer to a **STAT** block that describes a logical position in a specific address book container. This parameter is used to both specify input parameters from the client and return values from the server.

pTarget: A **PropertyValue_r** value holding the value that is being sought.

IpETable: The value NULL or a **PropertyTagArray_r** value. It holds a list of Minimal Entry IDs that comprises a restricted address book container.

pPropTags: The value NULL or a reference to a **PropertyTagArray_r** value. Contains list of the proptags of the columns that client wants to be returned for each row returned.

ppRows: A reference to a **PropertyRowSet_r** value. Contains the address book container rows the server returns in response to the request.

Return Values: The server returns a long value specifying the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value CP_WINUNICODE, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or whether the server changes its state.
2. If the input parameter *IpETable* is not NULL and does not contain an Explicit Table both containing a restriction of the table specified by the input parameter *pStat* and sorted as specified by the **SortType** field of the input parameter *pStat*, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or whether the server changes its state.
3. If the input parameter *Reserved* contains any value other than 0, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
4. If the server returns any return values other than "Success", the server MUST return a NULL for the output parameter *ppRows* and MUST NOT modify the value of the parameter *pStat*.
5. The server MAY make additional validations as described in section [5](#). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
6. If the server is unable to locate the address book container specified by the **ContainerID** field in the input parameter *pStat*, the server MUST return the return value "InvalidBookmark".
7. If the input parameter *IpETable* is NULL, the server MUST use the table specified by the input parameter *pStat* when constructing the return parameter *ppRows*.

8. If the input parameter *lpETable* contains an Explicit Table, the server MUST use that table when constructing the return parameter *ppRows*.
9. If the server does not support the **SortTypePhoneticDisplayName** and the **SortType** field of the input parameter *pStat* has the value **SortTypePhoneticDisplayName**, the server MUST return the value **GeneralFailure**.
10. If the **SortType** field in the input parameter *pStat* has any value other than **SortTypeDisplayName** or **SortTypePhoneticDisplayName**, the server MUST return the value **GeneralFailure**.
11. If the **SortType** field in the input parameter *pStat* is **SortTypeDisplayName** and the property specified in the input parameter *pTarget* is anything other than **PidTagDisplayName** (with either the Property Type **PtypString8** or **PtypString**), the server MUST return the value **GeneralFailure**.
12. If the **SortType** field in the input parameter *pStat* is **SortTypePhoneticDisplayName** and the property specified in the input parameter *pTarget* is anything other than **PidTagAddressBookPhoneticDisplayName** (with either the Property Type **PtypString8** or **PtypString**), the server MUST return the value **GeneralFailure**.
13. The server MUST locate the first row in the specified table that has a value equal to or greater than the value specified in the input parameter *pTarget*. If no such row exists, the server MUST return the value **NotFound**.
14. If a qualifying row was found, the server MUST update the position information in the parameter *pStat*.
 - The server MUST set **CurrentRec** field of the parameter *pStat* to the Minimal Entry ID of the qualifying row.
 - If the server is using the table specified by the input parameter *lpETable*, the server MUST set the **NumPos** field of the parameter *pStat* to the accurate numeric position of the qualifying row in the table.
 - If the server is using the table specified by the input parameter *pStat*, the server MUST set the **NumPos** field of the parameter *pStat* to the approximate numeric position of the qualifying row in the table.
 - The **TotalRecs** field of the parameter *pStat* MUST be set to the accurate number of records in the table used.
 - The server MUST NOT modify any other fields of the parameter *pStat*.
15. If the input parameter *pPropTags* is not NULL, the client is requesting the server to return an **PropertyRowSet_r**. Subject to the prior constraints, the server MUST construct an **PropertyRowSet_r** to return to the client in the output parameter *ppRows*. This **PropertyRowSet_r** MUST be exactly the same **PropertyRowSet_r** that would be returned in the *ppRows* parameter of a call to the **NspiQueryRows** method with the following parameters:
 - The **NspiSeekEntries** parameter *hRpc* is used as the **NspiQueryRows** parameter *hRpc*.
 - The value **fEphID** is used as the **NspiQueryRows** parameter *dwFlag*.
 - The **NspiSeekEntries** output parameter *pStat* (as modified by the prior constraints) is used as the **NspiQueryRows** parameter *pStat*.

- If the **NspiSeekEntries** input parameter *lpETable* is NULL, the value 0 is used as the **NspiQueryRows** parameter *dwETableCount*, and the value NULL is used as the **NspiQueryRows** parameter *lpETable*.
- If the **NspiSeekEntries** input parameter *lpETable* is not NULL, the server constructs an explicit table from the table specified by *lpETable* by copying rows in order from *lpETable* to the new explicit table. The server begins copying from the row specified by the **NumPos** field of the *pStat* parameter (as modified by the prior constraints), and continues until all remaining rows are added to the new table. The number of rows in this new table is used as the **NspiQueryRows** parameter *dwETableCount*, and the new table is used as the **NspiQueryRows** *lpETable* parameter.
- The list of Minimal Entry IDs in the input parameter *lpETable* starting with the qualifying row is used as the **NspiQueryRows** parameter *lpETable*. These Minimal Entry IDs are expressed as a simple array of **DWORD** values rather than as a **PropertyTagArray_r** value. Note that the qualifying row is included in this list, and that the order of the Minimal Entry IDs from the input parameter *lpETable* is preserved in this list.
- If the **NspiSeekEntries** input parameter *lpETable* is NULL, the server MUST choose a value for the **NspiQueryRows** parameter *Count*. The Exchange Server NSPI Protocol does not prescribe any particular algorithm. The server MUST use a value greater than 0.
- If the **NspiSeekEntries** input parameter *lpETable* is not NULL, the value used for the **NspiQueryRows** parameter *dwETableCount* is used for the **NspiQueryRows** parameter *Count*.
- The **NspiSeekEntries** parameter *pPropTags* is used as the **NspiQueryRows** parameter *pPropTags*.

Note that the server MUST NOT modify the return value of the **NspiSeekEntry** output parameter *pStat* in any way in the process of constructing the output **PropertyRowSet_r**.

- If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.10 NspiGetMatches (Opnum 5)

The **NspiGetMatches** method returns an Explicit Table. The rows in the table are chosen based on two possible criteria: a restriction applied to an address book container or the values of a property on a single object that hold references to other objects.

```
long NspiGetMatches (
    [in] NSPI_HANDLE hRpc,
    [in] DWORD Reserved1,
    [in, out] STAT* pStat,
    [in, unique] PropertyTagArray_r* pReserved,
    [in] DWORD Reserved2,
    [in, unique] Restriction_r* Filter,
    [in, unique] PropertyName_r* lpPropName,
    [in] DWORD ulRequested,
    [out] PropertyTagArray_r** ppOutMIds,
    [in, unique] PropertyTagArray_r* pPropTags,
    [out] PropertyRowSet_r** ppRows
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

Reserved1: A **DWORD** [\[MS-DTYP\]](#) value reserved for future use.

pStat: A reference to a **STAT** block describing a logical position in a specific address book container.

pReserved: A **PropertyTagArray_r** reserved for future use.

Reserved2: A **DWORD** value reserved for future use. Ignored by the server.

Filter: The value NULL or an **Restriction_r** value. Holds a logical restriction to apply to the rows in the address book container specified in the *pStat* parameter.

lpPropName: The value NULL or a **PropertyName_r** value. Holds the property to be opened as a restricted address book container.

ulRequested: A **DWORD** value. Contains the maximum number of rows to return in a restricted address book container.

ppOutMIDs: A **PropertyTagArray_r** value. On return, it holds a list of Minimal Entry IDs that comprise a restricted address book container.

pPropTags: The value NULL or a reference to a **PropertyTagArray_r** value. Contains list of the proptags of the columns that client wants to be returned for each row returned.

ppRows: A reference to a **PropertyRowSet_r** value. Contains the address book container rows the server returns in response to the request.

Return Values: The server returns a long value specifying the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value **CP_WINUNICODE**, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
2. If the input parameter *Filter* contains any value other than NULL and the **SortOrder** field of the input parameter *pStat* contains any value other than **SortTypeDisplayName** or **SortTypePhoneticDisplayName**, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
3. If the input parameter *Reserved1* contains any value other than 0, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
4. If the server returns any return values other than "Success", the server MUST return a NULL for the output parameters *ppOutMIDs* and *ppRows* and MUST NOT modify the value of the parameter *pStat*.

5. The server MAY make additional validations as described in section 5. If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
6. If the reserved input parameter *pReserved* contains any value other than NULL, the server MUST return the value "TooComplex".
7. If the server does not support the **SortTypePhoneticDisplayName** and the **SortType** field of the input parameter *pStat* has the value "SortTypePhoneticDisplayName", the server MUST return the value "GeneralFailure".
8. If the input **SortType** field of the input parameter *pStat* is **SortTypeDisplayName** or **SortTypePhoneticDisplayName** and the server is unable to locate the address book container specified by the **ContainerID** field in the input parameter *pStat*, the server MUST return the return value "InvalidBookmark".
9. If the input parameter *Filter* is not NULL, the server constructs an Explicit Table as follows:
 - If the input parameter *Filter* is not NULL, it specifies a restriction, as specified in [\[MS-OXCDATA\]](#).
 - If the server will not support the call because the search is too complex, the server MUST return the value "TooComplex". The Exchange Server NSPI Protocol does not prescribe what constitutes a search that is too complex.
 - If the server will support the filter, it identifies the rows in the table specified in the input parameter *pStat* for which the filter is true. The Minimal IDs of these rows are inserted into the Explicit Table, maintaining their order from the originating table.
- 10.If the input parameter *Filter* is NULL, the server constructs an Explicit Table as follows:
 - The Minimal Entry ID of the object the server is to read values from is specified in the **CurrentRec** field of the input parameter *pStat*. The server MUST ignore any values of the **Delta** and **ContainerID** fields while locating the object. That is, the server MUST NOT enforce any restrictions that the object specified by **CurrentRec** is actually in any particular address book container. Note that this is an exceptional use of the *pStat* parameter for position, not conforming to the semantic meaning of this field in all other NSPI methods.
 - If the input parameter *lpPropName* is not NULL, it specifies the property the server is to read the values of. If the input parameter *lpPropName* is NULL, the server is to read the values of the property specified as a proptag value in the **ContainerID** field of the input parameter *pStat*. Note, this is an exceptional use of this field, not conforming to the semantic meaning of this field in all other NSPI methods.
 - The server locates the object specified by the client, subject to these restraints. If the server is unable to locate the object, the server MUST return the value "GeneralFailure".
 - If the **SortType** field of the input parameter *pStat* has the value **SortTypeDisplayName_W** and the server does not support modifying the value of the property specified by the client on the object specified by the client, the server MUST return the value "NotSupported".
 - If the server is unable to locate objects in the address book based on values of the property specified by the client on the object specified by the client, the server MUST return the value "NotSupported". Note that this constraint is intended to apply in the case where the server is categorically unable to locate specific objects based on the value of the property, not the case where the property has no values.

- The server reads the values of the property specified by the client. For each value read, the server tries to locate a specific object in the address book corresponding to this value. If a specific object is located, the Minimal ID of the object is inserted into the Explicit Table.
 - The server MUST sort the rows in Explicit Table by the Unicode representation of the value of the **PidTagDisplayName** property, as specified in section [3.1.1.2](#)).
 - If the server returns "Success", the server MUST set the **ContainerID** field of the output parameter *pStat* to be equal to the **CurrentRec** field of the input parameter *pStat*. The server MUST NOT modify any other fields in this parameter.
- 11.If the number of rows in the constructed Explicit Table is greater than the input parameter *ulRequested*, the server MUST return the value "TableTooBig".
 - 12.If the server will not support the call because the Explicit Table is larger than the server will allow, the server MUST return the value "TableTooBig". The Exchange Server NSPI Protocol does not prescribe what constitutes a table that is too large.
 - 13.If the input parameter *proptags* is not NULL, the client is requesting the server to return a **PropertyRowSet_r**. Subject to the prior constraints, the server MUST construct a **PropertyRowSet_r** to return to the client in the output parameter *ppRows*. This **PropertyRowSet_r** MUST be exactly the same **PropertyRowSet_r** that would be returned in the *ppRows* parameter of a call to the **NspiQueryRows** method with the following parameters:
 - The **NspiGetMatches** parameter *hRpc* is used as the **NspiQueryRows** parameter *hRpc*.
 - The value "fEphID" is used as the **NspiQueryRows** parameter *dwFlags*.
 - The **NspiGetMatches** output parameter *pStat* (as modified by the prior constraints) is used as the **NspiQueryRows** parameter *pStat*.
 - The number of Minimal Entry IDs in the constructed Explicit Table is used as the **NspiQueryRows** parameter *dwETableCount*.
 - The constructed Explicit Table is used as the **NspiQueryRows** parameter *lpETable*. These Minimal Entry IDs are expressed as a simple array of **DWORD** values rather than as a **PropertyTagArray_r** value.
 - The number of Minimal Entry IDs in the constructed Explicit Table is used as the **NspiQueryRows** parameter *Count*.
 - The **NspiGetMatches** parameter *proptags* is used as the **NspiQueryRows** parameter *proptags*.

Note that the server MUST NOT modify the return value of the **NspiSeekEntries** method output parameter *pStat* in any way in the process of constructing the output **PropertyRowSet_r**. The server MUST return the constructed **PropertyRowSet_r** in the output parameter *ppRows*.

- If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.11 NspiResortRestriction (Opnum 6)

The **NspiResortRestriction** method applies a sort order to the objects in a restricted address book container.

```
long NspiResortRestriction(
    [in] NSPI_HANDLE hRpc,
```

```

[in] DWORD Reserved,
[in, out] STAT* pStat,
[in] PropertyTagArray_r* pInMIds,
[in, out] PropertyTagArray_r** ppOutMIds
);

```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

Reserved: A **DWORD** [\[MS-DTYP\]](#) value reserved for future use. Ignored by the server.

pStat: A reference to a **STAT** block describing a logical position in a specific address book container.

pInMIds: A **PropertyTagArray_r** value. It holds a list of Minimal Entry IDs that comprise a restricted address book container.

ppOutMIds: A **PropertyTagArray_r** value. On return, it holds a list of Minimal Entry IDs that comprise a restricted address book container.

Return Values: The server returns a long value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value CP_WINUNICODE, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
2. If the **SortType** field of the input parameter *pStat* contains any value other than "SortTypeDisplayName" or "SortTypePhoneticDisplayName", the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
3. If the server returns any return values other than "Success", the server MUST return a NULL for the output parameter *ppOutMIds* and MUST NOT modify the value of the parameter *pStat*.
4. The server MAY make additional validations as described in section [5](#). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
5. If the server does not support the **SortTypePhoneticDisplayName** and the **SortType** field of the input parameter *pStat* has the value "SortTypePhoneticDisplayName", the server MUST return the value "GeneralFailure".
6. The server constructs an Explicit Table as follows:
 - The server locates all the objects specified in the Explicit Table specified by the input value *pInMIds*. The server MUST ignore any Minimal Entry IDs that do not specify an object.
 - For each such object located, a row is inserted into the constructed Explicit Table.

- The server MUST sort the rows in the constructed explicit table by the property specified in the **SortType** field of the input parameter *pStat*.
7. The server MUST return the constructed Explicit Table in the output parameter *ppOutMIds*.
 8. The server MUST update the output parameter *pStat* as follows:
 - The **TotalRecs** field is set to the number of objects in the constructed Explicit Table.
 - If the object specified by the **CurrentRec** field of the input parameter *pStat* is not in the constructed Explicit Table, the **CurrentRec** field of the output parameter *pStat* is set to the value `MID_BEGINNING_OF_TABLE` and the **NumPos** field of the output parameter *pStat* is set to the value 0.
 - If the object specified by the **CurrentRec** field of the input parameter *pStat* is in the constructed Explicit Table, the **NumPos** field of the output parameter *pStat* is set to the numeric position in the Explicit Table.
 - The server MUST NOT modify any other fields of the output parameter *pStat*.
 9. If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.12 NspiCompareMIds (Opnum 10)

The **NspiCompareMIds** method compares the position in an address book container of two objects identified by Minimal Entry ID and returns the value of the comparison.

```
long NspiCompareMIds(
    [in] NSPI_HANDLE hRpc,
    [in] DWORD Reserved,
    [in] STAT* pStat,
    [in] DWORD MId1,
    [in] DWORD MId2,
    [out] long* plResult
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

Reserved: A **DWORD** [\[MS-DTYP\]](#) value reserved for future use. Ignored by the server.

pStat: A reference to a **STAT** block that describes a logical position in a specific address book container.

MId1: A **DWORD** value containing a Minimal Entry ID.

MId2: A **DWORD** value containing a Minimal Entry ID.

plResult: A **DWORD** value. On return, it contains the result of the comparison.

Return Values: The server returns a long value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value CP_WINUNICODE, the server MUST return one of the return values specified in section 2.2.2. No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
2. The server MAY make additional validations as described in section 5. If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
3. If the server is unable to locate the address book container specified by the **ContainerID** field in the input parameter *pStat*, the server MUST return the return value "InvalidBookmark".
4. If the server returns any return value other than "Success", the protocol does not constrain the value in the return parameter *plResult*.
5. If the server is unable to locate the objects specified by the input parameters *MId1* or *MId2* in the table specified by the **ContainerID** field of the input parameter *pStat*, the server MUST return the return value "GeneralFailure".
6. If the position of the object specified by *MId1* comes before the position of the object specified by *MId2* in the table specified by the field **ContainerID** of the input parameter *pStat*, the server MUST return a value less than 0 in the output parameter *plResult*.
7. If the position of the object specified by *MId1* comes after the position of the object specified by *MId2* in the table specified by the field **ContainerID** of the input parameter *pStat*, the server MUST return a value greater than 0 in the output parameter *plResult*.
8. If the position of the object specified by *MId1* is the same as the position of the object specified by *MId2* in the table specified by the **ContainerID** field of the input parameter *pStat* (that is, they specify the same object), the server MUST return a value of 0 in the output parameter *plResult*.
9. If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.13 NspiDNToMId (Opnum 7)

The **NspiDNToMId** method maps a set of DN to a set of Minimal Entry ID.

```
long NspiDNToMId(
    [in] NSPI_HANDLE hRpc,
    [in] DWORD Reserved,
    [in] StringsArray_r* pNames,
    [out] PropertyTagArray_r** ppMIds
);
```

hRpc: An RPC context handle, as specified in section 2.3.9.

Reserved: A **DWORD** [MS-DTYP] value reserved for future use. Ignored by the server.

pNames: A **StringsArray_r** value. It holds a list of strings that contain **DNs**, as specified in [MS-OXOABK].

ppMIds: A **PropertyTagArray_r** value. On return, it holds a list of Minimal Entry IDs.

Return Values: The server returns a long value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the server returns any return value other than "Success", the server MUST return the value NULL in the return parameter *ppMIds*.
2. The server MAY make additional validations as described in section 5). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
3. If the server is unable to locate an appropriate mapping between a DN and a Minimal Entry ID, it MUST map the DN to a Minimal Entry ID with the value 0.
4. The server constructs a list of Minimal Entry IDs to return to the client, encoding the mappings. The list is in a one-to-one order preserving correspondence with the list of DNs in the input parameter *pNames*. The server MUST return the list in the output parameter *ppMIds*.
5. If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.14 NspiModProps (Opnum 11)

The **NspiModProps** method is used to modify the properties of an object in the address book. This protocol supports the **PidTagUserX509Certificate** ([\[MS-OXPROPS\]](#) section 2.1123) and **PidTagAddressBookX509Certificate** ([\[MS-OXPROPS\]](#) section 2.633) properties.

```
long NspiModProps(  
    [in] NSPI_HANDLE hRpc,  
    [in] DWORD Reserved,  
    [in] STAT* pStat,  
    [in, unique] PropertyTagArray_r* pPropTags,  
    [in] PropertyRow_r* pRow  
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

Reserved: A **DWORD** [\[MS-DTYP\]](#) value reserved for future use.

pStat: A reference to a **STAT** block that describes a logical position in a specific address book container.

pPropTags: The value NULL or a reference to a **PropertyTagArray_r**. Contains list of the proptags of the columns that client requests all values to be removed from.

pRow: A **PropertyRow_r** value. Contains an address book row.

Return Values: The server returns a long value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value CP_WINUNICODE, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
2. If the server returns any return value other than "Success", the server MUST NOT modify any properties of any objects in the address book.
3. The server MAY make additional validations, as described in section [5](#). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
4. If the reserved input parameter *Reserved* contains any value other than 0, the server MUST return the value "CallFailed".
5. If the input parameter *pPropTags* is NULL, the server MUST return the value "InvalidParameter".
6. If the server is unable to locate the object specified by the **CurrentRec** field of the input parameter *pStat*, the server MUST return the value "InvalidParameter".
7. If the server is able to locate the object, but will not allow modifications to the object due to its display type, the server MUST return the value "InvalidObject".
8. The server MUST remove all values for all properties specified in the input parameter *pPropTags* from the object specified by the field **CurrentRec** in the input parameter *pStat*.
9. The server MUST remove all values for all properties specified in the input parameter *pRow* from the object specified by the field **CurrentRec** in the input parameter *pStat*.
10. The server MUST add all values for all properties specified in the input parameter *pRow* to the object specified by the field **CurrentRec** in the input parameter *pStat*.
11. If the server is unable to apply the modifications specified for any other reason, the server MUST return the value "AccessDenied".
12. If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.15 NspiModLinkAtt (Opnum 14)

The **NspiModLinkAtt** method modifies the values of a specific property of a specific row in the address book. This protocol supports the **PidTagAddressBookMember** ([\[MS-OXPROPS\]](#) section 2.608) and **PidTagAddressBookPublicDelegates** ([\[MS-OXPROPS\]](#) section 2.624) properties.

```
long NspiModLinkAtt(  
    [in] NSPI_HANDLE hRpc,  
    [in] DWORD dwFlags,  
    [in] DWORD ulPropTag,  
    [in] DWORD dwMId,  
    [in] BinaryArray_r* lpEntryIds  
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

dwFlags: A **DWORD** [\[MS-DTYP\]](#) value that contains a set of bit flags. The server MUST ignore values other than the bit flag **fDelete**.

ulPropTag: A **DWORD** value. Contains the proptag of the property that the client wants to modify.

dwMId: A **DWORD** value that contains the Minimal Entry ID of the address book row that the client wants to modify.

lpEntryIds: A **BinaryArray** value. Contains a list of EntryIDs to be used to modify the requested property on the requested address book row. These EntryIDs can be either Ephemeral Entry IDs or Permanent Entry IDs or both.

Return Values: The server returns a long value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the server returns any return value other than "Success", the server MUST NOT modify any properties of any objects in the address book.
2. The server MAY make additional validations, as described in section [5](#)). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
3. If the input parameter *ulPropTag* does not specify a proptag the server recognizes, the server MUST return **NotFound**.
4. If the server is unable to locate the object specified by the input parameter *dwMId*, the server MUST return the value "InvalidParameter".
5. If the server is able to locate the object, but will not allow modifications to the object due to its display type, the server MUST NOT modify any properties of any objects in the address book, and the server MUST return the value "Success".
6. If the input parameter *dwFlags* contains the bit value **fDelete**, the server MUST remove all values specified by the input parameter *lpEntryIDs* from the property specified by **ulPropTag** for the object specified by input parameter *dwMId*. The server MUST ignore any values specified by *lpEntryIDs* that are not present on the object specified by *dwMId*.
7. If the input parameter *dwFlags* does not contain the bit value **fDelete**, the server MUST add all values specified by the input parameter *lpEntryIDs* to the property specified by *ulPropTag* for the object specified by the input parameter *dwMId*. The server MUST ignore any values specified by *lpEntryIDs* that are already present on the object specified by *dwMId*.
8. If the server is unable to apply the modifications specified, the server MUST return the value "AccessDenied".
9. If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.16 NspiResolveNames (Opnum 19)

The **NspiResolveNames** method takes a set of string values in an 8-bit character set and performs ANR (as specified in section [3.1.1.6](#)) on those strings. The server reports the Minimal Entry ID that are the result of the ANR process. Certain property values are returned for any valid Minimal Entry IDs identified by the ANR process.

```
long NspiResolveNames(  
    [in] NSPI_HANDLE hRpc,  
    [in] DWORD Reserved,  
    [in] STAT* pStat,  
    [in, unique] PropertyTagArray_r* pPropTags,  
    [in] StringsArray_r* paStr,  
    [out] PropertyTagArray_r** ppMIds,  
    [out] PropertyRowSet_r** ppRows  
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

Reserved: A **DWORD** [\[MS-DTYP\]](#) reserved for future use.

pStat: A reference to a STAT block that describes a logical position in a specific address book container.

pPropTags: The value NULL or a reference to a **PropertyTagArray_r** value containing a list of the proptags of the columns that the client requests to be returned for each row returned.

paStr: A **StringsArray_r** value. Specifies the values the client is requesting the server to do ANR on. The server MUST apply any necessary character set conversion as specified in section [3.1.1.2](#).

ppMIds: A **PropertyTagArray_r** value. On return, contains a list of Minimal Entry IDs that match the array of strings, as specified in the input parameter *paStr*.

ppRows: A reference to a **PropertyRowSet_r** value. Contains the address book container rows that the server returns in response to the request.

Return Values: The server returns a long value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value CP_WINUNICODE, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
2. If the input parameter Reserved1 contains any value other than 0, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.

3. If the server returns any return value other than "Success", the server MUST return the value NULL in the return parameters *ppMIds* and *ppRows*.
4. The server MAY make additional validations, as described in section 5. If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
5. If the server is unable to locate the address book container specified by the **ContainerID** field in the input parameter *pStat*, the server MUST return the return value "InvalidBookmark".
6. The server constructs a list of the Minimal Entry IDs specified in section 2.2.8 to return to the client. These Minimal Entry IDs are those that result from applying the ANR process, as specified in section 3.1.1.6, to the strings in the input parameter *paStr*. This list is in a one-to-one order preserving correspondence with the strings in the input parameter *paStr*. The server MUST return this list of Minimal Entry IDs in the output parameter *ppMIds*.
7. Subject to the prior constraints, the server MUST construct a **PropertyRowSet_r** to return to the client. This **PropertyRowSet_r** MUST be exactly the same **PropertyRowSet_r** that would be returned via the **NspiQueryRows** method with the following parameters:
 - The **NspiResolveNames** parameter *hRpc* is used as the **NspiQueryRows** parameter *hRpc*.
 - The value 0 is used as the **NspiQueryRows** parameter *dwFlag*.
 - The **NspiResolveNames** parameter *pStat* is used as the **NspiQueryRows** parameter *pStat*.
 - The number of valid Minimal Entry IDs constructed for the **NspiResolveNames** output parameter *ppMIds* (that is, all those Minimal Entry IDs not equal to MID_AMBIGUOUS or MID_UNRESOLVED) is used as the **NspiQueryRows** parameter *dwETableCount*.
 - The list of valid Minimal Entry IDs constructed for the **NspiResolveNames** output parameter *ppMIds* (that is, all those Minimal Entry IDs not equal to MID_AMBIGUOUS or MID_UNRESOLVED) is used as the **NspiQueryRows** parameter *lpETable*. These Minimal Entry IDs are expressed as a simple array of **DWORD** values rather than as a **PropertyTagArray_r** value.
 - The number of valid Minimal Entry IDs constructed for the **NspiResolveNames** output parameter *ppMIds* (that is, all those Minimal Entry IDs not equal to MID_AMBIGUOUS or MID_UNRESOLVED) is used as the **NspiQueryRows** parameter *Count*.
 - The **NspiResolveNames** parameter *pPropTags* is used as the **NspiQueryRows** parameter *pPropTags*.

And the additional constraint:

- If the **NspiQueryRows** returns "Success" or "ErrorsReturned", the method MUST return the number of rows specified by the input parameter *Count*.

If the method **NspiQueryRows** with the specified parameters and additional constraint would return any value other than "Success" or "ErrorsReturned", the **NspiResolveNames** method MUST return that error code. If the **NspiQueryRows** method would return either "Success" or "ErrorsReturned", the server MUST return the constructed **PropertyRowSet_r** in the output parameter *ppRows*.

- If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.17 NspiResolveNamesW (Opnum 20)

The **NspiResolveNamesW** method takes a set of string values in the Unicode character set and performs ANR (as specified in section [3.1.1.6](#)) on those strings. The server reports the Minimal Entry IDs that are the result of the ANR process. Certain property values are returned for any valid Minimal Entry IDs identified by the ANR process.

```
long NspiResolveNamesW(  
    [in] NSPI_HANDLE hRpc,  
    [in] DWORD Reserved,  
    [in] STAT* pStat,  
    [in, unique] PropertyTagArray_r* pPropTags,  
    [in] WStringsArray_r* paWStr,  
    [out] PropertyTagArray_r** ppMIds,  
    [out] PropertyRowSet_r** ppRows  
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

Reserved: A **DWORD** [\[MS-DTYP\]](#) value that is reserved for future use.

pStat: A reference to a STAT block that describes a logical position in a specific address book container.

pPropTags: The value NULL or a reference to a **PropertyTagArray_r** containing a list of the proptags of the columns that the client requests to be returned for each row returned.

paWStr: A **WStringsArray_r** value. Specifies the values on which the client is requesting that the server perform ANR. The server MUST apply any necessary character set conversion, as specified in section [3.1.1.2](#).

ppMIds: A **PropertyTagArray_r** value. On return, contains a list of Minimal Entry IDs that match the array of strings, as specified in the input parameter *paWStr*

ppRows: A reference to a **PropertyRowSet_r** structure. Contains the address book container rows that the server returns in response to the request.

Return Values: The server returns a long value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the **CodePage** field of the input parameter *pStat* contains the value CP_WINUNICODE, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.
2. If the input parameter *Reserved1* contains any value other than 0, the server MUST return one of the return values specified in section [2.2.2](#). No further constraints are applied to server processing of this method; in this case server behavior is undefined. Note especially that there is no constraint on the data the server returns in any output parameter other than the return value, nor is there any constraint on how or if the server changes its state.

3. If the server returns any return value other than "Success", the server MUST return the value NULL in the return parameters *ppMIds* and *ppRows*.
4. The server MAY make additional validations, as described in section 5. If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
5. If the server is unable to locate the address book container specified by the **ContainerID** field in the input parameter *pStat*, the server MUST return the return value "InvalidBookmark".
6. The server constructs a list of the Minimal Entry IDs specified in section 2.2.8 to return to the client. These Minimal Entry IDs are those that result from the ANR process, as specified in section 3.1.1.6, to the strings in the input parameter *paStr*. This list is in a one-to-one order preserving correspondence with the strings in the input parameter *paStr*. The server MUST return this list of Minimal Entry IDs in the output parameter *ppMIds*.
7. Subject to the prior constraints, the server MUST construct a **PropertyRowSet_r** to return to the client. This **PropertyRowSet_r** MUST be exactly the same **PropertyRowSet_r** that would be returned via the **NspiQueryRows** method with the following parameters:
 - The **NspiResolveNamesW** parameter *hRpc* is used as the **NspiQueryRows** parameter *hRpc*.
 - The value 0 is used as the **NspiQueryRows** parameter *dwFlag*.
 - The **NspiResolveNamesW** parameter *pStat* is used as the **NspiQueryRows** parameter *pStat*.
 - The number of valid Minimal Entry IDs constructed for the **NspiResolveNamesW** output parameter *ppMIds* (that is, all those Minimal Entry IDs not equal to MID_AMBIGUOUS or MID_UNRESOLVED) is used as the **NspiQueryRows** parameter *dwETableCount*.
 - The list of valid Minimal Entry IDs constructed for the **NspiResolveNamesW** output parameter *ppMIds* (that is, all those Minimal Entry IDs not equal to MID_AMBIGUOUS or MID_UNRESOLVED) is used as the **NspiQueryRows** parameter *lpETable*. These Minimal Entry IDs are expressed as a simple array of **DWORD** values rather than as a **PropertyTagArray_r** value.
 - The number of valid Minimal Entry IDs constructed for the **NspiResolveNamesW** output parameter *ppMIds* (that is, all those Minimal Entry IDs not equal to MID_AMBIGUOUS or MID_UNRESOLVED) is used as the **NspiQueryRows** parameter *Count*.
 - The **NspiResolveNamesW** parameter *pPropTags* is used as the **NspiQueryRows** parameter *pPropTags*.

The additional constraint applies:

- If the **NspiQueryRows** returns "Success" or "ErrorsReturned", the server MUST return the number of rows specified by the input parameter *Count*.

If the method **NspiQueryRows** with the specified parameters and additional constraint would return any value other than "Success" or "ErrorsReturned", the **NspiResolveNamesW** method MUST return that error code. If the **NspiQueryRows** would return either "Success" or "ErrorsReturned", the server MUST return the constructed **PropertyRowSet_r** in the output parameter *ppRows*.

- If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.1.4.18 NspiGetTemplateInfo (Opnum 13)

The **NspiGetTemplateInfo** method returns information about template objects in the .

```
long NspiGetTemplateInfo(  
    [in] NSPI_HANDLE hRpc,  
    [in] DWORD dwFlags,  
    [in] DWORD ulType,  
    [string, in, unique] char* pDN,  
    [in] DWORD dwCodePage,  
    [in] DWORD dwLocaleID,  
    [out] PropertyRow_r** ppData  
);
```

hRpc: An RPC context handle, as specified in section [2.3.9](#).

dwFlags: A **DWORD** [\[MS-DTYP\]](#) value that contains a set of bit flags. The server MUST ignore values other than the bit flags **TI_HELPFILE_NAME**, **TI_HELPFILE_CONTENTS**, **TI_SCRIPT**, **TI_TEMPLATE**, and **TI_EMT**.

ulType: A **DWORD** value. Specifies the display type of the template for which information is requested.

pDN: The value NULL or the DN of the template requested. The value is NULL-terminated.

dwCodePage: A **DWORD** value. Specifies the code page of the template for which information is requested.

dwLocaleID: A **DWORD** value. Specifies the LCID of the template for which information is requested.

ppData: A reference to a **PropertyRow_r** value. On return, it contains the information requested.

Return Values: The server returns a long value that specifies the return status of the method.

Exceptions Thrown: No exceptions are thrown beyond those thrown by the underlying RPC protocol, as specified in [\[MS-RPCE\]](#).

Server Processing Rules: Upon receiving this message, the server MUST process the data from the message subject to the following constraints:

1. If the server returns any return value other than "Success", the server MUST return the value NULL in the return parameters *ppData*.
2. The server MAY make additional validations, as described in section [5](#). If the server chooses to limit the visibility of data based on these validations, the server MUST proceed as if that data did not exist in the address book.
3. If the codepage specified in the *dwCodePage* input parameter has the value CP_WINUNICODE, the server MUST return the value "InvalidCodePage".
4. If the server does not recognize the codepage specified in the *dwCodePage* input parameter as a supported code page, the server MUST return the value "InvalidCodePage".
5. The server locates the template for which it will return information as follows:

- If the input parameter *pDN* is NULL, the server MUST choose an appropriate template object for the display type specified by the input parameter *ulType* and for the LCID specified by the input parameter *dwLocaleID*. The specific choice of an appropriate template object is defined by local policy, and is not constrained by the Exchange Server NSPI Protocol. For details, see [\[MS-OXOABKT\]](#).
 - If the input parameter *pDN* is not NULL, it specifies the DN of a template object in the address book. In this case, the server MUST ignore the input parameters *ulDispType* and *dwLocaleID*.
 - If the server is unable to locate a specific object based on these constraints, the server MUST return the value "InvalidLocale".
6. The server constructs a **PropertyRow_r** value. This property values in this **PropertyRow_r** are specified as follows:
- If the input parameter *dwFlags* has the **TI_HELPFILE_NAME** bit set, the client is requesting the helpfile name data for the template, as specified in [MS-OXOABKT]. The server MUST place this data into the **PropertyRow_r** structure.
 - If the input parameter *dwFlags* has the **TI_HELPFILE_CONTENTS** bit set, the client is requesting the helpfile contents data for the template, as specified in [MS-OXOABKT]. The server MUST place this data into the **PropertyRow_r** structure.
 - If the input parameter *dwFlags* has the **TI_SCRIPT** bit set, the client is requesting the script data for the template, as specified in [MS-OXOABKT]. The server MUST place this data into the **PropertyRow_r** structure.
 - If the input parameter *dwFlags* has the **TI_TEMPLATE** bit set, the client is requesting the user interface data for the template, as specified in the [MS-OXOABKT]. The server MUST place this data into the **PropertyRow_r** structure.
 - If the input parameter *dwFlags* has the **TI_EMT** bit set, the client is requesting the address type data for the template, as specified in [MS-OXOABKT]. The server MUST place this data into the **PropertyRow_r** structure.
7. The server MUST return the constructed **PropertyRow_r** structure in the output parameter *ppData*.
8. If no other return values have been specified by these constraints, the server MUST return the return value "Success".

3.2 Client Details

3.2.1 Abstract Data Model

There is no normative data model for the client. The input data might come from any source, and the returned data can be processed by the client in any manner.

3.2.2 Timers

None.

3.2.3 Initialization

None.

3.2.4 Message Processing Events and Sequencing Rules

In order to obtain any context handle to the server, the **NspiBind** method MUST be called initially. With the *contextHandle* parameter returned from this method, it is possible to call any associated methods on the handle, as described in section 4.

This protocol MUST indicate to the RPC runtime that it is to perform a strict NDR data consistency check at target level 5.0 or 6.0, as specified in [\[MS-RPCE\]](#).

This protocol MUST indicate to the RPC runtime that it is to perform a strict NDR data consistency check at target level 6.0, as specified in [\[MS-RPCE\]](#).

This protocol MUST indicate to the RPC runtime via the **strict_context_handle** attribute that it is to reject use of context handles created by a method of a different RPC interface than this one, as specified in [\[MS-RPCE\]](#).

This protocol MUST indicate to the RPC runtime via the **type_strict_context_handle** attribute that it is to reject use of context handles created by a method that creates a different type of context handle, as specified in [\[MS-RPCE\]](#).

3.2.5 Timer Events

None. For details about any transport-level timers, see [\[MS-RPCE\]](#).

3.2.6 Other Local Events

None.

4 Protocol Examples

This section shows the call sequence for obtaining the address book hierarchy table at the NSPI layer. It further shows how a messaging client can use this table to retrieve properties of the Address Book objects by using the **NspiQueryRows** method.

It is assumed that the messaging client has established an RPC connection to the server.

Note Only parts of the details of client request parameters and server response parameters are documented, to show only the relevant information.

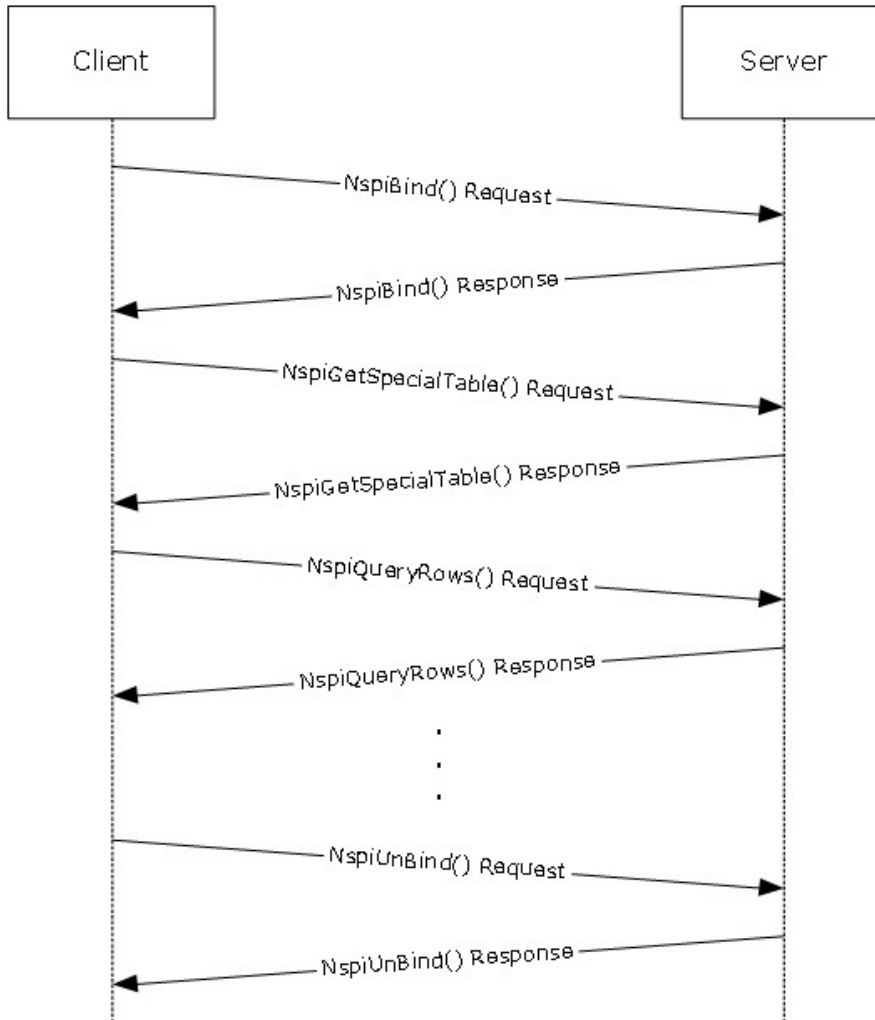


Figure 2: NSPI session message sequence example

The client initiates a session to the server by calling the **NspiBind** method. Messaging clients send the following values to the server.

Note Only relevant information, and not all parameters, are shown.

`dwFlags` `0x00000000` `unsigned long`

```

pStat
  hIndex          0x00000000      unsigned long
  ContainerID     0x00000000      unsigned long
  CurrentRec      0x00000000      unsigned long
  Delta          0x00000000      long
  NumPos         0x00000000      unsigned long
  TotalRecs      0x00000000      unsigned long
  CodePage       0x000004e4      unsigned long
  TemplateLocale 0x00000409      unsigned long
  SortLocale     0x00000409      unsigned long
pServerGuid
<pointer to an array of 16 unsigned char to be returned by the server>

```

1. The server responds to the **NspiBind** method 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>

```

2. The client requests the address book hierarchy table from the server by calling the **NspiGetSpecialTable** method with *dwFlags* parameter typically set to the **NspiUnicodeStrings** bit flag. More importantly, the client does not set the **NspiAddressCreationTemplates** flag. Typical parameters are as follows.

```

dwFlags          0x00000004      unsigned long
pStat
  hIndex          0x00000000      unsigned long
  ContainerID     0x00000000      unsigned long
  CurrentRec      0x00000000      unsigned long
  Delta          0x00000000      long
  NumPos         0x00000000      unsigned long
  TotalRecs      0x00000000      unsigned long
  CodePage       0x000004e4      unsigned long
  TemplateLocale 0x00000409      unsigned long
  SortLocale     0x00000409      unsigned long
ppRows
  <memory location that holds _PropertyRowSet_r** returned by the
  server>

```

3. The server responds to the **NspiGetSpecialTable** method call with return code "Success", and the rows of the address book hierarchy table typically have the following columns set, as described in [\[MS-OXOABK\]](#):

4. PidTagEntryId

5. PidTagContainerFlags

6. PidTagDepth

7. PidTagAddressBookContainerId

8. PidTagDisplayName

9. PidTagAddressBookIsMaster.

In this example, the server did not return the optional **PidTagAddressBookParentEntryId** property. Typical parameters are as follows.

Note Only relevant information, and not all return parameters, are shown.

```
ppRows_PropertyRowSet_r * *
{
    cRows=0x00000007
    aRow=<a pointer to an array of rows>
}
```

In this example, the server has returned a total of 0x7 rows, denoted as [0x0]...[0x6], and each row typically looks as follows.

```
aRow[0x0] ... [0x6]_PropertyRow_r *
{
    Reserved=0x00000000
    cValues=0x00000006
    lpProps=<a pointer to an array of columns>
}
```

In this example, the server has returned a column set of six properties, and each column looks as follows.

```
[0x0]_PropertyValue_r
{
    ulPropTag=PidTagEntryId
    dwAlignPad=0x00000000
    Value={...}
}
[0x1]_PropertyValue_r
{
    ulPropTag=PidTagContainerFlags
    dwAlignPad=0x00000000
    Value={...}
}
[0x2]_PropertyValue_r
{
    ulPropTag=PidTagDepth
    dwAlignPad=0x00000000
    Value={...}
}
[0x3]_PropertyValue_r
{
    ulPropTag=PidTagAddressBookContainerId
    dwAlignPad=0x00000000
    Value={...}
}
[0x4]_PropertyValue_r
{
    ulPropTag=PidTagDisplayName
    dwAlignPad=0x00000000
```

```

        Value={...}
    }
}
[0x5]_PropertyValue_r
{
    ulPropTag=PidTagAddressBookIsMaster
    dwAlignPad=0x00000000
    Value={...}
}

```

Note The client can invoke additional NSPI calls to access other information from the server before calling the **NspiUnbind** method.

1. Messaging clients call the **NspiQueryRows** method to retrieve various properties of Address Book objects. The following example shows the client requesting the server a total of two rows that contain the following properties:

2. **PidTagEntryId**

3. **PidTagDisplayName**

4. **PidTagSmtpAddress**

5. **PidTagTitle**.

Also, the client is requesting the server to use the *pStat* structure for table information by setting *lpETable* NULL and setting relevant values in the *pStat* structure. Typical parameters are as follows.

Note Only relevant information, and not all return parameters, are shown.

```

pStat
    hIndex          0x00000000      unsigned long
    ContainerID     0x00000000      unsigned long
    CurrentRec      0x00000000      unsigned long
    Delta           0x00000000      long
    NumPos          0x00000000      unsigned long
    TotalRecs      0xffffffff      unsigned long
    CodePage        0x000004e4      unsigned long
    TemplateLocale  0x00000409      unsigned long
    SortLocale      0x00000409      unsigned long
    dwETableCount0 0x00000000      unsigned long
    lpETable        0x00000000      unsigned long *
    Count           0x00000002      unsigned long
    Flags           0x00000000      unsigned long
    pPropTags_PropertyTagArray_r *
    {
        cValues=0x00000004
        aulPropTag=<a pointer to an array of properties>
    }
    aulPropTag<array of 4 PropTags>
    [0x0]PidTagEntryId      unsigned long
    [0x1]PidTagDisplayName  unsigned long
    [0x2]PidTagSmtpAddress  unsigned long
    [0x3]PidTagTitle        unsigned long

```

- The server responds to the **NspiQueryRows** method call with return code "Success" and a row set. Typical return parameters are as follows.

Note Only relevant information, and not all parameters, are shown.

```
dwFlags      0x00000000 unsigned long
pStat
  hIndex      0x00000000      unsigned long
  ContainerID 0x00000000      unsigned long
  CurrentRec  0x00001928      unsigned long
  Delta       0x00000000      long
  NumPos      0x00000002      unsigned long
  TotalRecs   0x00000016      unsigned long
  CodePage    0x000004e4      unsigned long
  TemplateLocale 0x00000409      unsigned long
  SortLocale  0x00000409      unsigned long

dwETableCount 0x00000000      unsigned long
lpETable      0x00000000      unsigned long *
Count         0x00000002      unsigned long
pPropTags_PropertyRowSet_r * *
{
    cRows=0x00000002
    aRow=<a pointer to an array of rows>
}

```

In this example, the server has returned a total of 0x2 rows denoted as [0x0]...[0x1] equal to the number of rows requested by the client. Each row typically looks as follows.

```
aRow[0x0] ... [0x1]_PropertyRow_r *
{
    Reserved=0x00000000
    cValues=0x00000004
    lpProps=<a pointer to an array of columns>
}

```

In this example, the server has returned a column set of four properties equal to the number of properties requested by the client. Each column looks as follows.

```
[0x0]_PropertyValue_r
{
    ulPropTag= PidTagEntryId
    dwAlignPad=0x00000000
    Value={...}
}
[0x1]_PropertyValue_r
{
    ulPropTag= PidTagDisplayName
    dwAlignPad=0x00000000
    Value={...}
}
[0x2]_PropertyValue_r
{
    ulPropTag= PidTagSmtAddress
    dwAlignPad=0x00000000
    Value={...}
}
[0x3]_PropertyValue_r
{

```



```
    ulPropTag= PidTagTitle
    dwAlignPad=0x00000000
    Value={...}
}
```

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

```
contextHandleNSPI_HANDLE *
<a token>
dwFlags    0x00000000    unsigned long
```

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

5 Security

5.1 Security Considerations for Implementers

The Exchange Server NSPI Protocol is not suitable for general administration of the data held by a server. It is suitable for client read access to data with limited modification of existing objects, not including address book container objects. Administration tasks the Exchange Server NSPI Protocol does not support include (but are not limited to) adding new objects to an address book, removing existing objects, and moving existing objects from one address book to another.

Beyond the basic support for address book browsing, a server can apply local security policies. When applying these security policies, a server can limit a client's access to data, either reading access and/or modification access. The simplest form of local security policy is the empty set; all data held by the server is accessible to all clients of the Exchange Server NSPI Protocol for both reading and modifying, regardless of the identity of the client. Local security policy is, with one exception, an implementation-specific detail and is not constrained by the Exchange Server NSPI Protocol. If local security policy allows a client read access to an object, the server is required to allow the client read access to the properties of the object specifying the object's identity. The following properties specify an object's identity:

- **PidTagTransmittableDisplayName**
- **PidTagDisplayName**
- **PidTagAddressBookDisplayNamePrintable**
- **PidTagEmailAddress**
- **PidTagAddressType**
- **PidTagInitialDetailsPane**
- **PidTagInstanceKey**
- **PidTagAddressBookContainerId**
- **PidTagObjectType**
- **PidTagContainerContents**
- **PidTagContainerFlags**
- **PidTagDisplayType**
- **PidTagTemplateid**
- **PidTagEntryId**
- **PidTagMappingSignature**
- **PidTagRecordKey**
- **PidTagSearchKey**

The protocol does not provide support for administration of local security policy or for client discovery of a server's security policy.

The protocol carries identity information from the client to the server in the form of an authenticated remote procedure call (RPC) connection. The client **MUST** create a secure RPC session such that the server can identify and determine the authorization for the client. For details about secure RPC, see [\[MS-RPCE\]](#). This requirement exists so that the server can implement its security model.

The server can use this information to apply local security policy. How the server uses this information is an implementation-specific detail and is not constrained by the protocol.

5.2 Index of Security Parameters

Security parameter	Section
RPC connection security	2.1

6 Appendix A: Full IDL

For ease of implementation, the following full **Interface Definition Language (IDL)** is provided, where "ms-rpce.idl" is the IDL, as described in [\[MS-RPCE\]](#).

```
import "ms-dtyp.idl";

typedef long NTSTATUS;
typedef unsigned long DWORD;

[
  uuid (F5CC5A18-4264-101A-8C59-08002B2F8426),
  version(56.0)
]

interface nsapi {

  typedef struct {
    BYTE ab[16];
  } FlatUID_r;

  typedef struct PropertyTagArray_r {
    DWORD cValues;
    [range(0, 100001)]
  [size_is(cValues + 1),
length_is(cValues)] DWORD aulPropTag[];
  } PropertyTagArray_r;

  typedef struct Binary_r {
    [range(0, 2097152)] DWORD cb;
    [size_is(cb)] BYTE * lpb;
  } Binary_r;

  typedef struct ShortArray_r {
    [range(0, 100000)] DWORD cValues;
    [size_is(cValues)] short int * lpi;
  } ShortArray_r;

  typedef struct _LongArray_r {
    [range(0, 100000)] DWORD cValues;
    [size_is(cValues)] long * lpl;
  } LongArray_r;

  typedef struct _StringArray_r {
    [range(0, 100000)] DWORD cValues;
    [size_is(cValues)] [string] char ** lppsZA;
  } StringArray_r;

  typedef struct _BinaryArray_r {
    [range(0, 100000)] DWORD cValues;
    [size_is(cValues)] Binary_r * lpbin;
  } BinaryArray_r;

  typedef struct _FlatUIDArray_r {
    [range(0, 100000)] DWORD cValues;
    [size_is(cValues)] FlatUID_r** lpguid;
  } FlatUIDArray_r;
```

```

typedef struct _WStringArray_r {
    [range(0, 100000)] DWORD cValues;
    [size_is(cValues)] [string] wchar_t ** lpszW;
} WStringArray_r;

typedef struct _DateTimeArray_r {
    [range(0, 100000)] DWORD cValues;
    [size_is(cValues)] FILETIME * lpft;
} DateTimeArray_r;

typedef struct _PropertyValue_r PropertyValue_r;

typedef struct _PropertyRow_r {
    DWORD Reserved;
    [range(0, 100000)] DWORD cValues;
    [size_is(cValues)] PropertyValue_r * lpProps;
} PropertyRow_r;

typedef struct _PropertyRowSet_r {
    [range(0, 100000)] DWORD cRows;
    [size_is(cRows)] PropertyRow_r aRow[];
} PropertyRowSet_r;

typedef struct _Restriction_r Restriction_r;

typedef struct _AndOrRestriction_r {
    [range(0, 100000)] DWORD cRes;
    [size_is(cRes)] Restriction_r * lpRes;
} AndRestriction_r, OrRestriction_r;

typedef struct _NotRestriction_r {
    Restriction_r * lpRes;
} NotRestriction_r;

typedef struct _ContentRestriction_r {
    DWORD ulFuzzyLevel;
    DWORD ulPropTag;
    PropertyValue_r * lpProp;
} ContentRestriction_r;

typedef struct _BitMaskRestriction_r {
    DWORD relBMR;
    DWORD ulPropTag;
    DWORD ulMask;
} BitMaskRestriction_r;

typedef struct _PropertyRestriction_r {
    DWORD relop;
    DWORD ulPropTag;
    PropertyValue_r * lpProp;
} PropertyRestriction_r;

typedef struct _ComparePropsRestriction_r {
    DWORD relop;
    DWORD ulPropTag1;
    DWORD ulPropTag2;
} ComparePropsRestriction_r;

```

```

typedef struct _SubRestriction_r {
    DWORD ulSubObject;
    Restriction_r * lpRes;
} SubRestriction_r;

typedef struct _SizeRestriction_r {
    DWORD relop;
    DWORD ulPropTag;
    DWORD cb;
} SizeRestriction_r;

typedef struct _ExistRestriction_r {
    DWORD ulReserved1;
    DWORD ulPropTag;
    DWORD ulReserved2;
} ExistRestriction_r;

typedef [switch_type(long)] union _RestrictionUnion_r {
    [case (0x00000000)] AndRestriction_r resAnd;
    [case (0x00000001)] OrRestriction_r resOr;
    [case (0x00000002)] NotRestriction_r resNot;
    [case (0x00000003)] ContentRestriction_r resContent;
    [case (0x00000004)] PropertyRestriction_r resProperty;
    [case (0x00000005)] ComparePropsRestriction_r resCompareProps;
    [case (0x00000006)] BitMaskRestriction_r resBitMask;
    [case (0x00000007)] SizeRestriction_r resSize;
    [case (0x00000008)] ExistRestriction_r resExist;
    [case (0x00000009)] SubRestriction_r resSubRestriction;
} RestrictionUnion_r;

struct _Restriction_r {
    DWORD rt;
    [switch_is((long)rt)] RestrictionUnion_r res;
};

typedef struct PropertyName_r {
    FlatUID_r * lpguid;
    DWORD ulReserved;
    long lID;
} PropertyName_r;

typedef struct PropertyNameSet_r {
    [range(0, 100000)] DWORD cNames;
    [size_is(cNames)] PropertyName_r aNames[];
} PropertyNameSet_r;

typedef struct _StringsArray {
    [range(0, 100000)] DWORD Count;
    [size_is(Count)] [string] char * Strings[];
} StringsArray_r;

typedef struct _WStringsArray {
    [range(0, 100000)] DWORD Count;
    [size_is(Count)] [string] wchar_t * Strings[];
} WStringsArray_r;

typedef struct _STAT {

```

```

    DWORD SortType;
    DWORD ContainerID;
    DWORD CurrentRec;
    long Delta;
    DWORD NumPos;
    DWORD TotalRecs;
    DWORD CodePage;
    DWORD TemplateLocale;
    DWORD SortLocale;
}STAT;

typedef [switch_type(long)] union _PV_r {
    [case (0x00000002)] short int i;
    [case (0x00000003)] long l;
    [case (0x0000000B)] unsigned short int b;
    [case (0x0000001E)] [string] char * lpszA;
    [case (0x00000102)] Binary_r bin;
    [case (0x0000001F)] [string] wchar_t * lpszW;
    [case (0x00000048)] FlatUID_r * lpguid;
    [case (0x00000040)] FILETIME ft;
    [case (0x0000000A)] long err;
    [case (0x00001002)] ShortArray_r MVi;
    [case (0x00001003)] LongArray_r MVl;
    [case (0x0000101E)] StringArray_r MVszA;
    [case (0x00001102)] BinaryArray_r MVbin;
    [case (0x00001048)] FlatUIDArray_r MVguid;
    [case (0x0000101F)] WStringArray_r MVszW;
    [case (0x00001040)] DateTimeArray_r MVft;
    [case (0x00000001, 0x0000000D)] long lReserved;
} PROP_VAL_UNION;

struct _PropertyValue_r {
    DWORD ulPropTag;
    DWORD ulReserved;
    [switch_is ((long)(ulPropTag & 0x0000FFFF))]
PROP_VAL_UNION Value;
};

typedef [context_handle ] void * NSPI_HANDLE;

//opnum 0
long
NspiBind(
    [in] handle_t hRpc,
    [in] DWORD dwFlags,
    [in] STAT * pStat,
    [in,out,unique] FlatUID_r * pServerGuid,
    [out,ref] NSPI_HANDLE * contextHandle
);

//opnum 1
DWORD
NspiUnbind(
    [in,out] NSPI_HANDLE * contextHandle,
    [in] DWORD Reserved
);

```

```

//opnum 2
long
    NspiUpdateStat(
        [in] NSPI_HANDLE hRpc,
        [in] DWORD Reserved,
        [in,out] STAT * pStat,
        [in,out,unique] long * plDelta
    );

//opnum 3
long
    NspiQueryRows(
        [in] NSPI_HANDLE hRpc,
        [in] DWORD dwFlags,
        [in, out] STAT * pStat,
        [in, range(0, 100000)] DWORD dwEtableCount,
        [in, unique, size_is(dwEtableCount)] DWORD * lpEtable,
        [in] DWORD Count,
        [in,unique] PropertyTagArray_r * pPropTags,
        [out] PropertyRowSet_r ** ppRows
    );

//opnum 4
long
    NspiSeekEntries(
        [in] NSPI_HANDLE hRpc,
        [in] DWORD Reserved,
        [in,out] STAT * pStat,
        [in] PropertyValue_r * pTarget,
        [in, unique] PropertyTagArray_r * lpEtable,
        [in,unique] PropertyTagArray_r * pPropTags,
        [out] PropertyRowSet_r ** ppRows
    );

//opnum 5
long
    NspiGetMatches(
        [in] NSPI_HANDLE hRpc,
        [in] DWORD Reserved1,
        [in,out] STAT * pStat,
        [in, unique] PropertyTagArray_r * pReserved,
        [in] DWORD Reserved2,
        [in,unique] Restriction_r * Filter,
        [in,unique] PropertyName_r * lpPropName,
        [in] DWORD ulRequested,
        [out] PropertyTagArray_r ** ppOutMIds,
        [in,unique] PropertyTagArray_r * pPropTags,
        [out] PropertyRowSet_r ** ppRows
    );

//opnum 6
long
    NspiResortRestriction(
        [in] NSPI_HANDLE hRpc,
        [in] DWORD Reserved,
        [in,out] STAT * pStat,
        [in] PropertyTagArray_r * pInMIds,
        [in,out] PropertyTagArray_r ** ppOutMIds

```



```

);

//opnum 7
long
    NspiDNToMid(
[in] NSPI_HANDLE hRpc,
[in] DWORD Reserved,
[in] StringsArray_r * pNames,
[out] PropertyTagArray_r ** ppOutMids
);

//opnum 8
long
    NspiGetPropList(
[in] NSPI_HANDLE hRpc,
[in] DWORD dwFlags,
[in] DWORD dwMid,
[in] DWORD CodePage,
[out] PropertyTagArray_r ** ppPropTags
);

//opnum 9
long
    NspiGetProps(
[in] NSPI_HANDLE hRpc,
[in] DWORD dwFlags,
[in] STAT * pStat,
[in,unique] PropertyTagArray_r * pPropTags,
[out] PropertyRow_r ** ppRows
);

//opnum 10
long
    NspiCompareMids(
[in] NSPI_HANDLE hRpc,
[in] DWORD Reserved,
[in] STAT * pStat,
[in] DWORD MID1,
[in] DWORD MID2,
[out] long * plResult
);

//opnum 11
long
    NspiModProps(
[in] NSPI_HANDLE hRpc,
[in] DWORD Reserved,
[in] STAT * pStat,
[in, unique] PropertyTagArray_r * pPropTags,
[in] PropertyRow_r * pRow
);

//opnum 12
long
    NspiGetSpecialTable(
[in] NSPI_HANDLE hRpc,
[in] DWORD dwFlags,
[in] STAT * pStat,
[in, out] DWORD * lpVersion,

```

```

[out] PropertyRowSet_r ** ppRows
);

//opnum 13
long
NspiGetTemplateInfo(
[in] NSPI_HANDLE hRpc,
[in] DWORD dwFlags,
[in] DWORD ulType,
[in,unique] [string] char * pDN,
[in] DWORD dwCodePage,
[in] DWORD dwLocaleID,
[out] PropertyRow_r ** ppData
);

//opnum 14
long
NspiModLinkAtt(
[in] NSPI_HANDLE hRpc,
[in] DWORD dwFlags,
[in] DWORD ulPropTag,
[in] DWORD dwMId,
[in] BinaryArray_r * lpEntryIds
);

//opnum 15
long
Opnum15NotUsedOnWire(
[in] NSPI_HANDLE Reserved1,
[in] DWORD Reserved2,
[in] DWORD Reserved3,
[in] BinaryArray_r * Reserved4
);

//opnum 16
long
NspiQueryColumns(
[in] NSPI_HANDLE hRpc,
[in] DWORD Reserved,
[in] DWORD dwFlags,
[out] PropertyTagArray_r ** ppColumns
);

//opnum 17
long
NspiGetNamesFromIDs(
[in] NSPI_HANDLE hRpc,
[in] DWORD Reserved,
[in, unique] FlatUID_r * lpguid,
[in, unique] PropertyTagArray_r * pPropTags,
[out] PropertyTagArray_r ** ppReturnedPropTags,
[out] PropertyNameSet_r ** ppNames
);

//opnum 18
long
NspiGetIDsFromNames(
[in] NSPI_HANDLE hRpc,
[in] DWORD Reserved,

```

```

[in] DWORD dwFlags,
[in, range(0, 100000)] DWORD cPropNames,
[in, size_is(cPropNames)] PropertyName_r ** pNames,
[out] PropertyTagArray_r ** ppPropTags
);

//opnum 19
long
NspiResolveNames(
[in] NSPI_HANDLE hRpc,
[in] DWORD Reserved,
[in] STAT * pStat,
[in, unique] PropertyTagArray_r * pPropTags,
[in] StringsArray_r * paStr,
[out] PropertyTagArray_r ** ppMIds,
[out] PropertyRowSet_r ** ppRows
);

//opnum 20
long
NspiResolveNamesW(
[in] NSPI_HANDLE hRpc,
[in] DWORD Reserved,
[in] STAT * pStat,
[in, unique] PropertyTagArray_r * pPropTags,
[in] WStringsArray_r * paWStr,
[out] PropertyTagArray_r ** ppMIds,
[out] PropertyRowSet_r ** ppRows
);
}

```

7 Appendix B: Product Behavior

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

- Microsoft® Exchange Server 2010

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

8 Change Tracking

This section identifies changes that were made to the [MS-OXNSPI] protocol document between the June 2011 and August 2011 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

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

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

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

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

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

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

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

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

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

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

The changes made to this document are listed in the following table. For more information, please contact protocol@microsoft.com.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
3.1.1.1 Required Properties	Changed the name of a property from PidTag7BitDisplayName to PidTagAddressBookDisplayNamePrintable.	N	Content updated.
3.1.1.2.1 Required Native Categorizations	Changed the name of a property from PidTag7BitDisplayName to PidTagAddressBookDisplayNamePrintable.	N	Content updated.
5.1 Security Considerations for Implementers	Changed the name of a property from PidTag7BitDisplayName to PidTagAddressBookDisplayNamePrintable.	N	Content updated.

9 Index

A

Abstract data model
[client](#) 74
[server](#) 34
[Applicability](#) 9

C

[Capability negotiation](#) 9
[Change tracking](#) 93
Client
[abstract data model](#) 74
[initialization](#) 74
[local events](#) 75
[message processing](#) 75
[sequencing rules](#) 75
[timer events](#) 75
[timers](#) 74
[Common data types](#) 17

D

Data model - abstract
[client](#) 74
[server](#) 34
Data types
[common - overview](#) 17

E

Events
[local - client](#) 75
[timer - client](#) 75
Examples
[overview](#) 76

F

[Fields - vendor-extensible](#) 9
[Full IDL](#) 84

G

[Glossary](#) 6

I

[IDL](#) 84
[Implementer - security considerations](#) 82
[Index of security parameters](#) 83
[Informative references](#) 7
Initialization
[client](#) 74
[server](#) 42
[Introduction](#) 6

L

Local events
[client](#) 75

M

Message processing
[client](#) 75
[server](#) 43
Messages
[common data types](#) 17
[transport](#) 10

Methods

[NspiBind \(Opnum 0\)](#) 44
[NspiCompareMIds \(Opnum 10\)](#) 64
[NspiDNToMId \(Opnum 7\)](#) 65
[NspiGetMatches \(Opnum 5\)](#) 59
[NspiGetPropList \(Opnum 8\)](#) 50
[NspiGetProps \(Opnum 9\)](#) 51
[NspiGetSpecialTable \(Opnum 12\)](#) 46
[NspiGetTemplateInfo \(Opnum 13\)](#) 73
[NspiModLinkAtt \(Opnum 14\)](#) 67
[NspiModProps \(Opnum 11\)](#) 66
[NspiQueryColumns \(Opnum 16\)](#) 49
[NspiQueryRows \(Opnum 3\)](#) 53
[NspiResolveNames \(Opnum 19\)](#) 69
[NspiResolveNamesW \(Opnum 20\)](#) 71
[NspiResortRestriction \(Opnum 6\)](#) 62
[NspiSeekEntries \(Opnum 4\)](#) 56
[NspiUnbind \(Opnum 1\)](#) 46
[NspiUpdateStat \(Opnum 2\)](#) 48

N

[Normative references](#) 7
[NspiBind \(Opnum 0\) method](#) 44
[NspiCompareMIds \(Opnum 10\) method](#) 64
[NspiDNToMId \(Opnum 7\) method](#) 65
[NspiGetMatches \(Opnum 5\) method](#) 59
[NspiGetPropList \(Opnum 8\) method](#) 50
[NspiGetProps \(Opnum 9\) method](#) 51
[NspiGetSpecialTable \(Opnum 12\) method](#) 46
[NspiGetTemplateInfo \(Opnum 13\) method](#) 73
[NspiModLinkAtt \(Opnum 14\) method](#) 67
[NspiModProps \(Opnum 11\) method](#) 66
[NspiQueryColumns \(Opnum 16\) method](#) 49
[NspiQueryRows \(Opnum 3\) method](#) 53
[NspiResolveNames \(Opnum 19\) method](#) 69
[NspiResolveNamesW \(Opnum 20\) method](#) 71
[NspiResortRestriction \(Opnum 6\) method](#) 62
[NspiSeekEntries \(Opnum 4\) method](#) 56
[NspiUnbind \(Opnum 1\) method](#) 46
[NspiUpdateStat \(Opnum 2\) method](#) 48

O

[Overview \(synopsis\)](#) 8

P

[Parameters - security index](#) 83
[Preconditions](#) 8
[Prerequisites](#) 8
[Product behavior](#) 92

R

References
[informative](#) 7
[normative](#) 7
[Relationship to other protocols](#) 8

S

Security
[implementer considerations](#) 82
[parameter index](#) 83

Sequencing rules
[client](#) 75
[server](#) 43

Server
[abstract data model](#) 34
[initialization](#) 42
[message processing](#) 43
[NspiBind \(Opnum 0\) method](#) 44
[NspiCompareMIDs \(Opnum 10\) method](#) 64
[NspiDNToMid \(Opnum 7\) method](#) 65
[NspiGetMatches \(Opnum 5\) method](#) 59
[NspiGetPropList \(Opnum 8\) method](#) 50
[NspiGetProps \(Opnum 9\) method](#) 51
[NspiGetSpecialTable \(Opnum 12\) method](#) 46
[NspiGetTemplateInfo \(Opnum 13\) method](#) 73
[NspiModLinkAtt \(Opnum 14\) method](#) 67
[NspiModProps \(Opnum 11\) method](#) 66
[NspiQueryColumns \(Opnum 16\) method](#) 49
[NspiQueryRows \(Opnum 3\) method](#) 53
[NspiResolveNames \(Opnum 19\) method](#) 69
[NspiResolveNamesW \(Opnum 20\) method](#) 71
[NspiResortRestriction \(Opnum 6\) method](#) 62
[NspiSeekEntries \(Opnum 4\) method](#) 56
[NspiUnbind \(Opnum 1\) method](#) 46
[NspiUpdateStat \(Opnum 2\) method](#) 48
[sequencing rules](#) 43
[timers](#) 42

[Standards assignments](#) 9

T

Timer events
[client](#) 75

Timers
[client](#) 74
[server](#) 42

[Tracking changes](#) 93
[Transport](#) 10

V

[Vendor-extensible fields](#) 9
[Versioning](#) 9