[MS-OXCDATA]:
Data Structures

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Revision Summary

Date	Revision History	Revision Class	Comments
04/04/2008	0.1.0	Major	Initial Availability.
04/25/2008	0.2.0	Minor	Revised and updated property names and other technical content.
06/27/2008	1.0.0	Major	Initial Release.
08/06/2008	1.01	Editorial	Revised and edited technical content.
09/03/2008	1.02	Editorial	Revised and edited technical content.
12/03/2008	1.03	Editorial	Revised and edited technical content.
04/10/2009	2.0.0	Major	Updated technical content and applicable product releases.
07/15/2009	3.0.0	Major	Revised and edited for technical content.
11/04/2009	3.1.0	Minor	Updated the technical content.
02/10/2010	4.0.0	Major	Updated and revised the technical content.
05/05/2010	4.1.0	Minor	Updated the technical content.
08/04/2010	5.0	Major	Significantly changed the technical content.

Contents

1 Introduction

Certain data structures appear repeatedly in different **remote operations (ROPs)** and **property** values, and in both **store** and **address book** protocols.

The Data Structures Protocol specifies certain common data structures that are used repeatedly in the ROPs specified in the Remote Operations (ROP) List and Encoding Protocol and in the Office Exchange Protocols Master Property List. This protocol includes structure layouts and semantics.

1.1 Glossary

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

address book
Address Book object
AddressEntry
AddressList
Augmented Backus-Naur Form (ABNF)
big-endian
binary large object (BLOB)
contact
Contact object
COUNT
Deleted Items folder
distribution list
EntryID
EntryList
extended rule
folder ID (FID)
Folder object
global identifier (GID)
GUID
Hypertext Markup Language (HTML)
little-endian
Long ID (LID)
LongTermID
mail user
mailbox
message body
message ID (MID)
Message object
MIME
multiple-byte character set (MBCS)
named property
Personal Distribution List object
Personal Information Manager (PIM)
plain text
plain text message body
property (1)
property ID
property set
property tag
property type
public folder

Receive folder
recipient (2)
recipient table
remote operation (ROP)
remote procedure call (RPC)
replica (1)
restriction
search folder
search folder definition message
special folder
store
Store object
subobject
template
Transport Neutral Encapsulation Format (TNEF)
Unicode
WebDAV
X500 DN

The following terms are specific to this document:

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.

[ISO-8601] International Organization for Standardization, "Data elements and interchange formats -- Information interchange -- Representation of dates and times", ISO 8601:2004, December 2004, http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=40874

[MS-DTYP] Microsoft Corporation, "Windows Data Types", March 2007, http://msdn.microsoft.com/en-us/library/cc230273.aspx

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

[MS-OAUT] Microsoft Corporation, "OLE Automation Protocol Specification", March 2007, http://msdn.microsoft.com/en-us/library/cc208313.aspx

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

[MS-OXCROPS] Microsoft Corporation, "Remote Operations (ROP) List and Encoding Protocol Specification", April 2008.

[MS-OXCRPC] Microsoft Corporation, "Wire Format Protocol Specification", April 2008.

[MS-OXCTABL] Microsoft Corporation, "Table Object Protocol Specification", April 2008.

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

[MS-OXOCNTC] Microsoft Corporation, "Contact Object Protocol Specification", April 2008.

[MS-OXOMSG] Microsoft Corporation, "E-Mail Object Protocol Specification", April 2008.

[MS-OXORULE] Microsoft Corporation, "E-Mail Rules Protocol Specification", April 2008.

[MS-OXOSFLD] Microsoft Corporation, "Special Folders Protocol Specification", April 2008.

[MS-OXOSRCH] Microsoft Corporation, "Search Folder List Configuration Protocol Specification", April 2008.

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

[MS-XWDSEARCH] Microsoft Corporation, "Web Distributed Authoring and Versioning (WebDAV) Extensions for Search", December 2008.

[RFC1123] Braden, R., Ed., "Requirements for Internet Hosts -- Application and Support", RFC 1123, October 1989, http://www.ietf.org/rfc/rfc1123.txt

[RFC2045] Freed, N., and Borenstein, N., "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies", RFC 2045, November 1996, http://www.ietf.org/rfc/rfc2045.txt

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

[RFC3986] Berners-Lee, T., Fielding, R., and Masinter, L., "Uniform Resource Identifier (URI): Generic Syntax", STD 66, RFC 3986, January 2005, http://www.ietf.org/rfc/rfc3986.txt

[RFC4122] Leach, P., Mealling, M., and Salz, R., "A Universally Unique IDentifier (UUID) URN Namespace", RFC 4122, July 2005, http://www.ietf.org/rfc/rfc4122.txt

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

[XMLSCHEMA2/2] Biron, P., and Malhotra, A., Eds., "XML Schema Part 2: Datatypes Second Edition", W3C Recommendation, October 2004, http://www.w3.org/TR/xmlschema-2/

1.2.2 Informative References

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

1.3 Overview

The Data Structures Protocol specifies several commonly used data structures. These structures are primarily concerned with property values, folder and **Message object** identifiers, and folder queries.

There are some apparent redundancies; for example, **EntryIDs** are specified in several different ways in section 2.2. This is because information is formatted differently in different contexts. For example, storeEntryIDs are formatted differently in the context of a remote operation (ROP) than in the context of a binary property value created by clients.

As a rule, integers in the data structures here specified are transmitted in **little-endian** byte order, with the least significant byte first. But when individual bits within a byte field are specified, they are numbered starting with the most significant bit. Therefore, in a 1-byte field, bit 0 is the 0x80 bit, bit 1 is the 0x40 bit, and bit 7 is the 0x01 bit.

1.4 Relationship to Protocols and Other Structures

This specification defines structures used by more than one of the ROPs as specified in [MS-OXCROPS]. It also defines structures used by more than one of the **Personal Information Manager (PIM)** object type specifications, such as [MS-OXOMSG] and the protocols that extend it.

The descriptions and list of properties in [MS-OXPROPS] provide context for many of the structures defined in this specification.

1.5 Applicability Statement

This specification applies to communication between clients and **mailbox** or **public folder** servers via the protocol as specified in [MS-OXCRPC].

1.6 Versioning and Localization

None.

1.7 Vendor-Extensible Fields

None.

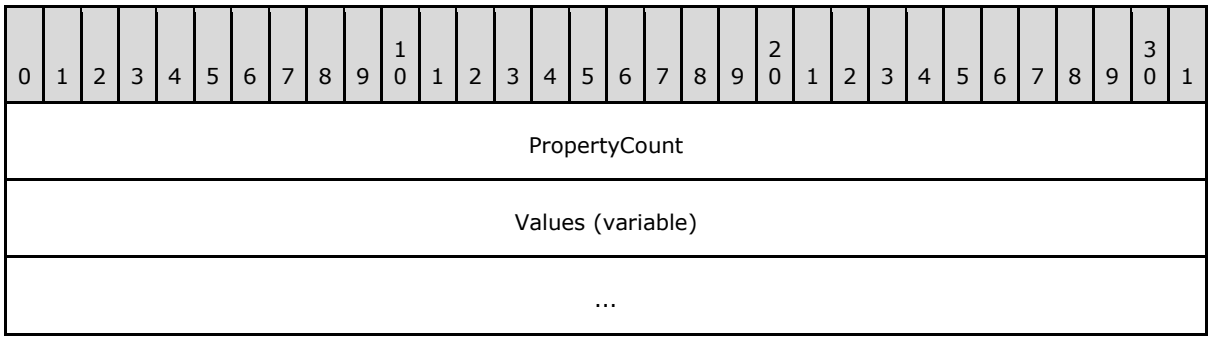
2 Structures

2.1 Address Lists

In the context of a ROP, addressees or **recipients** of a Message object are represented either by a few property values or by a RecipientRow structure (section 2.8.3). In certain other contexts, such as in saved **search folder** criteria, addressees are represented less compactly by counted lists of **property tags** and values, called **AddressLists**.

2.1.1 AddressEntry

An **AddressEntry** is a set of properties representing one addressee.

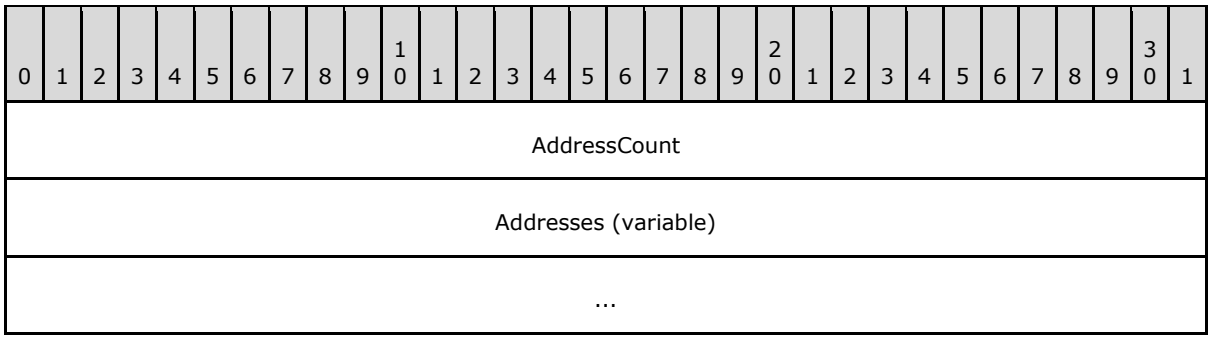


PropertyCount (4 bytes): A 32-bit unsigned integer giving the number of **TaggedPropertyValues** to follow. Please refer to section 2.11.4 for the specification of **TaggedPropertyValue**.

Values (variable): **TaggedPropertyValue** structures representing one addressee. The number of structures is indicated by **PropertyCount**.

2.1.2 AddressList

An AddressList is simply a counted set of **AddressEntry** structures. Each AddressEntry represents one addressee.



AddressCount (4 bytes): A 32-bit unsigned integer giving the number of addressees to follow.

Addresses (variable): An array of **AddressEntry** structures. The number of structures is indicated by **AddressCount**.

2.2 EntryID and Related Types

EntryID is an abstraction of an identifier for many different types of objects including folders, messages, recipients, address book entries, and message stores.

For the most common ROPs, concrete identifiers such as **folder ID (FID)** and **message ID (MID)** – which are much more compact than EntryID – are used instead. However, in many cases, EntryIDs are stored as part or all of a binary property value; for example:

- Address book IDs are stored in the PidTagSentRepresentingEntryId ([MS-OXPROPS]) property of a Message object.
- Address book and one-off EntryIDs are stored in the PidTagEntryId ([MS-OXPROPS]) property of a recipient.
- **Contact** address EntryIDs are stored in the PidLidDistributionListMembers ([MS-OXPROPS]) property of a contact **distribution list**.

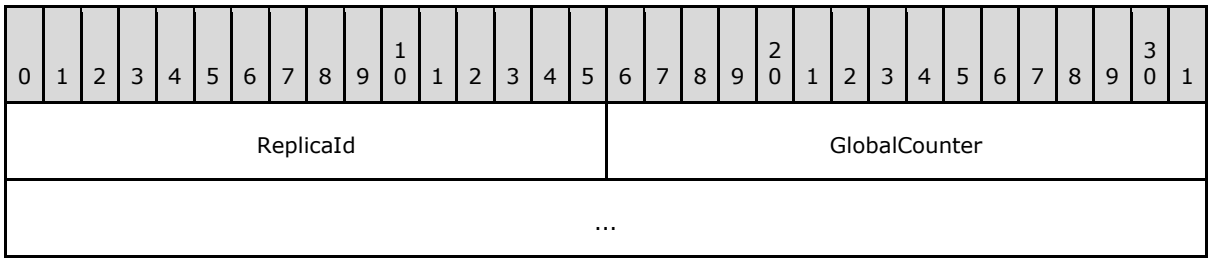
This section first describes the compact FID, MID, and **global identifier (GID)** structures, then the general EntryID structure, followed by folder, message, and **Store object** EntryIDs, and finally recipient EntryIDs.

2.2.1 FID, MID, and GID

These are compact structures used in ROPs where the Store object context of the objects they refer to is known.

2.2.1.1 Folder ID (FID)

A folder ID uniquely identifies a folder in the context of a logon to a Store object. The folder ID is used in the context of a ROP, such as RopOpenFolder ([MS-OXCROPS]), where the Store object context is already established. It is an 8-byte structure.

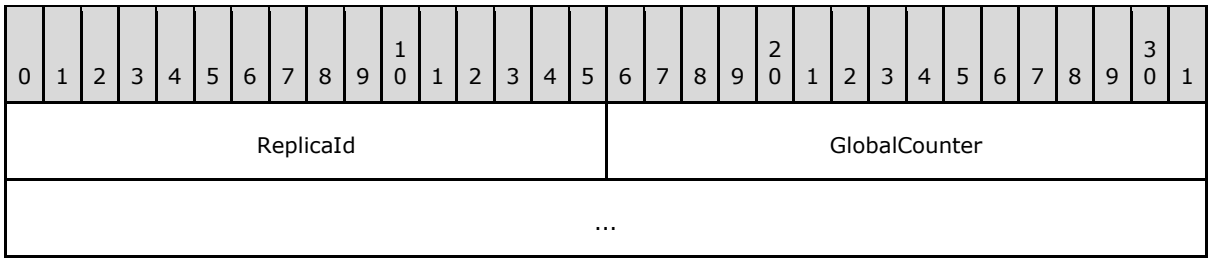


ReplicaId (2 bytes): A 16-bit unsigned integer identifying a Store object.

GlobalCounter (6 bytes): An unsigned 48-bit integer identifying the folder within its Store object.

2.2.1.2 Message ID (MID)

A message ID uniquely identifies a message in the context of a logon to a Store object. The message ID is serialized compactly in the context of a ROP, such as RopOpenMessage ([MS-OXCROPS]), where the Store object context is already established. It is an 8-byte structure.

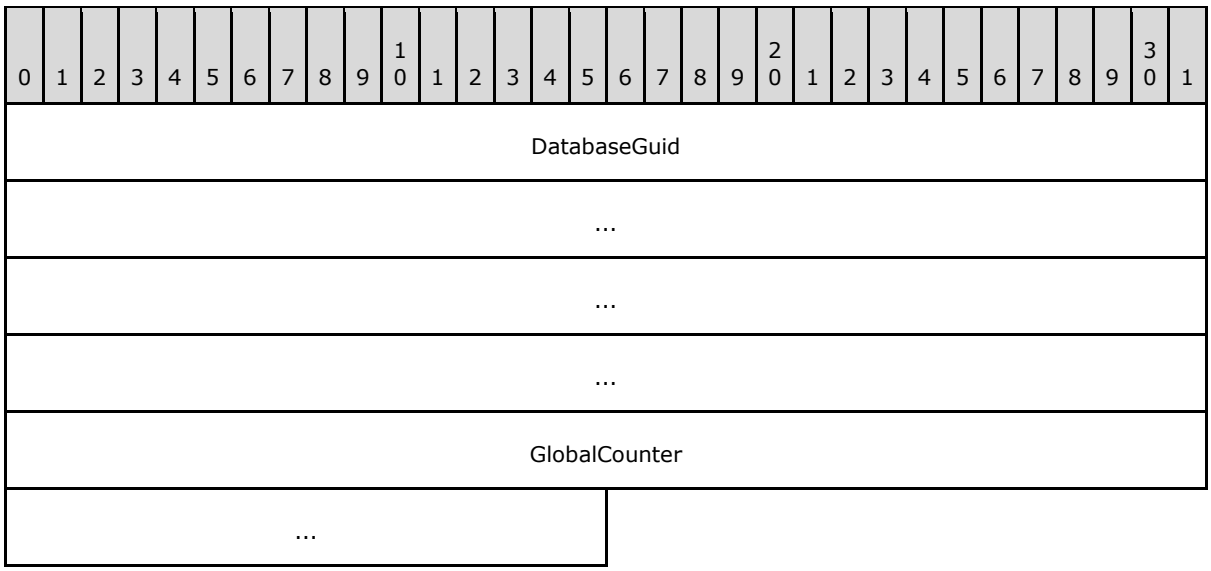


ReplicaId (2 bytes): A 16-bit unsigned integer identifying a Store object.

GlobalCounter (6 bytes): An unsigned 48-bit integer identifying the message within its Store object.

2.2.1.3 Global Identifier (GID)

A GID identifies a folder or message in a Store object. It differs from a FID or MID in that the **ReplicaId** is replaced by the corresponding Store object's **GUID**. The last fields of a folder or message EntryID are effectively a GID.



DatabaseGuid (16 bytes): A 128-bit unsigned integer identifying a Store object.

GlobalCounter (6 bytes): An unsigned 48-bit integer identifying the folder or message within its Store object.

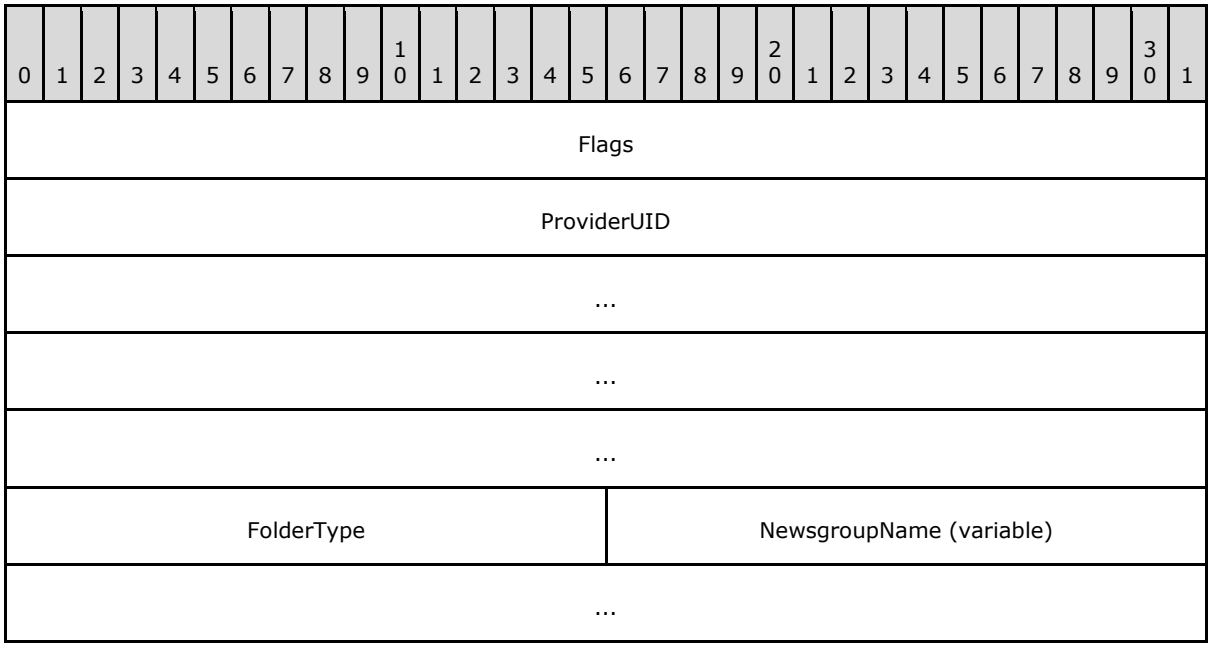
2.2.1.3.1 LongTermID Structure

A **LongTermID** is a GID, as defined in section 2.2.1.3, plus a 2-byte Pad field containing 0x0000. The total length of the LongTermID is 24 bytes.

LongTermIDs can be generated from the MID and FID by using RopLongTermIdFromId. Going the other way, MID and FID can be generated from their LongTermIDs by using RopIdFromLongTermId. See [MS-OXCROPS] for the ROP specifications.

2.2.2 NNTP Newsgroup Folder EntryID Structure

The NNTP Newsgroup Folder EntryID identifies a newsgroup folder in a public store.<1>



Flags (4 bytes): MUST be set to 0x00000000.

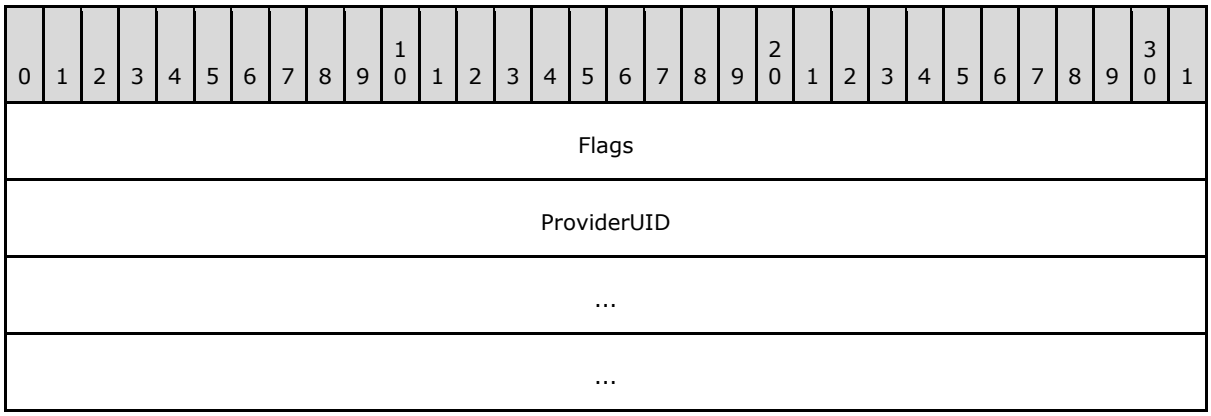
ProviderUID (16 bytes): MUST be set to %x38.A1.BB.10.05.E5.10.1A.A1.BB.08.00.2B.2A.56.C2.

FolderType (2 bytes): MUST be set to 0x000C.

NewsgroupName (variable): The name of the newsgroup formatted as a null-terminated string of 8-bit characters.

2.2.3 General EntryID Structure

An EntryID carries a sequence of bytes used to identify and access an object. Note that the length of an EntryID is specified externally, not in the structure itself.



...
ProviderData (variable)
...

Flags (4 bytes): MUST be set to 0x00000000. Bits in this field indicate under what circumstances a short-term EntryID is valid. However, in any EntryID stored in a property value, these 4 bytes MUST be zero indicating a long-term EntryID.

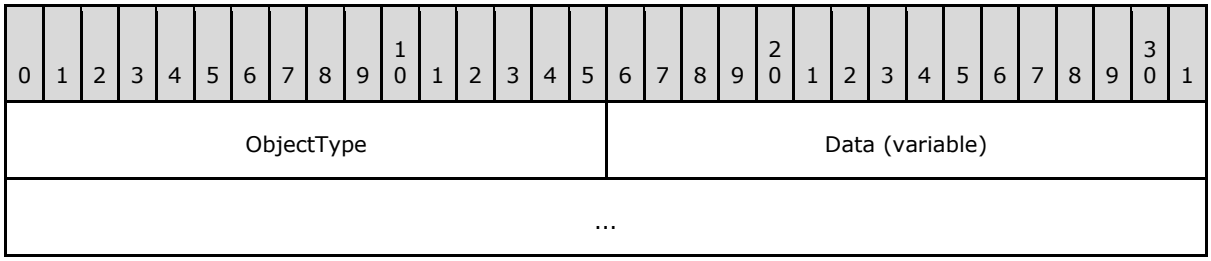
ProviderUID (16 bytes): Identifies the provider that created the EntryID, and used to route EntryIDs to the correct provider. A table of values for this field appears below.

EntryID UID type	ProviderUID value
Object in private store	MUST be set to the **MailboxGuid** field value provided in the RopLogon response buffer, as specified in [MS-OXCROPS] section 2.2.3.1.2.
Object in public store	%x1A. 44.73.90.AA.66.11.CD.9B.C8.00.AA.00.2F.C4.5A
Address book recipient	%xDC.A7.40.C8.C0.42.10.1A.B4.B9.08.00.2B.2F.E1.82
One-off recipient	%x81.2B.1F.A4.BE.A3.10.19.9D.6E.00.DD.01.0F.54.02
Contact address or personal distribution list recipient	%xFE.42.AA.0A.18.C7.1A.10.E8.85.0B.65.1C.24.00.00

ProviderData (variable): Provider-specific data, further specified below for several different types.

2.2.4 Messaging Object EntryIDs

All EntryIDs for objects in a Store object include, at the beginning of the **ProviderData** field, a 16-bit unsigned integer indicating the type of object to which the EntryID corresponds. The following diagram specifies the format of the **ProviderData** field.



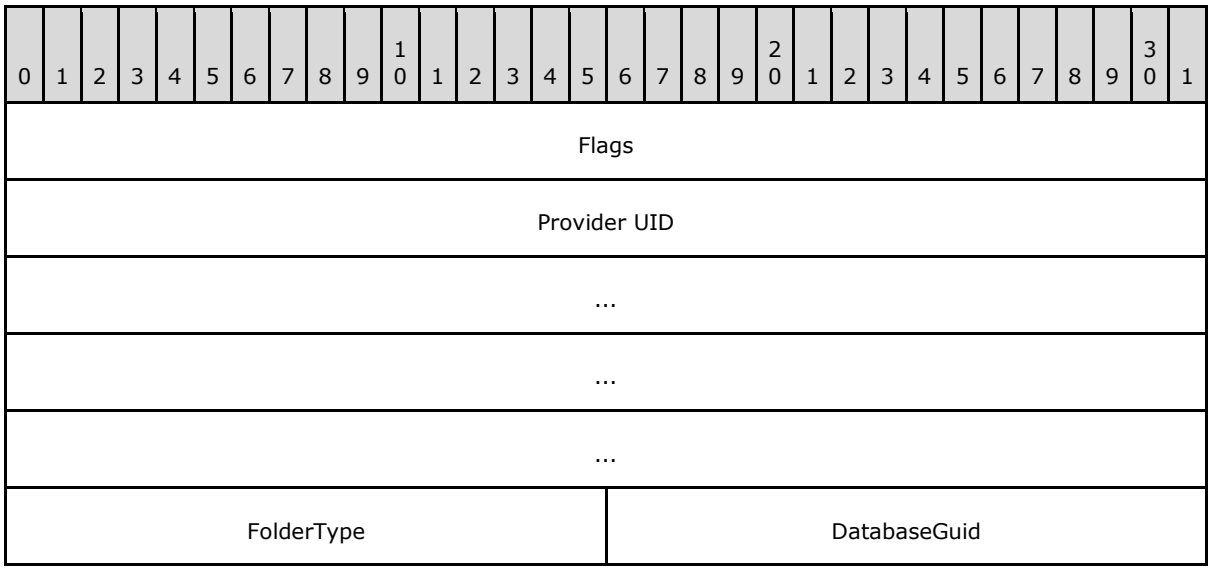
ObjectType (2 bytes): a 16-bit unsigned integer indicating the type of object to which the EntryID corresponds.

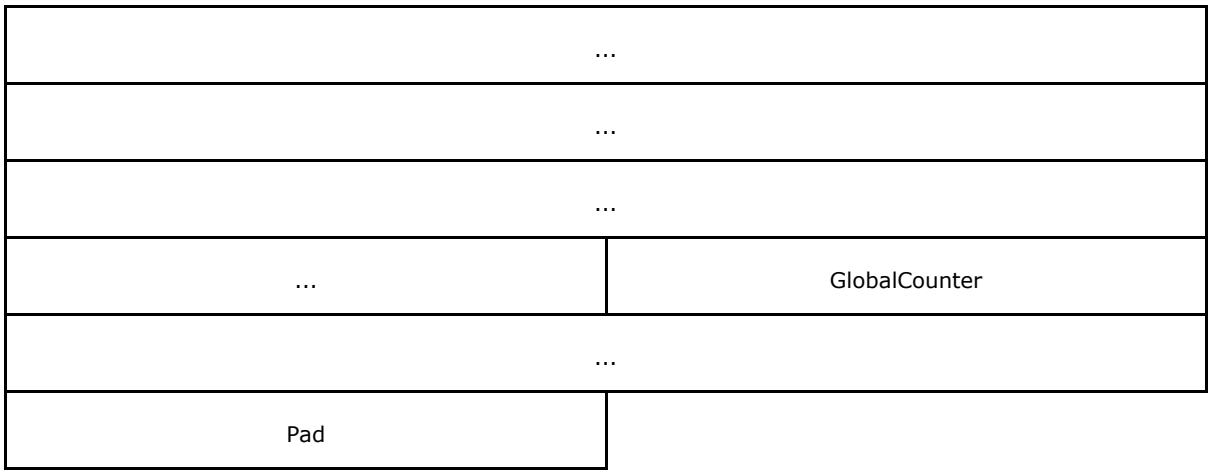
Store object type (alternate name)	Hexadecimal value
PrivateFolder (eitLTPrivateFolder)	0x0001 %x01.00
PublicFolder (eitLTPublicFolder)	0x0003 %x03.00
MappedPublicFolder (eitLTWackyFolder)	0x0005 %x05.00
PrivateMessage (eitLTPrivateMessage)	0x0007 %x07.00
PublicMessage (eitLTPublicMessage)	0x0009 %x09.00
MappedPublicMessage (eitLTWackyMessage)	0x000B %x0B.00
PublicNewsgroupFolder (eitLTPublicFolderByName)	0x000C %x0C.00

Data (variable): Type-specific data. Sections 2.2.4.1, 2.2.4.2, and 2.2.4.3 specify the format of this data.

2.2.4.1 Folder EntryID

In the context of an EntryID, a folder ID looks quite different than in the context of a ROP. The **ReplicaId** is mapped to a **DatabaseGuid**; the RopLongTermIdFromId ([MS-OXCROPS]) operation supports this mapping. This less compact format is necessary because no assumptions can be made about the Store object context in which a folder EntryID is used.





Flags (4 bytes): MUST be zero.

Provider UID (16 bytes): For a folder in a private mailbox MUST be set to the **MailboxGuid** field value from the RopLogon ([MS-OXCROPS]) response buffer. For a folder in the public store MUST be set to %x1A.44.73.90.AA.66.11.CD.9B.C8.00.AA.00.2F.C4.5A.

FolderType (2 bytes): One of several types as specified in the table in section 2.2.4.

DatabaseGuid (16 bytes): A GUID associated with the Store object, and corresponding to the **ReplicaId** field of the FID.

GlobalCounter (6 bytes): An unsigned 48-bit integer identifying the folder.

Pad (2 bytes): MUST be zero.

2.2.4.2 Message EntryID

In the context of an EntryID, a message ID looks quite different than in the context of a ROP. The **DatabaseReplicationId** is mapped to a **MessageDatabaseGuid** and the whole ID is prefixed with flags and a provider UID. In addition, the folder ID of the folder in which the message resides is included.

MessageType	FolderDatabaseGuid
...	
...	
...	
...	FolderGlobalCounter
...	
Pad	MessageDatabaseGuid
...	
...	
...	
...	MessageGlobalCounter
...	
Pad	

Flags (4 bytes): MUST be 0x00000000.

ProviderUID (16 bytes): For a folder in a private mailbox, MUST be set to the **MailboxGuid** field value from the RopLogon ([MS-OXCROPS]) response buffer. For a folder in the public store, MUST be set to %x1A.44.73.90.AA.66.11.CD.9B.C8.00.AA.00.2F.C4.5A.

MessageType (2 bytes): One of several types as specified in the table in section 2.2.4.

FolderDatabaseGuid (16 bytes): A GUID associated with the Store object of the folder in which the message resides, and corresponding to the **DatabaseReplicationId** field of the folder ID.

FolderGlobalCounter (6 bytes): An unsigned 48-bit integer identifying the folder in which the message resides.

Pad (2 bytes): MUST be zero.

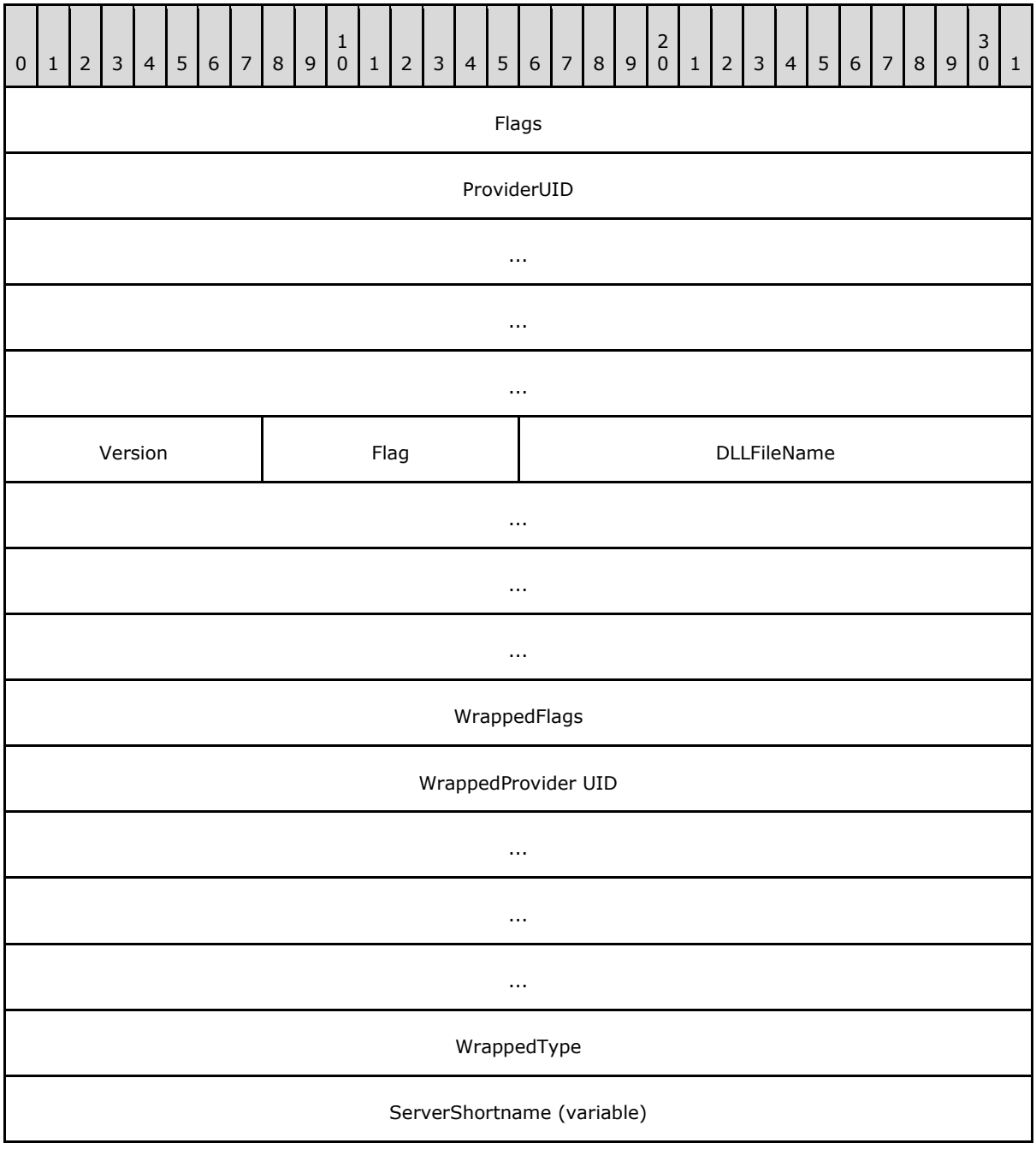
MessageDatabaseGuid (16 bytes): A GUID associated with the Store object of the message and corresponding to the **DatabaseReplicationId** field of the message ID.

MessageGlobalCounter (6 bytes): An unsigned 48-bit integer identifying the message.

Pad (2 bytes): MUST be zero.

2.2.4.3 Store Object EntryIDs

A Store object EntryID identifies a mailbox Store object or a public folder Store object itself, rather than a message or **Folder object** residing in such a database. It is used in certain property values.



...
MailboxDN (variable)
...

Flags (4 bytes): MUST be 0x00000000.

ProviderUID (16 bytes): MUST be %x38.A1.BB.10.05.E5.10.1A.A1.BB.08.00.2B.2A.56.C2.

Version (1 byte): MUST be zero.

Flag (1 byte): MUST be zero.

DLLFileName (14 bytes): MUST be set to the following value which represents "emsmdb.dll": %x45.4D.53.4D.44.42.2E.44.4C.4C.00.00.00.00.

WrappedFlags (4 bytes): MUST be 0x00000000.

WrappedProvider UID (16 bytes): MUST be one of the following values:

Store object type	ProviderUID value
Mailbox Store object	%x1B.55.FA.20.AA.66.11.CD.9B.C8.00.AA.00.2F.C4.5A
Public folder Store object	%x1C.83.02.10.AA.66.11.CD.9B.C8.00.AA.00.2F.C4.5A

WrappedType (4 bytes): MUST be %x0C.00.00.00 for a mailbox store, or %x06.00.00.00 for a public store.

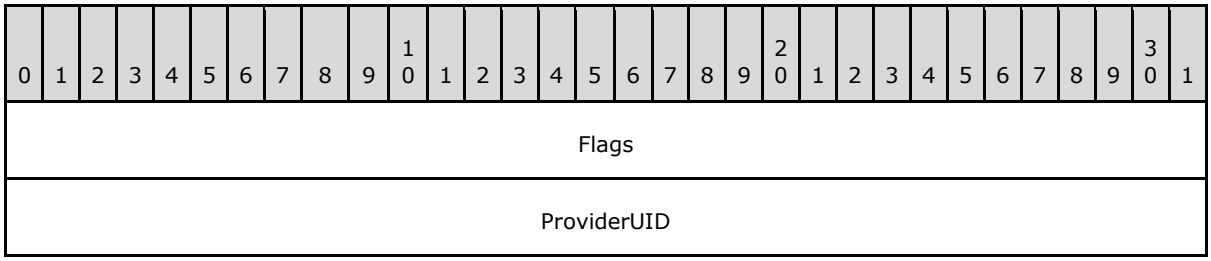
ServerShortname (variable): A string of single-byte characters terminated by a single zero byte, indicating the shortname or NetBIOS name of the server.

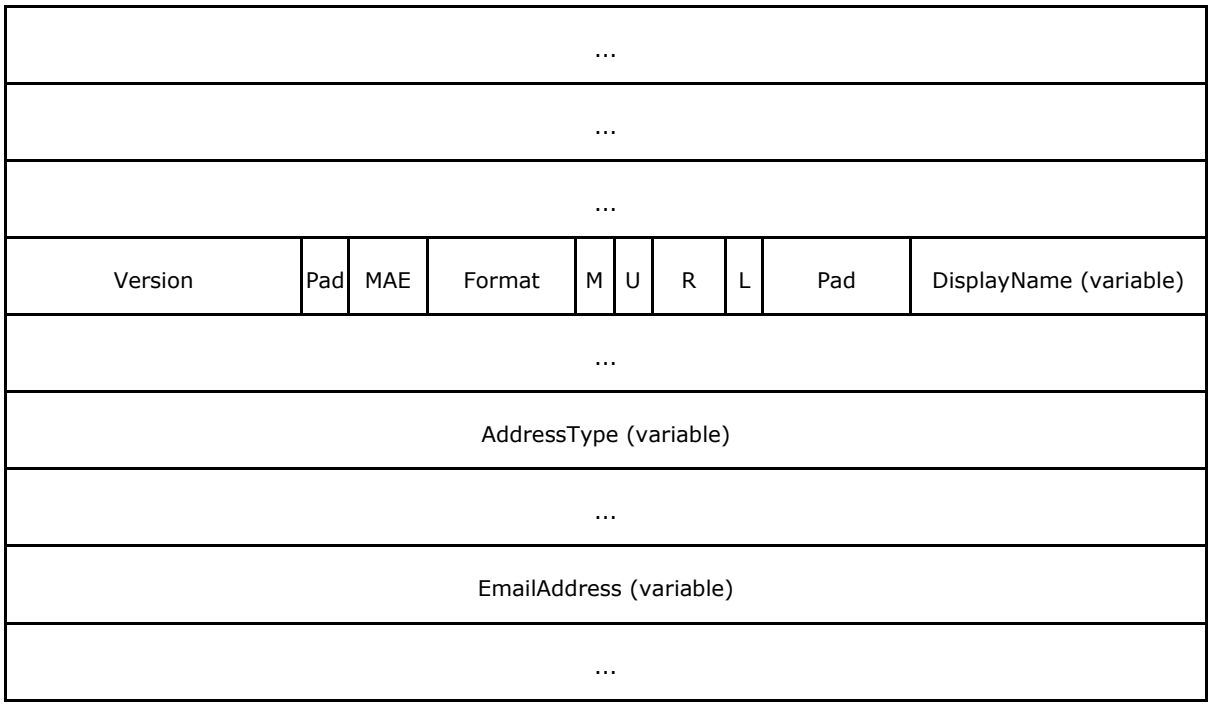
MailboxDN (variable): A string of single-byte characters terminated by a single zero byte and representing the **X500 DN** of the mailbox, as specified in [MS-OXOAB]. This field is present only for mailbox databases.

2.2.5 Recipient EntryIDs

2.2.5.1 One-Off EntryID

One-off EntryIDs are used to hold information about recipients that do not exist in the directory. All information about a one-off recipient is contained in the EntryID itself.





Flags (4 bytes): MUST be 0x00000000.

ProviderUID (16 bytes): MUST be %x81.2B.1F.A4.BE.A3.10.19.9D.6E.00.DD.01.0F.54.02.

Version (1 byte): MUST be 0x0000.

Pad (1 bit): Reserved (mask 0x8000), MUST be '0'.

MAE (2 bits): (2-bit flag, mask 0x0C00) The encoding used for Mac attachments, as specified in [MS-OXCMAIL] section 2.1.4.3. The values for this field are specified in the following table.

Name	Word value	Field value	Description
BinHex	0x0000	b'00'	BinHex encoded.
UUENCODE	0x0020	b'01'	UUENCODED. Not valid if the message is in **MIME**, in which case the flag will be ignored and BinHex used instead.
AppleSingle	0x0040	b'10'	Apple Single encoded. Allowed only when the message format is MIME.
AppleDouble	0x0060	b'11'	Apple Double encoded. Allowed only when the message format is MIME.

Format (4 bits): (4-bit enumeration, mask 0x1E00) The message format desired for this recipient, as specified in the following table.

Name	Word value	Field value	Description
TextOnly	0x0006	b'0011'	Send a **plain text message body**.
HtmlOnly	0x000E	b'0111'	Send an **HTML message body**.
TextAndHtml	0x0016	b'1011'	Send a multipart/alternative body with both **plain text** and HTML.

M (1 bit): 1-bit flag (mask 0x0100). If b'0', messages SHOULD be sent to the recipient in **Transport Neutral Encapsulation Format (TNEF)** format; if b'1', messages SHOULD be sent to the recipient in MIME format.

U (1 bit): 1-bit flag (mask 0x0080). If b'1', the string fields following are in **Unicode** (UTF-16) with two-byte null terminators; if b'0', the string fields following are **multiple-byte character set (MBCS)** characters terminated by a single 0 byte.

R (2 bits): Reserved (mask 0x0060), MUST be b'00'.

L (1 bit): 1-bit flag (mask 0x0010). If b'1', server SHOULD NOT look up this user's e-mail address in the address book.

Pad (4 bits): Reserved (mask 0x000F), MUST be b'0000'.

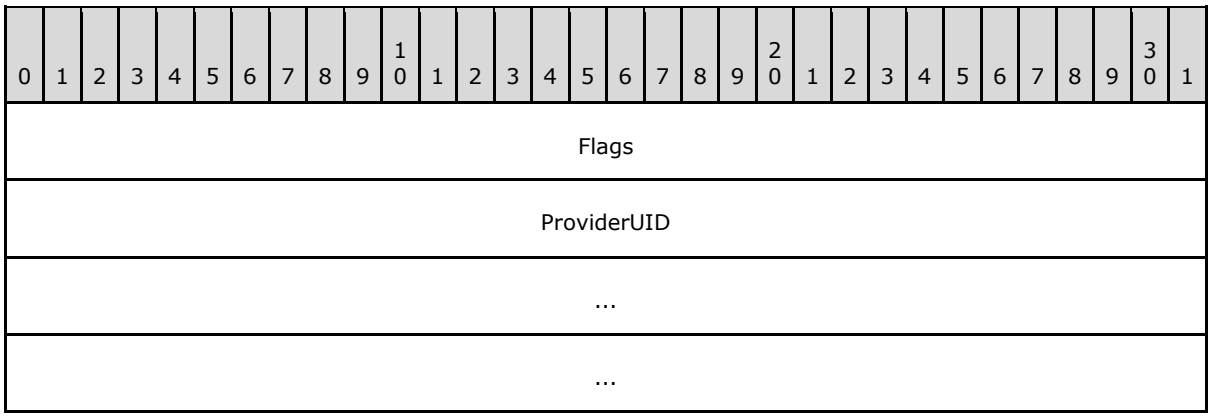
DisplayName (variable): The recipient's display name (in the **recipient table**, PidTagDisplayName ([MS-OXPROPS])) as a null-terminated string. If the U field is b'1', the null terminator is 2 bytes long; otherwise, 1 byte.

AddressType (variable): The recipient's e-mail address type (in the recipient table, PidTagAddressType ([MS-OXPROPS])) as a null-terminated string. If the U field is b'1', the null terminator is 2 bytes long; otherwise, 1 byte.

EmailAddress (variable): The recipient's e-mail address (in the recipient table, PidTagEmailAddress ([MS-OXPROPS])) as a null-terminated string. If the U field is b'1', the null terminator is 2 bytes long; otherwise, 1 byte.

2.2.5.2 Address Book EntryID

Address book EntryIDs can represent several types of **Address Book objects** including individual users, distribution lists, containers, and **templates**.



...
Version
Type
X500DN (variable)
...

Flags (4 bytes): MUST be 0x00000000.

ProviderUID (16 bytes): MUST be %xDC.A7.40.C8.C0.42.10.1A.B4.B9.08.00.2B.2F.E1.82.

Version (4 bytes): MUST be set to %x01.00.00.00.

Type (4 bytes): A 32-bit integer representing the type of the object. It MUST be one of the values from the following table.

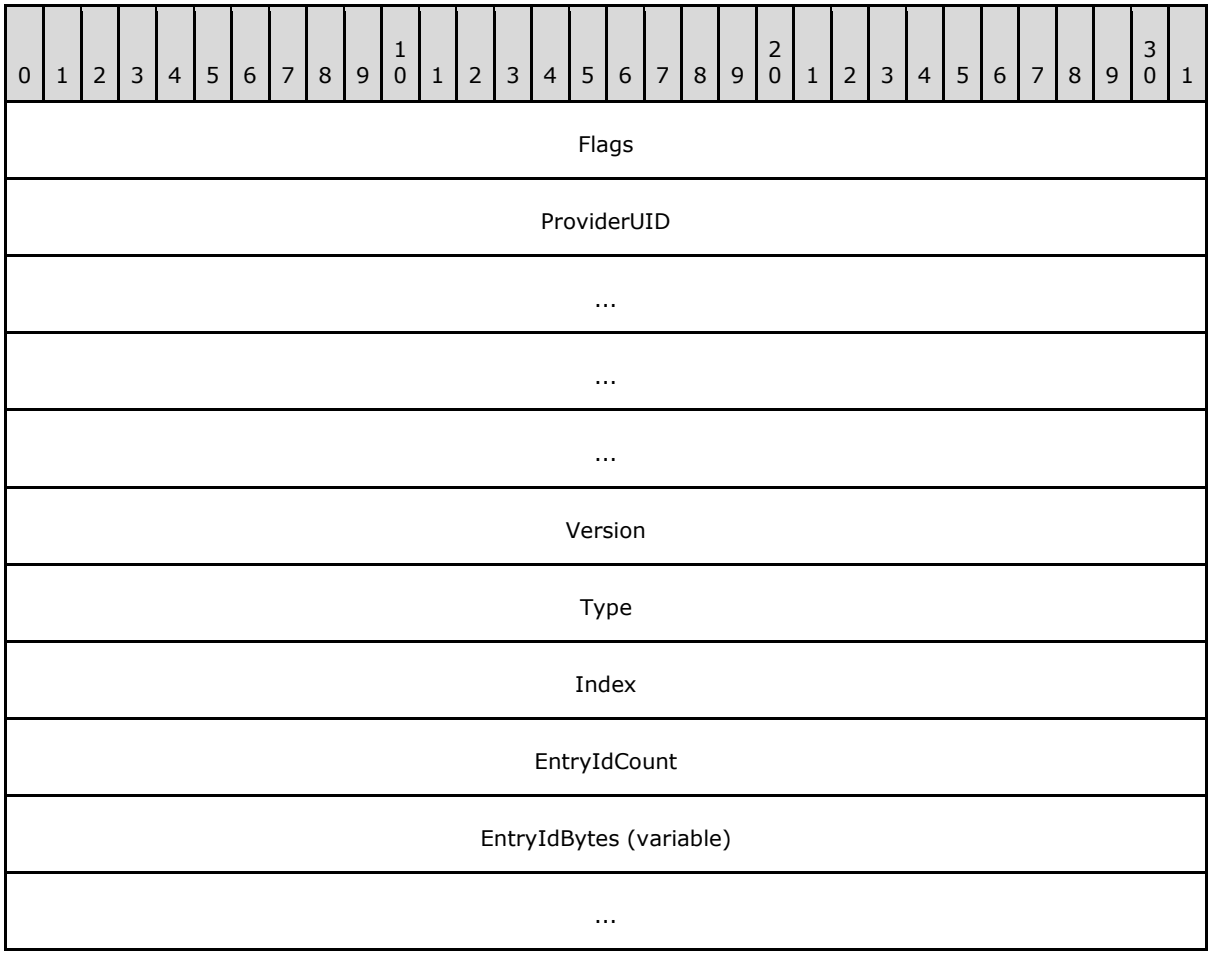
Value (hex bytes)	Address book EntryID type
0x00000000 %x00.00.00.00	Local **mail user**
0x00000001 %x01.00.00.00	Distribution list
0x00000002 %x02.00.00.00	Bulletin board or public folder
0x00000003 %x03.00.00.00	Automated mailbox
0x00000004 %x04.00.00.00	Organizational mailbox
0x00000005 %x05.00.00.00	Private distribution list
0x00000006 %x06.00.00.00	Remote mail user
0x00000100 %x00.01.00.00	Container
0x00000101 %x01.01.00.00	Template
0x00000102 %x02.01.00.00	One-off user

Value (hex bytes)	Address book EntryID type
0x00000200 %x00.02.00.00	Search

X500DN (variable): The X500 DN of the Address Book object. **X500DN** is a null-terminated string of 8-bit characters.

2.2.5.3 Contact Address EntryID

Contact Address EntryIDs represent recipients whose information is stored in a **Contact object**, as specified in [MS-OXOCNTC].



Flags (4 bytes): MUST be %x00.00.00.00.

ProviderUID (16 bytes): MUST be %xFE.42.AA.0A.18.C7.1A.10.E8.85.0B.65.1C.24.00.00.

Version (4 bytes): MUST be %x03.00.00.00.

Type (4 bytes): MUST be %x04.00.00.00.

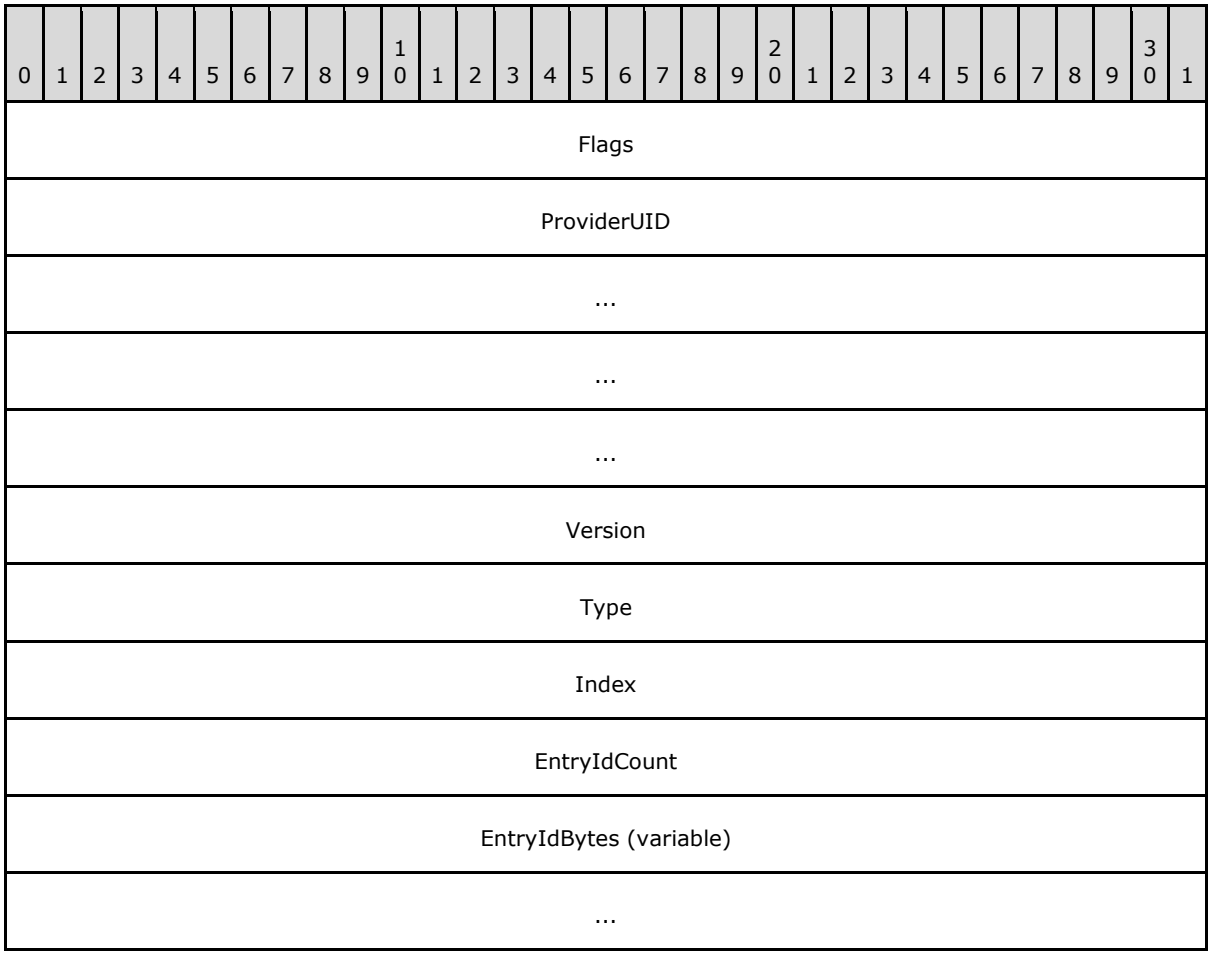
Index (4 bytes): 4-byte unsigned integer value. This value MUST be a number between 0 and 5 (inclusive) and represents which electronic address in the contact information to use. A value of 0, 1, and 2 represents Email1, Email2, and Email3 respectively, and a value of 3, 4, and 5 represents Fax1, Fax2 and Fax3 respectively. For more details, see [MS-OXOCNTC] section 2.2.1.2.

EntryIdCount (4 bytes): 4-byte unsigned integer value representing the count of bytes in the **EntryIdBytes** field.

EntryIdBytes (variable): EntryID of the Contact object that contains this address, which in turn has a format specified in section 2.2.4.2. The size of this structure is specified by the **EntryIdCount** field.<2>

2.2.5.4 Personal Distribution List EntryID

The Personal Distribution List EntryIDs represent recipients whose information is stored in a **Personal Distribution List object**, as specified in [MS-OXOCNTC] section 2.2.2.



Flags (4 bytes): MUST be %x00.00.00.00.

ProviderUID (16 bytes): MUST be %xFE.42.AA.0A.18.C7.1A.10.E8.85.0B.65.1C.24.00.00.

Version (4 bytes): MUST be %x03.00.00.00.

Type (4 bytes): MUST be %x05.00.00.00.

Index (4 bytes): MUST be %xFF.00.00.00.

EntryIdCount (4 bytes): 4-byte unsigned integer value representing the count of bytes in the **EntryIdBytes** field.

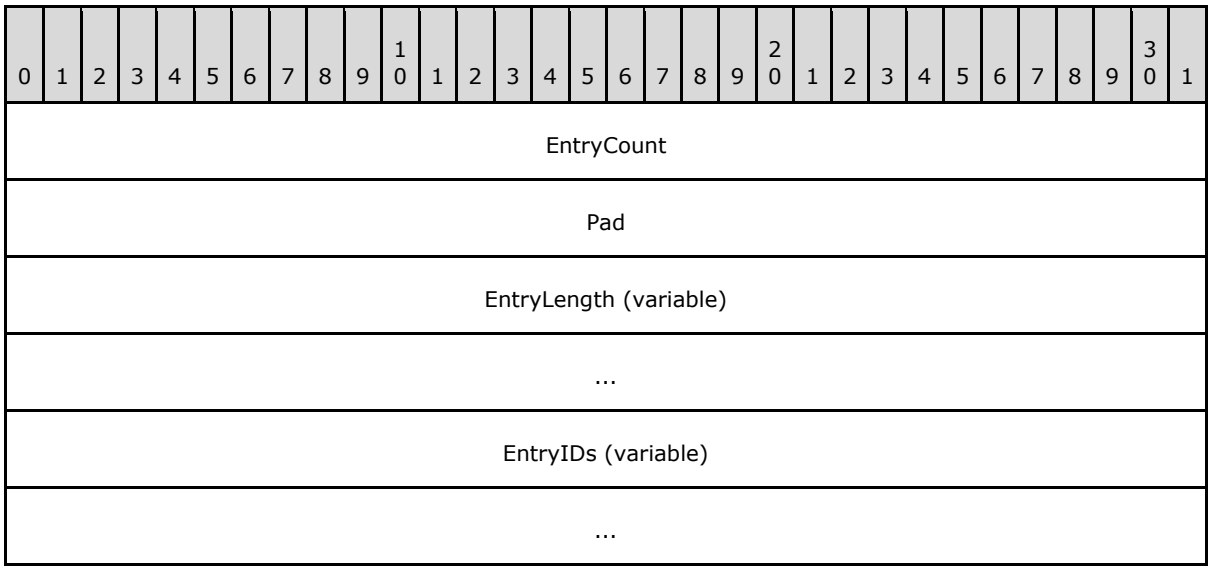
EntryIdBytes (variable): EntryID of the Personal Distribution List object to which this address refers, which in turn has the format specified in section 2.2.4.2. The size of this structure is specified by the **EntryIdCount** field.<3>

2.3 EntryID Lists

2.3.1 EntryList

EntryList is used in search folder criteria to serialize a list of EntryIDs. Briefly, there are three parts to this structure:

- The count of entries in the list
- "Count" structures giving the length of individual entries
- Data for each of the individual entries



EntryCount (4 bytes): An unsigned 32-bit integer giving the number of **EntryIDs** in the list. It MUST be followed by that many **EntryLength** and that many **EntryID** structures.

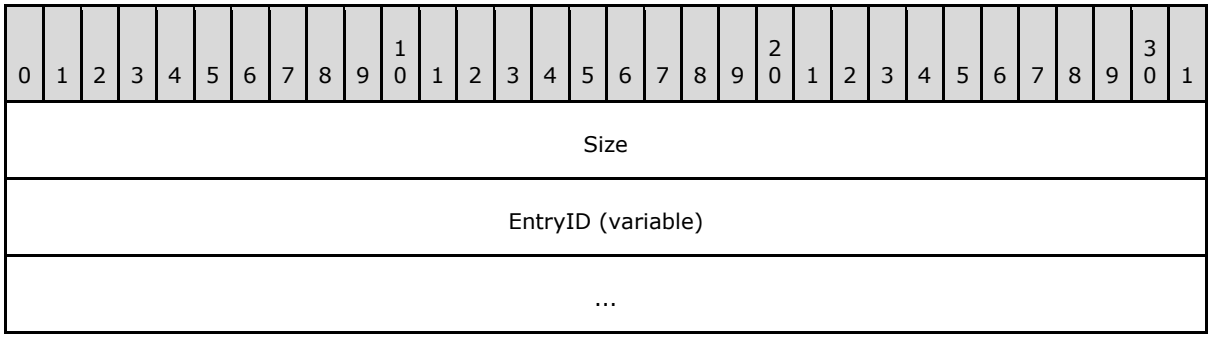
Pad (4 bytes): Can be any value; clients and servers MUST ignore the value.

EntryLength (variable): A series of **EntryCount** pairs: an unsigned 32-bit integer giving the size of one **EntryID**, followed by 4-byte pad that can have any value.

EntryIDs (variable): A series of **EntryCount EntryIDs**. There is no padding between **EntryIDs**. The length of the i-th **EntryID** is specified by the first 32 bits of the i-th element of the **EntryLength**.

2.3.2 FlatEntry

A **FlatEntry** structure is simply the size of an EntryID, followed by the EntryID itself, for ease of serialization.

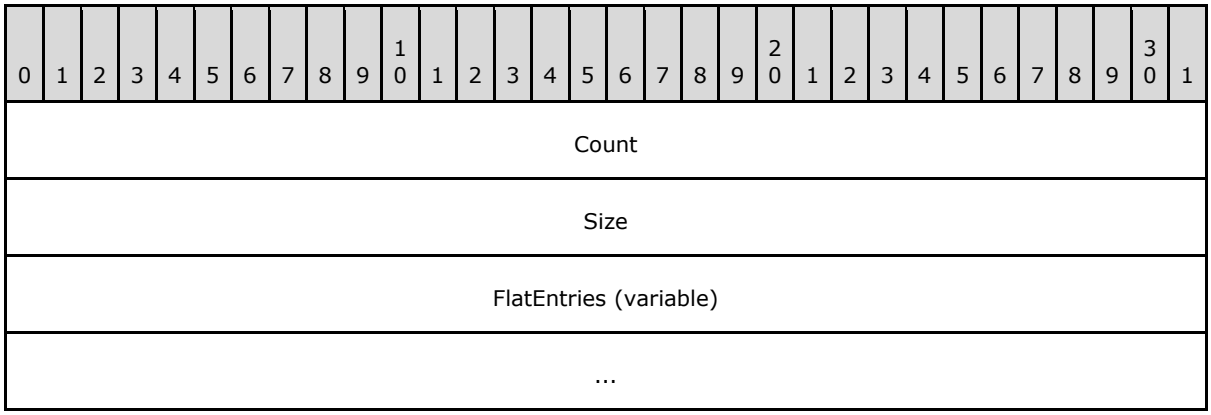


Size (4 bytes): An unsigned 32-bit integer giving the size of the following **EntryID**, not including the **Size** field itself.

EntryID (variable): The **EntryID** itself. It MUST be exactly **Size** bytes long.

2.3.3 FlatEntryList

A **FlatEntryList** gives the number of EntryIDs and their total size, followed by a series of **FlatEntry** structures.



Count (4 bytes): An unsigned 32-bit integer giving the number of **FlatEntry** structures in the list.

Size (4 bytes): The total size of all the **FlatEntry** structures, not including the **Count** and **Size** fields themselves.

FlatEntries (variable): A series of **FlatEntry** structures with the actual **EntryID** data. There MUST be exactly **Count** structures, and their total size MUST be exactly **Size**.

2.4 Error Codes

When encoded in ROP buffers, all error codes are transmitted as 32-bit integers in little-endian format. Error codes are presented in the following table.

Name	Description (alternate names)	Numeric value (hex)
Success	The operation succeeded. (S_OK, SUCCESS_SUCCESS)	0x00000000, %x00.00.00.00
GeneralFailure	The operation failed for an unspecified reason. (E_FAIL, MAPI_E_CALL_FAILED, ecError, SYNC_E_ERROR)	0x80004005, %x05.40.00.80
OutOfMemory	Not enough memory was available to complete the operation. (E_NOMEMORY, MAPI_E_NOT_ENOUGH_MEMORY, ecMAPIOOM, ecPropSize)	0x8007000E, %x0E.00.07.80
InvalidParameter	An invalid parameter was passed to a **remote procedure call**. (E_INVALIDARG, MAPI_E_INVALID_PARAMETER, ecInvalidParam, ecInvalidSession, ecBadBuffer, SYNC_E_INVALID_PARAMETER)	0x80070057, %x57.00.07.80
NoInterface	The requested interface is not supported. (E_NOINTERFACE, MAPI_E_INTERFACE_NOT_SUPPORTED, ecinterfacenotsupported)	0x80004002 %x02.40.00.80
AccessDenied	The caller does not have sufficient access rights to perform the operation. (E_ACCESSDENIED, MAPI_E_NO_ACCESS, ecaccessdenied, ecpropsecurityviolation)	0x80070005, %x05.00.07.80
StorageInvalidFunction	The server was unable to perform the requested operation. (STG_E_INVALIDFUNCTION)	0x80030001 %x01.00.03.80
StorageAccessDenied	The caller does not have sufficient access rights to perform the operation. (STG_E_ACCESSDENIED)	0x80030005 %x05.00.03.80
StorageInsufficientMemory	There is insufficient memory available to complete the operation. (STG_E_INSUFFICIENTMEMORY)	0x80030008 %x08.00.03.80
StorageInvalidPointer	An invalid pointer was passed to the remote procedure call. (STG_E_INVALIDPOINTER)	0x80030009 %x09.00.03.80
StorageReadFault	A disk error occurred during a read operation. (STG_E_READFAULT)	0x8003001E %x1E.00.03.80
StorageLockViolation	A lock violation has occurred.	0x80030021

Name	Description (alternate names)	Numeric value (hex)
	(STG_E_LOCKVIOLATION)	%x21.00.03.80
StorageInvalidParameter	An invalid parameter was passed to the remote procedure call. (STG_E_INVALIDPARAMETER)	0x80030057 %x57.00.03.80
StorageInvalidFlag	An invalid flag was passed to a remote procedure call. (STG_E_INVALIDFLAG)	0x800300FF %xFF.00.03.80
StorageCannotSave	A stream could not be saved. (STG_E_CANTSAVE)	0x80030103 %x03.01.03.80
NotSupported	The server does not support this method call. (MAPI_E_NO_SUPPORT, ecNotSupported, ecNotImplemented)	0x80040102, %x02.01.04.80
InvalidCharacterWidth	Unicode characters were requested when only 8-bit characters are supported, or vice versa. (MAPI_E_BAD_CHARWIDTH, ecBadCharwidth)	0x80040103, %x03.01.04.80
StringTooLong	In the context of this method call, a string exceeds the maximum permitted length. (MAPI_E_STRING_TOO_LONG, ecStringTooLarge)	0x80040105, %x05.01.04.80
InvalidFlag	An unrecognized flag bit was passed to a method call. (MAPI_E_UNKNOWN_FLAGS, ecUnknownFlags, SYNC_E_UNKNOWN_FLAGS)	0x80040106, %x06.01.04.80
InvalidEntryID	An incorrectly formatted EntryID was passed to a method call. (MAPI_E_INVALID_ENTRYID, ecInvalidEntryId)	0x80040107, %x07.01.04.80
InvalidObject	A method call was made using a reference to an object that has been destroyed or is not in a viable state. (MAPI_E_INVALID_OBJECT, ecInvalidObject)	0x80040108, %x08.01.04.80
ObjectChanged	An attempt to commit changes failed because the object was changed separately. (MAPI_E_OBJECT_CHANGED, ecObjectModified)	0x80040109, %x09.01.04.80
ObjectDeleted	An operation failed because the object was deleted separately. (MAPI_E_OBJECT_DELETED, ecObjectDeleted)	0x8004010A, %x0A.01.04.80
ServerBusy	A table operation failed because a separate operation was in progress at the same time. (MAPI_E_BUSY, ecBusy)	0x8004010B, %x0B.01.04.80
OutOfDisk	Not enough disk space was available to complete the operation. (MAPI_E_NOT_ENOUGH_DISK, ecDiskFull)	0x8004010D, %x0D.01.04.80
OutOfResources	Not enough of an unspecified resource was available to	0x8004010E,

Name	Description (alternate names)	Numeric value (hex)
	complete the operation. (MAPI_E_NOT_ENOUGH_RESOURCES, ecInsufficientResrc)	%x0E.01.04.80
NotFound	The requested object could not be found at the server. (MAPI_E_NOT_FOUND, ecNotFound, ecAttachNotFound, ecUnknownRecip, ecPropNotExistent)	0x8004010F, %x0F.01.04.80
VersionMismatch	Client and server versions are not compatible. (MAPI_E_VERSION, ecVersionMismatch, ecVersion)	0x80040110, %x10.01.04.80
LogonFailed	A client was unable to log on to the server. (MAPI_E_LOGON_FAILED, ecLoginFailure)	0x80040111, %x11.01.04.80
TooManySessions	A server or service is unable to create any more sessions. (MAPI_E_SESSION_LIMIT, ecTooManySessions)	0x80040112, %x12.01.04.80
UserCanceled	An operation failed because a user cancelled it. (MAPI_E_USER_CANCEL, ecUserAbort)	0x80040113, %x13.01.04.80
AbortFailed	A RopAbort ([MS-OXCROPS]) or RopAbortSubmit ([MS-OXCROPS]) request was unsuccessful. (MAPI_E_UNABLE_TO_ABORT, ecUnableToAbort)	0x80040114, %x14.01.04.80
NetworkError	An operation was unsuccessful because of a problem with network operations or services. (MAPI_E_NETWORK_ERROR, ecNetwork)	0x80040115, %x15.01.04.80
DiskError	There was a problem writing to or reading from disk. (MAPI_E_DISK_ERROR, ecWriteFault, ecReadFault)	0x80040116, %x16.01.04.80
TooComplex	The operation requested is too complex for the server to handle; often applied to restrictions. (MAPI_E_TOO_COMPLEX, ecTooComplex)	0x80040117, %x17.01.04.80
InvalidColumn	The column requested is not allowed in this type of table. (MAPI_E_BAD_COLUMN)	0x80040118, %x18.01.04.80
ComputedValue	A property cannot be updated because it is read-only, computed by the server. (MAPI_E_COMPUTED, ecComputed)	0x8004011A, %x1A.01.04.80
CorruptData	There is an internal inconsistency in a database, or in a complex property value. (MAPI_E_CORRUPT_DATA, ecCorruptData)	0x8004011B, %x1B.01.04.80
InvalidCodepage	The server is not configured to support the code page requested by the client. (MAPI_E_UNKNOWN_CPID)	0x8004011E, %x1E.01.04.80
InvalidLocale	The server is not configured to support the locale	0x8004011F,

Name	Description (alternate names)	Numeric value (hex)
	requested by the client. (MAPI_E_UNKNOWN_LCID)	%x1F.01.04.80
TimeSkew	The operation failed due to clock skew between servers. (MAPI_E_INVALID_ACCESS_TIME, ecTimeSkew)	0x80040123, %x23.01.04.80
EndOfSession	Indicates that the server session has been destroyed, possibly by a server restart. (MAPI_E_END_OF_SESSION)	0x80040200, %x00.02.04.80
UnknownEntryId	Indicates that the EntryID passed to OpenEntry was created by a different MAPI provider. (MAPI_E_UNKNOWN_ENTRYID)	0x80040201, %x01.02.04.80
NotCompleted	A complex operation such as building a table row set could not be completed. (MAPI_E_UNABLE_TO_COMPLETE, ecUnableToComplete)	0x80040400, %x00.04.04.80
Timeout	An asynchronous operation did not succeed within the specified timeout. (MAPI_E_TIMEOUT, ecTimeout)	0x80040401, %x01.04.04.80
EmptyTable	A table essential to the operation is empty. (MAPI_E_TABLE_EMPTY, ecTableEmpty)	0x80040402, %x02.04.04.80
TableTooBig	The table is too big for the requested operation to complete. (MAPI_E_TABLE_TOO_BIG, ecTableTooBig)	0x80040403, %x03.04.04.80
InvalidBookmark	The bookmark passed to a table operation was not created on the same table. (MAPI_E_INVALID_BOOKMARK, ecInvalidBookmark)	0x80040405, %x05.04.04.80
ErrorWait	A wait timeout has expired. (MAPI_E_WAIT, ecWait)	0x80040500, %x00.05.04.80
ErrorCancel	The operation had to be canceled. (MAPI_E_CANCEL, ecCancel)	0x80040501, %x01.05.04.80
NoSuppress	The server does not support the suppression of read receipts. (MAPI_E_NO_SUPPRESS)	0x80040602, %x02.06.04.80
CollidingNames	A folder or item cannot be created because one with the same name or other criteria already exists. (MAPI_E_COLLISION, ecDuplicateName)	0x80040604, %x04.06.04.80
NotInitialized	The subsystem is not ready. (MAPI_E_NOT_INITIALIZED, ecNotInitialized)	0x80040605, %x05.06.04.80
NoRecipients	A message cannot be sent because it has no recipients. (MAPI_E_NO_RECIPIENTS)	0x80040607, %x07.06.04.80

Name	Description (alternate names)	Numeric value (hex)
AlreadySent	A message cannot be opened for modification because it has already been sent. (MAPI_E_SUBMITTED, ecSubmitted)	0x80040608, %x08.06.04.80
HasFolders	A folder cannot be deleted because it still contains subfolders. (MAPI_E_HAS_FOLDERS, ecFolderHasChildren)	0x80040609, %x09.06.04.80
HasMessages	A folder cannot be deleted because it still contains messages. (MAPI_E_HAS_MESSAGES, ecFolderHasContents)	0x8004060A, %x0A.06.04.80
FolderCycle	A folder move or copy operation would create a cycle (typically when the request is to copy a parent folder to one of its subfolders). (MAPI_E_FOLDER_CYCLE, ecRootFolder)	0x8004060B, %x0B.06.04.80
TooManyLocks	Too many locks have been requested. (MAPI_E_LOCKID_LIMIT, ecLockIdLimit)	0x8004060D, %x0D.06.04.80
AmbiguousRecipient	An unresolved recipient matches more than one entry in the directory. (MAPI_E_AMBIGUOUS_RECIP, ecAmbiguousRecip)	0x80040700, %x00.07.04.80
SyncObjectDeleted	The requested object was previously deleted. (SYNC_E_OBJECT_DELETED)	0x80040800, %x00.08.04.80
IgnoreFailure	An error occurred but it's safe to ignore the error, perhaps because the change in question has been superseded. (SYNC_E_IGNORE)	0x80040801 %x01.08.04.80
SyncConflict	Conflicting changes to an object have been detected. (SYNC_E_CONFLICT)	0x80040802 %x02.08.04.80
NoParentFolder	The parent folder could not be found. (SYNC_E_NO_PARENT)	0x80040803 %x03.08.04.80
CycleDetected	An operation would create a cycle (for instance, by copying a parent folder to one of its subfolders).	0x80040804 %x04.08.04.80
NotSynchronized	A sync operation did not take place, possibly due to a conflicting change. (SYNC_E_UNSYNCHRONIZED)	0x80040805 %x05.08.04.80
NamedPropertyQuota	The Store object cannot store any more named property mappings. (MAPI_E_NAMED_PROP_QUOTA_EXCEEDED, ecNPQuotaExceeded)	0x80040900, %x00.09.04.80
NotImplemented	The server does not implement this method call.	0x80040FFF, %xFF.0F.04.80

2.4.1 Additional Error Codes

When encoded in ROP buffers, all error codes are transmitted as 32-bit integers in little-endian format. Additional error codes are presented in the following table.

Name	Description (alternate names)	Numeric value (hex)
IsamError	Unspecified database failure. (ecJetError)	0x000003EA, %EA.03.00.00
UnknownUser	Unable to identify a home Store object for this user. (ecUnknownUser)	0x000003EB, %xEB.03.00.00
Exiting	The server is in the process of stopping. (ecExiting)	0x000003ED, %xED.03.00.00
BadConfiguration	Protocol settings for this user are incorrect. (ecBadConfig)	0x000003EE, %xEE.03.00.00
UnknownCodePage	The specified code page is not installed on the server. (ecUnknownCodePage)	0x000003EF, %xEF.03.00.00
ServerMemory	The server is out of memory. (ecServerOOM, ecMemory)	0x000003F0, %xF0.03.00.00
LoginPermission	This user does not have access rights to the mailbox. (ecLoginPerm)	0x000003F2, %xF2.03.00.00
DatabaseRolledBack	The database has been restored and needs fixup, but cannot be fixed up. (ecDatabaseRolledBack)	0x000003F3, %xF3.03.00.00
DatabaseCopiedError	The database file has been copied from another server. (ecDatabaseCopiedError)	0x000003F4, %xF4.03.00.00
AuditNotAllowed	Auditing of security operations is not permitted. (ecAuditNotAllowed)	0x000003F5, %xF5.03.00

Name	Description (alternate names)	Numeric value (hex)
		.00
ZombieUser	User has no security identifier. (ecZombieUser)	0x000003F6, %xF6.03.00.00
UnconvertableACL	An access control list cannot be converted to NTFS format. (ecUnconvertableACL)	0x000003F7, %xF7.03.00.00
NoFreeJetSessions	No Jet session is available. (ecNoFreeJses)	0x0000044C, %x4C.04.00.00
DifferentJetSession	Warning, a Jet session other than the one requested was returned. (ecDifferentJses)	0x0000044D, %x4D.04.00.00
FileRemove	An error occurred when attempting to remove a database file. (ecFileRemove)	0x0000044F, %x4F.04.00.00
ParameterOverflow	Parameter value overflow. (ecParameterOverflow)	0x00000450, %x50.04.00.00
BadVersion	Bad message store database version number. (ecBadVersion)	0x00000451, %x51.04.00.00
TooManyColumns	Too many columns requested in SetColumns. (ecTooManyCols)	0x00000452, %x52.04.00.00
HaveMore	A ROP has more data to return. (ecHaveMore)	0x00000453, %x53.04.00.00
DatabaseError	General database problem. (ecDatabaseError)	0x00000454, %x54.04.00.00
IndexNameTooBig	An index name is larger than what Jet allows.	0x00000455,

Name	Description (alternate names)	Numeric value (hex)
	(ecIndexNameTooBig)	%x55.04.00.00
UnsupportedProperty	The property data type is not supported. (ecUnsupportedProp)	0x00000456, %x56.04.00.00
MessageNotSaved	During AbortSubmit, a message was not saved. (ecMsgNotSaved)	0x00000457, %x57.04.00.00
UnpublishedNotification	A notification could not be published at this time. (ecUnpubNotif)	0x00000459, %x59.04.00.00
DifferentRoot	Moving or copying folders to a different top-level hierarchy is not supported. (ecDifferentRoot)	0x0000045B, %x5B.04.00.00
BadFolderName	Invalid folder name. (ecBadFolderName)	0x0000045C, %x5C.04.00.00
AttachmentOpen	The attachment is open. (ecAttachOpen)	0x0000045D, %x5D.04.00.00
InvalidCollapseState	The collapse state given to SetCollapseState is invalid. (ecInvClpsState)	0x0000045E, %x5E.04.00.00
SkipMyChildren	While walking a folder tree, do not consider children of this folder. (ecSkipMyChildren)	0x0000045F, %x5F.04.00.00
SearchFolder	The operation is not supported on a search folder. (ecSearchFolder)	0x00000460, %x60.04.00.00
NotSearchFolder	The operation is valid only on a search folder. (ecNotSearchFolder)	0x00000461, %x61.04.00.00
FolderSetReceive	This is a **Receive folder** and cannot be	0x00000462

Name	Description (alternate names)	Numeric value (hex)
	deleted. (ecFolderSetReceive)	, %x62.04.00 .00
NoReceiveFolder	No Receive folder is available (even no default). (ecNoReceiveFolder)	0x00000463 , %x63.04.00 .00
DeleteSubmittedMessage	Deleting a message that has been submitted for sending is not permitted. (ecNoDelSubmitMsg)	0x00000465 , %x65.04.00 .00
InvalidRecipients	It was impossible to deliver to this recipient. (ecInvalidRecips)	0x00000467 , %x67.04.00 .00
NoReplicaHere	No **replica** of the public folder in this Store object. (ecNoReplicaHere)	0x00000468 , %x68.04.00 .00
NoReplicaAvailable	No available Store object has a replica of this public folder. (ecNoReplicaAvailable)	0x00000469 , %x69.04.00 .00
PublicDatabase	The operation is invalid on a public Store object. (ecPublicMDB)	0x0000046A , %x6A.04.00 .00
NotPublicDatabase	The operation is valid only on a public Store object. (ecNotPublicMDB)	0x0000046B , %x6B.04.00 .00
RecordNotFound	The record was not found. (ecRecordNotFound)	0x0000046C , %x6C.04.00 .00
ReplicationConflict	A replication conflict was detected. (ecReplConflict)	0x0000046 D, %x6D.04.00 .00
FXBufferOverrun	Prevented an overrun while reading a fast transfer buffer. (ecFxBufferOverrun)	0x00000470 , %x70.04.00 .00

Name	Description (alternate names)	Numeric value (hex)
FXBufferEmpty	No more in a fast transfer buffer. (ecFxBufferEmpty)	0x00000471, %x71.04.00.00
FXPartialValue	Partial long value in a fast transfer buffer. (ecFxPartialValue)	0x00000472, %x72.04.00.00
FxNoRoom	No room for an atomic value in a fast transfer buffer. (ecFxNoRoom)	0x00000473, %x73.04.00.00
TimeExpired	Housekeeping functions have exceeded their time window. (ecMaxTimeExpired)	0x00000474, %x74.04.00.00
DestinationError	An error occurred on the destination folder during a copy operation. (ecDstError)	0x00000475, %x75.04.00.00
DatabaseNotInitialized	The Store object was not properly initialized. (ecMDBNotInit)	0x00000476, %x76.04.00.00
WrongServer	This server does not host the user's mailbox database. (ecWrongServer)	0x00000478, %x78.04.00.00
BufferTooSmall	A buffer passed to this function is not big enough. (ecBufferTooSmall)	0x0000047D, %x7D.04.00.00
AttachmentResolutionRequired	Linked attachments could not be resolved to actual files. (ecRequiresRefResolve)	0x0000047E, %x7E.04.00.00
ServerPaused	The service is in a paused state. (ecServerPaused)	0x0000047F, %x7F.04.00.00
ServerBusy	The server is too busy to complete an operation. (ecServerBusy)	0x00000480, %x80.04.00

Name	Description (alternate names)	Numeric value (hex)
		.00
NoSuchLogon	No such logon exists in the Store object's Logon list. (ecNoSuchLogon)	0x00000481, %x81.04.00.00
LoadLibraryFailed	Internal error: the service cannot load a required DLL. (ecLoadLibFailed)	0x00000482, %x82.04.00.00
AlreadyConfigured	A synchronization object has already been configured. (ecObjAlreadyConfig)	0x00000483, %x83.04.00.00
NotConfigured	A synchronization object has not yet been configured. (ecObjNotConfig)	0x00000484, %x84.04.00.00
DataLoss	A code page conversion incurred when data loss. (ecDataLoss)	0x00000485, %x85.04.00.00
MaximumSendThreadExceeded	The maximum number of send threads has been exceeded. (ecMaxSendThreadExceeded)	0x00000488, %x88.04.00.00
FxErrorMarker	A fast transfer error marker was found, and recovery is necessary. (ecFxErrorMarker)	0x00000489, %x89.04.00.00
NoFreeJtabs	There are no more free Jet tables. (ecNoFreeJtabs)	0x0000048A, %x8A.04.00.00
NotPrivateDatabase	The operation is only valid on a private mailbox database. (ecNotPrivateMDB)	0x0000048B, %x8B.04.00.00
IsintegMDB	The Store object has been locked by the ISINTEG utility. (ecIsintegMDB)	0x0000048C, %x8C.04.00.00
RecoveryMismatch	A recovery storage group operation was attempted on a non-RSG Store object, or	0x0000048D,

Name	Description (alternate names)	Numeric value (hex)
	vice-versa. (ecRecoveryMDBMismatch)	%x8D.04.00.00
TableMayNotBeDeleted	Attempt to delete a critical table, such as the messages or attachments table. (ecTableMayNotBeDeleted)	0x0000048E, %x8E.04.00.00
SearchFolderScopeViolation	Attempt to perform a recursive search on a search folder. (ecSearchFolderScopeViolation)	0x00000490, %x90.04.00.00
RpcRegisterIf	Error in registering RPC interfaces. (ecRpcRegisterIf)	0x000004B1, %xB1.04.00.00
RpcListen	Error in starting the RPC listener. (ecRpcListen)	0x000004B2, %xB2.04.00.00
RpcFormat	A badly formatted RPC buffer was detected. (ecRpcFormat)	0x000004B6, %xB6.04.00.00
NoCopyTo	Single instance storage cannot be used in this case. (ecNoCopyTo)	0x000004B7, %xB7.04.00.00
NullObject	An object handle reference in the RPC buffer could not be resolved. (ecNullObject)	0x000004B9, %xB9.04.00.00
RpcAuthentication	Server requests client to use authentication. (ecRpcAuthentication)	0x000004BC, %xBC.04.00.00
RpcBadAuthenticationLevel	The server doesn't recognize a client's authentication level. (ecRpcBadAuthenticationLevel)	0x000004BD, %xBD.04.00.00
NullCommentRestriction	The sub-restriction of a comment restriction is empty. (ecNullCommentRestriction)	0x000004BE, %xBE.04.00.00

Name	Description (alternate names)	Numeric value (hex)
RulesLoadError	Rule data was unavailable for this folder. (ecRulesLoadError)	0x000004CC, %xCC.04.00.00
RulesDeliverErr	Delivery-time failure in rule execution. (ecRulesDeliverErr)	0x000004CD, %xCD.04.00.00
RulesParsingErr	Invalid syntax in a stored rule condition or action. (ecRulesParsingErr)	0x000004CE, %xCE.04.00.00
RulesCreateDAE	Failure creating a deferred rule action error message. (ecRulesCreateDaeErr)	0x000004CF, %xCF.04.00.00
RulesCreateDAM	Failure creating a deferred rule action message. (ecRulesCreateDamErr)	0x000004D0, %xD0.04.00.00
RulesNoMoveCopyFolder	A move or copy rule action could not be performed due to a problem with the target folder. (ecRulesNoMoveCopyFolder)	0x000004D1, %xD1.04.00.00
RulesNoFolderRights	A move or copy rule action could not be performed due to a permissions problem with the target folder. (ecRulesNoFolderRights)	0x000004D2, %xD2.04.00.00
MessageTooBig	A message could not be delivered because it exceeds a size limit. (ecMessageTooBig)	0x000004D4, %xD4.04.00.00
FormNotValid	There is a problem with the form mapped to the message's message class. (ecFormNotValid)	0x000004D5, %xD5.04.00.00
NotAuthorized	Delivery to the desired folder was not authorized. (ecNotAuthorized)	0x000004D6, %xD6.04.00.00
DeleteMessage	The message was deleted by a rule action. (ecDeleteMessage)	0x000004D7, %xD7.04.00

Name	Description (alternate names)	Numeric value (hex)
		.00
BounceMessage	Delivery of the message was denied by a rule action. (ecBounceMessage)	0x000004D8, %xD8.04.00.00
QuotaExceeded	The operation failed because it would have exceeded a resource quota. (ecQuotaExceeded)	0x000004D9, %xD9.04.00.00
MaxSubmissionExceeded	A message could not be submitted because its size exceeds the defined maximum. (ecMaxSubmissionExceeded)	0x000004DA, %xDA.04.00.00
MaxAttachmentExceeded	The maximum number of message attachments has been exceeded. (ecMaxAttachmentExceeded)	0x000004DB, %xDB.04.00.00
SendAsDenied	The user account does not have permission to send mail as the owner of this mailbox. (ecSendAsDenied)	0x000004DC, %xDC.04.00.00
ShutoffQuotaExceeded	The operation failed because it would have exceeded the mailbox's shutoff quota. (ecShutoffQuotaExceeded)	0x000004DD, %xDD.04.00.00
TooManyOpenObjects	A client has opened too many objects of a specific type. (ecMaxObjsExceeded)	0x000004DE, %xDE.04.00.00
ClientVersionBlocked	The server is configured to block clients of this version. (ecClientVerDisallowed)	0x000004DF, %xDF.04.00.00
RpcHttpDisallowed	The server is configured to block RPC connections via HTTP. (ecRpcHttpDisallowed)	0x000004E0, %xE0.04.00.00
CachedModeRequired	The server is configured to block online mode connections; only cached mode connections are allowed. (ecCachedModeRequired)	0x000004E1, %xE1.04.00.00
FolderNotCleanedUp	The folder has been deleted but not yet cleaned up.	0x000004E3,

Name	Description (alternate names)	Numeric value (hex)
	(ecFolderNotCleanedUp)	%xE3.04.00.00
FormatError	Part of a ROP buffer was incorrectly formatted. (ecFmtError)	0x000004ED, %xED.04.00.00
NotExpanded	Error in expanding or collapsing rows in a categorized view. (ecNotExpanded)	0x000004F7, %xF7.04.00.00
NotCollapsed	Error in expanding or collapsing rows in a categorized view. (ecNotCollapsed)	0x000004F8, %xF8.04.00.00
NoExpandLeafRow	Leaf rows cannot be expanded; only category header rows can be expanded. (ecLeaf)	0x000004F9, %xF9.04.00.00
UnregisteredNameProp	An operation was attempted on a named property ID for which no name has been registered. (ecUnregisteredNameProp)	0x000004FA, %xFA.04.00.00
FolderDisabled	Access to the folder is disabled, perhaps because form design is in progress. (ecFolderDisabled)	0x000004FB, %xFB.04.00.00
DomainError	There is an inconsistency in the Store object's association with its server. (ecDomainError)	0x000004FC, %xFC.04.00.00
NoCreateRight	The operation requires create access rights which the user does not have. (ecNoCreateRight)	0x000004FF, %xFF.04.00.00
PublicRoot	The operation requires create access rights at a public folder root. (ecPublicRoot)	0x00000500, %x00.05.00.00
NoReadRight	The operation requires read access rights which the user does not have. (ecNoReadRight)	0x00000501, %x01.05.00.00
NoCreateSubfolderRight	The operation requires create subfolder	0x00000502

Name	Description (alternate names)	Numeric value (hex)
	access rights which the user does not have. (ecNoCreateSubfolderRight)	, %x02.05.00 .00
MessageCycle	The source message contains the destination message and cannot be attached to it. (ecMsgCycle)	0x00000504 , %x04.05.00 .00
NullDestinationObject	The RPC buffer contains a destination object handle that could not be resolved to a server object. (ecDstNullObject)	0x00000503 , %x03.05.00 .00
TooManyRecips	A hard limit on the number of recipients per message was exceeded. (ecTooManyRecips)	0x00000505 , %x05.05.00 .00
VirusScanInProgress	The operation failed because the target message is being scanned for viruses. (ecVirusScanInProgress)	0x0000050A , %x0A.05.00 .00
VirusDetected	The operation failed because the target message is infected with a virus. (ecVirusDetected)	0x0000050B , %x0B.05.00 .00
MailboxInTransit	The mailbox is in transit and is not accepting mail. (ecMailboxInTransit)	0x0000050C , %x0C.05.00 .00
BackupInProgress	The operation failed because the Store object is being backed up. (ecBackupInProgress)	0x0000050 D, %x0D.05.00 .00
VirusMessageDeleted	The operation failed because the target message was infected with a virus and has been deleted. (ecVirusMessageDeleted)	0x0000050E , %x0E.05.00 .00
InvalidBackupSequence	Backup steps were performed out of sequence. (ecInvalidBackupSequence)	0x0000050F , %x0F.05.00 .00
InvalidBackupType	The requested backup type was not recognized. (ecInvalidBackupType)	0x00000510 , %x10.05.00 .00

Name	Description (alternate names)	Numeric value (hex)
TooManyBackups	Too many backups are already in progress. (ecTooManyBackupsInProgress)	0x00000511, %x11.05.00.00
RestoreInProgress	A restore is already in progress. (ecRestoreInProgress)	0x00000512, %x12.05.00.00
DuplicateObject	The object already exists. (ecDuplicateObject)	0x00000579, %x79.05.00.00
ObjectNotFound	An internal database object could not be found. (ecObjectNotFound)	0x0000057A, %x7A.05.00.00
FixupReplyRule	The template message ID in a reply rule object is missing or incorrect. (ecFixupReplyRule)	0x0000057B, %x7B.05.00.00
TemplateNotFound	The reply template could not be found for a message that triggered an auto-reply rule. (ecTemplateNotFound)	0x0000057C, %x7C.05.00.00
RuleExecution	An error occurred while executing a rule action. (ecRuleExecution)	0x0000057D, %x7D.05.00.00
DSNoSuchObject	A server object could not be found in the directory. (ecDSNoSuchObject)	0x0000057E, %x7E.05.00.00
AlreadyTombstoned	An attempt to tombstone a message already in the message tombstone list failed. (ecMessageAlreadyTombstoned)	0x0000057F, %x7F.05.00.00
ReadOnlyTransaction	A write operation was attempted in a read-only transaction. (ecRequiresRWTransaction)	0x00000596, %x96.05.00.00
Paused	Attempt to pause a server that is already paused. (ecPaused)	0x0000060E, %x0E.06.00

Name	Description (alternate names)	Numeric value (hex)
		.00
NotPaused	Attempt to unpause a server that is not paused. (ecNotPaused)	0x0000060F, %x0F.06.00.00
WrongMailbox	The operation was attempted on the wrong mailbox. (ecWrongMailbox)	0x00000648, %x48.06.00.00
ChangePassword	The account password needs to be changed. (ecChgPassword)	0x0000064C, %x4C.06.00.00
PasswordExpired	The account password has expired. (ecPwdExpired)	0x0000064D, %x4D.06.00.00
InvalidWorkstation	The account has logged on from the wrong workstation. (ecInvWkstn)	0x0000064E, %x4E.06.00.00
InvalidLogonHours	The account has logged on at the wrong time of day. (ecInvLogonHrs)	0x0000064F, %x4F.06.00.00
AccountDisabled	The account is disabled. (ecAcctDisabled)	0x00000650, %x50.06.00.00
RuleVersion	The rule data contains an invalid rule version. (ecRuleVersion)	0x000006A4, %xA4.06.00.00
RuleFormat	The rule condition or action was incorrectly formatted. (ecRuleFormat)	0x000006A5, %xA5.06.00.00
RuleSendAsDenied	The rule is not authorized to send from this mailbox. (ecRuleSendAsDenied)	0x000006A6, %xA6.06.00.00
NoServerSupport	A newer client requires functionality that an older server does not support.	0x000006B9,

Name	Description (alternate names)	Numeric value (hex)
	(ecNoServerSupport)	%xB9.06.00.00
LockTimedOut	An attempt to unlock a message failed because the lock had already timed out. (ecLockTimedOut)	0x000006BA, %xBA.06.00.00
ObjectLocked	The operation failed because the target object is locked. (ecObjectLocked)	0x000006BB, %xBB.06.00.00
InvalidLockNamespace	Attempt to lock a nonexistent object. (ecInvalidLockNamespace)	0x000006BD, %xBD.06.00.00
MessageDeleted	Operation failed because the message has been deleted. (ecMessageDeleted)	0x000007D6, %xD6.07.00.00
ProtocolDisabled	The requested protocol is disabled in the server configuration. (ecProtocolDisabled)	0x000007D8, %xD8.07.00.00
CleartextLogonDisabled	Clear text logons were disabled. (ecCleartextLogonDisabled)	0x000007D9, %xD9.07.00.00
Rejected	The operation was rejected, perhaps because it is not supported. (ecRejected)	0x000007EE, %xEE.07.00.00
AmbiguousAlias	User account information did not uniquely identify a user. (ecAmbiguousAlias)	0x0000089A, %x9A.08.00.00
UnknownMailbox	No mailbox object for this logon exists in the address book. (ecUnknownMailbox)	0x0000089B, %x9B.08.00.00
ExpressionReserved	Internal error in evaluating an expression. (ecExpReserved)	0x000008FC, %xFC.08.00.00
ExpressionParseDepth	The expression tree exceeds a defined depth	0x000008FD

Name	Description (alternate names)	Numeric value (hex)
	limit. (ecExpParseDepth)	, %xFD.08.00 .00
ExpressionArgumentType	An argument to a function has the wrong type. (ecExpFuncArgType)	0x000008FE , %xFE.08.00 .00
ExpressionSyntax	Syntax error in expression. (ecExpSyntax)	0x000008FF , %xFF.08.00 .00
ExpressionBadStringToken	Invalid string token in expression. (ecExpBadStrToken)	0x00000900 , %x00.09.00 .00
ExpressionBadColToken	Invalid column name in expression. (ecExpBadColToken)	0x00000901 , %x01.09.00 .00
ExpressionTypeMismatch	Property types in, for example, a comparison expression, are incompatible. (ecExpTypeMismatch)	0x00000902 , %x02.09.00 .00
ExpressionOperatorNotSupported	The requested operator is not supported. (ecExpOpNotSupported)	0x00000903 , %x03.09.00 .00
ExpressionDivideByZero	Divide by zero doesn't work. (ecExpDivByZero)	0x00000904 , %x04.09.00 .00
ExpressionUnaryArgument	The argument to a unary expression is of incorrect type. (ecExpUnaryArgType)	0x00000905 , %x05.09.00 .00
NotLocked	An attempt to lock a resource failed. (ecNotLocked)	0x00000960 , %x60.09.00 .00
ClientEvent	A client-supplied event has fired. (ecClientEvent)	0x00000961 , %x61.09.00 .00

Name	Description (alternate names)	Numeric value (hex)
CorruptEvent	Data in the event table is bad. (ecCorruptEvent)	0x00000965 , %x65.09.00 .00
CorruptWatermark	A watermark in the event table is bad. (ecCorruptWatermark)	0x00000966 , %x66.09.00 .00
EventError	General event processing error. (ecEventError)	0x00000967 , %x67.09.00 .00
WatermarkError	An event watermark is out of range or otherwise invalid. (ecWatermarkError)	0x00000968 , %x68.09.00 .00
NonCanonicalACL	A modification to an access control list failed because the existing ACL is not in canonical format. (ecNonCanonicalACL)	0x00000969 , %x69.09.00 .00
MailboxDisabled	Logon was unsuccessful because the mailbox is disabled. (ecMailboxDisabled)	0x0000096C , %x6C.09.00 .00
RulesFolderOverQuota	A move or copy rule action failed because the destination folder is over quota. (ecRulesFolderOverQuota)	0x0000096 D, %x6D.09.00 .00
AddressBookUnavailable	The address book server could not be reached. (ecADUnavailable)	0x0000096E , %x6E.09.00 .00
AddressBookError	Unspecified error from the address book server. (ecADError)	0x0000096F , %x6F.09.00 .00
AddressBookObjectNotFound	An object was not found in the address book. (ecADNotFound)	0x00000971 , %x71.09.00 .00
AddressBookPropertyError	A property was not found in the address book. (ecADPropertyError)	0x00000972 , %x72.09.00

Name	Description (alternate names)	Numeric value (hex)
		.00
NotEncrypted	The server is configured to force encrypted connections, but the client requested an unencrypted connection. (ecNotEncrypted)	0x00000970, %x70.09.00.00
RpcServerTooBusy	An external RPC call failed because the server was too busy. (ecRpcServerTooBusy)	0x00000973, %x73.09.00.00
RpcOutOfMemory	An external RPC call failed because the local server was out of memory. (ecRpcOutOfMemory)	0x00000974, %x74.09.00.00
RpcServerOutOfMemory	An external RPC call failed because the remote server was out of memory. (ecRpcServerOutOfMemory)	0x00000975, %x75.09.00.00
RpcOutOfResources	An external RPC call failed because the remote server was out of an unspecified resource. (ecRpcOutOfResources)	0x00000976, %x76.09.00.00
RpcServerUnavailable	An external RPC call failed because the remote server was unavailable. (ecRpcServerUnavailable)	0x00000977, %x77.09.00.00
SecureSubmitError	A failure occurred while setting the secure submission state of a message. (ecSecureSubmitError)	0x0000097A, %x7A.09.00.00
EventsDeleted	Requested events were already deleted from the queue. (ecEventsDeleted)	0x0000097C, %x7C.09.00.00
SubsystemStopping	A component service is in the process of shutting down. (ecSubsystemStopping)	0x0000097D, %x7D.09.00.00
AttendantUnavailable	The system attendant service is unavailable. (ecSAUnavailable)	0x0000097E, %x7E.09.00.00
CIStopping	The content indexer service is stopping.	0x00000A28,

Name	Description (alternate names)	Numeric value (hex)
	(ecCIStopping)	%x28.0A.00.00
FxInvalidState	An internal fast transfer object has invalid state. (ecFxInvalidState)	0x00000A29, %x29.0A.00.00
FxUnexpectedMarker	Fast Transfer parsing has hit an invalid marker. (ecFxUnexpectedMarker)	0x00000A2A, %x2A.0A.00.00
DuplicateDelivery	A copy of this message has already been delivered. (ecDuplicateDelivery)	0x00000A2B, %x2B.0A.00.00
ConditionViolation	The condition was not met for a conditional operation. (ecConditionViolation)	0x00000A2C, %x2C.0A.00.00
MaximumConnectionPoolsExceeded	An RPC client has exceeded the defined limit of RPC connection pools. (ecMaxPoolExceeded)	0x00000A2D, %x2D.0A.00.00
InvalidRpcHandle	The RPC connection is no longer valid. (ecRpcInvalidHandle)	0x00000A2E, %x2E.0A.00.00
EventNotFound	There are no events in the event table, or the requested event was not found. (ecEventNotFound)	0x00000A2F, %x2F.0A.00.00
PropertyNotPromoted	A property was not copied from message table to message header table. (ecPropNotPromoted)	0x00000A30, %x30.0A.00.00
LowFreeSpaceForDatabase	The drive hosting database files have little or no free space. (ecLowMdbSpace)	0x00000A31, %x31.0A.00.00
LowFreeSpaceForLogs	The drive hosting log files for the database have little or no free space. (ecLowMdbLogSpace)	0x00000A32, %x32.0A.00.00
MailboxIsQuarantined	The mailbox has been placed under	0x00000A33

Name	Description (alternate names)	Numeric value (hex)
	quarantine by an administrator. (ecMailboxQuarantined)	, %x33.0A.00 .00
DatabaseMountInProgress	The mailbox database is being mounted. (ecMountInProgress)	0x00000A34 , %x34.0A.00 .00
DatabaseDismountInProgress	The mailbox database is being dismounted. (ecDismountInProgress)	0x00000A35 , %x35.0A.00 .00
ConnectionsOverBudget	The number of RPC connections in use exceeds the amount budgeted for this client. (ecMaxConnectionsExceeded)	0x00000A36 , %x36.0A.00 .00
NotFoundInContainer	The mailbox was not found in the mailbox metadata cache. (ecNotFoundInContainer)	0x00000A37 , %x37.0A.00 .00
CannotRemove	An item cannot be removed from an internal list. (ecCannotRemove)	0x00000A38 , %x38.0A.00 .00
InvalidConnectionPool	An RPC client has attempted connection using a connection pool unknown to the server. (ecInvalidPool)	0x00000A39 , %x39.0A.00 .00
VirusScanGeneralFailure	A non-specified failure occurred while scanning an item. ecVirusScannerError	0x00000A3A , %x3A.0A.00 .00
IsamErrorRfsFailure	The Resource Failure Simulator failed. (JET_errRfsFailure)	0xFFFFFF9C, %x9C.FF.FF. FF
IsamErrorRfsNotArmed	The Resource Failure Simulator has not been initialized. (JET_errRfsNotArmed)	0xFFFFFF9B, %x9B.FF.FF. FF
IsamErrorFileClose	The file could not be closed. (JET_errFileClose)	0xFFFFFF9A, %x9A.FF.FF. FF
IsamErrorOutOfThreads	The thread could not be started. (JET_errOutOfThreads)	0xFFFFFF99, %x99.FF.FF.

Name	Description (alternate names)	Numeric value (hex)
		FF
IsamErrorTooManyIO	The system is busy due to too many IOs. (JET_errTooManyIO)	0xFFFFFF97, %x97.FF.FF.FF
IsamErrorTaskDropped	The requested asynchronous task could not be executed. (JET_errTaskDropped)	0xFFFFFF96, %x96.FF.FF.FF
IsamErrorInternalError	There was a fatal internal error. (JET_errInternalError)	0xFFFFFF95, %x95.FF.FF.FF
IsamErrorDatabaseBufferDependenciesCorrupted	The buffer dependencies were set improperly and there was a recovery failure. (JET_errDatabaseBufferDependenciesCorrupted)	0xFFFFFF01, %x01.FF.FF.FF
IsamErrorPreviousVersion	The version already existed and there was a recovery failure. (JET_errPreviousVersion)	0xFFFFFEBE, %xBE.FE.FF.FF
IsamErrorPageBoundary	The page boundary has been reached. (JET_errPageBoundary)	0xFFFFFEBD, %xBD.FE.FF.FF
IsamErrorKeyBoundary	The key boundary has been reached. (JET_errKeyBoundary)	0xFFFFFEBC, %xBC.FE.FF.FF
IsamErrorBadPageLink	The database is corrupt. (JET_errBadPageLink)	0xFFFFFEB9, %xB9.FE.FF.FF
IsamErrorBadBookmark	The bookmark has no corresponding address in the database. (JET_errBadBookmark)	0xFFFFFEB8, %xB8.FE.FF.FF
IsamErrorNTSystemCallFailed	The call to the operating system failed. (JET_errNTSystemCallFailed)	0xFFFFFEB2, %xB2.FE.FF.FF
IsamErrorBadParentPageLink	A parent database is corrupt. (JET_errBadParentPageLink)	0xFFFFFEAE, %xAE.FE.FF.FF
IsamErrorSPAvailExtCacheOutOfSync	The AvailExt cache does not match the B+ tree. (JET_errSPAvailExtCacheOutOfSync)	0xFFFFFEAC, %xAC.FE.FF.FF

Name	Description (alternate names)	Numeric value (hex)
IsamErrorSPAvailExtCorrupted	The AllAvailExt space tree is corrupt. (JET_errSPAvailExtCorrupted)	0xFFFFFEAB, %xAB.FE.FF.FF
IsamErrorSPAvailExtCacheOutOfMemory	An out of memory error occurred while allocating an AvailExt cache node. (JET_errSPAvailExtCacheOutOfMemory)	0xFFFFFEAA, %xAA.FE.FF.FF
IsamErrorSPOwnExtCorrupted	The OwnExt space tree is corrupt. (JET_errSPOwnExtCorrupted)	0xFFFFFEA9, %xA9.FE.FF.FF
IsamErrorDbTimeCorrupted	The Dbtime on the current page is greater than the global database dbtime. (JET_errDbTimeCorrupted)	0xFFFFFEA8, %xA8.FE.FF.FF
IsamErrorKeyTruncated	An attempt to create a key for an index entry failed because the key would have been truncated and the index definition disallows key truncation. (JET_errKeyTruncated)	0xFFFFFEA6, %xA6.FE.FF.FF
IsamErrorKeyTooBig	The key is too large. (JET_errKeyTooBig)	0xFFFFFE68, %x68.FE.FF.FF
IsamErrorInvalidLoggedOperation	The logged operation cannot be redone. (JET_errInvalidLoggedOperation)	0xFFFFFE0C, %x0C.FE.FF.FF
IsamErrorLogFileCorrupt	The log file is corrupt. (JET_errLogFileCorrupt)	0xFFFFFE0B, %x0B.FE.FF.FF
IsamErrorNoBackupDirectory	A backup directory was not given. (JET_errNoBackupDirectory)	0xFFFFFE09, %x09.FE.FF.FF
IsamErrorBackupDirectoryNotEmpty	The backup directory is not empty. (JET_errBackupDirectoryNotEmpty)	0xFFFFFE08, %x08.FE.FF.FF
IsamErrorBackupInProgress	The backup is already active. (JET_errBackupInProgress)	0xFFFFFE07, %x07.FE.FF.FF
IsamErrorRestoreInProgress	A restore is in progress. (JET_errRestoreInProgress)	0xFFFFFE06, %x06.FE.FF.FF
IsamErrorMissingPreviousLogFile	The log file is missing for the check point.	0xFFFFFE03,

Name	Description (alternate names)	Numeric value (hex)
	(JET_errMissingPreviousLogFile)	%x03.FE.FF.FF
IsamErrorLogWriteFail	There was a failure writing to the log file. (JET_errLogWriteFail)	0xFFFFFE02, %x02.FE.FF.FF
IsamErrorLogDisabledDueToRecoveryFailure	The attempt to write to the log after recovery failed. (JET_errLogDisabledDueToRecoveryFailure)	0xFFFFFE01, %x01.FE.FF.FF
IsamErrorCannotLogDuringRecoveryRedo	The attempt to write to the log during the recovery redo failed. (JET_errCannotLogDuringRecoveryRedo)	0xFFFFFE00, %x00.FE.FF.FF
IsamErrorLogGenerationMismatch	The name of the log file does not match the internal generation number. (JET_errLogGenerationMismatch)	0xFFFFFDFF, %xFF.FD.FF.FF
IsamErrorBadLogVersion	The version of the log file is not compatible with the ESE version. (JET_errBadLogVersion)	0xFFFFFDFE, %xFE.FD.FF.FF
IsamErrorInvalidLogSequence	The timestamp in the next log does not match the expected timestamp. (JET_errInvalidLogSequence)	0xFFFFFDFD, %xFD.FD.FF.FF
IsamErrorLoggingDisabled	The log is not active. (JET_errLoggingDisabled)	0xFFFFFDFC, %xFC.FD.FF.FF
IsamErrorLogBufferTooSmall	The log buffer is too small for recovery. (JET_errLogBufferTooSmall)	0xFFFFFDFB, %xFB.FD.FF.FF
IsamErrorLogSequenceEnd	The maximum log file number has been exceeded. (JET_errLogSequenceEnd)	0xFFFFFDF9, %xF9.FD.FF.FF
IsamErrorNoBackup	There is no backup in progress. (JET_errNoBackup)	0xFFFFFDF8, %xF8.FD.FF.FF
IsamErrorInvalidBackupSequence	The backup call is out of sequence. (JET_errInvalidBackupSequence)	0xFFFFFDF7, %xF7.FD.FF.FF

Name	Description (alternate names)	Numeric value (hex)
IsamErrorBackupNotAllowedYet	A backup cannot be done at this time. (JET_errBackupNotAllowedYet)	0xFFFFFDF5, %xF5.FD.FF.FF
IsamErrorDeleteBackupFileFail	A backup file could not be deleted. (JET_errDeleteBackupFileFail)	0xFFFFFDF4, %xF4.FD.FF.FF
IsamErrorMakeBackupDirectoryFail	The backup temporary directory could not be created. (JET_errMakeBackupDirectoryFail)	0xFFFFFDF3, %xF3.FD.FF.FF
IsamErrorInvalidBackup	Circular logging is enabled; an incremental backup cannot be performed. (JET_errInvalidBackup)	0xFFFFFDF2, %xF2.FD.FF.FF
IsamErrorRecoveredWithErrors	The data was restored with errors. (JET_errRecoveredWithErrors)	0xFFFFFDF1, %xF1.FD.FF.FF
IsamErrorMissingLogFile	The current log file is missing. (JET_errMissingLogFile)	0xFFFFFDF0, %xF0.FD.FF.FF
IsamErrorLogDiskFull	The log disk is full. (JET_errLogDiskFull)	0xFFFFFDEF, %xEF.FD.FF.FF
IsamErrorBadLogSignature	There is a bad signature for a log file. (JET_errBadLogSignature)	0xFFFFFDEE, %xEE.FD.FF.FF
IsamErrorBadDbSignature	There is a bad signature for a database file. (JET_errBadDbSignature)	0xFFFFFDED, %xED.FD.FF.FF
IsamErrorBadCheckpointSignature	There is a bad signature for a checkpoint file. (JET_errBadCheckpointSignature)	0xFFFFFDEC, %xEC.FD.FF.FF
IsamErrorCheckpointCorrupt	The checkpoint file was not found or was corrupt. (JET_errCheckpointCorrupt)	0xFFFFFDEB, %xEB.FD.FF

Name	Description (alternate names)	Numeric value (hex)
		.FF
IsamErrorMissingPatchPage	The database patch file page was not found during recovery. (JET_errMissingPatchPage)	0xFFFFFDEA, %xEA.FD.FF.FF
IsamErrorBadPatchPage	The database patch file page is not valid. (JET_errBadPatchPage)	0xFFFFFDE9, %xE9.FD.FF.FF
IsamErrorRedoAbruptEnded	The redo abruptly ended due to a sudden failure while reading logs from the log file. (JET_errRedoAbruptEnded)	0xFFFFFDE8, %xE8.FD.FF.FF
IsamErrorBadSLVSignature	The signature in the SLV file does not agree with the database. (JET_errBadSLVSignature)	0xFFFFFDE7, %xE7.FD.FF.FF
IsamErrorPatchFileMissing	The hard restore detected that a database patch file is missing from the backup set. (JET_errPatchFileMissing)	0xFFFFFDE6, %xE6.FD.FF.FF
IsamErrorDatabaseLogSetMismatch	The database does not belong with the current set of log files. (JET_errDatabaseLogSetMismatch)	0xFFFFFDE5, %xE5.FD.FF.FF
IsamErrorDatabaseStreamingFileMismatch	This flag is reserved. (JET_errDatabaseStreamingFileMismatch)	0xFFFFFDE4, %xE4.FD.FF.FF
IsamErrorLogFileSizeMismatch	The actual log file size does not match the configured size. (JET_errLogFileSizeMismatch)	0xFFFFFDE3, %xE3.FD.FF.FF
IsamErrorCheckpointFileNotFound	The checkpoint file could not be located. (JET_errCheckpointFileNotFound)	0xFFFFFDE2, %xE2.FD.FF.FF
IsamErrorRequiredLogFilesMissing	The required log files for recovery are missing. (JET_errRequiredLogFilesMissing)	0xFFFFFDE1, %xE1.FD.FF.FF
IsamErrorSoftRecoveryOnBackupDatabase	A soft recovery is about to be used on a backup database when a restore should be	0xFFFFFDE0,

Name	Description (alternate names)	Numeric value (hex)
	used instead. (JET_errSoftRecoveryOnBackupDatabase)	%xE0.FD.FF.FF
IsamErrorLogFileSizeMismatchDatabasesConsistent	The databases have been recovered, but the log file size used during recovery does not match JET_paramLogFileSize. (JET_errLogFileSizeMismatchDatabasesConsistent)	0xFFFFFDDF, %xDF.FD.FF.FF
IsamErrorLogSectorSizeMismatch	The log file sector size does not match the sector size of the current volume. (JET_errLogSectorSizeMismatch)	0xFFFFFDDE, %xDE.FD.FF.FF
IsamErrorLogSectorSizeMismatchDatabasesConsistent	The databases have been recovered, but the log file sector size (used during recovery) does not match the sector size of the current volume. (JET_errLogSectorSizeMismatchDatabasesConsistent)	0xFFFFFDDD, %xDD.FD.FF.FF
IsamErrorLogSequenceEndDatabasesConsistent	The databases have been recovered, but all possible log generations in the current sequence have been used. All log files and the checkpoint file must be deleted and databases must be backed up before continuing. (JET_errLogSequenceEndDatabasesConsistent)	0xFFFFFDDC, %xDC.FD.FF.FF
IsamErrorStreamingDataNotLogged	There was an illegal attempt to replay a streaming file operation where the data was not logged. This is probably caused by an attempt to rollforward with circular logging enabled. (JET_errStreamingDataNotLogged)	0xFFFFFDDB, %xDB.FD.FF.FF
IsamErrorDatabaseDirtyShutdown	The database was not shutdown cleanly. A recovery must first be run to properly complete database operations for the previous shutdown. (JET_errDatabaseDirtyShutdown)	0xFFFFFDDA, %xDA.FD.FF.FF
IsamErrorConsistentTimeMismatch	The last consistent time for the database has not been matched. (JET_errConsistentTimeMismatch)	0xFFFFFDD9, %xD9.FD.FF.FF
IsamErrorDatabasePatchFileMismatch	The database patch file is not generated from this backup. (JET_errDatabasePatchFileMismatch)	0xFFFFFDD8, %xD8.FD.FF.FF
IsamErrorEndingRestoreLogTooLow	The starting log number is too low for the restore. (JET_errEndingRestoreLogTooLow)	0xFFFFFDD7, %xD7.FD.FF

Name	Description (alternate names)	Numeric value (hex)
		.FF
IsamErrorStartingRestoreLogTooHigh	The starting log number is too high for the restore. (JET_errStartingRestoreLogTooHigh)	0xFFFFFDD6, %xD6.FD.FF.FF
IsamErrorGivenLogFileHasBadSignature	The restore log file has a bad signature. (JET_errGivenLogFileHasBadSignature)	0xFFFFFDD5, %xD5.FD.FF.FF
IsamErrorGivenLogFileIsNotContiguous	The restore log file is not contiguous. (JET_errGivenLogFileIsNotContiguous)	0xFFFFFDD4, %xD4.FD.FF.FF
IsamErrorMissingRestoreLogFiles	Some restore log files are missing. (JET_errMissingRestoreLogFiles)	0xFFFFFDD3, %xD3.FD.FF.FF
IsamErrorMissingFullBackup	The database missed a previous full backup before attempting to perform an incremental backup. (JET_errMissingFullBackup)	0xFFFFFDD0, %xD0.FD.FF.FF
IsamErrorBadBackupDatabaseSize	The backup database size is not a multiple of the database page size. (JET_errBadBackupDatabaseSize)	0xFFFFFDCF, %xCF.FD.FF.FF
IsamErrorDatabaseAlreadyUpgraded	The current attempt to upgrade a database has been stopped because the database is already current. (JET_errDatabaseAlreadyUpgraded)	0xFFFFFDCE, %xCE.FD.FF.FF
IsamErrorDatabaseIncompleteUpgrade	The database was only partially converted to the current format. The database must be restored from backup. (JET_errDatabaseIncompleteUpgrade)	0xFFFFFDCD, %xCD.FD.FF.FF
IsamErrorMissingCurrentLogFiles	Some current log files are missing for continuous restore. (JET_errMissingCurrentLogFiles)	0xFFFFFDCB, %xCB.FD.FF.FF
IsamErrorDbTimeTooOld	The dbtime on a page is smaller than the dbtimeBefore that is in the record. (JET_errDbTimeTooOld)	0xFFFFFDCA, %xCA.FD.FF.FF
IsamErrorDbTimeTooNew	The dbtime on a page is in advance of the dbtimeBefore that is in the record.	0xFFFFFDC9,

Name	Description (alternate names)	Numeric value (hex)
	(JET_errDbTimeTooNew)	%xC9.FD.FF.FF
IsamErrorMissingFileToBackup	Some log or database patch files were missing during the backup. (JET_errMissingFileToBackup)	0xFFFFFDC7, %xC7.FD.FF.FF
IsamErrorLogTornWriteDuringHardRestore	A torn write was detected in a backup that was set during a hard restore. (JET_errLogTornWriteDuringHardRestore)	0xFFFFFDC6, %xC6.FD.FF.FF
IsamErrorLogTornWriteDuringHardRecovery	A torn write was detected during a hard recovery (the log was not part of a backup set). (JET_errLogTornWriteDuringHardRecovery)	0xFFFFFDC5, %xC5.FD.FF.FF
IsamErrorLogCorruptDuringHardRestore	Corruption was detected in a backup set during a hard restore. (JET_errLogCorruptDuringHardRestore)	0xFFFFFDC3, %xC3.FD.FF.FF
IsamErrorLogCorruptDuringHardRecovery	Corruption was detected during hard recovery (the log was not part of a backup set). (JET_errLogCorruptDuringHardRecovery)	0xFFFFFDC2, %xC2.FD.FF.FF
IsamErrorMustDisableLoggingForDbUpgrade	Logging cannot be enabled while attempting to upgrade a database. (JET_errMustDisableLoggingForDbUpgrade)	0xFFFFFDC1, %xC1.FD.FF.FF
IsamErrorBadRestoreTargetInstance	Either the TargetInstance that was specified for restore has not been found or the log files do not match. (JET_errBadRestoreTargetInstance)	0xFFFFFDBF, %xBF.FD.FF.FF
IsamErrorRecoveredWithoutUndo	The database engine successfully replayed all operations in the transaction log to perform a crash recovery but the caller elected to stop recovery without rolling back uncommitted updates. (JET_errRecoveredWithoutUndo)	0xFFFFFDBD, %xBD.FD.FF.FF
IsamErrorDatabasesNotFromSameSnapshot	The databases to be restored are not from the same shadow copy backup. (JET_errDatabasesNotFromSameSnapshot)	0xFFFFFDBC, %xBC.FD.FF.FF
IsamErrorSoftRecoveryOnSnapshot	There is a soft recovery on a database from a shadow copy backup set. (JET_errSoftRecoveryOnSnapshot)	0xFFFFFDBB, %xBB.FD.FF.FF

Name	Description (alternate names)	Numeric value (hex)
IsamErrorCommittedLogFilesMissing	One or more logs that were committed to this database are missing. (JET_errCommittedLogFilesMissing)	0xFFFFFDBA, %xBA.FD.FF.FF
IsamErrorCommittedLogFilesCorrupt	One or more logs were found to be corrupt during recovery. (JET_errCommittedLogFilesCorrupt)	0xFFFFFDB6, %xB6.FD.FF.FF
IsamErrorUnicodeTranslationBufferTooSmall	The Unicode translation buffer is too small. (JET_errUnicodeTranslationBufferTooSmall)	0xFFFFFDA7, %xA7.FD.FF.FF
IsamErrorUnicodeTranslationFail	The Unicode normalization failed. (JET_errUnicodeTranslationFail)	0xFFFFFDA6, %xA6.FD.FF.FF
IsamErrorUnicodeNormalizationNotSupported	The operating system does not provide support for Unicode normalization and a normalization callback was not specified. (JET_errUnicodeNormalizationNotSupported)	0xFFFFFDA5, %xA5.FD.FF.FF
IsamErrorExistingLogFileHasBadSignature	The existing log file has a bad signature. (JET_errExistingLogFileHasBadSignature)	0xFFFFFD9E, %x9E.FD.FF.FF
IsamErrorExistingLogFileIsNotContiguous	An existing log file is not contiguous. (JET_errExistingLogFileIsNotContiguous)	0xFFFFFD9D, %x9D.FD.FF.FF
IsamErrorLogReadVerifyFailure	A checksum error was found in the log file during backup. (JET_errLogReadVerifyFailure)	0xFFFFFD9C, %x9C.FD.FF.FF
IsamErrorSLVReadVerifyFailure	A checksum error was found in the SLV file during backup. (JET_errSLVReadVerifyFailure)	0xFFFFFD9B, %x9B.FD.FF.FF
IsamErrorCheckpointDepthTooDeep	There are too many outstanding generations between the checkpoint and the current generation. (JET_errCheckpointDepthTooDeep)	0xFFFFFD9A, %x9A.FD.FF.FF
IsamErrorRestoreOfNonBackupDatabase	A hard recovery was attempted on a database that was not a backup database. (JET_errRestoreOfNonBackupDatabase)	0xFFFFFD99, %x99.FD.FF

Name	Description (alternate names)	Numeric value (hex)
		.FF
IsamErrorInvalidGrbit	There is an invalid grbit parameter. (JET_errInvalidGrbit)	0xFFFFFC7C, %x7C.FC.FF.FF
IsamErrorTermInProgress	Termination is in progress. (JET_errTermInProgress)	0xFFFFFC18, %x18.FC.FF.FF
IsamErrorFeatureNotAvailable	This API element is not supported. (JET_errFeatureNotAvailable)	0xFFFFFC17, %x17.FC.FF.FF
IsamErrorInvalidName	An invalid name is being used. (JET_errInvalidName)	0xFFFFFC16, %x16.FC.FF.FF
IsamErrorInvalidParameter	An invalid API parameter is being used. (JET_errInvalidParameter)	0xFFFFFC15, %x15.FC.FF.FF
IsamErrorDatabaseFileReadOnly	There was an attempt to attach to a read-only database file for read/write operations. (JET_errDatabaseFileReadOnly)	0xFFFFFC10, %x10.FC.FF.FF
IsamErrorInvalidDatabaseId	There is an invalid database ID. (JET_errInvalidDatabaseId)	0xFFFFFC0E, %x0E.FC.FF.FF
IsamErrorOutOfMemory	The system is out of memory. (JET_errOutOfMemory)	0xFFFFFC0D, %x0D.FC.FF.FF
IsamErrorOutOfDatabaseSpace	The maximum database size has been reached. (JET_errOutOfDatabaseSpace)	0xFFFFFC0C, %x0C.FC.FF.FF
IsamErrorOutOfCursors	The table is out of cursors. (JET_errOutOfCursors)	0xFFFFFC0B, %x0B.FC.FF.FF
IsamErrorOutOfBuffers	The database is out of page buffers. (JET_errOutOfBuffers)	0xFFFFFC0A,

Name	Description (alternate names)	Numeric value (hex)
		%x0A.FC.FF.FF
IsamErrorTooManyIndexes	There are too many indexes. (JET_errTooManyIndexes)	0xFFFFFC09, %x09.FC.FF.FF
IsamErrorTooManyKeys	There are too many columns in an index. (JET_errTooManyKeys)	0xFFFFFC08, %x08.FC.FF.FF
IsamErrorRecordDeleted	The record has been deleted. (JET_errRecordDeleted)	0xFFFFFC07, %x07.FC.FF.FF
IsamErrorReadVerifyFailure	There is a checksum error on a database page. (JET_errReadVerifyFailure)	0xFFFFFC06, %x06.FC.FF.FF
IsamErrorPageNotInitialized	There is a blank database page. (JET_errPageNotInitialized)	0xFFFFFC05, %x05.FC.FF.FF
IsamErrorOutOfFileHandles	There are no file handles. (JET_errOutOfFileHandles)	0xFFFFFC04, %x04.FC.FF.FF
IsamErrorDiskIO	There is a disk IO error. (JET_errDiskIO)	0xFFFFFC02, %x02.FC.FF.FF
IsamErrorInvalidPath	There is an invalid file path. (JET_errInvalidPath)	0xFFFFFC01, %x01.FC.FF.FF
IsamErrorInvalidSystemPath	There is an invalid system path. (JET_errInvalidSystemPath)	0xFFFFFC00, %x00.FC.FF.FF
IsamErrorInvalidLogDirectory	There is an invalid log directory. (JET_errInvalidLogDirectory)	0xFFFFFBFF, %xFF.FB.FF.FF
IsamErrorRecordTooBig	The record is larger than maximum size. (JET_errRecordTooBig)	0xFFFFFBFE, %xFE.FB.FF.

Name	Description (alternate names)	Numeric value (hex)
		FF
IsamErrorTooManyOpenDatabases	There are too many open databases. (JET_errTooManyOpenDatabases)	0xFFFFFBFD, %xFD.FB.FF.FF
IsamErrorInvalidDatabase	This is not a database file. (JET_errInvalidDatabase)	0xFFFFFBFC, %xFC.FB.FF.FF
IsamErrorNotInitialized	The database engine has not been initialized. (JET_errNotInitialized)	0xFFFFFBFB, %xFB.FB.FF.FF
IsamErrorAlreadyInitialized	The database engine is already initialized. (JET_errAlreadyInitialized)	0xFFFFFBFA, %xFA.FB.FF.FF
IsamErrorInitInProgress	The database engine is being initialized. (JET_errInitInProgress)	0xFFFFFBF9, %xF9.FB.FF.FF
IsamErrorFileAccessDenied	The file cannot be accessed because the file is locked or in use. (JET_errFileAccessDenied)	0xFFFFFBF8, %xF8.FB.FF.FF
IsamErrorBufferTooSmall	The buffer is too small. (JET_errBufferTooSmall)	0xFFFFFBF2, %xF2.FB.FF.FF
IsamErrorTooManyColumns	Too many columns are defined. (JET_errTooManyColumns)	0xFFFFFBF0, %xF0.FB.FF.FF
IsamErrorContainerNotEmpty	The container is not empty. (JET_errContainerNotEmpty)	0xFFFFFBED, %xED.FB.FF.FF
IsamErrorInvalidFilename	The filename is invalid. (JET_errInvalidFilename)	0xFFFFFBEC, %xEC.FB.FF.FF
IsamErrorInvalidBookmark	There is an invalid bookmark. (JET_errInvalidBookmark)	0xFFFFFBEB, %xEB.FB.FF.FF
IsamErrorColumnInUse	The column used is in an index. (JET_errColumnInUse)	0xFFFFFBEA, %xEA.FB.FF

Name	Description (alternate names)	Numeric value (hex)
		.FF
IsamErrorInvalidBufferSize	The data buffer does not match the column size. (JET_errInvalidBufferSize)	0xFFFFFBE9, %xE9.FB.FF.FF
IsamErrorColumnNotUpdatable	The column value cannot be set. (JET_errColumnNotUpdatable)	0xFFFFFBE8, %xE8.FB.FF.FF
IsamErrorIndexInUse	The index is in use. (JET_errIndexInUse)	0xFFFFFBE5, %xE5.FB.FF.FF
IsamErrorLinkNotSupported	The link support is unavailable. (JET_errLinkNotSupported)	0xFFFFFBE4, %xE4.FB.FF.FF
IsamErrorNullKeyDisallowed	Null keys are not allowed on an index. (JET_errNullKeyDisallowed)	0xFFFFFBE3, %xE3.FB.FF.FF
IsamErrorNotInTransaction	The operation must occur within a transaction. (JET_errNotInTransaction)	0xFFFFFBE2, %xE2.FB.FF.FF
IsamErrorTooManyActiveUsers	There are too many active database users. (JET_errTooManyActiveUsers)	0xFFFFFBDD, %xDD.FB.FF.FF
IsamErrorInvalidCountry	There is an invalid or unknown country code. (JET_errInvalidCountry)	0xFFFFFBDB, %xDB.FB.FF.FF
IsamErrorInvalidLanguageId	There is an invalid or unknown language ID. (JET_errInvalidLanguageId)	0xFFFFFBDA, %xDA.FB.FF.FF
IsamErrorInvalidCodePage	There is an invalid or unknown code page. (JET_errInvalidCodePage)	0xFFFFFBD9, %xD9.FB.FF.FF
IsamErrorInvalidLCMapStringFlags	There are invalid flags being used for LCMapString. (JET_errInvalidLCMapStringFlags)	0xFFFFFBD8, %xD8.FB.FF.FF
IsamErrorVersionStoreEntryTooBig	There was an attempt to create a version store entry (RCE) that was larger than a version bucket.	0xFFFFFBD7, %xD7.FB.FF

Name	Description (alternate names)	Numeric value (hex)
	(JET_errVersionStoreEntryTooBig)	.FF
IsamErrorVersionStoreOutOfMemoryAndCleanupTimedOut	The version store is out of memory and the cleanup attempt failed to complete. (JET_errVersionStoreOutOfMemoryAndCleanupTimedOut)	0xFFFFFBD6, %xD6.FB.FF.FF
IsamErrorVersionStoreOutOfMemory	The version store is out of memory and a cleanup was already attempted. (JET_errVersionStoreOutOfMemory)	0xFFFFFBD3, %xD3.FB.FF.FF
IsamErrorCannotIndex	The escrow and SLV columns cannot be indexed. (JET_errCannotIndex)	0xFFFFFBD1, %xD1.FB.FF.FF
IsamErrorRecordNotDeleted	The record has not been deleted. (JET_errRecordNotDeleted)	0xFFFFFBD0, %xD0.FB.FF.FF
IsamErrorTooManyMempoolEntries	Too many mempool entries have been requested. (JET_errTooManyMempoolEntries)	0xFFFFFBCF, %xCF.FB.FF.FF
IsamErrorOutOfObjectIDs	The database is out of B+ tree ObjectIDs so an offline defragmentation must be performed to reclaim freed or unused ObjectIDs. (JET_errOutOfObjectIDs)	0xFFFFFBCE, %xCE.FB.FF.FF
IsamErrorOutOfLongValueIDs	The Long-value ID counter has reached the maximum value. An offline defragmentation must be performed to reclaim free or unused LongValueIDs. (JET_errOutOfLongValueIDs)	0xFFFFFBCD, %xCD.FB.FF.FF
IsamErrorOutOfAutoincrementValues	The auto-increment counter has reached the maximum value. An offline defragmentation will not be able to reclaim free or unused auto-increment values. (JET_errOutOfAutoincrementValues)	0xFFFFFBCC, %xCC.FB.FF.FF
IsamErrorOutOfDbtimeValues	The Dbtime counter has reached the maximum value. An offline defragmentation must be performed to reclaim free or unused Dbtime values. (JET_errOutOfDbtimeValues)	0xFFFFFBCB, %xCB.FB.FF.FF
IsamErrorOutOfSequentialIndexValues	A sequential index counter has reached the maximum value. An offline defragmentation must be performed to reclaim Free or unused SequentialIndex values. (JET_errOutOfSequentialIndexValues)	0xFFFFFBCA, %xCA.FB.FF.FF
IsamErrorRunningInOneInstanceMode	This multi-instance call has the single-instance mode enabled.	0xFFFFFBC8

Name	Description (alternate names)	Numeric value (hex)
	(JET_errRunningInOneInstanceMode)	, %xC8.FB.FF .FF
IsamErrorRunningInMultiInstanceMode	This single-instance call has the multi-instance mode enabled. (JET_errRunningInMultiInstanceMode)	0xFFFFFBC7 , %xC7.FB.FF .FF
IsamErrorSystemParamsAlreadySet	The global system parameters have already been set. (JET_errSystemParamsAlreadySet)	0xFFFFFBC6 , %xC6.FB.FF .FF
IsamErrorSystemPathInUse	The system path is already being used by another database instance. (JET_errSystemPathInUse)	0xFFFFFBC5 , %xC5.FB.FF .FF
IsamErrorLogFilePathInUse	The log file path is already being used by another database instance. (JET_errLogFilePathInUse)	0xFFFFFBC4 , %xC4.FB.FF .FF
IsamErrorTempPathInUse	The path to the temporary database is already being used by another database instance. (JET_errTempPathInUse)	0xFFFFFBC3 , %xC3.FB.FF .FF
IsamErrorInstanceNameInUse	The instance name is already in use. (JET_errInstanceNameInUse)	0xFFFFFBC2 , %xC2.FB.FF .FF
IsamErrorInstanceUnavailable	This instance cannot be used because it encountered a fatal error. (JET_errInstanceUnavailable)	0xFFFFFBBE , %xBE.FB.FF .FF
IsamErrorDatabaseUnavailable	This database cannot be used because it encountered a fatal error. (JET_errDatabaseUnavailable)	0xFFFFFBBD , %xBD.FB.FF .FF
IsamErrorInstanceUnavailableDueToFatalLogDiskFull	This instance cannot be used because it encountered a log-disk-full error while performing an operation (such as a transaction rollback) that could not tolerate failure. (JET_errInstanceUnavailableDueToFatalLogDiskFull)	0xFFFFFBBC , %xBC.FB.FF .FF
IsamErrorOutOfSessions	The database is out of sessions. (JET_errOutOfSessions)	0xFFFFFBB3 ,

Name	Description (alternate names)	Numeric value (hex)
		%xB3.FB.FF.FF
IsamErrorWriteConflict	The write lock failed due to the existence of an outstanding write lock. (JET_errWriteConflict)	0xFFFFFBB2, %xB2.FB.FF.FF
IsamErrorTransTooDeep	The transactions are nested too deeply. (JET_errTransTooDeep)	0xFFFFFBB1, %xB1.FB.FF.FF
IsamErrorInvalidSesid	There is an invalid session handle. (JET_errInvalidSesid)	0xFFFFFBB0, %xB0.FB.FF.FF
IsamErrorWriteConflictPrimaryIndex	An update was attempted on an uncommitted primary index. (JET_errWriteConflictPrimaryIndex)	0xFFFFFBAF, %xAF.FB.FF.FF
IsamErrorInTransaction	The operation is not allowed within a transaction. (JET_errInTransaction)	0xFFFFFBAC, %xAC.FB.FF.FF
IsamErrorRollbackRequired	The current transaction must be rolled back. It cannot be committed and a new one cannot be started. (JET_errRollbackRequired)	0xFFFFFBAB, %xAB.FB.FF.FF
IsamErrorTransReadOnly	A read-only transaction tried to modify the database. (JET_errTransReadOnly)	0xFFFFFBAA, %xAA.FB.FF.FF
IsamErrorSessionWriteConflict	There was an attempt to replace the same record by two different cursors in the same session. (JET_errSessionWriteConflict)	0xFFFFFBA9, %xA9.FB.FF.FF
IsamErrorRecordTooBigForBackwardCompatibility	The record would be too big if represented in a database format from a previous version of Jet. (JET_errRecordTooBigForBackwardCompatibility)	0xFFFFFBA8, %xA8.FB.FF.FF
IsamErrorCannotMaterializeForwardOnlySort	The temporary table could not be created due to parameters that conflict with JET_bitTTForwardOnly. (JET_errCannotMaterializeForwardOnlySort)	0xFFFFFBA7, %xA7.FB.FF.FF
IsamErrorSesidTableIdMismatch	The session handle cannot be used with the	0xFFFFFBA6

Name	Description (alternate names)	Numeric value (hex)
	table id because it was not used to create it. (JET_errSesidTableIdMismatch)	, %xA6.FB.FF .FF
IsamErrorInvalidInstance	The instance handle is invalid or refers to an instance that has been shut down. (JET_errInvalidInstance)	0xFFFFFBA5 , %xA5.FB.FF .FF
IsamErrorDatabaseDuplicate	The database already exists. (JET_errDatabaseDuplicate)	0xFFFFFB4F, %x4F.FB.FF. FF
IsamErrorDatabaseInUse	The database in use. (JET_errDatabaseInUse)	0xFFFFFB4E, %x4E.FB.FF .FF
IsamErrorDatabaseNotFound	There is no such database. (JET_errDatabaseNotFound)	0xFFFFFB4D , %x4D.FB.FF .FF
IsamErrorDatabaseInvalidName	The database name is invalid. (JET_errDatabaseInvalidName)	0xFFFFFB4C , %x4C.FB.FF .FF
IsamErrorDatabaseInvalidPages	There are an invalid number of pages. (JET_errDatabaseInvalidPages)	0xFFFFFB4B , %x4B.FB.FF .FF
IsamErrorDatabaseCorrupted	There is a non-database file or corrupt database. (JET_errDatabaseCorrupted)	0xFFFFFB4A , %x4A.FB.FF .FF
IsamErrorDatabaseLocked	The database is exclusively locked. (JET_errDatabaseLocked)	0xFFFFFB49, %x49.FB.FF .FF
IsamErrorCannotDisableVersioning	The versioning for this database cannot be disabled. (JET_errCannotDisableVersioning)	0xFFFFFB48, %x48.FB.FF .FF
IsamErrorInvalidDatabaseVersion	The database engine is incompatible with the database. (JET_errInvalidDatabaseVersion)	0xFFFFFB47, %x47.FB.FF .FF
IsamErrorDatabase200Format	The database is in an older (200) format. (JET_errDatabase200Format)	0xFFFFFB46, %x46.FB.FF .FF

Name	Description (alternate names)	Numeric value (hex)
IsamErrorDatabase400Format	The database is in an older (400) format. (JET_errDatabase400Format)	0xFFFFFB45, %x45.FB.FF.FF
IsamErrorDatabase500Format	The database is in an older (500) format. (JET_errDatabase500Format)	0xFFFFFB44, %x44.FB.FF.FF
IsamErrorPageSizeMismatch	The database page size does not match the engine. (JET_errPageSizeMismatch)	0xFFFFFB43, %x43.FB.FF.FF
IsamErrorTooManyInstances	No more database instances can be started. (JET_errTooManyInstances)	0xFFFFFB42, %x42.FB.FF.FF
IsamErrorDatabaseSharingViolation	A different database instance is using this database. (JET_errDatabaseSharingViolation)	0xFFFFFB41, %x41.FB.FF.FF
IsamErrorAttachedDatabaseMismatch	An outstanding database attachment has been detected at the start or end of the recovery, but the database is missing or does not match attachment info. (JET_errAttachedDatabaseMismatch)	0xFFFFFB40, %x40.FB.FF.FF
IsamErrorDatabaseInvalidPath	The specified path to the database file is illegal. (JET_errDatabaseInvalidPath)	0xFFFFFB3F, %x3F.FB.FF.FF
IsamErrorDatabaseIdInUse	A database is being assigned an ID that is already in use. (JET_errDatabaseIdInUse)	0xFFFFFB3E, %x3E.FB.FF.FF
IsamErrorForceDetachNotAllowed	The force detach is allowed only after the normal detach was stopped due to an error. (JET_errForceDetachNotAllowed)	0xFFFFFB3D, %x3D.FB.FF.FF
IsamErrorCatalogCorrupted	Corruption was detected in the catalog. (JET_errCatalogCorrupted)	0xFFFFFB3C, %x3C.FB.FF.FF
IsamErrorPartiallyAttachedDB	The database is only partially attached and the attach operation cannot be completed. (JET_errPartiallyAttachedDB)	0xFFFFFB3B, %x3B.FB.FF.FF
IsamErrorDatabaseSignInUse	The database with the same signature is already in use. (JET_errDatabaseSignInUse)	0xFFFFFB3A, %x3A.FB.FF.FF

Name	Description (alternate names)	Numeric value (hex)
IsamErrorDatabaseCorruptedNoRepair	The database is corrupted but a repair is not allowed. (JET_errDatabaseCorruptedNoRepair)	0xFFFFFB38, %x38.FB.FF .FF
IsamErrorInvalidCreateDbVersion	The database engine attempted to replay a Create Database operation from the transaction log but failed due to an incompatible version of that operation. (JET_errInvalidCreateDbVersion)	0xFFFFFB37, %x37.FB.FF .FF
IsamErrorTableLocked	The table is exclusively locked. (JET_errTableLocked)	0xFFFFFAEA , %xEA.FA.FF .FF
IsamErrorTableDuplicate	The table already exists. (JET_errTableDuplicate)	0xFFFFFAE9, %xE9.FA.FF .FF
IsamErrorTableInUse	The table is in use and cannot be locked. (JET_errTableInUse)	0xFFFFFAE8, %xE8.FA.FF .FF
IsamErrorObjectNotFound	There is no such table or object. (JET_errObjectNotFound)	0xFFFFFAE7, %xE7.FA.FF .FF
IsamErrorDensityInvalid	There is a bad file or index density. (JET_errDensityInvalid)	0xFFFFFAE5, %xE5.FA.FF .FF
IsamErrorTableNotEmpty	The table is not empty. (JET_errTableNotEmpty)	0xFFFFFAE4, %xE4.FA.FF .FF
IsamErrorInvalidTableId	The table ID is invalid. (JET_errInvalidTableId)	0xFFFFFAE2, %xE2.FA.FF .FF
IsamErrorTooManyOpenTables	No more tables can be opened, even after the internal cleanup task has run. (JET_errTooManyOpenTables)	0xFFFFFAE1, %xE1.FA.FF .FF
IsamErrorIllegalOperation	The operation is not supported on the table. (JET_errIllegalOperation)	0xFFFFFAE0, %xE0.FA.FF .FF
IsamErrorTooManyOpenTablesAndCleanupTimedOut	No more tables can be opened because the cleanup attempt failed to complete. (JET_errTooManyOpenTablesAndCleanupTimedOut)	0xFFFFFADF , %xDF.FA.FF .FF
IsamErrorObjectDuplicate	The table or object name is in use.	0xFFFFFADE

Name	Description (alternate names)	Numeric value (hex)
	(JET_errObjectDuplicate)	, %xDE.FA.FF .FF
IsamErrorInvalidObject	The object is invalid for operation. (JET_errInvalidObject)	0xFFFFFADC , %xDC.FA.FF .FF
IsamErrorCannotDeleteTempTable	JetCloseTable must be used instead of JetDeleteTable to delete a temporary table. (JET_errCannotDeleteTempTable)	0xFFFFFADB , %xDB.FA.FF .FF
IsamErrorCannotDeleteSystemTable	There was an illegal attempt to delete a system table. (JET_errCannotDeleteSystemTable)	0xFFFFFADA , %xDA.FA.FF .FF
IsamErrorCannotDeleteTemplateTable	There was an illegal attempt to delete a template table. (JET_errCannotDeleteTemplateTable)	0xFFFFFAD9 , %xD9.FA.FF .FF
IsamErrorExclusiveTableLockRequired	There must be an exclusive lock on the table. (JET_errExclusiveTableLockRequired)	0xFFFFFAD6 , %xD6.FA.FF .FF
IsamErrorFixedDDL	DDL operations are prohibited on this table. (JET_errFixedDDL)	0xFFFFFAD5 , %xD5.FA.FF .FF
IsamErrorFixedInheritedDDL	On a derived table, DDL operations are prohibited on the inherited portion of the DDL. (JET_errFixedInheritedDDL)	0xFFFFFAD4 , %xD4.FA.FF .FF
IsamErrorCannotNestDDL	Nesting the hierarchical DDL is not currently supported. (JET_errCannotNestDDL)	0xFFFFFAD3 , %xD3.FA.FF .FF
IsamErrorDDLNotInheritable	There was an attempt to inherit a DDL from a table that is not marked as a template table. (JET_errDDLNotInheritable)	0xFFFFFAD2 , %xD2.FA.FF .FF
IsamErrorInvalidSettings	The system parameters were set improperly. (JET_errInvalidSettings)	0xFFFFFAD0 , %xD0.FA.FF .FF

Name	Description (alternate names)	Numeric value (hex)
IsamErrorClientRequestToStopJetService	The client has requested that the service be stopped. (JET_errClientRequestToStopJetService)	0xFFFFFACF, %xCF.FA.FF.FF
IsamErrorCannotAddFixedVarColumnToDerivedTable	The template table was created with the NoFixedVarColumnsInDerivedTables flag set. (JET_errCannotAddFixedVarColumnToDerivedTable)	0xFFFFFACE, %xCE.FA.FF.FF
IsamErrorIndexCantBuild	The index build failed. (JET_errIndexCantBuild)	0xFFFFFA87, %x87.FA.FF.FF
IsamErrorIndexHasPrimary	The primary index is already defined. (JET_errIndexHasPrimary)	0xFFFFFA86, %x86.FA.FF.FF
IsamErrorIndexDuplicate	The index is already defined. (JET_errIndexDuplicate)	0xFFFFFA85, %x85.FA.FF.FF
IsamErrorIndexNotFound	There is no such index. (JET_errIndexNotFound)	0xFFFFFA84, %x84.FA.FF.FF
IsamErrorIndexMustStay	The clustered index cannot be deleted. (JET_errIndexMustStay)	0xFFFFFA83, %x83.FA.FF.FF
IsamErrorIndexInvalidDef	The index definition is invalid. (JET_errIndexInvalidDef)	0xFFFFFA82, %x82.FA.FF.FF
IsamErrorInvalidCreateIndex	The creation of the index description was invalid. (JET_errInvalidCreateIndex)	0xFFFFFA7F, %x7F.FA.FF.FF
IsamErrorTooManyOpenIndexes	The database is out of index description blocks. (JET_errTooManyOpenIndexes)	0xFFFFFA7E, %x7E.FA.FF.FF
IsamErrorMultiValuedIndexViolation	Non-unique inter-record index keys have been generated for a multi-valued index. (JET_errMultiValuedIndexViolation)	0xFFFFFA7D, %x7D.FA.FF.FF
IsamErrorIndexBuildCorrupted	A secondary index that properly reflects the primary index failed to build. (JET_errIndexBuildCorrupted)	0xFFFFFA7C, %x7C.FA.FF.FF
IsamErrorPrimaryIndexCorrupted	The primary index is corrupt and the database must be defragmented.	0xFFFFFA7B,

Name	Description (alternate names)	Numeric value (hex)
	(JET_errPrimaryIndexCorrupted)	%x7B.FA.FF.FF
IsamErrorSecondaryIndexCorrupted	The secondary index is corrupt and the database must be defragmented. (JET_errSecondaryIndexCorrupted)	0xFFFFFA7A, %x7A.FA.FF.FF
IsamErrorInvalidIndexId	The index ID is invalid. (JET_errInvalidIndexId)	0xFFFFFA78, %x78.FA.FF.FF
IsamErrorIndexTuplesSecondaryIndexOnly	The tuple index can only be set on a secondary index. (JET_errIndexTuplesSecondaryIndexOnly)	0xFFFFFA6A, %x6A.FA.FF.FF
IsamErrorIndexTuplesTooManyColumns	The index definition for the tuple index contains more key columns that the database engine can support. (JET_errIndexTuplesTooManyColumns)	0xFFFFFA69, %x69.FA.FF.FF
IsamErrorIndexTuplesNonUniqueOnly	The tuple index must be a non-unique index. (JET_errIndexTuplesNonUniqueOnly)	0xFFFFFA68, %x68.FA.FF.FF
IsamErrorIndexTuplesTextBinaryColumnsOnly	A tuple index definition can only contain key columns that have text or binary column types. (JET_errIndexTuplesTextBinaryColumnsOnly)	0xFFFFFA67, %x67.FA.FF.FF
IsamErrorIndexTuplesVarSegMacNotAllowed	The tuple index does not allow setting cbVarSegMac. (JET_errIndexTuplesVarSegMacNotAllowed)	0xFFFFFA66, %x66.FA.FF.FF
IsamErrorIndexTuplesInvalidLimits	The minimum/maximum tuple length or the maximum number of characters that are specified for an index are invalid. (JET_errIndexTuplesInvalidLimits)	0xFFFFFA65, %x65.FA.FF.FF
IsamErrorIndexTuplesCannotRetrieveFromIndex	JetRetrieveColumn cannot be called with the JET_bitRetrieveFromIndex flag set while retrieving a column on a tuple index. (JET_errIndexTuplesCannotRetrieveFromIndex)	0xFFFFFA64, %x64.FA.FF.FF
IsamErrorIndexTuplesKeyTooSmall	The specified key does not meet the minimum tuple length. (JET_errIndexTuplesKeyTooSmall)	0xFFFFFA63, %x63.FA.FF.FF
IsamErrorColumnLong	The column value is long. (JET_errColumnLong)	0xFFFFFA23, %x23.FA.FF.FF
IsamErrorColumnNoChunk	There is no such chunk in a long value.	0xFFFFFA22,

Name	Description (alternate names)	Numeric value (hex)
	(JET_errColumnNoChunk)	%x22.FA.FF.FF
IsamErrorColumnDoesNotFit	The field will not fit in the record. (JET_errColumnDoesNotFit)	0xFFFFFA21, %x21.FA.FF.FF
IsamErrorNullInvalid	Null is not valid. (JET_errNullInvalid, JET_errColumnIllegalNull)	0xFFFFFA20, %x20.FA.FF.FF
IsamErrorColumnIndexed	The column is indexed and cannot be deleted. (JET_errColumnIndexed)	0xFFFFFA1F, %x1F.FA.FF.FF
IsamErrorColumnTooBig	The field length is greater than maximum allowed length. (JET_errColumnTooBig)	0xFFFFFA1E, %x1E.FA.FF.FF
IsamErrorColumnNotFound	There is no such column. (JET_errColumnNotFound)	0xFFFFFA1D, %x1D.FA.FF.FF
IsamErrorColumnDuplicate	This field is already defined. (JET_errColumnDuplicate)	0xFFFFFA1C, %x1C.FA.FF.FF
IsamErrorMultiValuedColumnMustBeTagged	An attempt was made to create a multi-valued column, but the column was not tagged. (JET_errMultiValuedColumnMustBeTagged)	0xFFFFFA1B, %x1B.FA.FF.FF
IsamErrorColumnRedundant	There was a second auto-increment or version column. (JET_errColumnRedundant)	0xFFFFFA1A, %x1A.FA.FF.FF
IsamErrorInvalidColumnType	The column data type is invalid. (JET_errInvalidColumnType)	0xFFFFFA19, %x19.FA.FF.FF
IsamErrorTaggedNotNULL	There are no non-NULL tagged columns. (JET_errTaggedNotNULL)	0xFFFFFA16, %x16.FA.FF.FF
IsamErrorNoCurrentIndex	The database is invalid because it does not contain a current index. (JET_errNoCurrentIndex)	0xFFFFFA15, %x15.FA.FF.FF
IsamErrorKeyIsMade	The key is completely made. (JET_errKeyIsMade)	0xFFFFFA14, %x14.FA.FF

Name	Description (alternate names)	Numeric value (hex)
		.FF
IsamErrorBadColumnId	The column ID is incorrect. (JET_errBadColumnId)	0xFFFFFA13, %x13.FA.FF .FF
IsamErrorBadItagSequence	There is a bad itagSequence for the tagged column. (JET_errBadItagSequence)	0xFFFFFA12, %x12.FA.FF .FF
IsamErrorColumnInRelationship	A column cannot be deleted because it is part of a relationship. (JET_errColumnInRelationship)	0xFFFFFA11, %x11.FA.FF .FF
IsamErrorCannotBeTagged	The auto increment and version cannot be tagged. (JET_errCannotBeTagged)	0xFFFFFA0F, %x0F.FA.FF. FF
IsamErrorDefaultValueTooBig	The default value exceeds the maximum size. (JET_errDefaultValueTooBig)	0xFFFFFA0C , %x0C.FA.FF .FF
IsamErrorMultiValuedDuplicate	A duplicate value was detected on a unique multi-valued column. (JET_errMultiValuedDuplicate)	0xFFFFFA0B , %x0B.FA.FF .FF
IsamErrorLVCorrupted	Corruption was encountered in a long-value tree. (JET_errLVCorrupted)	0xFFFFFA0A , %x0A.FA.FF .FF
IsamErrorMultiValuedDuplicateAfterTruncation	A duplicate value was detected on a unique multi-valued column after the data was normalized, and it is normalizing truncated the data before comparison. (JET_errMultiValuedDuplicateAfterTruncation)	0xFFFFFA08, %x08.FA.FF .FF
IsamErrorDerivedColumnCorruption	There is an invalid column in derived table. (JET_errDerivedColumnCorruption)	0xFFFFFA07, %x07.FA.FF .FF
IsamErrorInvalidPlaceholderColumn	An attempt was made to convert a column to a primary index placeholder, but the column does not meet the necessary criteria. (JET_errInvalidPlaceholderColumn)	0xFFFFFA06, %x06.FA.FF .FF
IsamErrorRecordNotFound	The key was not found. (JET_errRecordNotFound)	0xFFFFF9BF, %xBF.F9.FF. FF
IsamErrorRecordNoCopy	There is no working buffer.	0xFFFFF9BE,

Name	Description (alternate names)	Numeric value (hex)
	(JET_errRecordNoCopy)	%xBE.F9.FF.FF
IsamErrorNoCurrentRecord	There is no current record. (JET_errNoCurrentRecord)	0xFFFFF9BD, %xBD.F9.FF.FF
IsamErrorRecordPrimaryChanged	The primary key might not change. (JET_errRecordPrimaryChanged)	0xFFFFF9BC, %xBC.F9.FF.FF
IsamErrorKeyDuplicate	There is an illegal duplicate key. (JET_errKeyDuplicate)	0xFFFFF9BB, %xBB.F9.FF.FF
IsamErrorAlreadyPrepared	An attempt was made to update a record while a record update was already in progress. (JET_errAlreadyPrepared)	0xFFFFF9B9, %xB9.F9.FF.FF
IsamErrorKeyNotMade	A call was not made to JetMakeKey. (JET_errKeyNotMade)	0xFFFFF9B8, %xB8.F9.FF.FF
IsamErrorUpdateNotPrepared	A call was not made to JetPrepareUpdate. (JET_errUpdateNotPrepared)	0xFFFFF9B7, %xB7.F9.FF.FF
IsamErrorDataHasChanged	The data has changed and the operation was aborted. (JET_errDataHasChanged)	0xFFFFF9B5, %xB5.F9.FF.FF
IsamErrorLanguageNotSupported	The operating system does not support the selected language. (JET_errLanguageNotSupported)	0xFFFFF9AD, %xAD.F9.FF.FF
IsamErrorTooManySorts	There are too many sort processes. (JET_errTooManySorts)	0xFFFFF95B, %x5B.F9.FF.FF
IsamErrorInvalidOnSort	An invalid operation occurred during a sort. (JET_errInvalidOnSort)	0xFFFFF95A, %x5A.F9.FF.FF
IsamErrorTempFileOpenError	The temporary file could not be opened. (JET_errTempFileOpenError)	0xFFFFF8F5, %xF5.F8.FF.FF
IsamErrorTooManyAttachedDatabases	Too many databases are open. (JET_errTooManyAttachedDatabases)	0xFFFFF8F3, %xF3.F8.FF.

Name	Description (alternate names)	Numeric value (hex)
		FF
IsamErrorDiskFull	There is no space left on disk. (JET_errDiskFull)	0xFFFFF8F0, %xF0.F8.FF.FF
IsamErrorPermissionDenied	Permission is denied. (JET_errPermissionDenied)	0xFFFFF8EF, %xEF.F8.FF.FF
IsamErrorFileNotFound	The file was not found. (JET_errFileNotFound)	0xFFFFF8ED, %xED.F8.FF.FF
IsamErrorFileInvalidType	The file type is invalid. (JET_errFileInvalidType)	0xFFFFF8EC, %xEC.F8.FF.FF
IsamErrorAfterInitialization	A restore cannot be started after initialization. (JET_errAfterInitialization)	0xFFFFF8C6, %xC6.F8.FF.FF
IsamErrorLogCorrupted	The logs could not be interpreted. (JET_errLogCorrupted)	0xFFFFF8C4, %xC4.F8.FF.FF
IsamErrorInvalidOperation	The operation is invalid. (JET_errInvalidOperation)	0xFFFFF88E, %x8E.F8.FF.FF
IsamErrorAccessDenied	Access is denied. (JET_errAccessDenied)	0xFFFFF88D, %x8D.F8.FF.FF
IsamErrorTooManySplits	An infinite split. (JET_errTooManySplits)	0xFFFFF88B, %x8B.F8.FF.FF
IsamErrorSessionSharingViolation	Multiple threads are using the same session. (JET_errSessionSharingViolation)	0xFFFFF88A, %x8A.F8.FF.FF
IsamErrorEntryPointNotFound	An entry point in a required DLL could not be found. (JET_errEntryPointNotFound)	0xFFFFF889, %x89.F8.FF.FF
IsamErrorSessionContextAlreadySet	The specified session already has a session context set. (JET_errSessionContextAlreadySet)	0xFFFFF888, %x88.F8.FF.

Name	Description (alternate names)	Numeric value (hex)
		FF
IsamErrorSessionContextNotSetByThisThread	An attempt was made to reset the session context, but the current thread was not the original one that set the session context. (JET_errSessionContextNotSetByThisThread)	0xFFFFF887, %x87.F8.FF.FF
IsamErrorSessionInUse	An attempt was made to terminate the session currently in use. (JET_errSessionInUse)	0xFFFFF886, %x86.F8.FF.FF
IsamErrorRecordFormatConversionFailed	An internal error occurred during a dynamic record format conversion. (JET_errRecordFormatConversionFailed)	0xFFFFF885, %x85.F8.FF.FF
IsamErrorOneDatabasePerSession	Only one open user database per session is allowed. (JET_errOneDatabasePerSession)	0xFFFFF884, %x84.F8.FF.FF
IsamErrorRollbackError	There was an error during rollback. (JET_errRollbackError)	0xFFFFF883, %x83.F8.FF.FF
IsamErrorCallbackFailed	A callback function call failed. (JET_errCallbackFailed)	0xFFFFF7CB, %xCB.F7.FF.FF
IsamErrorCallbackNotResolved	A callback function could not be found. (JET_errCallbackNotResolved)	0xFFFFF7CA, %xCA.F7.FF.FF
IsamErrorOSSnapshotInvalidSequence	The operating system shadow copy API was used in an invalid sequence. (JET_errOSSnapshotInvalidSequence)	0xFFFFF69F, %x9F.F6.FF.FF
IsamErrorOSSnapshotTimeOut	The operating system shadow copy ended with a time-out. (JET_errOSSnapshotTimeOut)	0xFFFFF69E, %x9E.F6.FF.FF
IsamErrorOSSnapshotNotAllowed	The operating system shadow copy is not allowed because a backup or recovery in is progress. (JET_errOSSnapshotNotAllowed)	0xFFFFF69D, %x9D.F6.FF.FF
IsamErrorOSSnapshotInvalidSnapId	The operation failed because the specified operating system shadow copy handle was invalid. (JET_errOSSnapshotInvalidSnapId)	0xFFFFF69C, %x9C.F6.FF.FF
IsamErrorLSCallbackNotSpecified	An attempt was made to use local storage without a callback function being specified. (JET_errLSCallbackNotSpecified)	0xFFFFF448, %x48.F4.FF.FF

Name	Description (alternate names)	Numeric value (hex)
IsamErrorLSAlreadySet	An attempt was made to set the local storage for an object which already had it set. (JET_errLSAlreadySet)	0xFFFFF447, %x47.F4.FF.FF
IsamErrorLSNotSet	An attempt was made to retrieve local storage from an object which did not have it set. (JET_errLSNotSet)	0xFFFFF446, %x46.F4.FF.FF
IsamErrorFileIOSparse	An I/O operation failed because it was attempted against an unallocated region of a file. (JET_errFileIOSparse)	0xFFFFF060, %x60.F0.FF.FF
IsamErrorFileIOBeyondEOF	A read was issued to a location beyond the EOF (writes will expand the file). (JET_errFileIOBeyondEOF)	0xFFFFF05F, %x5F.F0.FF.FF
IsamErrorFileCompressed	Read/write access is not supported on compressed files. (JET_errFileCompressed)	0xFFFFF05B, %x5B.F0.FF.FF

2.4.2 Property Error Codes

Property errors appear in two different contexts. When an error occurs in getting a property of an object, or a column of a table, from the server, then the type of the returned property value is ErrorCode (0x000A) and the property value itself is the error code. When an error occurs in setting a property of an object on the server, then the RopSetProperties ([MS-OXCROPS]) returns an array of PropertyProblem structures (section 2.7) that includes the error code.

Most property error codes are also used as general error codes, but they have a special meaning in the context of a property operation.

Property Error Codes are presented in the following table.

Name	Description (alternate names)	Numeric value (hex)
NotEnoughMemory	On get, indicates that the property or column value is too large to be retrieved by the request, and the property value needs to be accessed with RopOpenStream ([MS-OXCROPS]). (E_NOMEMORY, MAPI_E_NOT_ENOUGH_MEMORY)	0x8007000E, %x0E.00.07.80
NotFound	On get, indicates that the property or column has no value for this object. (MAPI_E_NOT_FOUND)	0x8004010F, %x0F.01.04.80
BadValue	On set, indicates that the property value is not acceptable to the server. (MAPI_E_BAD_VALUE, ecPropBadValue)	0x80040301, %x01.03.04.80
InvalidType	On get or set, indicates that the data type passed with the property or column is undefined. (MAPI_E_INVALID_TYPE, ecInvalidType)	0x80040302, %x02.03.04.80

Name	Description (alternate names)	Numeric value (hex)
UnsupportedType	On get or set, indicates that the data type passed with the property or column is not acceptable to the server. (MAPI_E_TYPE_NO_SUPPORT, ecTypeNotSupported)	0x80040303, %x03.0.04.80
UnexpectedType	On get or set, indicates that the data type passed with the property or column is not the type expected by the server. (MAPI_E_UNEXPECTED_TYPE, ecPropType)	0x80040304, %x04.03.04.80
TooBig	Indicates that the result set of the operation is too big for the server to return. (MAPI_E_TOO_BIG, ecTooBig)	0x80040305, %x05.03.04.80
DeclineCopy	On a copy operation, indicates that the server cannot copy the object – possibly because the source and destination are on different types of servers – and wishes to delegate the copying to client code. (MAPI_E_DECLINE_COPY)	0x80040306, %x06.03.04.80
UnexpectedId	On get or set, indicates that the server does not support property IDs in this range, usually the named property ID range (0x8000-0xFFFF). (MAPI_E_UNEXPECTED_ID)	0x80040307, %x07.03.04.80

2.4.3 Warning Codes

Warning codes indicate that while the operation as a whole was processed successfully by the server, individual items or properties were not processed successfully. For example, if three properties are requested from a Message object in a RopGetPropertiesSpecific ([MS-OXCROPS]) operation and one of the three properties does not exist on the Message object, then in the return buffer:

1. The ROP returns an **ErrorsReturned** warning.
2. The type in the property tag of the missing property is **PtypErrorCode**.
3. The property value of the missing property is **NotFound**.

Warning codes are presented in the following table.

Name	Description (alternate names)	Numeric value (hex)
ErrorsReturned	A request involving multiple properties failed for one or more individual properties, while succeeding overall. (MAPI_W_ERRORS_RETURNED, ecWarnWithErrors)	0x00040380, %x80.03.04.00
PositionChanged	A table operation succeeded, but the bookmark specified is no longer set at the same row as when it was last used. (MAPI_W_POSITION_CHANGED,	0x00040481, %x81.04.04.00

Name	Description (alternate names)	Numeric value (hex)
	ecWarnPositionChanged)	
ApproximateCount	The row count returned by a table operation is approximate, not exact. (MAPI_W_APPROX_COUNT, ecWarnApproxCount)	0x00040482, %x82.04.04.00
PartiallyComplete	A move, copy, or delete operation succeeded for some messages but not for others. (MAPI_W_PARTIAL_COMPLETION, ecPartialCompletion)	0x00040680, %x80.06.04.00
SyncProgress	The operation succeeded but there is more to do. (SYNC_W_PROGRESS)	0x00040820, %x20.08.04.00
NewerClientChange	In a change conflict, the client has the more recent change. (SYNC_W_CLIENT_CHANGE_NEWER)	0x00040821, %x21.08.04.00
IsamWarningRemainingVersions	The version store is still active. (JET_wrnRemainingVersions)	0x00000141, %x41.01.00.00
IsamWarningUniqueKey	A seek on a non-unique index yielded a unique key. (JET_wrnUniqueKey)	0x00000159, %x59.01.00.00
IsamWarningSeparateLongValue	A database column is a separated long value. (JET_wrnSeparateLongValue)	0x00000196, %x96.01.00.00
IsamWarningExistingLogFileHasBadSignature	The existing log file has a bad signature. (JET_wrnExistingLogFileHasBadSignature)	0x0000022E, %x2E.02.00.00
IsamWarningExistingLogFileIsNotContiguous	The existing log file is not contiguous. (JET_wrnExistingLogFileIsNotContiguous)	0x0000022F, %x2F.02.00.00
IsamWarningSkipThisRecord	This error is for internal use only. (JET_wrnSkipThisRecord)	0x00000234, %x34.02.00.00
IsamWarningTargetInstanceRunning	The TargetInstance specified for the restore is running. (JET_wrnTargetInstanceRunning)	0x00000242, %x42.02.00.00
IsamWarningDatabaseRepaired	The database corruption has been repaired. (JET_wrnDatabaseRepaired)	0x00000253, %x53.02.00.00
IsamWarningColumnNull	The column has a NULL value. (JET_wrnColumnNull)	0x000003EC, %xEC.03.00.00
IsamWarningBufferTruncated	The buffer is too small for the data. (JET_wrnBufferTruncated)	0x000003EE, %xEE.03.00.00
IsamWarningDatabaseAttached	The database is already attached.	0x000003EF,

Name	Description (alternate names)	Numeric value (hex)
	(JET_wrnDatabaseAttached)	%xEF.03.00.00
IsamWarningSortOverflow	The sort that is being attempted does not have enough memory to complete. (JET_wrnSortOverflow)	0x000003F1, %xF1.03.00.00
IsamWarningSeekNotEqual	An exact match was not found during a seek. (JET_wrnSeekNotEqual, JET_wrnRecordFoundGreater, JET_wrnRecordFoundLess)	0x0000040F, %x0F.04.00.00
IsamWarningNoErrorInfo	There is no extended error information. (JET_wrnNoErrorInfo)	0x0000041F, %x1F.04.00.00
IsamWarningNoIdleActivity	No idle activity occurred. (JET_wrnNoIdleActivity)	0x00000422, %x22.04.00.00
IsamWarningNoWriteLock	There is a no write lock at transaction level 0. (JET_wrnNoWriteLock)	0x0000042B, %x2B.04.00.00
IsamWarningColumnSetNull	The column is set to a NULL value. (JET_wrnColumnSetNull)	0x0000042C, %x2C.04.00.00
IsamWarningTableEmpty	An empty table was opened. (JET_wrnTableEmpty)	0x00000515, %x15.05.00.00
IsamWarningTableInUseBySystem	The system cleanup has a cursor open on the table. (JET_wrnTableInUseBySystem)	0x0000052F, %x2F.05.00.00
IsamWarningCorruptIndexDeleted	The out-of-date index must be removed. (JET_wrnCorruptIndexDeleted)	0x00000587, %x87.05.00.00
IsamWarningColumnMaxTruncated	The max length is too large and has been truncated. (JET_wrnColumnMaxTruncated)	0x000005E8, %xE8.05.00.00
IsamWarningCopyLongValue	A **binary large object (BLOB)** value has been moved from the record into a separate storage of large BLOBs. (JET_wrnCopyLongValue)	0x000005F0, %xF0.05.00.00
IsamWarningColumnSkipped	The column values were not returned because the corresponding column ID or itagSequence member from the JET_ENUMCOLUMNVALUE structure that was requested for enumeration was null. (JET_wrnColumnSkipped)	0x000005FB, %xFB.05.00.00
IsamWarningColumnNotLocal	The column values were not returned because they could not be reconstructed from the existing data. (JET_wrnColumnNotLocal)	0x000005FC, %xFC.05.00.00
IsamWarningColumnMoreTags	The existing column values were not requested for enumeration.	0x000005FD, %xFD.05.00.00

Name	Description (alternate names)	Numeric value (hex)
	(JET_wrnColumnMoreTags)	
IsamWarningColumnTruncated	The column value was truncated at the requested size limit during enumeration. (JET_wrnColumnTruncated)	0x000005FE, %xFE.05.00.00
IsamWarningColumnPresent	The column values exist but were not returned by the request. (JET_wrnColumnPresent)	0x000005FF, %xFF.05.00.00
IsamWarningColumnSingleValue	The column value was returned in JET_COLUMNENUM as a result of the JET_bitEnumerateCompressOutput being set. (JET_wrnColumnSingleValue)	0x00000600, %x00.06.00.00
IsamWarningColumnDefault	The column value is set to the default value of the column. (JET_wrnColumnDefault)	0x00000601, %x01.06.00.00
IsamWarningDataHasChanged	The data has changed. (JET_wrnDataHasChanged)	0x0000064A, %x4A.06.00.00
IsamWarningKeyChanged	A new key is being used. (JET_wrnKeyChanged)	0x00000652, %x52.06.00.00
IsamWarningFileOpenReadOnly	The database file is read only. (JET_wrnFileOpenReadOnly)	0x00000715, %x15.07.00.00
IsamWarningIdleFull	The idle registry is full. (JET_wrnIdleFull)	0x00000774, %x74.07.00.00
IsamWarningDefragAlreadyRunning	There was an online defragmentation already running on the specified database. (JET_wrnDefragAlreadyRunning)	0x000007D0, %xD0.07.00.00
IsamWarningDefragNotRunning	An online defragmentation is not running on the specified database. (JET_wrnDefragNotRunning)	0x000007D1, %xD1.07.00.00
IsamWarningCallbackNotRegistered	A non-existent callback function was unregistered. (JET_wrnCallbackNotRegistered)	0x00000834, %x34.08.00.00
IsamWarningNotYetImplemented	The function is not yet implemented. (JET_wrnNyi)	0xFFFFFFFF, %xFF.FF.FF.FF

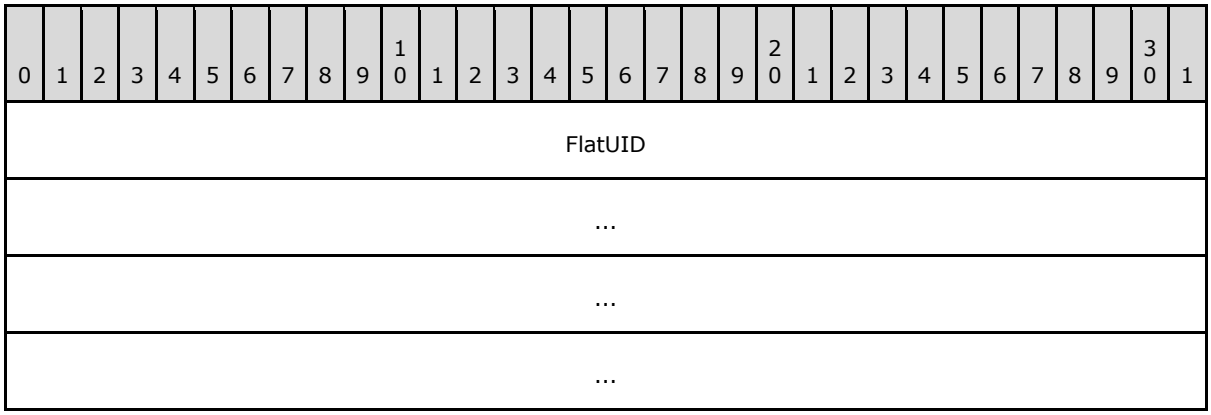
2.5 Flat UID

The **FlatUID** structure is a byte-order independent version of a GUID structure and is used to uniquely identify a service provider. It appears in EntryIDs.

The **FlatUID_r** structure is an encoding of the **FlatUID** data structure. The semantic meaning is unchanged from the **FlatUID** data structure.

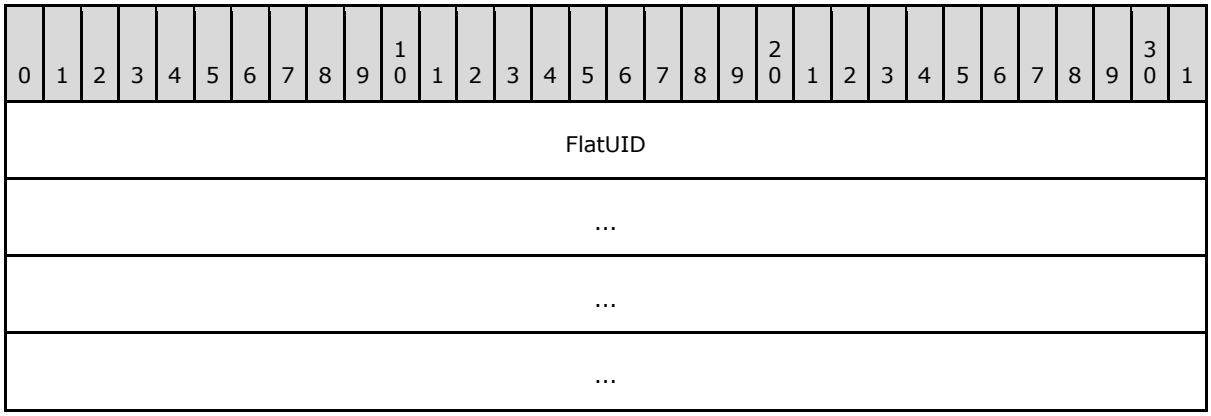
2.5.1 FlatUID

A FlatUID is a **GUID** structure put into little-endian byte order. That is, **FlatUID** and **GUID** structures have the same byte order when used on a little-endian processor. However, on a **big-endian** processor, the **FlatUID** has the same byte order as on the little-endian machine, but the **GUID** uses big-endian format for certain fields.



FlatUID (16 bytes): A flat 16-byte little-endian sequence used as a unique identifier in various structures.

2.5.2 FlatUID_r



FlatUID (16 bytes): A flat 16-byte little-endian sequence used as a unique identifier in various structures.

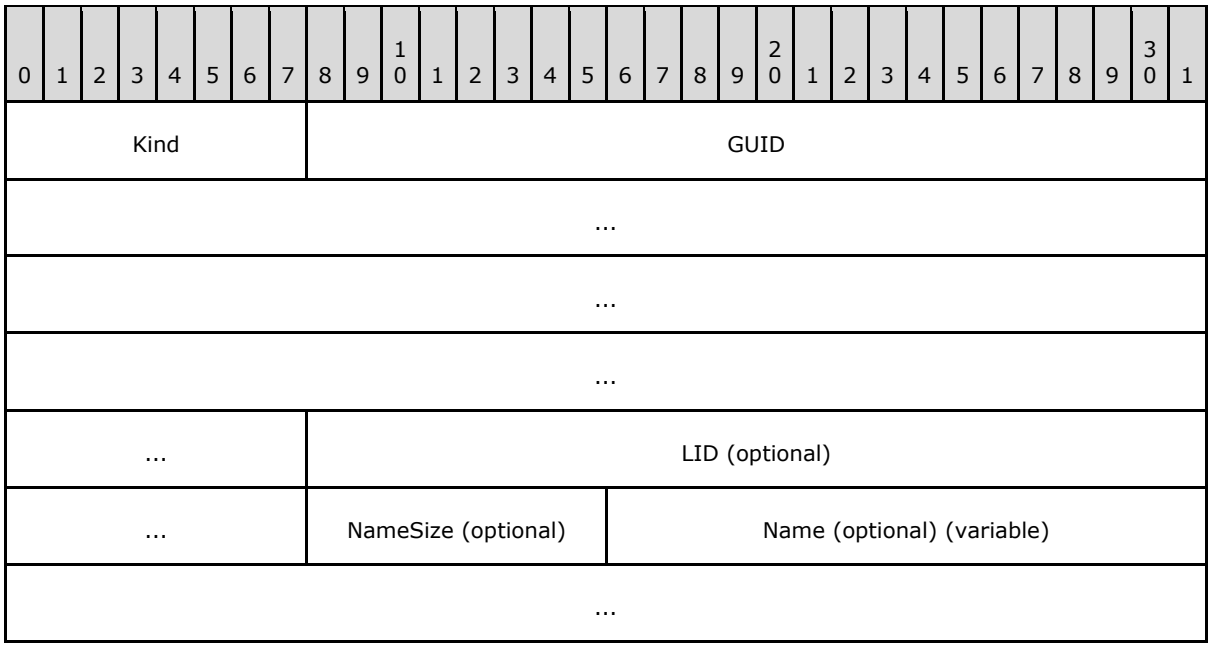
2.6 PropertyName

The **PropertyName** structure describes a **named property**. It is used in RopGetPropertyIdsFromNames ([MS-OXCROPS]) and RopGetNamesFromPropertyIds ([MS-OXCROPS]) requests.

The **PropertyName_r** structure, specified in [MS-NSPI], is an encoding of the **PropertyName** data structure, as specified in section 2.6.1. Strictly speaking, **PropertyName_r** and **PropertyName** are distinct encodings off the same abstract data structure rather than **PropertyName_r** being an encoding of **PropertyName**. In this case, the semantics of the **PropertyName_r** structure is different from the **PropertyName** structure; **PropertyName_r** uses no string names, only **LIDs**.

The packet diagrams in sections 2.6.1 and 2.6.2 illustrate the differences between the two structures.

2.6.1 PropertyName



Kind (1 byte): The following are possible values for the **Kind** field:

Name	Value
0x00	The property is identified by the LID field.
0x01	The property is identified by the Name field.
0xFF	The property does not have an associated PropertyName.

GUID (16 bytes): The GUID that identifies the **property set** for the named property.

Note Servers MUST NOT swap bytes for this GUID; it is treated as a **FlatUID**. Client code on big-endian systems MUST therefore place **GUID** fields in little-endian byte order in the request buffer.

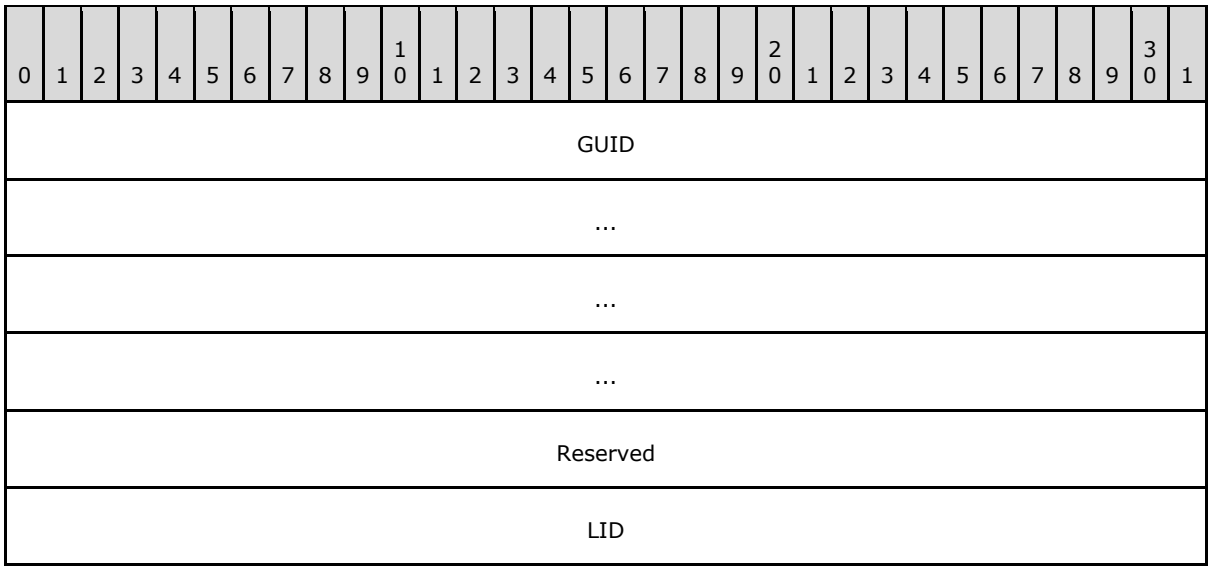
LID (optional) (4 bytes): Present only if Kind = 0x00. An unsigned 32-bit integer that identifies the named property within its property set.

NameSize (optional) (1 byte): Present only if Kind = 0x01. A single byte giving the number of bytes in the **Name** string that follows it.

Name (optional) (variable): Present only if Kind = 0x01. A Unicode (UTF-16) string, followed by two zero bytes as a null terminator, that identifies the property within its property set.

2.6.2 PropertyName_r

The **PropertyName_r** structure does not support string names for named properties. **PropertyName_r** only supports **LIDs**.



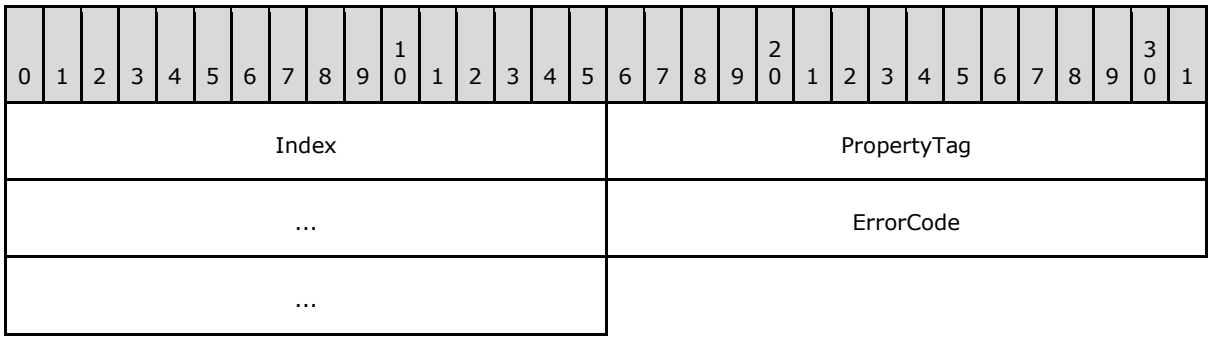
GUID (16 bytes): Encodes the GUID field of the **PropertyName** structure. For more details, see section 2.6.1.

Reserved (4 bytes): All clients and servers MUST set this value to 0x00000000.

LID (4 bytes): Encodes the LID field in the **PropertyName** structure. For more details, see section 2.6.1. Unlike the LID field in the **PropertyName** structure, the LID field is always present in the **PropertyName_r** structure. It is not optional. Also, string names for named properties are not allowed.

2.7 PropertyProblem

A **PropertyProblem** describes an error relating to an operation involving a property.



Index (2 bytes): Unsigned 16-bit integer. This value specifies an index into an array of property tags.

PropertyTag (4 bytes): **PropertyTag** structure. This value specifies the property for which there was an error.

ErrorCode (4 bytes): Unsigned 32-bit integer. This value specifies the error that occurred when processing this property.

An array of **PropertyProblem** structures is returned from the following ROPs:

- RopDeleteProperties ([MS-OXCROPS])
- RopDeletePropertiesNoReplicate ([MS-OXCROPS])
- RopSetProperties ([MS-OXCROPS])
- RopSetPropertiesNoReplicate ([MS-OXCROPS])
- RopCopyProperties ([MS-OXCROPS])
- RopCopyTo ([MS-OXCROPS])

A **PropertyProblem** structure contains an error value that is a result of an operation attempting to modify or delete a property, as specified in section 2.4.2. That property is identified by its **PropertyTag**, and also by its index in the property array passed to the request.

2.8 PropertyRows

2.8.1 PropertyRow

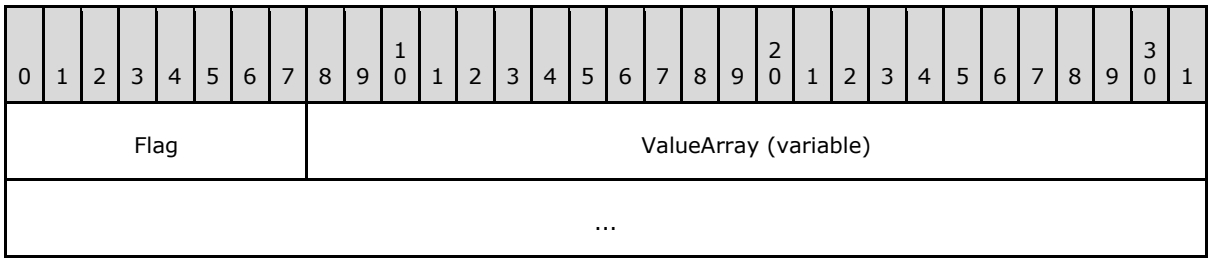
A **PropertyRow** structure is used to pass back a list of property values without including the property tag values that correspond to them. It is used to format property data returned to the client when the list of property tags is known in advance.

For instance, this data structure is used to format the response buffers of RopGetPropertiesSpecific ([MS-OXCROPS]), RopFindRow ([MS-OXCROPS]), and RopGetReceiveFolderTable ([MS-OXCROPS]). In addition, an array of **PropertyRow** structures makes up the key part of the PropertyRowSet structure (section 2.8.2) returned in the response buffer for RopQueryRows ([MS-OXCROPS]).

Because the property tags are not returned, clients interpret the property values based on the context of the request. For RopGetPropertiesSpecific, property values are returned in the order that the properties were requested. For RopFindRow, RopGetReceiveFolderTable, and RopQueryRows, property values are returned in the order of the properties in the table, set by a prior call to RopSetColumns ([MS-OXCROPS]).

There are three **PropertyRow** variants. A **StandardPropertyRow** contains no error values and no type data; it is simply a sequence of property values. A **FlaggedPropertyRow** contains type data, if the request included **PtypUnspecified** for any property or column, and it contains error values if a property value is missing or there was a problem retrieving the value. By examining the first byte of the property row, the client can identify the variant. A **PropertyRow_r**, as specified in [MS-NSPI], is an encoding of the **StandardPropertyRow** data structure, as specified in section 2.8.1.1. The semantic meaning is unchanged from the **StandardPropertyRow** structure.

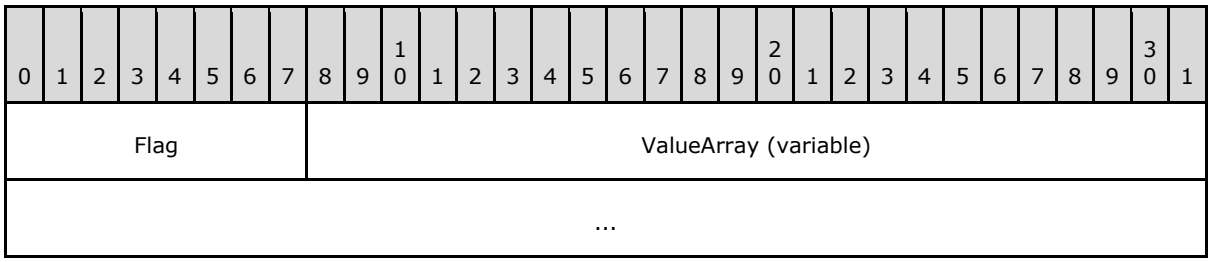
2.8.1.1 StandardPropertyRow



Flag (1 byte): Unsigned 8-bit integer. This MUST be set to 0x00 to indicate that all property values are present and without error.

ValueArray (variable): An array of variable-sized structures. At each position of the array, the structure will either be a **PropertyValue** structure (see section 2.11.2.1) if the type of the corresponding property tag was specified, or a **TypedPropertyValue** structure (see section 2.11.3) if the type of the corresponding property tag was **PtypUnspecified**.

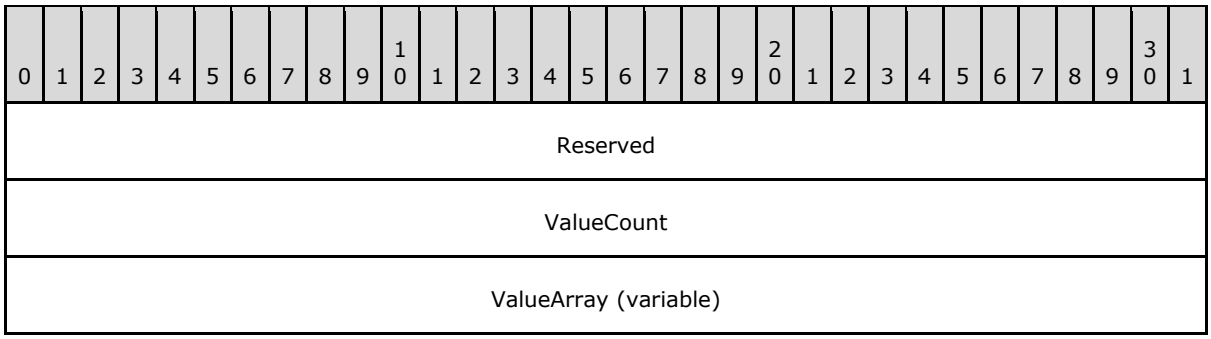
2.8.1.2 FlaggedPropertyRow



Flag (1 byte): Unsigned 8-bit integer. This MUST be set to 0x01 to indicate that there are errors or some property values are missing. This MUST also be set to 0x01 to indicate when **PtypUnspecified** was used in the ROP request and the ROP response includes a type. Otherwise, this MUST be set to 0x00.

ValueArray (variable): An array of variable-sized structures. At each position of the array, the structure will either be a **FlaggedPropertyValue** structure (see section 2.11.5) if the type of the corresponding property tag was previously specified, or a **FlaggedPropertyValueWithType** structure (see section 2.11.6) if the type of the corresponding property tag was **PtypUnspecified**.

2.8.1.3 PropertyRow_r



...

Reserved (4 bytes): Servers MUST set this value to 0x00000000.

ValueCount (4 bytes): The number of property values represented in the **ValueArray** field. This value MUST NOT exceed 100,000.

ValueArray (variable): Encodes the **ValueArray** field of **StandardPropertyRow** structure. For more details, see section 2.8.1.1.

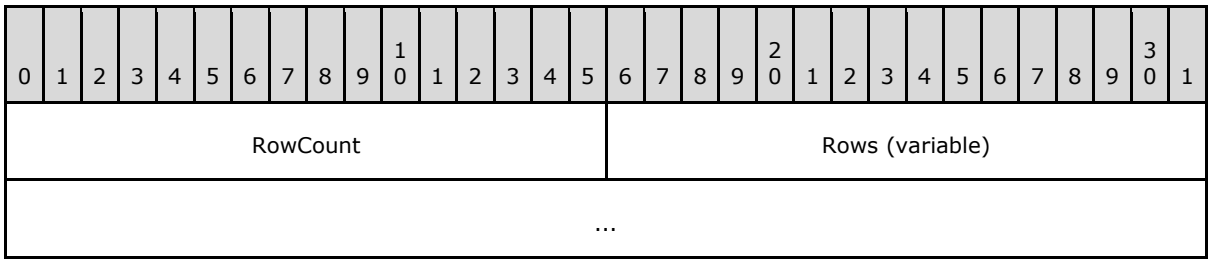
2.8.2 PropertyRowSet

A **PropertyRowSet** is a counted series of **PropertyRow** structures. As for **PropertyRow**, the number of columns in each **PropertyRow** is not included in the **PropertyRowSet**.

In table operations, such as in the response to a RopQueryRows ([MS-OXCROPS]) request, servers SHOULD<4> truncate long column values to a maximum of 255 bytes (for binary types) or 255 characters (for string types). Clients analyzing data returned from table operations can assume that if the length of such a value is exactly 255 bytes or characters, then the value of the same property obtained by opening the message and issuing a RopGetPropertiesSpecific ([MS-OXCROPS]) request is likely to be larger.

The **PropertyRowSet_r** structure, as specified in [MS-NSPI], is an encoding of the **PropertyRowSet** data structure, as specified in section 2.8.2.1. The permissible number of **PropertyRow** structures in the **PropertyRowSet_r** data structure exceeds that of the **PropertyRowSet** data structure. For more details, see section 2.8.2.2. The semantic meaning is otherwise unchanged from the **PropertyRowSet** data structure.

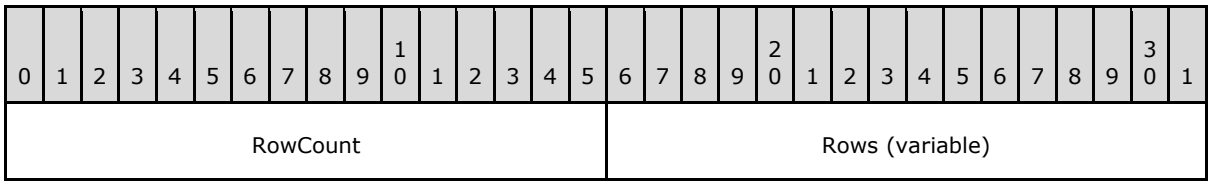
2.8.2.1 PropertyRowSet



RowCount (2 bytes): An unsigned 16-bit integer specifying the number of **PropertyRows** that follow.

Rows (variable): A series of **RowCount PropertyRow** structures.

2.8.2.2 PropertyRowSet_r



...

RowCount (2 bytes): Encodes the **RowCount** field of the **PropertyRowSet** structure. For more details, see section 2.8.2.1.

Rows (variable): Encodes the rows field of the **PropertyRowSet** structure. For more details, see section 2.8.2.1.

2.8.3 RecipientRow

A **RecipientRow** structure represents a single recipient belonging to a Message object. It is rather complex, but can be considered as a sequence of three different parts:

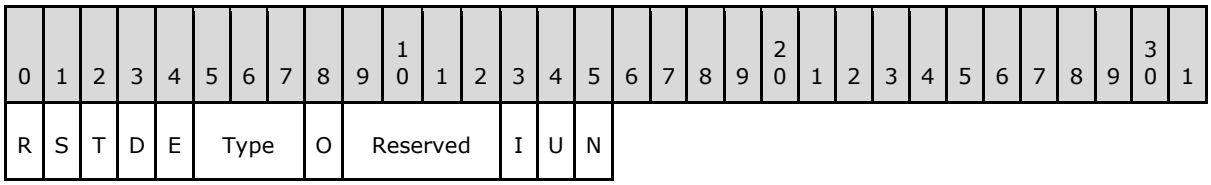
- A flags field indicating which of several standard properties are present
- Standard property values
- Arbitrary property values outside the standard set

This structure is used by several ROPs including:

- RopReadRecipients ([MS-OXCROPS])
- RopOpenMessage ([MS-OXCROPS])
- RopOpenEmbeddedMessage ([MS-OXCROPS])

First, we specify the **RecipientFlags** field.

2.8.3.1 RecipientFlags



R (1 bit): 1-bit flag (mask 0x0080). If b'1', a different transport is responsible for delivery to this recipient.

S (1 bit): 1-bit flag (mask 0x0040). If b'1', the **Transmittable Display Name** is the same as the **Display Name**.

T (1 bit): 1-bit flag (mask 0x0020). If b'1', the **TransmittableDisplayName** field is included.

D (1 bit): 1-bit flag (mask 0x0010). If b'1', the **DisplayName** field is included.

E (1 bit): 1-bit flag (mask 0x0008). If b'1', the **EmailAddress** field is included.

Type (3 bits): 3-bit enumeration (mask 0x0007). This enumeration specifies the type of address. The valid types are:

- NoType (0x0)
- X500DN (0x1)

- MsMail (0x2)
- SMTP (0x3)
- Fax (0x4)
- ProfessionalOfficeSystem (0x5)
- PersonalDistributionList1 (0x6)
- PersonalDistributionList2 (0x7)

O (1 bit): 1-bit flag (mask 0x8000). If b'1', this recipient has a non-standard address type and the **AddressType** field is included.

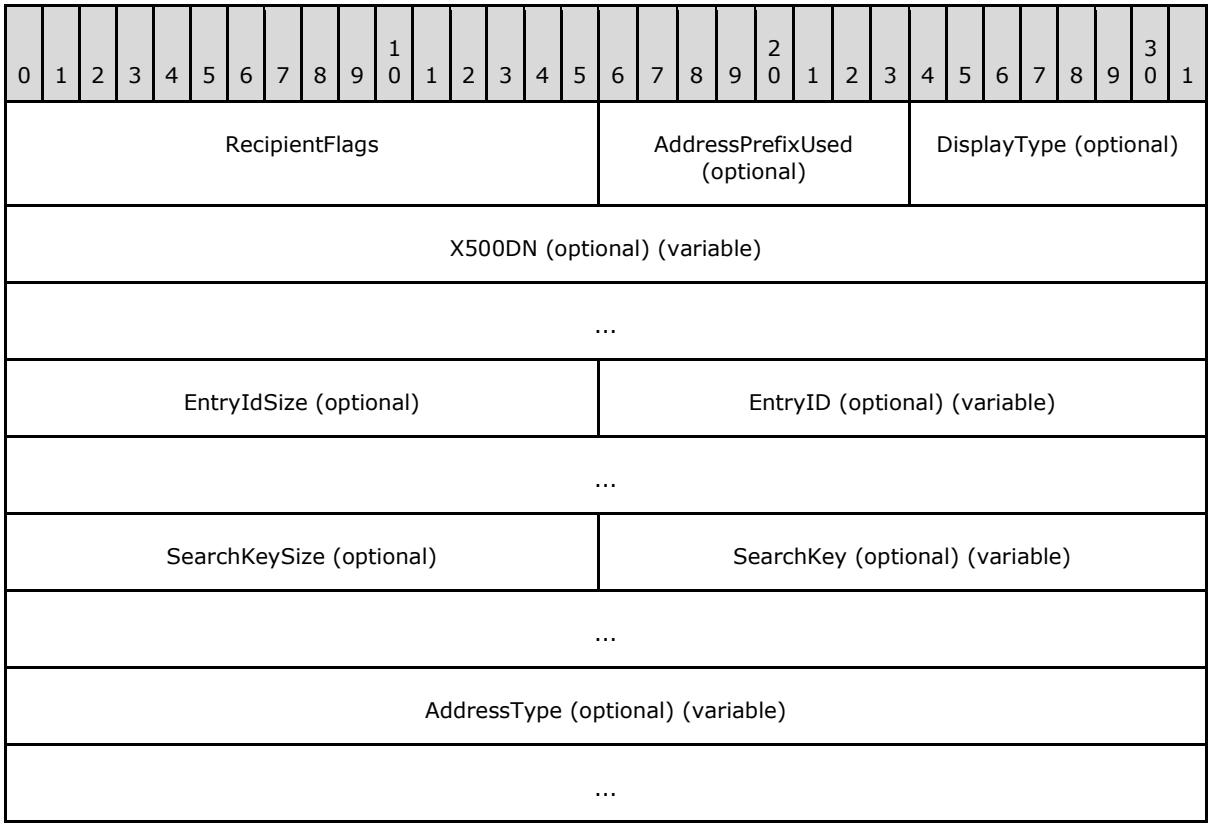
Reserved (4 bits): (mask 0x7800) The server MUST set this to b'0000'.

I (1 bit): 1-bit flag (mask 0x0400). If b'1', the **SimpleDisplayName** is included.

U (1 bit): 1-bit flag (mask 0x0200). If b'1', the associated string properties are in Unicode with a 2-byte null terminator; if b'0', string properties are MBCS with a single null terminator, in the code page sent to the server in **EcDoConnectEx** (as specified in [MS-OXCRPC] section 3.1.4.11).

N (1 bit): 1-bit flag (mask 0x0100). This flag specifies that the recipient does not support receiving rich text messages.

2.8.3.2 RecipientRow



EmailAddress (optional) (variable)	
...	
DisplayName (optional) (variable)	
...	
SimpleDisplayName (optional) (variable)	
...	
TransmittableDisplayName (optional) (variable)	
...	
RecipientColumnCount	RecipientProperties (variable)
...	

RecipientFlags (2 bytes): **RecipientFlags** structure. The format of this structure is defined in section 2.8.3.1. This value specifies the type of recipient and which standard properties are included.

AddressPrefixUsed (optional) (1 byte): Unsigned 8-bit integer. This field MUST be present when the **Type** field of the **RecipientFlags** field is set to **X500DN** (0x1) and MUST NOT be present otherwise. This value specifies the amount of the Address Prefix is used for this X500 DN.

DisplayType (optional) (1 byte): 8-bit enumeration. This field MUST be present when the **Type** field of the **RecipientFlags** field is set to X500DN (0x1) and MUST NOT be present otherwise. This value specifies the display type of this address.

X500DN (optional) (variable): Null-terminated ASCII string. This field MUST be present when the **Type** field of the **RecipientFlags** field is set to **X500DN** (0x1) and MUST NOT be present otherwise. This value specifies the X500 DN of this recipient.

EntryIdSize (optional) (2 bytes): Unsigned 16-bit integer. This field MUST be present when the **Type** field of the **RecipientFlags** field is set to **PersonalDistributionList1** (0x6) or **PersonalDistributionList2** (0x7). This field MUST NOT be present otherwise. This value specifies the size of the **EntryID** field.

EntryID (optional) (variable): Array of bytes. This field MUST be present when the **Type** field of the **RecipientFlags** field is set to **PersonalDistributionList1** (0x6) or **PersonalDistributionList2** (0x7). This field MUST NOT be present otherwise. The number of bytes in this field MUST be the same as specified in the **EntryIdSize** field. This array specifies the address book EntryID of the distribution list.

SearchKeySize (optional) (2 bytes): Unsigned 16-bit integer. This field MUST be present when the **Type** field of the **RecipientFlags** field is set to **PersonalDistributionList1** (0x6) or **PersonalDistributionList2** (0x7). This field MUST NOT be present otherwise. This value specifies the size of the **SearchKey** field.

SearchKey (optional) (variable): Array of bytes. This field is used when the **Type** field of the **RecipientFlags** field is set to **PersonalDistributionList1** (0x6) or **PersonalDistributionList2** (0x7). This field MUST NOT be present otherwise. The number of bytes in this field MUST be the same as specified in the **SearchKeySize** field and can be 0. This array specifies the Search Key of the distribution list.

AddressType (optional) (variable): Null-terminated ASCII string. This field MUST be present when the **Type** field of the **RecipientsFlags** field is set to **NoType** (0x0) and the **O** flag of the **RecipientsFlags** field is set. This field MUST NOT be present otherwise. This string specifies the address type of the recipient.

EmailAddress (optional) (variable): Null-terminated string. This field MUST be present when the **E** flag of the **RecipientsFlags** field is set and MUST NOT be present otherwise. This field MUST be specified in Unicode characters if the **U** flag of the **RecipientsFlags** field is set and 8-bit character set otherwise. This string specifies the Email Address of the recipient.

DisplayName (optional) (variable): Null-terminated string. This field MUST be present when the **D** flag of the **RecipientsFlags** field is set and MUST NOT be present otherwise. This field MUST be specified in Unicode characters if the **U** flag of the **RecipientsFlags** field is set and 8-bit character set otherwise. This string specifies the Email Address of the recipient.

SimpleDisplayName (optional) (variable): Null-terminated string. This field MUST be present when the **I** flag of the **RecipientsFlags** field is set and MUST NOT be present otherwise. This field MUST be specified in Unicode characters if the **U** flag of the **RecipientsFlags** field is set and 8-bit character set otherwise. This string specifies the Email Address of the recipient.

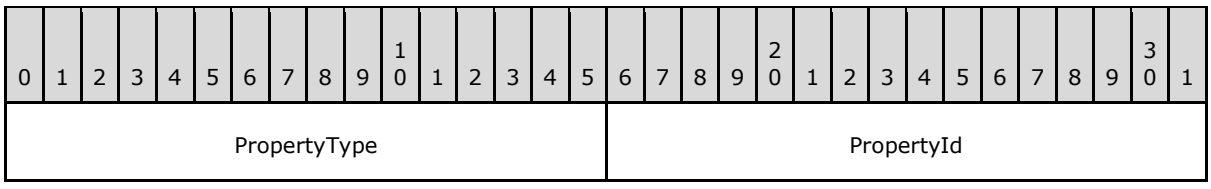
TransmittableDisplayName (optional) (variable): Null-terminated string. This field MUST be present when the **T** flag of the **RecipientsFlags** field is set and MUST NOT be present otherwise. This field MUST be specified in Unicode characters if the **U** flag of the **RecipientsFlags** field is set and 8-bit character set otherwise. This string specifies the Email Address of the recipient.

RecipientColumnCount (2 bytes): Unsigned 16-bit integer. This value specifies the number of columns from the **RecipientColumns** field that are included in **RecipientProperties**.

RecipientProperties (variable): **PropertyRow** structures. The format of the **PropertyRow** structure is defined in section 2.8.1 and the columns used for this row are those specified in **RecipientProperties**.

2.9 PropertyTag

A property tag both identifies a property and gives the data type its value.



PropertyType (2 bytes): 16-bit unsigned integer that identifies the data type of the property value, as specified by the table in section 2.11.1.

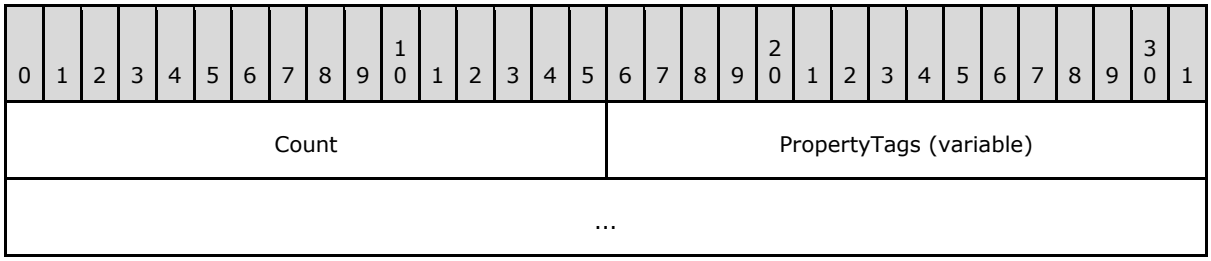
PropertyId (2 bytes): A 16-bit unsigned integer that identifies the property.

2.10 PropertyTagArray

A **PropertyTagArray** is simply a counted set of property tags, as specified in section 2.10.1.

The **PropertyTagArray_r** structure is an encoding of the **PropTagArray** data structure. The permissible number of proptag values in the **PropertyTagArray_r** structure exceeds that of the **PropertyTagArray** data structure. The semantic meaning is otherwise unchanged from the **PropTagArray** data structure.

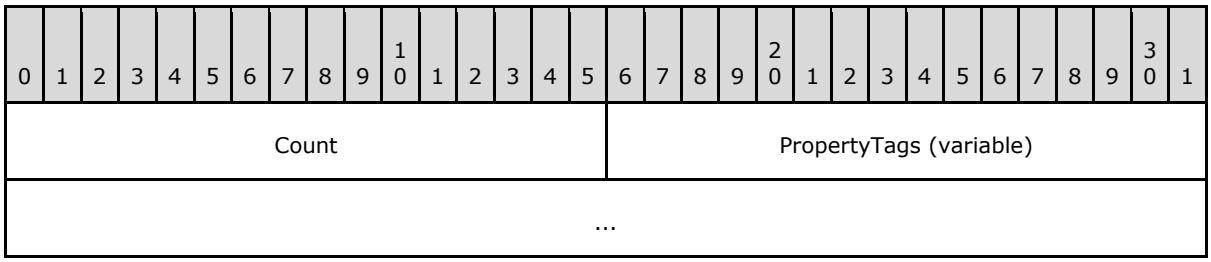
2.10.1 PropertyTagArray



Count (2 bytes): Unsigned 16-bit integer, specifying the number of property tags to follow.

PropertyTags (variable): **Count** unsigned 32-bit integers representing property tags.

2.10.2 PropertyTagArray_r



Count (2 bytes): Encodes the **Count** field in **PropTagArray**. For more details, see section 2.10.1.

PropertyTags (variable): Encodes the **PropertyTags** field of **PropTagArray**. For more details, see section 2.10.1.

2.11 Property Values

There are a variety of structures used for conveying the value of a property to and from the server. Some variants contain only the value, because the usage context dictates the type. Other variants include the type, or the full property tag. Still others include an indication of whether an error occurred.

2.11.1 Property Data Types

For all variants, the structure of a property value is the same and is specified by the property data type, whether or not the property data type is actually encoded in the buffer. The following table lists both the property data type identifiers and the format of the property values themselves. **WebDAV** protocol property data type identifiers are specified in section 2.11.1.5.

There is one variation in the width of count fields. In the context of ROP buffers, such as RopGetPropertiesSpecific ([MS-OXCROPS]), byte counts for **PtypBinary** property values and value counts for all **PtypMultiple** property values are 16 bits wide. But in the context of **extended rules**, as specified in [MS-OXORULE] section 2.2.4, byte counts and property value counts are 32 bits wide. Such count fields have a width designation of **COUNT**, rather than an explicit width, throughout section 2.11.

In the context of a table operation, properties are referred to as columns. The format of property identifiers, types, and values in table operations such as RopQueryRows ([MS-OXCROPS]) is the same as in property operations such as RopGetPropertiesSpecific. Property data types are presented in the following table. The property data type values specified are 16-bit integers. The **NSPI** protocol uses the same numeric values, but expresses them as 32-bit integers, with the high-order 16 bits of the 32-bit representation used by the NSPI protocol always set to 0x0000. For more information, see [MS-NSPI].

Property Type Name	Property Type Value	Property Type Specification	Alternate Names
PtypInteger16	0x0002, %x02.00	2 bytes, a 16-bit integer [MS-DTYP]: INT16	PT_SHORT, PT_I2, i2, ui2
PtypInteger32	0x0003, %x03.00	4 bytes, a 32-bit integer [MS-DTYP]: INT32	PT_LONG, PT_I4, int, ui4
PtypFloating32	0x0004, %x04.00	4 bytes, a 32-bit floating point number [MS-DTYP]: FLOAT	PT_FLOAT, PT_R4, float, r4
PtypFloating64	0x0005, %x05.00	8 bytes, a 64-bit floating point number [MS-DTYP]: DOUBLE	PT_DOUBLE, PT_R8, r8
PtypCurrency	0x0006, %x06.00	8 bytes, a 64-bit signed, scaled integer representation of a decimal currency value, with 4 places to the right of the decimal point [MS-DTYP]: LONGLONG [MS-OAUT]: CURRENCY	PT_CURRENCY, fixed.14.4
PtypFloatingTime	0x0007, %x07.00	8 bytes, a 64-bit floating point number in which the whole number part represents the number of days since December 30, 1899, and the fractional part represents the fraction of a day since midnight [MS-DTYP]: DOUBLE [MS-OAUT]: DATE	PT_APPTIME

Property Type Name	Property Type Value	Property Type Specification	Alternate Names
PtypErrorCode	0x000A, %x0A.00	4 bytes, a 32-bit integer encoding error information as specified in section 2.4.1.	PT_ERROR
PtypBoolean	0x000B, %x0B.00	1 byte, restricted to 1 or 0 [MS-DTYP]: BOOLEAN	PT_BOOLEAN. bool
PtypInteger64	0x0014, %x14.00	8 bytes, a 64-bit integer [MS-DTYP]: LONGLONG	PT_LONGLONG, PT_I8, i8, ui8
PtypString	0x001F, %x1F.00	Variable size, a string of Unicode characters in UTF-16LE encoding with terminating null character (0x0000).	PT_UNICODE, string
PtypString8	0x001E, %z1E.00	Variable size, a string of multi-byte characters in externally specified encoding with terminating null character (single 0 byte).	PT_STRING8
PtypTime	0x0040, %x40.00	8 bytes, a 64-bit integer representing the number of 100-nanosecond intervals since January 1, 1601 [MS-DTYP]: FILETIME	PT_SYSTIME, time, datetime, datetime.tz, datetime.rfc1123, Date, time, time.tz
PtypGuid	0x0048, %x48.00	16 bytes, a GUID with **Data1**, **Data2**, and **Data3** fields in little-endian format [MS-DTYP]: GUID	PT_CLSID, UUID
PtypServerId	0x00FB, %xFB.00	Variable size, a 16-bit COUNT followed by a structure as specified in section 2.11.1.3.	PT_SVREID
PtypRestriction	0x00FD, %xFD.00	Variable size, a byte array representing one or more **Restriction** structures as specified in section 2.12.	PT_SRESTRICT
PtypRuleAction	0x00FE, %xFE.00	Variable size, a 16-bit COUNT of actions (not bytes) followed by that many Rule Action structures, as specified in [MS-OXORULE] section 2.2.5.	PT_ACTIONS
PtypBinary	0x0102, %x02.01	Variable size, a COUNT followed by that many bytes.	PT_BINARY
PtypMultipleInteger16	0x1002, %x02.10	Variable size, a COUNT followed by that many **PtypInteger16** values.	PT_MV_SHORT, PT_MV_I2, mv.i2
PtypMultipleInteger32	0x1003,	Variable size, a COUNT followed by that many **PtypInteger32** values.	PT_MV_LONG, PT_MV_I4, mv.i4

Property Type Name	Property Type Value	Property Type Specification	Alternate Names
	%x03.10		
PtypMultipleFloating32	0x1004, %x04.10	Variable size, a COUNT followed by that many **PtypFloating32** values.	PT_MV_FLOAT, PT_MV_R4, mv.float
PtypMultipleFloating64	0x1005, %x05.10	Variable size, a COUNT followed by that many **PtypFloating64** values.	PT_MV_DOUBLE, PT_MV_R8
PtypMultipleCurrency	0x1006, %x06.10	Variable size, a COUNT followed by that many **PtypCurrency** values.	PT_MV_CURRENCY, mv.fixed.14.4
PtypMultipleFloatingTime	0x1007, %x07.10	Variable size, a COUNT followed by that many **PtypFloatingTime** values.	PT_MV_APPTIME
PtypMultipleInteger64	0x1014, %x14.10	Variable size, a COUNT followed by that many **PtypInteger64** values.	PT_MV_I8, PT_MV_LONGLONG
PtypMultipleString	0x101F, %x1F.10	Variable size, a COUNT followed by that **PtypString** values.	PT_MV_UNICODE
PtypMultipleString8	0x101E, %x1E.10	Variable size, a COUNT followed by that many **PtypString8** values.	PT_MV_STRING8, mv.string
PtypMultipleTime	0x1040, %x40.10	Variable size, a COUNT followed by that many **PtypTime** values.	PT_MV_SYSTIME
PtypMultipleGuid	0x1048, %x48.10	Variable size, a COUNT followed by that many **PtypGuid** values.	PT_MV_CLSID, mv.uuid
PtypMultipleBinary	0x1102, %x02.11	Variable size, a COUNT followed by that many **PtypBinary** values.	PT_MV_BINARY, mv.bin.hex
PtypUnspecified	0x0000, %x00.00	Any: this property type value matches any type; a server MUST return the actual type in its response. Servers MUST NOT return this type in response to a client request other than **NspiGetIDsFromNames** or RopGetPropertyIdsFromNames ([MS-OXCROPS]).	PT_UNSPECIFIED
PtypNull	0x0001, %x01.00	None: This property is a placeholder.	PT_NULL
PtypObject or PtypEmbeddedTable	0x000D, %x0d.00	The property value is a COM object, as specified in section 2.11.1.4.	PT_OBJECT

2.11.1.1 String Property Values

Clients SHOULD work with **PtypString** and **PtypMultipleString** properties in Unicode format. When working with strings in Unicode format, string data MUST be encoded as UTF-16LE, and property data types MUST be specified as 0x001F (**PtypString**) or 0x101F (**PtypMultipleString**).

Clients can, instead, work with **PtypString8** and **PtypMultipleString8** properties in a specific 8-bit or multibyte code page. In this case, property data types MUST be specified as 0x001E (**PtypString8**) or 0x101E (**PtypMultipleString8**).

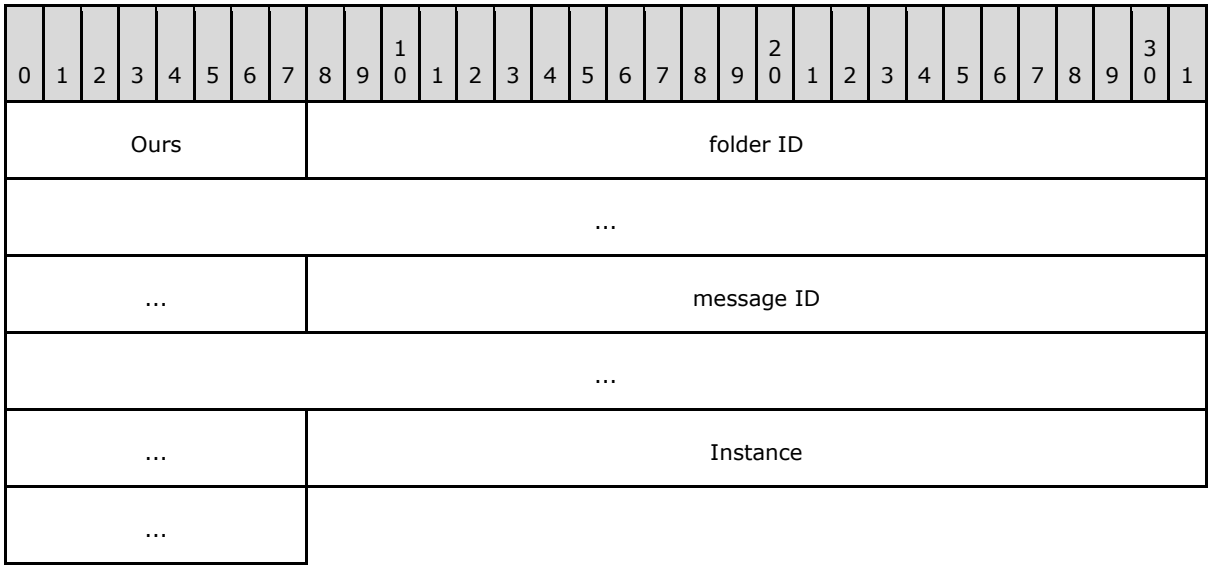
In requests sent to a store server, the code page of strings MUST match the code page sent to the server in EcDoConnectEx or similar RPCs, as specified in [MS-OXCRPC]. Address book server rules for working with **PtypString8** properties are somewhat more involved, and are specified in [MS-NSPI].

2.11.1.2 Multi-Valued Property Value Instances

When working with multi-valued columns in the context of table operations, clients set the 0x2000 (**MultivalueInstance**, %x00.20) flag bit in the column's **PropertyType** field to indicate that the multi-valued column is to be treated as individual values. The **MultivalueInstance** flag MUST NOT be set for any column that does not also set the 0x1000 (**Multivalue**) bit in its **property type**. All **PtypMultiple** types in the table in section 2.11.1 set the 0x1000 bit.

The **MultivalueInstance** flag causes table operations to treat multi-valued columns as if they were multiple instances of a single-valued column. Please refer to [MS-OXCTABL] for table ROP specifications.

2.11.1.3 The PtypServerId Type



Ours (1 byte): 0x01 indicates the remaining bytes conform to this structure; 0x00 indicates this is a client-defined value, and has whatever size and structure the client has defined.

folder ID (8 bytes): A FID, as specified in section 2.2.1.1, identifying a folder.

message ID (8 bytes): A MID, as specified in section 2.2.1.2, identifying a message in the folder identified by folder ID. If the object is a folder, then this field MUST be all zeros.

Instance (4 bytes): A 32-bit unsigned instance number within an array of **ServerIds** to compare against. This field is used only for searches against multi-value properties and MUST be zero in any other context.

2.11.1.4 PtypObject and PtypEmbeddedTable

Store and address book servers treat this property type somewhat differently, but in both cases a property of this type represents a complex structure. Access to properties of this type requires the server to construct an object, and the client to issue requests similar to those used for top-level objects.

- Store servers do not allow access to properties of type **PtypObject** through RopGetPropertiesSpecific ([MS-OXCROPS] section 2.2.8.3) or RopGetPropertiesAll ([MS-OXCROPS] section 2.2.8.4). Instead, properties of this type MUST be accessed with RopOpenStream ([MS-OXCROPS] section 2.2.9.1) or RopOpenEmbeddedMessage ([MS-OXCROPS] section 2.2.6.16) requests.
- Address book servers use **PtypEmbeddedTable** to designate properties whose value is a table, for example, the members of a distribution list. The necessary methods are specified in [MS-NSPI].

2.11.1.5 WebDAV Property Data Types

WebDAV property data types are specified for a property by using the "dt" attribute from the namespace "urn:uuid:c2f41010-65b3-11d1-a29f-00aa00c14882/".

The WebDAV property types are listed in the following table. Unless their formats are specified elsewhere, all property type formats are specified in **Augmented Backus-Naur Form (ABNF)** notation [RFC4234].

Server Property Type Name	WebDAV Property Type Name	Description	Format
PtypBinary	i1	The Unicode value of the element is interpreted as an optionally signed 1 byte, 8-bit decimal integer.	As a **byte**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="i1">3</element>
PtypInteger16	i2	The Unicode value of the element is interpreted as an optionally signed 2 byte, 16-	As a **short**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="i2">-255</element>

Server Property Type Name	WebDAV Property Type Name	Description	Format
		bit decimal integer.	
PtypInteger32	int	The Unicode value of the element is interpreted as an optionally signed 4 byte, 32-bit decimal integer.	As an **int**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="int">-53496</element>
PtypInteger64	i8	The Unicode value of the element is interpreted as an optionally signed 8 byte, 64-bit decimal integer.	As a **long**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="i8">-32415</element>
PtypBinary	ui1	The Unicode value of the element is interpreted as an unsigned 1 byte, 8-bit decimal integer.	As an **unsignedByte**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="ui1">255</element>
PtypInteger16	ui2	The Unicode value of the element is interpreted as an unsigned 2 byte, 16-bit decimal integer.	As an **unsignedShort**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="ui2">2296</element>
PtypInteger32	ui4	The Unicode value of	As an **unsignedInt**, as specified in [XMLSCHEMA2/2] **Example:**

Server Property Type Name	WebDAV Property Type Name	Description	Format
		the element is interpreted as an unsigned 4 byte, 32-bit decimal integer.	<element... d:dt="ui4">32768</element>
PtypInteger64	ui8	The Unicode value of the element is interpreted as an unsigned 8 byte, 64-bit decimal integer.	As an **unsignedLong**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="ui8">-189</element>
PtypFloating64	float	The Unicode value of the element is interpreted as a single precision floating point number.	float-val = (["+"] / "-") [1*DIGIT] ["." 1*DIGIT] ["d" / "D" / "e" / "E" (["+"] / "-") 1*DIGIT] **Example:** <element... d:dt="float">9.9</element>
PtypFloating32	r4	The Unicode value of the element is interpreted as a 4 byte single precision floating point number.	r4-val = (["+"] / "-") [1*DIGIT] ["." 1*DIGIT] ["d" / "D" / "e" / "E" (["+"] / "-") 1*DIGIT] **Example:** <element... d:dt="r4">9.9</element>
PtypFloating64	r8	The Unicode value of the element is interpreted as an 8 byte double precision	r8-val = (["+"] / "-") [1*DIGIT] ["." 1*DIGIT] ["d" / "D" / "e" / "E" (["+"] / "-") 1*DIGIT] **Example:** <element... d:dt="r8">.333333333</element>

Server Property Type Name	WebDAV Property Type Name	Description	Format
		floating point number.	
PtypBoolean	boolean	The Unicode value of the element is interpreted as a Boolean value either "1" (TRUE) or "0" (FALSE).	As a **boolean**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="boolean">1</element>
PtypString	string	The Unicode value of the element is interpreted as a sequence of Unicode characters.	As a **string**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="string">Description</element>
PtypString	char	The Unicode value of the element is interpreted as a single Unicode character. The character data type maps to a string and can be used for any sequence of Unicode characters.	char-val = 1VCHAR **Example:** <element... d:dt="char">D</element>
PtypCurrency	fixed.14.4	The Unicode value of the element is interpreted	fixed144-val = 0*14DIGIT "." 0*4 DIGIT **Example:** <element... d:dt="fixed.14.4">00000000000012.9500</element>

Server Property Type Name	WebDAV Property Type Name	Description	Format
		as an optionally signed floating point number with no more than 14 digits to the left of the decimal point, and no more than 4 digits to the right of the decimal point. This data type is normally used to represent currency values.	
PtypString	number	The Unicode value of the element is interpreted as a number, limited by the operating system limits, which can optionally contain a leading sign, fractional digits, and an exponent.	As a **string**, as specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="number">-123.456E+10</element>
PtypTime	dateTime	The Unicode value of the element is interpreted as a date and time	As specified in [ISO-8601] **Example:** <element... d:dt="datetime">2008-09-19T18:53:47.060</element>

Server Property Type Name	WebDAV Property Type Name	Description	Format
		value expressed in [ISO-8601] format with no time zone specified.	
PtypTime	dateTime.tz	The Unicode value of the element is interpreted as a date and time value expressed in [ISO-8601] format with an optional time zone identifier.	As specified in [ISO-8601] **Example:** <element... d:dt="datetime.tz">2008-09-19T18:53:47.060Z</element> <element... d:dt="datetime.tz">2008-09-19T18:53:47.060-0700</element>
PtypTime	dateTime.rfc1123	The Unicode value of the element is interpreted as a date and time value expressed in [RFC1123] format.	As specified in [RFC1123] **Example:** <element... d:dt="datetime.rfc1123">Mon, 15 Feb 1999 13:05:29-0700</element>
PtypTime	Date	The Unicode value of the element is interpreted as a date value that is expressed in [ISO-8601] format with no time or time zone	As specified in [ISO-8601] **Example:** <element... d:dt="date">2008-09-18</element>

Server Property Type Name	WebDAV Property Type Name	Description	Format
		specified.	
PtypTime	time	The Unicode value of the element is interpreted as a time value expressed in [ISO-8601] format with no date or time zone specified.	As specified in [ISO-8601] **Example:** <element... d:dt="time">19T18:53:47.060</element>
PtypTime	time.tz	The Unicode value of the element is interpreted as a time value expressed in [ISO-8601] format with an optional time zone identifier.	As specified in [ISO-8601] **Example:** <element... d:dt="time.tz">19T18:53:47.060Z</element> <element... d:dt="time.tz">19T18:53:47.060-0700</element>
PtypString	uri	The Unicode value of the element is interpreted as a uniform resource identifier as specified in [RFC3986].	As specified in [RFC3986] **Example:** <element... d:dt="uri">http://www.example.com/</element>
PtypGuid	uuid	The Unicode value of the element is interpreted as a universally	As specified in [RFC4122] **Example:** <element... d:dt="uuid">55B329F4-EF8A-4fac-A47C-C81213DB3061</element>

Server Property Type Name	WebDAV Property Type Name	Description	Format
		unique identifier as specified in [RFC4122].	
PtypBinary	bin.hex	The Unicode value of the element is interpreted as a binary BLOB encoded in hexadecimal digits.	As specified in [XMLSCHEMA2/2] **Example:** <element... d:dt="bin.hex">1f8b9d</element>
PtypBinary	bin.base64	The Unicode value of the element is interpreted as a binary BLOB encoded in base64 as specified in [RFC2045].	As specified in [RFC2045] **Example:** <element... d:dt="bin.base64">jfsSUsdjsdsUSDASjsdsusaqiq</element>

2.11.1.5.1 Multi-Valued WebDAV Property Data Types

WebDAV supports multi-valued properties where the value of the specified property is an array of items of a specific type. Multi-valued properties are represented in the XML markup by using the "dt" attribute with the value "mv", followed by the data type of the contents of the array.

For example, an array of strings is represented by the following:

<author d:dt="mv.string"></author>

Within the property element, the contents of the array are specified by a number of sub-elements, each with the element name "v" from the "xml" namespace. For example:

<author xmlns:x="xml:" d:dt="mv.string">

<x:v>Attila Biber</x:v>

<x:v>Kirk DeGrasse</x:v>

</author>

The following table lists the multi-valued property data types supported by WebDAV.

Server Property Type Name	WebDAV Type Name
PtypMultipleInteger16	mv.i2
PtypMultipleInteger32	mv.i4
PtypMultipleFloating64	mv.float
PtypMultipleCurrency	mv.fixed.14.4
PtypMultipleString8	mv.string
PtypMultipleBinary	mv.bin.hex
PtypMultipleGuid	mv.uuid

2.11.1.6 OLE DB Types

WebDAV **SEARCH** requests also support specifying data types using OLE DB types. The following table lists the property types supported by WebDAV. The OLE DB type names are strings for use in the query grammar specified in [MS-XWDSEARCH].

Server Property Type Name	WebDAV Property Type Name	OLE DB Type Name
PtypBoolean	boolean	DBTYPE_BOOL
PtypInteger16	i1	DBTYPE_I1
PtypInteger16	i2	DBTYPE_I2
PtypInteger16	ui1	DBTYPE_UI1
PtypInteger16	ui2	DBTYPE_UI2
PtypInteger32	int	DBTYPE_I4
PtypInteger32	ui4	DBTYPE_UI4
PtypInteger64	i8	DBTYPE_I8
PtypInteger64	ui8	DBTYPE_UI8
PtypTime	dateTime.tz	DBTYPE_FILETIME
PtypFloatingTime	dateTime.tz	DBTYPE_FILETIME
PtypFloatingTime	dateTime.tz	DBTYPE_DATE
PtypFloating32	r4	DBTYPE_R4
PtypCurrency	fixed.14.4	DBTYPE_CY
PtypFloating64	float	DBTYPE_R8
PtypGuid	uuid	DBTYPE_GUID
PtypString	string	DBTYPE_WSTR
PtypString	string	DBTYPE_BSTR

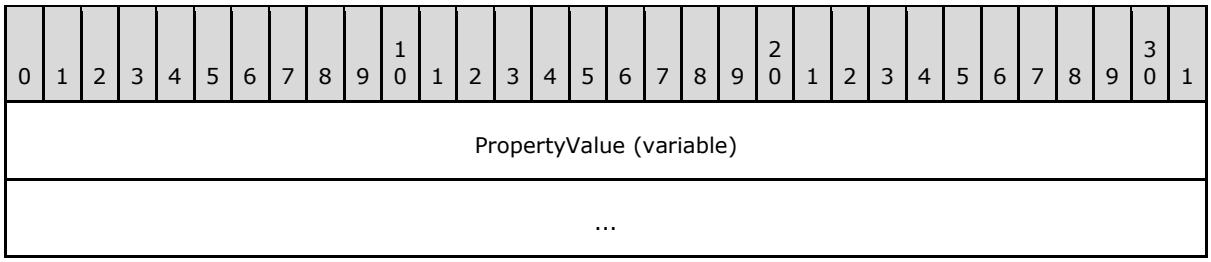
Server Property Type Name	WebDAV Property Type Name	OLE DB Type Name
PtypString8	string	DBTYPE_STR
PtypBinary	bin.base64	DBTYPE_BYTES

2.11.2 PropertyValue

The **PropertyValue** structure simply specifies the value of the property. It contains no information about the property type or id.

The **PropertyValue_r** structure, as specified in [MS-NSPI], is an encoding of the **PropertyValue** data structure, as specified in section 2.11.2.1. For property values with uninterpreted byte values, the permissible number of bytes in the **PropertyValue_r** structure exceeds that of the **PropertyValue** data structure, as specified in [MS-NSPI] section 2.3.1.12. 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.

2.11.2.1 PropertyValue



PropertyValue (variable): The size varies depending on the property type which can be understood from the usage context. All numeric values are in little-endian format. For multi-valued types, the first element in the ROP buffer is a 16-bit integer specifying the number of entries. If the property value being passed is a string then the data includes the null terminators.

2.11.2.2 PropertyValue_r

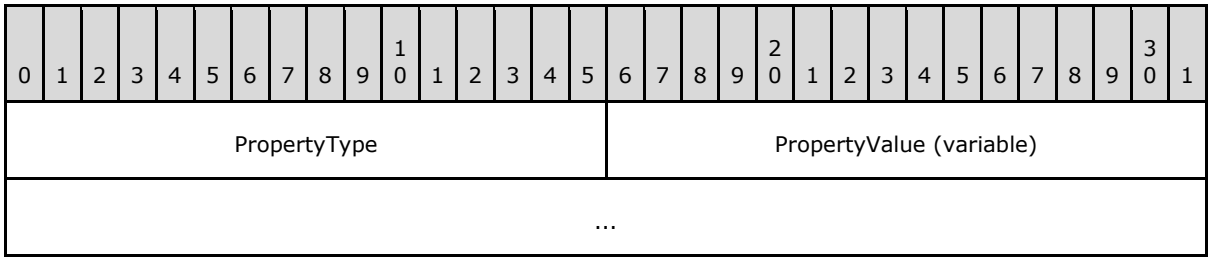
PropertyTag (4 bytes): Encodes the property tag with the value represented by the **PropertyValue_r** structure.

Reserved (4 bytes): All clients and servers MUST set this value to 0x00000000.

PropertyValue (variable): Encodes the **PropertyValue** field of the **PropertyValue** structure. For more details, see section 2.11.2.1. This is the actual value of the property represented by the **PropertyValue_r** structure. The type value is specified by the **PropertyTag** field.

2.11.3 TypedPropertyValue

The **TypedPropertyValue** structure includes the property type with the value of the property.

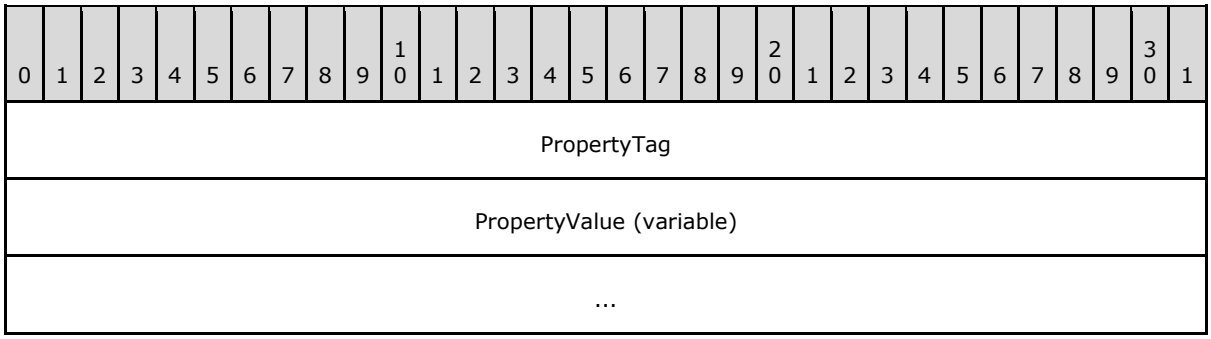


PropertyType (2 bytes): A 16-bit unsigned integer that specifies the data type of the property value, according to the table in section 2.11.1.

PropertyValue (variable): A **PropertyValue** structure as specified in section 2.11.2. The value MUST be compatible with the value of the **PropertyType** field.

2.11.4 TaggedPropertyValue

As a rule, property tags are not specified explicitly in ROP buffers. To save space, property tags are specified implicitly by a previous operation and only the property values are put in the buffer. But under some circumstances a **TaggedPropertyValue** is used to explicitly include the property type and ID in the buffer.

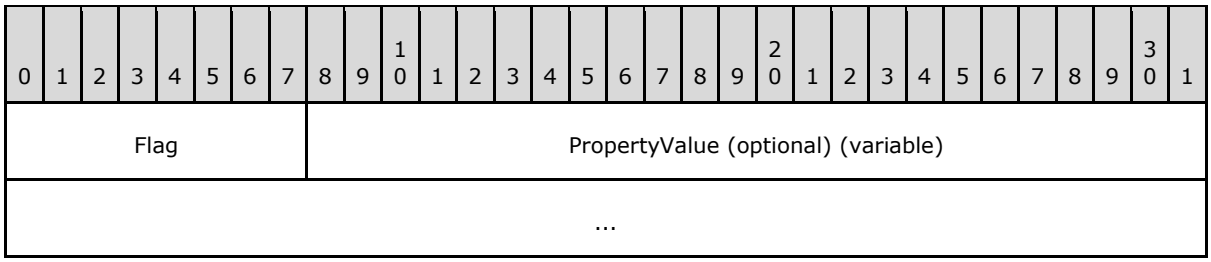


PropertyTag (4 bytes): A **PropertyTag** structure giving the **PropertyId** and **PropertyType** for the property.

PropertyValue (variable): A **PropertyValue** structure specifying the value of the property. Its syntax is specified by the **PropertyType** field of the tag, and its semantics by the **PropertyId** field of the tag.

2.11.5 FlaggedPropertyValue

The **FlaggedPropertyValue** structure includes a flag to indicate whether the value was successfully retrieved or not. Error conditions include a missing property or a failure at the server.



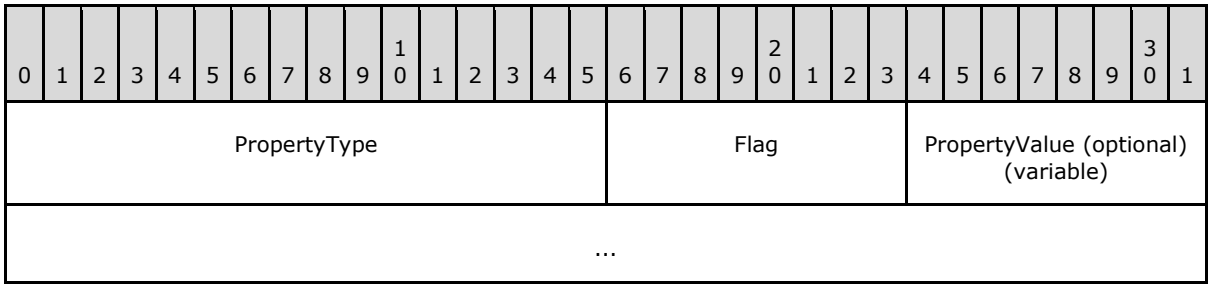
Flag (1 byte): An 8-bit unsigned integer. This flag MUST be set to one of three possible values: 0x0, 0x1, or 0xA, which determines what is conveyed in the **PropertyValue** field. The following table summarizes the meanings of these three values.

Flag value	What it implies about the PropertyValue field
0x0	The **PropertyValue** field will be a **PropertyValue** structure containing a value compatible with the property type implied by the context.
0x1	The **PropertyValue** field is not present.
0xA	The **PropertyValue** field will be a **PropertyValue** structure containing an unsigned 32-bit integer. This value is a property error code (see section 2.4.2) indicating why the property value is not present.

PropertyValue (optional) (variable): A **PropertyValue** structure (see section 2.11.2.1) unless the **Flag** field is 0x1.

2.11.6 FlaggedPropertyValueWithType

The **FlaggedPropertyValueWithType** structure includes both the property type and a flag giving more information about the property value.



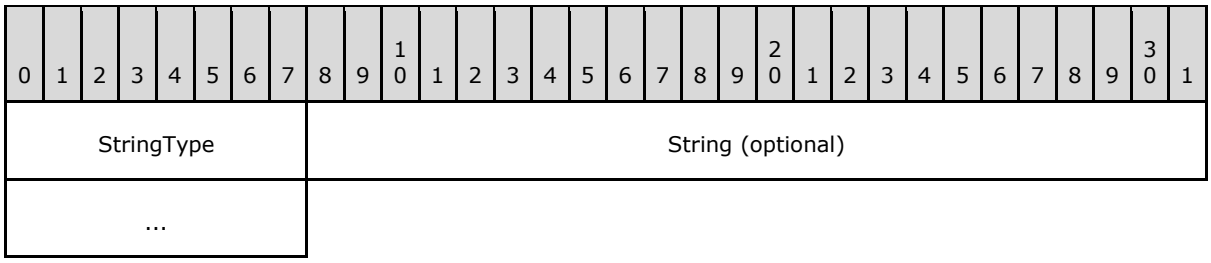
PropertyType (2 bytes): A 16-bit unsigned integer that specifies the data type of the property value, according to the table in section 2.11.1.

Flag (1 byte): An 8-bit unsigned integer. This flag MUST be set one of three possible values: 0x0, 0x1, or 0xA, which determines what is conveyed in the **PropertyValue** field. Refer to the table in section 2.11.5 for the interpretation of this flag.

PropertyValue (optional) (variable): A **PropertyValue** structure (see section 2.11.2.1) unless the **Flag** field is 0x1. The value MUST be compatible with the value of the **PropertyType** field.

2.11.7 TypedString

A **TypedString** structure is used in certain ROPs in order to compact the string representation on the wire as much as possible.



StringType (1 byte): 8-bit enumeration. The value MUST be one of the following:

Value	Meaning
0x00	There is no string present.
0x01	The string is empty.
0x02	Null-terminated 8-bit character string. The null terminator is one zero byte.
0x03	Null-terminated Reduced Unicode character string. The null terminator is one zero byte.
0x04	Null-terminated Unicode character string. The null terminator is 2 zero bytes.

String (optional) (4 bytes): If the **StringType** field is set to 0x02, 0x03, or 0x04, then this field MUST be present and in the format specified by the **Type** field. Otherwise, this field MUST NOT be present.

To produce a Reduced Unicode string from an original Unicode string, the server first scans the original Unicode string and determines that every character has a value less than 0x100; in other words, that the high-order byte of every character, including the null terminator, is zero. It then produces a Reduced Unicode string that is exactly half the size of the original Unicode string by omitting all the high-order zero bytes, including that of the null terminator.

To reproduce the original Unicode string from a Reduced Unicode string, the server inserts a zero byte after each byte of the Reduced Unicode string, doubling its size.

2.12 Restrictions

Restrictions describe a filter for limiting the view of a table to particular set of rows. This filter represents a Boolean expression that is evaluated against each item of the table. The item will be included as a row of the restricted table if and only if the value of the Boolean expression evaluates to **TRUE**.

Restrictions are sent to the server with the RopFindRow ([MS-OXCROPS] section 2.2.5.13), RopRestrict ([MS-OXCROPS] section 2.2.5.3), RopSetSearchCriteria ([MS-OXCROPS] section 2.2.4.4), and RopSynchronizationConfigure ([MS-OXCROPS] section 2.2.13.1) requests, and are returned from the RopGetSearchCriteria ([MS-OXCROPS] section 2.2.4.5) request.

There are 12 different restriction packet formats: Six of them (**AndRestriction**, **OrRestriction**, **NotRestriction**, **SubObjectRestriction**, **CommentRestriction**, and **CountRestriction**) are used to construct more complicated restrictions from one or more simpler ones. The other six types

(**ContentRestriction**, **PropertyRestriction**, **ComparePropertiesRestriction**, **BitMaskRestriction**, **SizeRestriction**, and **ExistRestriction**) specify specific tests based on the properties of an item.

While the packet formats differ, the first 8 bits always stores **RestrictType**, an unsigned byte value specifying the type of restriction. The possible values for **RestrictType** are presented in the following table.

RestrictType	Hexadecimal value	Description	Alternate name
AndRestriction **AndRestriction_r**	0x00	Logical **AND** operation applied to a list of subrestrictions.	**RES_AND**
OrRestriction **OrRestriction_r**	0x01	Logical **OR** operation applied to a list of subrestrictions.	**RES_OR**
NotRestriction **NotRestriction_r**	0x02	Logical **NOT** applied to a subrestriction.	**RES_NOT**
ContentRestriction **ContentRestriction_r**	0x03	Search a property value for specific content.	**RES_CONTENT**
PropertyRestriction **PropertyRestriction_r**	0x04	Compare a property value to a particular value.	**RES_PROPERTY**
ComparePropertiesRestriction **ComparePropertiesRestriction_r**	0x05	Compare the values of two properties.	**RES_COMPAREPROPS**
BitMaskRestriction **BitMaskRestriction_r**	0x06	Perform bitwise **AND** of a property value with a mask and compare to zero.	**RES_BITMASK**
SizeRestriction **SizeRestriction_r**	0x07	Compare the size of a property value to a particular figure.	**RES_SIZE**
ExistRestriction **ExistRestriction_r**	0x08	Test whether a property has a value.	**RES_EXIST**
SubObjectRestriction **SubRestriction_r**	0x09	Test whether any row of a message's attachment or recipient table satisfies a subrestriction.	**RES_SUBRESTRICTION**
CommentRestriction	0x0A	Associates a comment with a subrestriction.	**RES_COMMENT**

RestrictType	Hexadecimal value	Description	Alternate name
CountRestriction	0x0B	Limits the number of matches returned from a subrestriction.	**RES_COUNT**

The subsections which follow describe each packet format.

There is one variation in the way restriction structures are serialized. In the context of ROP buffers, such as RopRestrict or RopSetSearchCriteria, all count fields (such as the number of subrestrictions of an **AndRestriction**) are 16 bits wide. But, in the context of extended rules, as specified in [MS-OXORULE] section 2.2.4, or **search folder definition messages**, as specified in [MS-OXOSRCH] section 2.2.1, these counts are 32 bits wide. Such fields are identified as count fields throughout section 2.12.

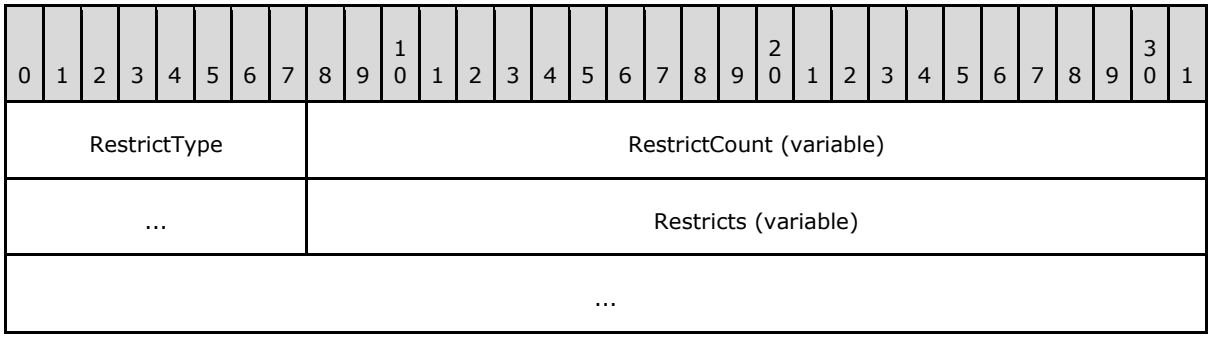
2.12.1 AndRestriction

The **AndRestriction** structure describes an AND restriction, which is used to join a group of restrictions using a logical AND operation.

The **AndRestriction_r** structure, as specified in [MS-NSPI], is an encoding of the **AndRestriction** data structure, as specified in section 2.12.1.1. The permissible number of restriction structures in the **AndRestriction_r** data structure exceeds that of the **AndRestriction** structure. The semantic meaning is otherwise unchanged from the **AndRestriction** data structure.

2.12.1.1 AndRestriction

The result of an **AndRestriction** is **TRUE** if all of its child restrictions evaluate to **TRUE**, and **FALSE** if any child restriction evaluates to **FALSE**.

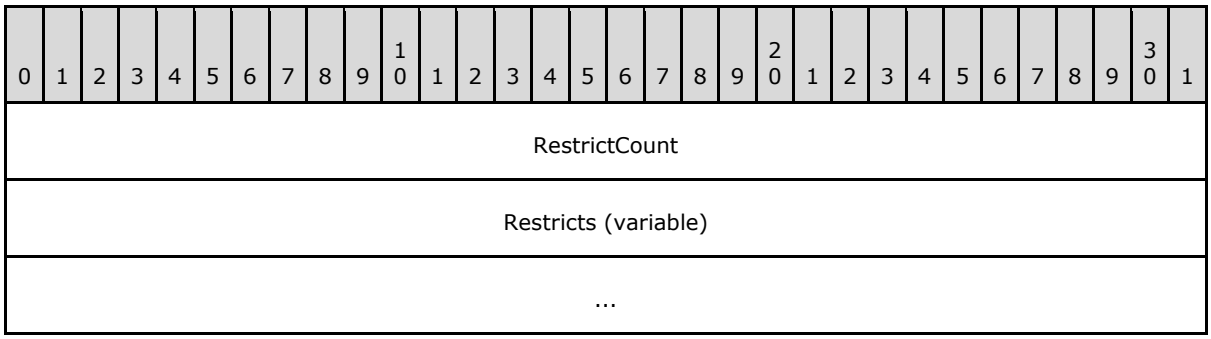


RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x00.

RestrictCount (variable): This value specifies how many restriction structures are present in **Restricts**. The width of this field is 16 bits in the context of ROPs, and 32 bits in the context of extended rules.

Restricts (variable): Array of restriction structures. This field MUST contain **RestrictCount** structures.

2.12.1.2 AndRestriction_r



RestrictCount (4 bytes): Encodes the **RestrictCount** field of the **AndRestriction**. For more details, see section 2.12.1.1. This value MUST NOT exceed 100,000.

Restricts (variable): Encodes the **Restricts** field of the **AndRestriction**. For more details, see section 2.12.1.

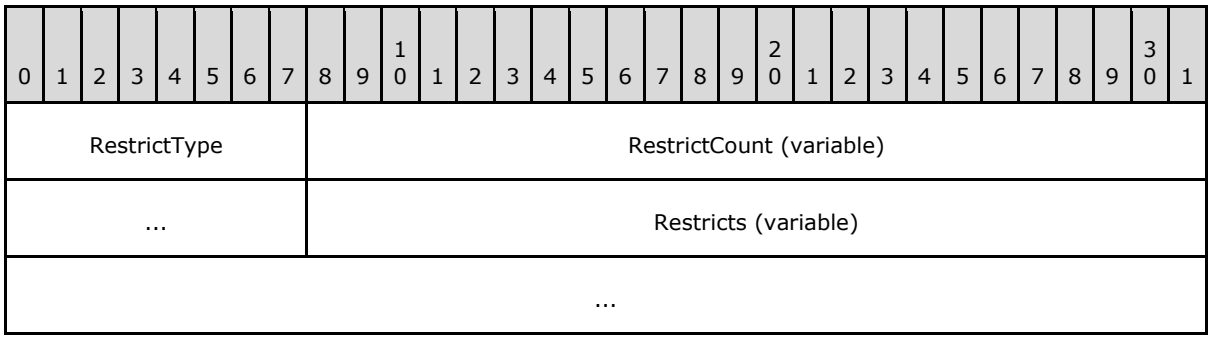
2.12.2 OrRestriction

The **OrRestriction** structure describes an OR restriction, which is used to join a group of restrictions using a logical OR operation.

The **OrRestriction_r** structure, as specified in [MS-NSPI], is an encoding of the **OrRestriction** data structure, as specified in section 2.12.2.1. The permissible number of restriction structures in the **OrRestriction_r** data structure exceeds that of the **OrRestriction** structure. The semantic meaning is otherwise unchanged from the **OrRestriction** data structure.

2.12.2.1 OrRestriction

The result of an **OrRestriction** is **TRUE** if at least one of its child restrictions evaluates to **TRUE**, and **FALSE** if all child restrictions evaluate to **FALSE**.

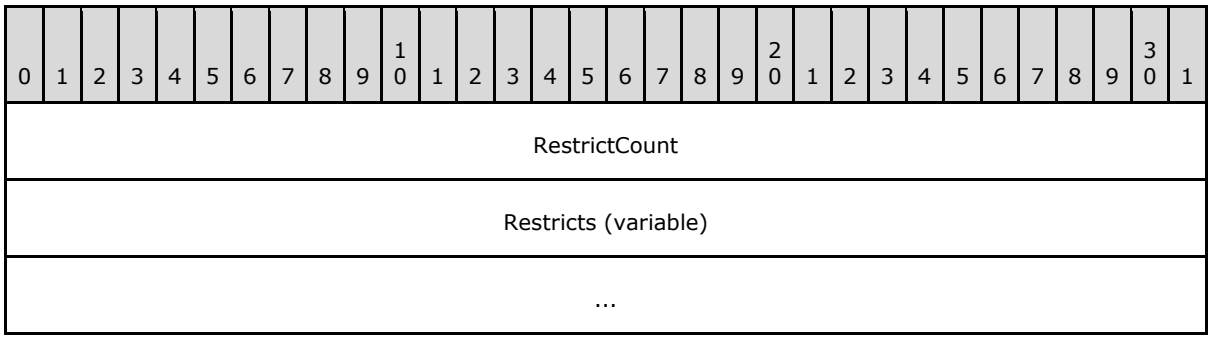


RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x01.

RestrictCount (variable): This value specifies how many restriction structures are present in **Restricts**. The width of this field is 16 bits in the context of ROPs, and 32 bits in the context of extended rules.

Restricts (variable): Array of restriction structures. This field MUST contain **RestrictCount** structures.

2.12.2.2 OrRestriction_r



RestrictCount (4 bytes): Encodes the **RestrictCount** field of the **OrRestriction**. For more details, see section 2.12.2.1. This value MUST NOT exceed 100,000.

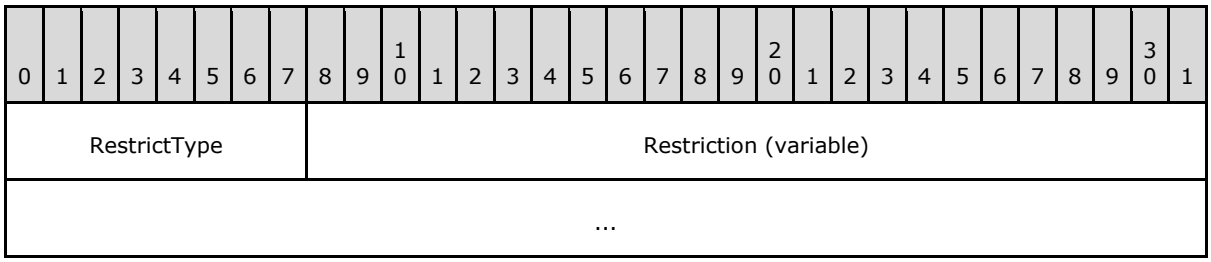
Restricts (variable): Encodes the **Restricts** field of the **OrRestriction**. For more details, see section 2.12.1.

2.12.3 NotRestriction

The **NotRestriction** structure describes a NOT restriction, which is used to apply a logical NOT operation to a single restriction.

The **NotRestriction_r** structure, as specified in [MS-NSPI], is an encoding of the **NotRestriction** data structure, as specified in section 2.12.3.1. The semantic meaning is unchanged from the **NotRestriction** data structure.

2.12.3.1 NotRestriction

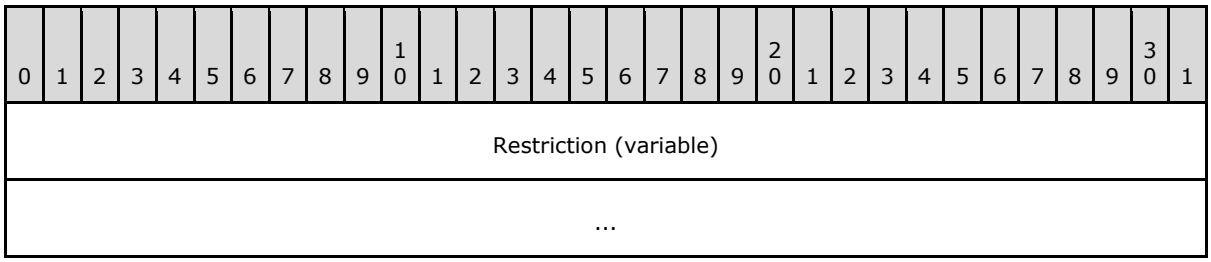


RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x02.

Restriction (variable): A restriction structure. This value specifies the restriction the logical NOT applies to.

The result of a **NotRestriction** is **TRUE** if the child restriction evaluates to **FALSE**, and **FALSE** if the child restriction evaluates to **TRUE**.

2.12.3.2 NotRestriction_r



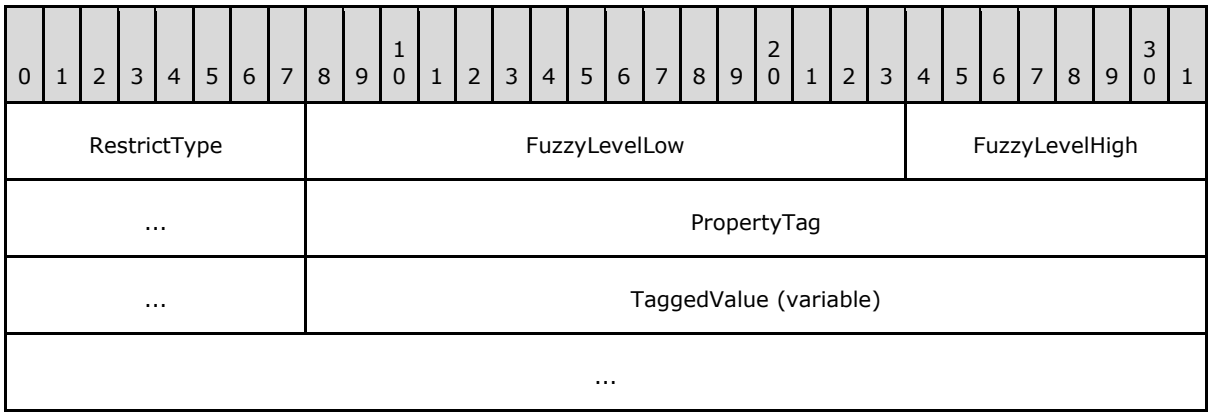
Restriction (variable): Encodes the restriction field of the **NotRestriction** structure. For more details, see section 2.12.3.1.

2.12.4 ContentRestriction

The ContentRestriction structure describes a content restriction, which is used to limit a table view to only those rows that include a column with contents matching a search string.

The **ContentRestriction_r** structure, as specified in [MS-NSPI], is an encoding of the **ContentRestriction** data structure, as specified in section 2.12.4.1. The semantic meaning is unchanged from the **ContentRestriction** data structure.

2.12.4.1 ContentRestriction



RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x03.

FuzzyLevelLow (2 bytes): Unsigned 16-bit integer. This field specifies the level of precision that the server enforces when checking for a match against a **ContentRestriction**. **FuzzyLevelLow** applies to both binary and string properties and MUST be set to one of the following values.

FuzzyLevelLow value	Description
0x0000 FL_FULLSTRING	The value stored in **TaggedValue** and the value of the column **PropertyTag** matches in their entirety.
0x0001	The value stored in **TaggedValue** matches some portion of the value of

FuzzyLevelLow value	Description
FL_SUBSTRING	the column **PropertyTag**.
0x0002 FL_PREFIX	The value stored in **TaggedValue** matches a starting portion of the value of the column **PropertyTag**.

FuzzyLevelHigh (2 bytes): This field applies only to string valued properties and can be set to the following bit values in any combination. **FuzzyLevelHigh** values can be OR'd together.

FuzzyLevelHigh values	Description
0x0001 FL_IGNORECASE	The comparison does not consider case.
0x0002 FL_IGNORENONSPACE	The comparison ignores Unicode-defined nonspacing characters such as diacritical marks.
0x0004 FL_LOOSE	The comparison results in a match whenever possible, ignoring case and nonspacing characters.

PropertyTag (4 bytes): Unsigned 32-bit integer. This value indicates the property tag of the column whose value MUST be matched against the value specified by the **TaggedValue** field.

TaggedValue (variable): A **TaggedPropertyValue** structure, as specified in section 2.11.4. This structure contains the value to be matched.

The **property ID** portion of the **PropertyTag** field in **TaggedValue** is ignored.

The result of a content restriction imposed against a property is undefined when the property does not exist. When a client requires well-defined behavior for such a restriction and is not sure whether the property exists, the client can create an **AndRestriction** to join the **ContentRestriction** with an **ExistRestriction**.

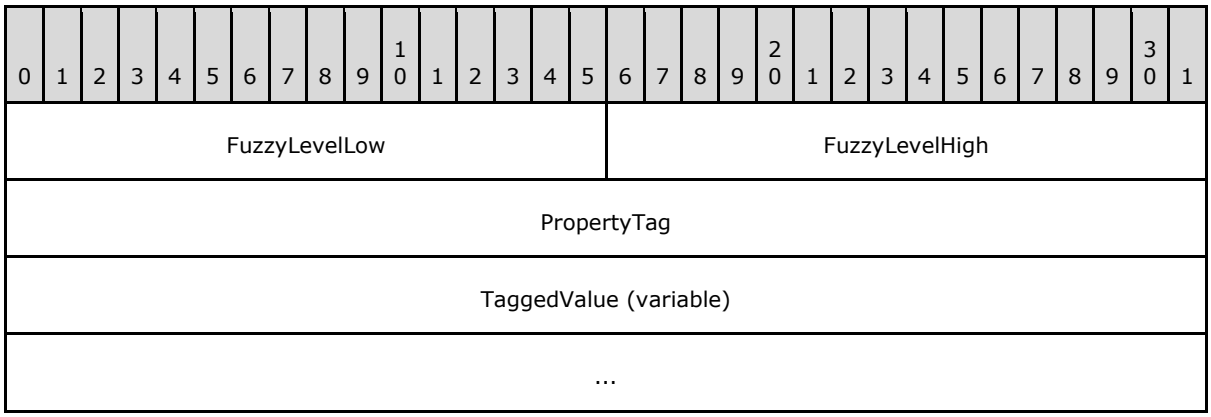
Multi-valued properties (when the bit **MultivalueFlag** is set) are supported for this type of restriction, but the property types (obtained by masking off the bit **MultivalueFlag**) of both the **PropertyTag** field and property tag subfield of **TaggedValue** subfield MUST be the same in all cases.

The following table describes which cases are supported for multi-valued properties.

PropertyTag	TaggedValue	Support	Details
Single-valued	Single-valued	All **RelOp** values are supported.	Simple comparison.
Single-valued	Multi-valued	Not supported.	
Multi-valued and same as MultivalueInstance column of table	Single-valued	All **RelOp** values are supported.	Each value of the property **PropertyTag** is compared with **TaggedValue**. One successful match means the restriction is

PropertyTag	TaggedValue	Support	Details
			satisfied.
Multi-valued and same as MultivalueInstance column of table	Multi-valued	Not supported.	
Multi-valued but not the same as MultivalueInstance column of table	Single-valued	All **RelOp** values are supported.	Each value of the property **PropertyTag** is compared with **TaggedValue**. One successful match means the restriction is satisfied.
Multi-valued but not the same as MultivalueInstance column of table	Multi-valued	Not supported.	

2.12.4.2 ContentRestriction_r



FuzzyLevelLow (2 bytes): Encodes the **FuzzyLevelLow** field of the **ContentRestriction** structure. For more details, see section 2.12.4.1.

FuzzyLevelHigh (2 bytes): Encodes the **FuzzyLevelHigh** field of the **ContentRestriction** structure. For more details, see section 2.12.4.1.

PropertyTag (4 bytes): Encodes the **PropertyTag** field of the **ContentRestriction** structure. For more details, see section 2.12.4.1.

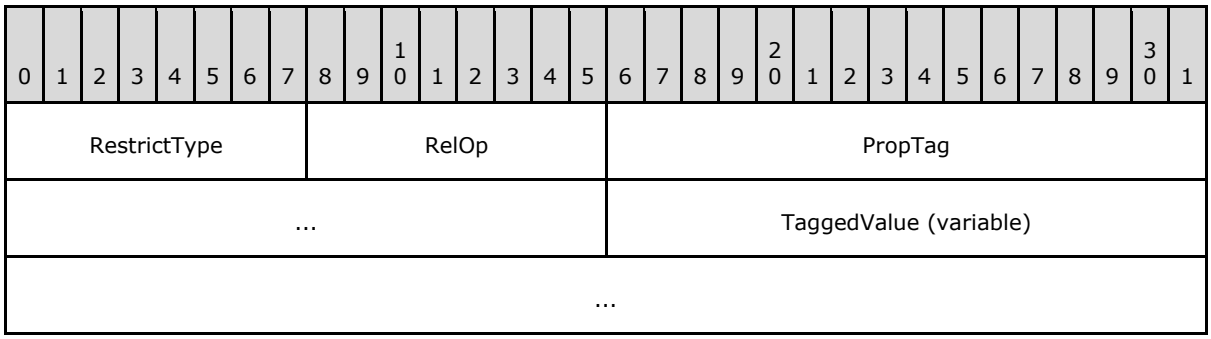
TaggedValue (variable): Encodes the **TaggedValue** field of the **ContentRestriction** structure. For more details, see section 2.12.4.1.

2.12.5 PropertyRestriction

The **PropertyRestriction** structure describes a property restriction that is used to match a constant with the value of a property.

The **PropertyRestriction_r** structure, as specified in [MS-NSPI], is an encoding of the **PropertyRestriction** data structure, as specified in section 2.12.5.1. The semantic meaning is unchanged from the **PropertyRestriction** data structure.

2.12.5.1 PropertyRestriction



RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x4.

RelOp (1 byte): Unsigned 8-bit integer. The value indicates the relational operator that is used to compare the property on the object with **TaggedValue**. The value MUST be one of the following.

Relational operator	Hexadecimal value	Evaluation	Alternate name
RelationalOperatorLessThan	0x00	TRUE if the value of the object's property is less than the given value.	**RELOP_LT**
RelationalOperatorLessThanOrEqual	0x01	TRUE if the value of the object's property is less than or equal to the given value.	**RELOP_LE**
RelationalOperatorGreaterThan	0x02	TRUE if the value of the object's property value is greater than the given value.	**RELOP_GT**
RelationalOperatorGreaterThanOrEqual	0x03	TRUE if the value of the object's property value is greater than or	**RELOP_GE**

Relational operator	Hexadecimal value	Evaluation	Alternate name
		equal to the given value.	
RelationalOperatorEqual	0x04	TRUE if the object's property value equals the given value.	**RELOP_EQ**
RelationalOperatorNotEqual	0x05	TRUE if the object's property value does not equal the given value.	**RELOP_NE**
RelationalOperatorMemberOfDL	0x64	TRUE if the value of the object's property is in the DL membership of the specified property value. The value of the object's property MUST be an EntryID of a mail-enabled object in the address book. The specified property value MUST be an EntryID of a distribution list object in the address book.	**RELOP_MEMBER_OF_DL**

PropTag (4 bytes): Unsigned 32-bit integer. This value indicates the property tag of the property that MUST be compared.

TaggedValue (variable): **TaggedValue** structure (see section 2.11.4). This structure describes the property value to be compared against. The **TaggedValue** field contains a property tag subfield which is distinct from the **PropTag** field of this structure. Only the property type portion of the **TaggedValue's** property tag subfield is used; the property ID is ignored.

Multi-valued properties (when the bit **MultivalueFlag** is set) are supported for this type of restriction, but the property types (obtained by masking off the bit **MultivalueFlag**) of both the **PropTag** field and property tag subfield of **TaggedValue** subfield MUST be the same in all cases.

The **MultivalueInstance** bit MUST be set in neither the **PropTag** field nor the property tag subfield of the **TaggedValue**.

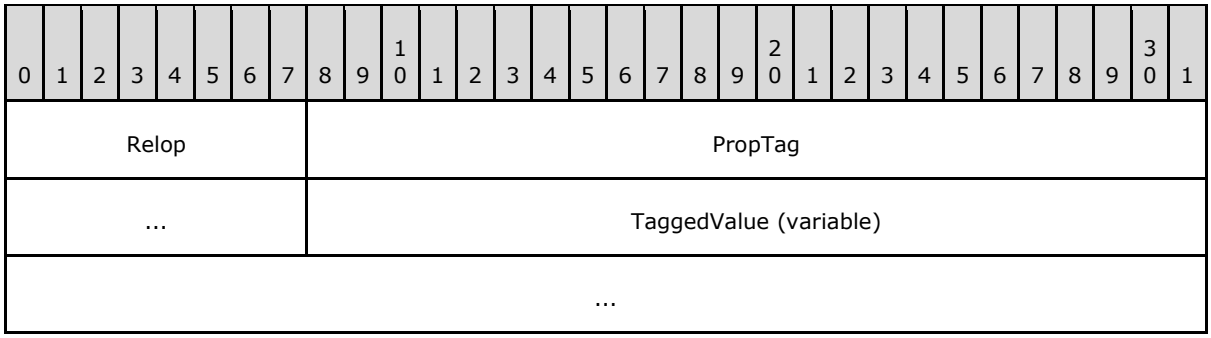
The following table describes which cases are supported for multi-valued properties.

PropTag	TaggedValue	Support	Details
Single-valued	Single-valued	All **RelOp** values are supported.	Simple comparison.
Single-valued	Multi-valued	Not supported.<5>	
Multi-valued and the same as a property tag for a **MultivalueInstance** column of table	Single-valued	All **RelOp** values are supported.	In this case, the client has previously called RopSetColumns ([MS-OXCROPS]) with the **MultivalueInstance** bit set in the property tag that matches the value in the **PropTag** field. The value in **TaggedValue** is compared against the value in the column for each row. Only the row that has a matching value is returned.
Multi-valued and the same as a property tag for a **MultivalueInstance** column of table	Multi-valued	Not supported.	
Multi-valued and the same as a property tag for a non-**MultivalueInstance** column of table	Single-valued	All **RelOp** values supported.	In this case, the client has previously called RopSetColumns ([MS-OXCROPS]) without the **MultivalueInstance** bit set in the property tag that matches the value in the **PropTag** field. Each value of the property **PropTag** is compared with **TaggedValue**. For all **RelOp** values except **RelationalOperatorNotEqual**, one successful match means the restriction is satisfied. For **RelationalOperatorNotEqual**, the restriction is satisfied only when there are no matches.

PropTag	TaggedValue	Support	Details
Multi-valued and the same as a property tag for a non-**MultivalueInstance** column of table	Multi-valued	Not supported.	

In the context of a RopFindRow ([MS-OXCROPS]) or RopRestrict ([MS-OXCROPS]) call, the results are undefined if the property **PropTag** does not exist on the object being tested. By creating an **AndRestriction** that joins the property restriction with an **ExistRestriction**, a caller can be guaranteed accurate results. Only **RelationalOperatorEqual** and **RelationalOperatorNotEqual** are allowed for the **RelOp** field when the type of **PropTag** is **PtypBoolean**.

2.12.5.2 PropertyRestriction_r



Relop (1 byte): Encodes the **Relop** field of the **PropertyRestriction** structure. For more details, see section 2.12.5.1.

PropTag (4 bytes): Encodes the **PropTag** field of the **PropertyRestriction** structure. For more details, see section 2.12.5.1.

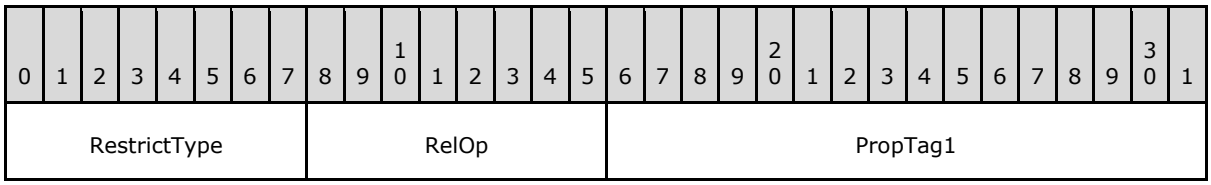
TaggedValue (variable): Encodes the **TaggedValue** field of the **PropertyRestriction** structure. For more details, see section 2.12.5.1.

2.12.6 CompareProperties Restriction

The **CompareProperties Restriction** structure specifies a comparison between the values of two properties using a relational operator.

The **CompareProps Restriction_r** structure, as specified in [MS-NSPI], is an encoding of the **CompareProperties Restriction** data structure, as specified in section 2.12.6.1. The semantic meaning is unchanged from the **CompareProperties Restriction** data structure.

2.12.6.1 CompareProperties Restriction



...	PropTag2
...	

RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x05.

RelOp (1 byte): Unsigned 8-bit integer. The value indicates the relational operator used to compare the two properties. The value MUST be one the following.

Relational operator	Hexadecimal value	Evaluation	Alternate name
RelationalOperatorLessThan	0x00	TRUE if the value of object's property is less than the given value.	**RELOP_LT**
RelationalOperatorLessThanOrEqual	0x01	TRUE if the value of the object's property is less than or equal to the given value.	**RELOP_LE**
RelationalOperatorGreaterThan	0x02	TRUE if the value of the object's property value is greater than the given value.	**RELOP_GT**
RelationalOperatorGreaterThanOrEqual	0x03	TRUE if the value of the object's property value is greater than or equal to the given value.	**RELOP_GE**
RelationalOperatorEqual	0x04	TRUE if the object's property value equals the	**RELOP_EQ**

Relational operator	Hexadecimal value	Evaluation	Alternate name
		given value.	
RelationalOperatorNotEqual	0x05	TRUE if the object's property value does not equal the given value.	**RELOP_NE**
RelationalOperatorMemberOfDL	0x64	TRUE if the value of the object's property is in the DL membership of the specified property value. The value of the object's property MUST be an EntryID of a mail-enabled object in the address book. The specified property value MUST be an EntryID of a distribution list object in the address book.	**RELOP_MEMBER_OF_DL**

PropTag1 (4 bytes): Unsigned 32-bit integer. This value is the **PropertyTag** of the first property that MUST be compared.

PropTag2 (4 bytes): Unsigned 32-bit integer. This value is the **PropertyTag** of the second property that MUST be compared.

The comparison order is (property tag 1) (relational operator) (property tag 2).

The properties to be compared MUST be of the same type.

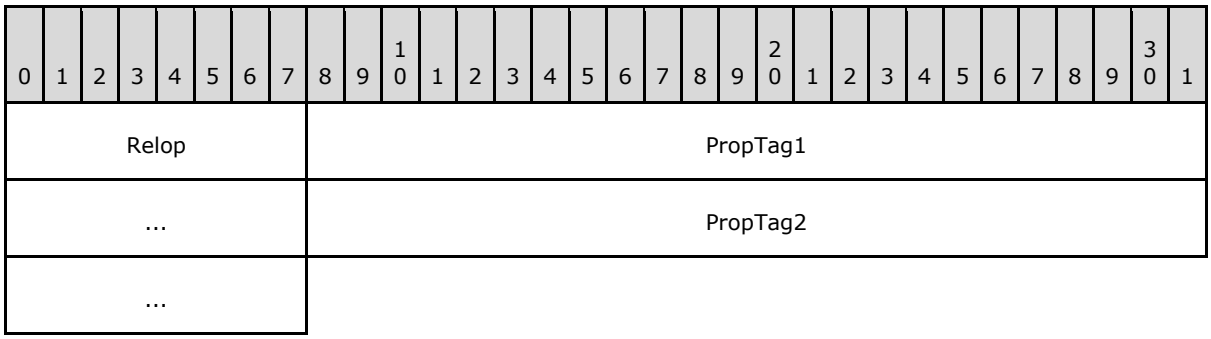
The result of a compare property value restriction is undefined when one or both of the properties do not exist. When a client requires well-defined behavior for such a restriction and is not sure whether the property exists, for example, it is not a required column of a table, it

can create an **AndRestriction** to join the compare property restriction with an Exists restriction.

The properties specified by **PropTag1** and **PropTag2** MUST be single-valued.

Only **Equal** and **NotEqual** operators are allowed field when the types of **PropTag1** and **PropTag2** are **PtypBoolean**.

2.12.6.2 ComparePropsRestriction_r



Relop (1 byte): Encodes the **Relop** field of the **CompareProperties Restriction** structure. For more details, see section 2.12.6.1.

PropTag1 (4 bytes): Encodes the **PropTag1** field of the **CompareProperties Restriction** structure. For more details, see section 2.12.6.1.

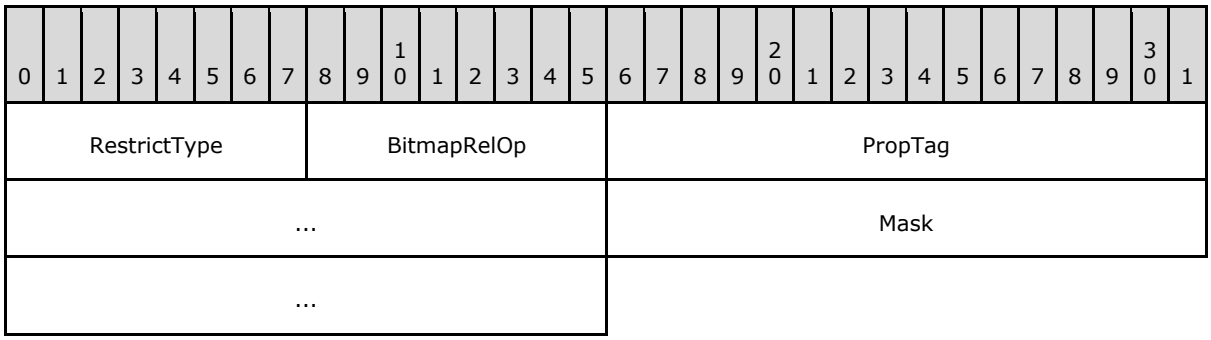
PropTag2 (4 bytes): Encodes the **PropTag2** field of the **CompareProperties Restriction** structure. For more details, see section 2.12.6.1.

2.12.7 BitMaskRestriction

The **BitMaskRestriction** structure describes a bitmask restriction, which performs a bitwise AND operation and compares the result with zero.

The **BitMaskRestriction_r** structure, as specified in [MS-NSPI], is an encoding of the **BitMaskRestriction** data structure, as specified in section 2.12.7.1. The semantic meaning is unchanged from the **BitMaskRestriction** data structure.

2.12.7.1 BitMaskRestriction



RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x06.

BitmapRelOp (1 byte): Unsigned 8-bit integer. The value specifies how the server MUST perform the masking operation. The value MUST be one of the following:

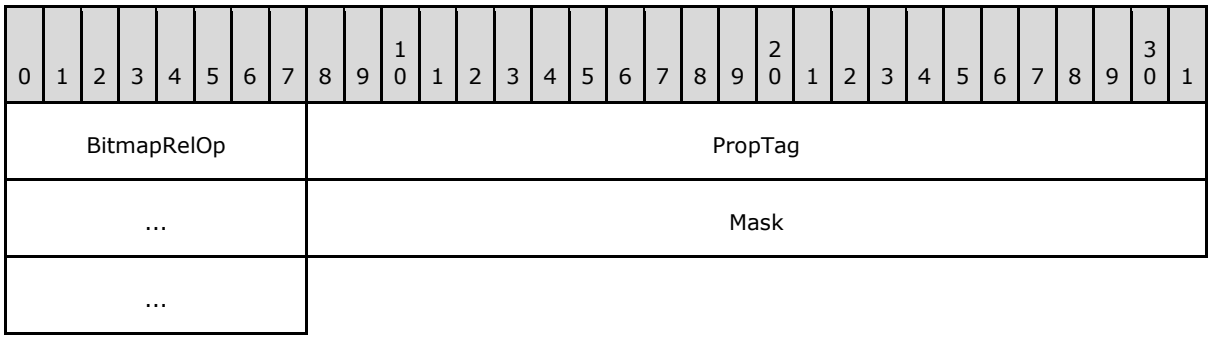
Name	Value	Meaning
BMR_EQZ	0x00	Perform a bitwise AND operation of the value of **Mask** with the value of the property **PropTag** and test for being equal to zero.
BMR_NEZ	0x01	Perform a bitwise AND operation of the value of **Mask** with the value of the property **PropTag** and test for NOT being equal to zero.

PropTag (4 bytes): Unsigned 32-bit integer. This value is the **PropertyTag** of the property to be tested. Its property type MUST be single-valued Int32 (refer to section 2.11.1 for details about individual property types).

Mask (4 bytes): Unsigned 32 bit integer. The bitmask to use for the AND operation.

The **BitMaskRestriction** structure performs a bitwise AND operation using the bitmask **Mask** and the value of the property **PropTag**. If the result is zero, then BMR_EQZ is satisfied. If it's nonzero, that is, if the property value has at least one of the same bits set as **Mask**, then BMR_NEZ is satisfied.

2.12.7.2 BitMaskRestriction_r



BitmapRelOp (1 byte): Encodes the **BitmapRelop** field of the **BitMaskRestriction** structure. For more details, see section 2.12.7.1.

PropTag (4 bytes): Encodes the **PropTag** field of the **BitMaskRestriction** structure. For more details, see section 2.12.7.1.

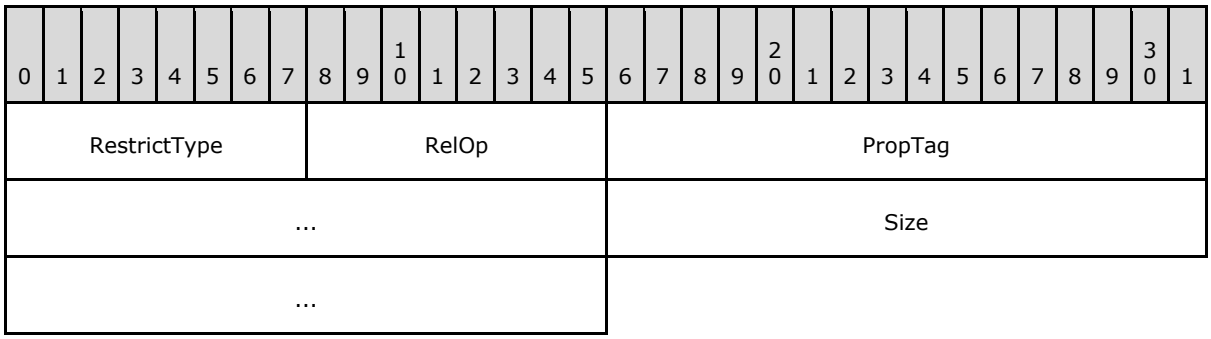
Mask (4 bytes): Encodes the **Mask** field of the **BitMaskRestriction** structure. For more details, see section 2.12.7.1.

2.12.8 SizeRestriction

The **SizeRestriction** structure describes a size restriction which compares the size (in bytes) of a property value with a given size.

The **SizeRestriction_r** structure, as specified in [MS-NSPI], is an encoding of the **SizeRestriction** data structure, as specified in section 2.12.8.1. The semantic meaning is unchanged from the **SizeRestriction** data structure.

2.12.8.1 SizeRestriction



RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x07.

RelOp (1 byte): Unsigned 8-bit integer. The value indicates the relational operator used in the size comparison. The value MUST be one the following.

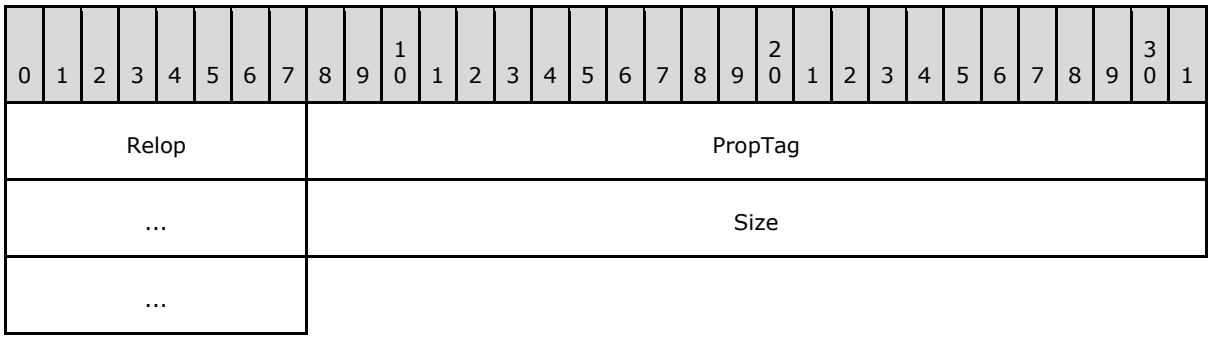
Relational operator	Hexadecimal value	Evaluation	Alternate name
RelationalOperatorLessThan	0x00	TRUE, if the value of the object's property is less than the given value.	**RELOP_LT**
RelationalOperatorLessThanOrEqual	0x01	TRUE, if the value of the object's property is less than or equal to the given value.	**RELOP_LE**
RelationalOperatorGreaterThan	0x02	TRUE, if the value of the object's property value is greater than the given value.	**RELOP_GT**
RelationalOperatorGreaterThanOrEqual	0x03	TRUE, if the value of the object's property value is greater than or equal to the given value.	**RELOP_GE**
RelationalOperatorEqual	0x04	TRUE, if the object's property value equals the given value.	**RELOP_EQ**
RelationalOperatorNotEqual	0x05	TRUE, if the object's property value does not equal the given value.	**RELOP_NE**

PropTag (4 bytes): Unsigned 32-bit integer. This value indicates the property tag of the property, the size of whose value we are testing.

Size (4 bytes): Unsigned 32-bit integer. This value indicates the size, as a count of bytes, that is to be used in the comparison.

In the case where **PropTag** is multivalued, there are two cases. If it was specified as a **MultivalueInstance** column of the table, the size restriction is evaluated for each row using the size of the single instance value of the row. If it was not specified as a **MultivalueInstance** column of the table, the size restriction is evaluated for each multi-value. If one of the size restrictions succeeds, the restriction is satisfied.

2.12.8.2 SizeRestriction_r



Relop (1 byte): Encodes the **Relop** field of the **SizeRestriction** structure. For more details, see section 2.12.8.1.

PropTag (4 bytes): Encodes the **PropTag** field of the **SizeRestriction** structure. For more details, see section 2.12.8.1.

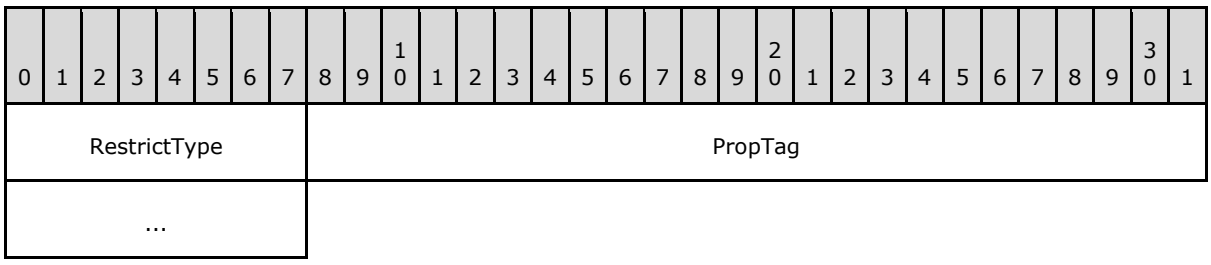
Size (4 bytes): Encodes the **Size** field of the **SizeRestriction** structure. For more details, see section 2.12.8.1.

2.12.9 ExistRestriction

The **ExistRestriction** structure tests whether a particular property value exists on a row of the table.

The **ExistRestriction_r** structure, as specified in [MS-NSPI], is an encoding of the **ExistRestriction** data structure, as specified in section 2.12.9.1. The semantic meaning is unchanged from the **ExistRestriction** data structure.

2.12.9.1 ExistRestriction

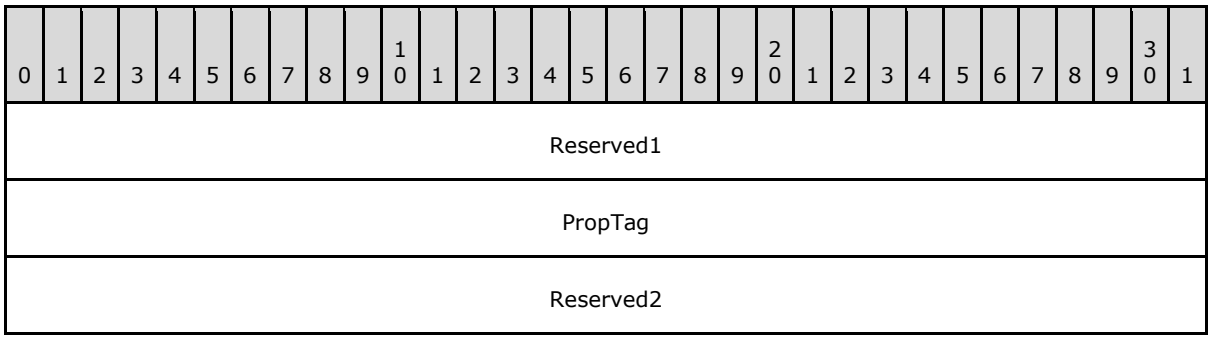


RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x08.

PropTag (4 bytes): Unsigned 32-bit integer. This value is the **PropertyTag** of the column to be tested for existence in each row.

The **ExistRestriction** is used to guarantee meaningful results for other types of restrictions that involve properties, such as property and content restrictions. The result of a restriction that involves a property which does not exist on a row is undefined. By creating an **AndRestriction** that joins the property restriction with an **ExistRestriction**, a client can be guaranteed accurate results.

2.12.9.2 ExistRestriction_r



Reserved1 (4 bytes): All clients and servers MUST set this value to 0x00000000.

PropTag (4 bytes): Encodes the **PropTag** field of the **ExistRestriction** structures. For more details, see section 2.12.9.1.

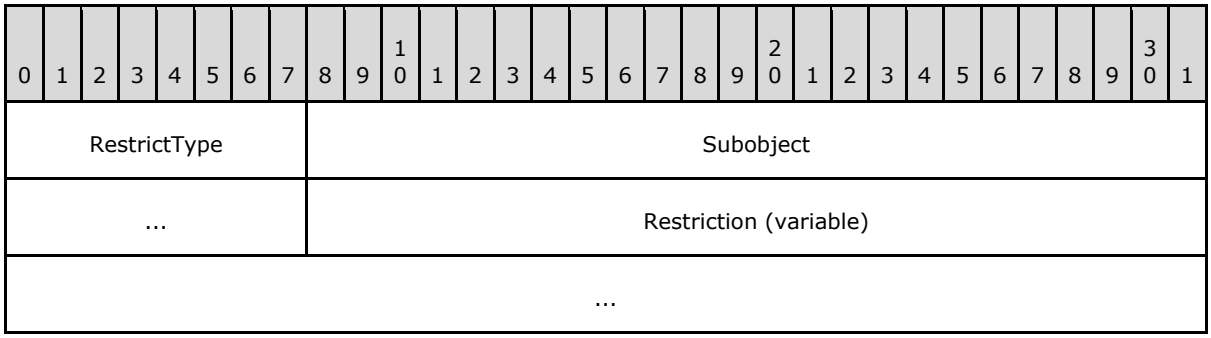
Reserved2 (4 bytes): All clients and servers MUST set this value to 0x00000000.

2.12.10 SubObjectRestriction

The **SubObjectRestriction** structure applies its subrestriction to a Message object's attachment table or recipients. If ANY row of the **subobject** satisfies the subrestriction, then the message satisfies the **SubObjectRestriction**.

The **SubRestriction_r** structure, as specified in [MS-NSPI], is an encoding of the **SubObjectRestriction** data structure, as specified in section 2.12.10.1. The semantic meaning is unchanged from the **SubObjectRestriction** data structure.

2.12.10.1 SubObjectRestriction



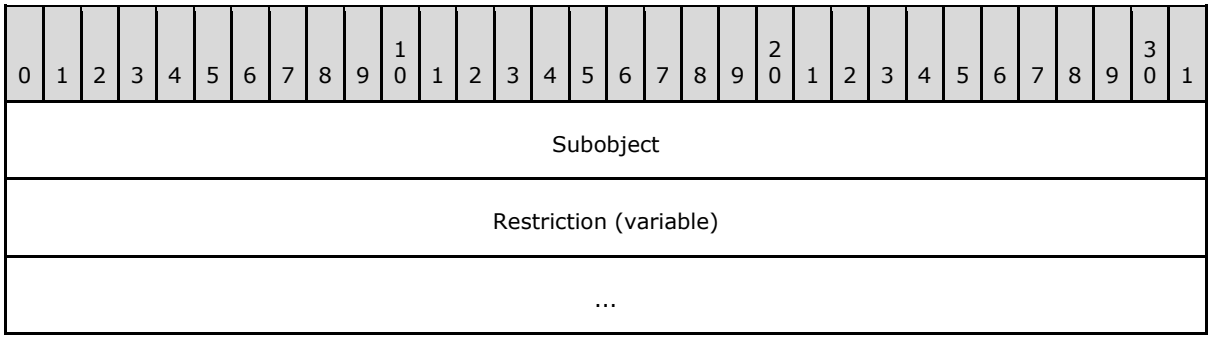
RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x09.

Subobject (4 bytes): Unsigned 32-bit integer. This value is a **PropertyTag** that designates the target of the subrestriction **Restriction**. Only two values are supported:

Value	Meaning
PidTagMessageRecipients ([MS-OXPROPS])	Apply the subrestriction to a message's recipients.
PidTagMessageAttachments ([MS-OXPROPS])	Apply the subrestriction to a message's attachments.

Restriction (variable): A **Restriction** structure. This subrestriction is applied to the rows of the subobject.

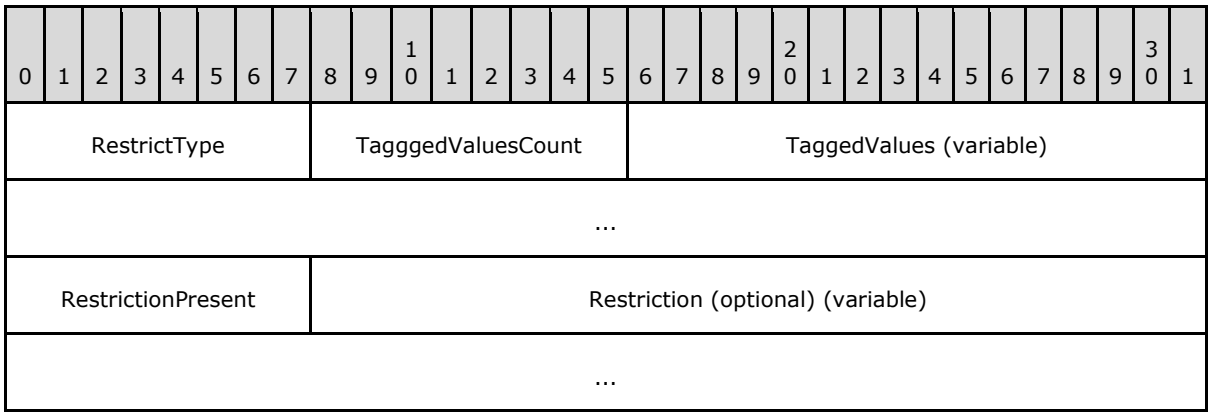
2.12.10.2 SubRestriction_r



Subobject (4 bytes): Encodes the subobject field of the **SubObjectRestriction** structure. For more details, see section 2.12.10.1.

Restriction (variable): Encodes the restriction field of the **SubObjectRestriction** structure. For more details, see section 2.12.10.1.

2.12.11 CommentRestriction



RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x0A.

TagggedValuesCount (1 byte): Unsigned 8-bit integer. This value specifies how many **TaggedValue** structures are present in **TaggedValues**.

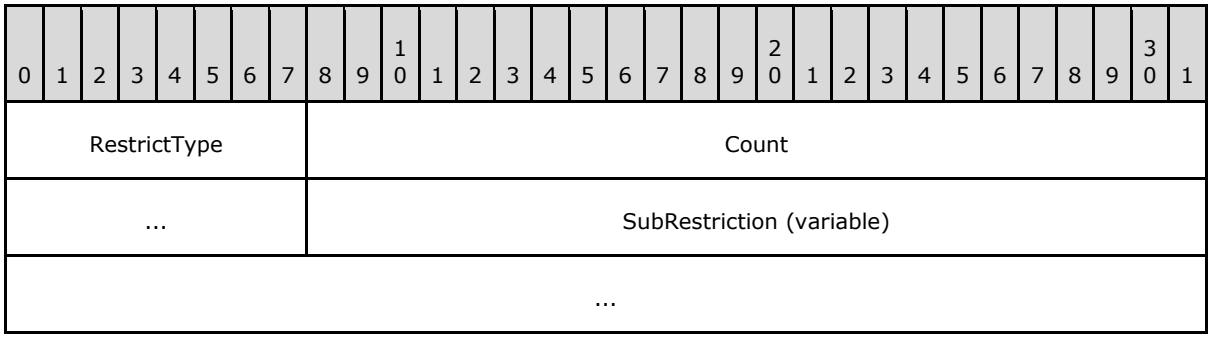
TaggedValues (variable): Array of **TaggedPropertyValue** (see section 2.11.4) structures. This field MUST contain **TaggedValuesCount** structures. The **TaggedPropertyValue** structures MUST NOT include any multi-valued properties.

RestrictionPresent (1 byte): Unsigned 8-bit integer. This field MUST contain either **TRUE** (0x01) or **FALSE** (0x00). A **TRUE** value means that the **Restriction** field is present, while a **FALSE** value indicates the **Restriction** field is not present.

Restriction (optional) (variable): A **Restriction** structure. This field is only present if **RestrictionPresent** is **TRUE**.

Clients can use a **CommentRestriction** structure to save associated comments together with a restriction they pertain to. The comments are formatted as an arbitrary array of **TaggedPropValue** structures, and servers MUST store and retrieve this information for the client. If the **Restriction** field is present, servers MUST evaluate it; if it is not present, then the **CommentRestriction** node will effectively evaluate as **TRUE**. In either case, the comments themselves have no effect on the evaluation of the restriction.

2.12.12 CountRestriction



RestrictType (1 byte): Unsigned 8-bit integer. This value indicates the type of restriction and MUST be set to 0x0B.

Count (4 bytes): Unsigned 32-bit integer. This value specifies the limit on the number of matches to be returned when **SubRestriction** is evaluated.

SubRestriction (variable): A restriction structure. This field specifies the restriction to be limited.

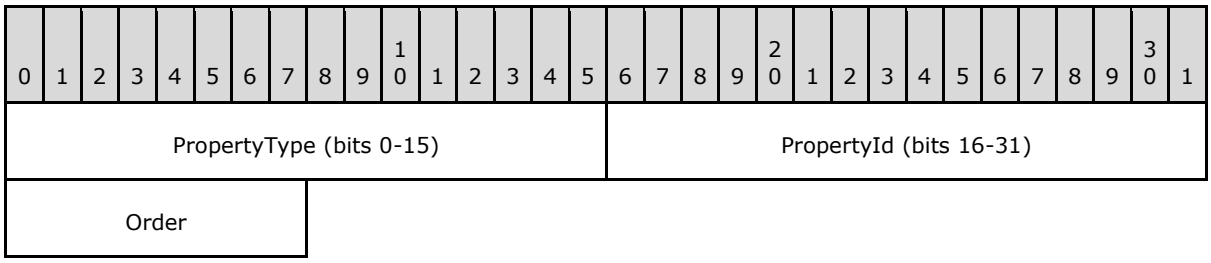
2.13 Sorting

Table sorting is performed by sending a RopSortTable ([MS-OXCROPS]) operation to the server. The sort key is specified using a **SortOrderSet** structure. The **SortOrder** structure is part of a **SortOrderSet**. The format of these two structures is specified in the subsections which follow.

2.13.1 SortOrder

The **SortOrder** structure describes one column that is part of a sort key for sorting rows of a table. It gives both the column and the direction of the sort.

SortOrder structures are typically combined into a **SortOrderSet** structure to describe multiple sort keys and directions in a RopSortTable ([MS-OXCROPS]) request.



PropertyType (bits 0-15) (2 bytes): Identifies the data type of the column to sort on. If the property is multi-valued, for example, the **MultivalueFlag** bit (0x1000) is set in the **PropertyType**, then clients MUST also set the **MultivalueInstance** bit (0x2000). In this case the server MUST generate one row for each individual value of a multivalued column, and sort the table by individual values of that column.

PropertyId (bits 16-31) (2 bytes): Identifies the column to sort on.

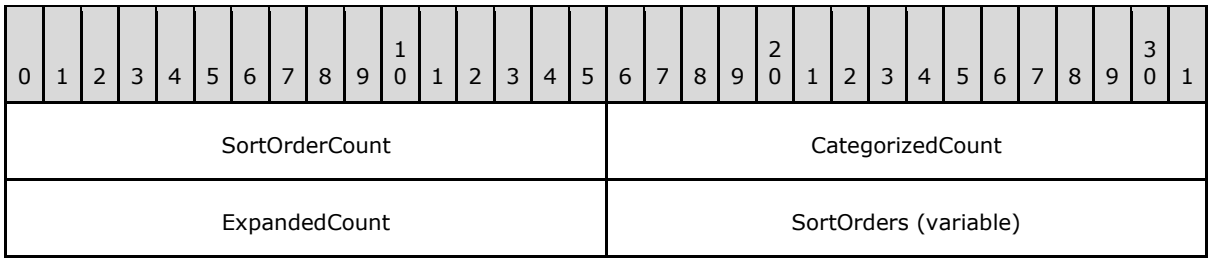
Order (1 byte): MUST be one of the following values.

Order name	Order value	Description
Ascending	0x00	Sort by this column in ascending order.
Descending	0x01	Sort by this column in descending order.
MaximumCategory	0x04	Indicates this is an aggregated column in a categorized sort, whose maximum value (within the group of items with the same value of the previous category) is to be used as the sort key for the entire group.

If the **MultivalueFlag** bit is set, then the **MultivalueInstance** bit MUST also be set, and if the **MultivalueInstance** bit is set, then the **MultivalueFlag** bit MUST also be set. In other words, it is not possible to sort on all values of a multi-valued column; one row per value MUST be generated and individual values used in the sort.

The **MaximumCategory** bit causes groups of messages in a categorized sort to be ordered by the maximum value of a column across an entire group. For example, a conversation view is grouped by PidTagConversationTopic ([MS-OXPROPS]); groups are sorted by the group's most recent (maximum) PidTagMessageDeliveryTime ([MS-OXPROPS]) value, and within each group messages are sorted by PidTagConversationIndex ([MS-OXPROPS]).

2.13.2 SortOrderSet



...

SortOrderCount (2 bytes): Unsigned 16-bit integer. This value specifies how many **SortOrder** structures are present in **SortOrders**.

CategorizedCount (2 bytes): Unsigned 16-bit integer. This value specifies that the first **CategorizedCount** columns are categorized. This value MUST be in the range "0" to **SortOrderCount**.

ExpandedCount (2 bytes): Unsigned 16-bit integer. This value specifies that the first **ExpandedCount** of the categorized columns start in an expanded state where all of the rows that apply to the category are visible in the table view. This value MUST be in the range "0" to **CategorizedCount**.

SortOrders (variable): Array of **SortOrder** structures. This field MUST contain **SortOrderCount** structures. At most one of the structures can specify a multi-valued property.

3 Structure Examples

This section provides two examples of how some of these structures would appear as a stream of bytes.

3.1 Restriction Example

The following restriction, described in high level terms, could be used to search for items with reminders set on them.

A restriction of the type **AndRestriction** with the following two sub-clauses:

1. A restriction of type **AndRestriction**, with the following eight sub-clauses:
    1. A restriction of type **PropertyRestriction** with a **relop** value of **RelationalOperatorNotEqual**, comparing the value of PidTagParentEntryId ([MS-OXPROPS]) with the PidTagEntryId ([MS-OXPROPS]) of the **Deleted Items folder** (see [MS-OXOSFLD])
    2. A restriction of type **PropertyRestriction** with a **relop** value of **RelationalOperatorNotEqual**, comparing the value of PidTagParentEntryId with the PidTagEntryId of the Junk Mail **special folder** (see [MS-OXOSFLD])
    3. A restriction of type **PropertyRestriction** with a **relop** value of **RelationalOperatorNotEqual**, comparing the value of PidTagParentEntryId with the PidTagEntryId of the Drafts special folder (see [MS-OXOSFLD])
    4. A restriction of type **PropertyRestriction** with a **relop** value of **RelationalOperatorNotEqual**, comparing the value of PidTagParentEntryId with the PidTagEntryId of the Outbox special folder (see [MS-OXOSFLD])
    5. A restriction of type **PropertyRestriction** with a **relop** value of **RelationalOperatorNotEqual**, comparing the value of PidTagParentEntryId with the PidTagEntryId of the Conflicts special folder (see [MS-OXOSFLD])
    6. A restriction of type **PropertyRestriction** with a **relop** value of **RelationalOperatorNotEqual**, comparing the value of PidTagParentEntryId with the PidTagEntryId of the Local Failures special folder (see [MS-OXOSFLD])
    7. A restriction of type **PropertyRestriction** with a **relop** value of **RelationalOperatorNotEqual**, comparing the value of PidTagParentEntryId with the PidTagEntryId of the Server Failures special folder (see [MS-OXOSFLD])
    8. A restriction of type **PropertyRestriction** with a **relop** value of **RelationalOperatorNotEqual**, comparing the value of PidTagParentEntryId with the PidTagEntryId of the Sync Issues special folder (see [MS-OXOSFLD])
2. A restriction of type **AndRestriction**, with the following three sub-clauses:
    1. A restriction of type **NotRestriction**, with the following sub-clause:
        - A restriction of type **AndRestriction**, with the following two sub-clauses:
            1. A restriction of type **ExistRestriction** that specifies the PidTagMessageClass ([MS-OXPROPS]) property
            2. A restriction of type **ContentRestriction** with a FuzzyLevel of FL_PREFIX, comparing the value of PidTagMessageClass property to the string value "IPM.Schedule"

2. A restriction of type **BitMaskRestriction** with a **BitmapRelOp** value of BMR_EQZ that compares the value of the PidTagMessageFlags ([MS-OXPROPS]) property to the ULONG value MSGFLAG_SUBMIT

3. A restriction of type **OrRestriction**, with the following two sub-clauses:

    1. A restriction of type **PropertyRestriction** with **relop RelationalOperatorEqual**, comparing the value of PidLidReminderSet ([MS-OXPROPS]) property to the Boolean value "1"

    2. A restriction of type **AndRestriction**, with the following two sub-clauses:

        1. A restriction of type **ExistRestriction** that specifies the PidLidRecurring ([MS-OXPROPS]) property

        2. A restriction of type **PropertyRestriction** with **relop RelationalOperatorEqual**, comparing the value of PidLidRecurring property to the Boolean value "1"

The following describes how this corresponds to a byte stream that is passed between the client and server.

Before formatting this data structure to send to the server, the client would need to send a RopGetPropertyIdsFromNames ([MS-OXCROPS]) request to the server to map the two named properties PidLidReminderSet and PidLidRecurring to actual property IDs.

Bytes	Field	Meaning
00	**RestrictType**	**AndRestriction**
02 00	**RestrictCount**	2
00	**RestrictType**	**AndRestriction**
08 00	**RestrictCount**	8
04	**RestrictType**	**PropertyRestriction**
05	**RelOp**	**RelationalOperatorNotEqual**
20 10 09 0E	**PropTag**	PidTagParentEntryId
	TaggedValue	**PtypBinary**
0E 02	**COUNT**	46
	Bytes	Interpreted as a **Folder EntryID**
00 00 00 00	**Flags**	Zero
EE C1 BD 78 61 11 D0 11 91 7B 00 00 00 00 00 01	**Provider UID**	UID for Mailbox store
01 00	**FolderType**	eitLTPrivateFolder
(16-byte guid specific to database)	**DatabaseGuid**	UID identifies database where folder was originally created
(6 bytes identifying Deleted Items folder)	**GlobalCounter**	UID identifies specific folder within database

Bytes	Field	Meaning
00 00	**Pad**	Zero
04	**RestrictType**	**PropertyRestriction**
05	**RelOp**	**RelationalOperatorNotEqual**
20 10 09 0E	**PropTag**	PidTagParentEntryId
	TaggedValue	**PtypBinary**
0E 02	**COUNT**	46
	Bytes	Interpreted as a **Folder EntryID**
00 00 00 00	**Flags**	Zero
EE C1 BD 78 61 11 D0 11 91 7B 00 00 00 00 00 01	**Provider UID**	UID for Mailbox store
01 00	**FolderType**	eitLTPrivateFolder
(16-byte guid specific to database)	**DatabaseGuid**	UID identifies database where folder was originally created
(6 bytes identifying Junk Mail folder)	**GlobalCounter**	UID identifies specific folder within database
00 00	**Pad**	Zero
04	**RestrictType**	**PropertyRestriction**
05	**RelOp**	**RelationalOperatorNotEqual**
20 10 09 0E	**PropTag**	PidTagParentEntryId
	TaggedValue	**PtypBinary**
0E 02	**COUNT**	46
	Bytes	Interpreted as a **Folder EntryID**
00 00 00 00	**Flags**	Zero
EE C1 BD 78 61 11 D0 11 91 7B 00 00 00 00 00 01	**Provider UID**	UID for Mailbox store
01 00	**FolderType**	eitLTPrivateFolder
(16-byte guid specific to database)	**DatabaseGuid**	UID identifies database where folder was originally created
(6 bytes identifying Drafts folder)	**GlobalCounter**	UID identifies specific folder within database

Bytes	Field	Meaning
00 00	**Pad**	Zero
04	**RestrictType**	**PropertyRestriction**
05	**RelOp**	**RelationalOperatorNotEqual**
20 10 09 0E	**PropTag**	PidTagParentEntryId
	TaggedValue	**PtypBinary**
0E 02	**COUNT**	46
	Bytes	Interpreted as a **Folder EntryID**
00 00 00 00	**Flags**	Zero
EE C1 BD 78 61 11 D0 11 91 7B 00 00 00 00 00 01	**Provider UID**	UID for Mailbox store
01 00	**FolderType**	eitLTPrivateFolder
(16-byte guid specific to database)	**DatabaseGuid**	UID identifies database where folder was originally created
(6 bytes identifying Outbox folder)	**GlobalCounter**	UID identifies specific folder within database
00 00	**Pad**	Zero
04	**RestrictType**	**PropertyRestriction**
05	**RelOp**	**RelationalOperatorNotEqual**
20 10 09 0E	**PropTag**	PidTagParentEntryId
	TaggedValue	**PtypBinary**
0E 02	**COUNT**	46
	Bytes	Interpreted as a **Folder EntryID**
00 00 00 00	**Flags**	Zero
EE C1 BD 78 61 11 D0 11 91 7B 00 00 00 00 00 01	**Provider UID**	UID for Mailbox store
01 00	**FolderType**	eitLTPrivateFolder
(16-byte guid specific to database)	**DatabaseGuid**	UID identifies database where folder was originally created
(6 bytes identifying Conflicts folder)	**GlobalCounter**	UID identifies specific folder within database

Bytes	Field	Meaning
00 00	**Pad**	Zero
04	**RestrictType**	**PropertyRestriction**
05	**RelOp**	**RelationalOperatorNotEqual**
20 10 09 0E	**PropTag**	PidTagParentEntryId
	TaggedValue	**PtypBinary**
0E 02	**COUNT**	46
	Bytes	Interpreted as a **Folder EntryID**
00 00 00 00	**Flags**	Zero
EE C1 BD 78 61 11 D0 11 91 7B 00 00 00 00 00 01	**Provider UID**	UID for Mailbox store
01 00	**FolderType**	eitLTPrivateFolder
(16-byte guid specific to database)	**DatabaseGuid**	UID identifies database where folder was originally created
(6 bytes identifying Local Failures folder)	**GlobalCounter**	UID identifies specific folder within database
00 00	**Pad**	Zero
04	**RestrictType**	**PropertyRestriction**
05	**RelOp**	**RelationalOperatorNotEqual**
20 10 09 0E	**PropTag**	PidTagParentEntryId
	TaggedValue	**PtypBinary**
0E 02	**COUNT**	46
	Bytes	Interpreted as a **Folder EntryID**
00 00 00 00	**Flags**	Zero
EE C1 BD 78 61 11 D0 11 91 7B 00 00 00 00 00 01	**Provider UID**	UID for Mailbox store
01 00	**FolderType**	eitLTPrivateFolder
(16-byte guid specific to database)	**DatabaseGuid**	UID identifies database where folder was originally created
(6 bytes identifying Server Failures folder)	**GlobalCounter**	UID identifies specific folder within database

Bytes	Field	Meaning
00 00	**Pad**	Zero
04	**RestrictType**	**PropertyRestriction**
05	**RelOp**	**RelationalOperatorNotEqual**
20 10 09 0E	**PropTag**	PidTagParentEntryId
	TaggedValue	**PtypBinary**
0E 02	**COUNT**	46
	Bytes	Interpreted as a **Folder EntryID**
00 00 00 00	**Flags**	Zero
EE C1 BD 78 61 11 D0 11 91 7B 00 00 00 00 00 01	**Provider UID**	UID for Mailbox store
01 00	**FolderType**	eitLTPrivateFolder
(16-byte guid specific to database)	**DatabaseGuid**	UID identifies database where folder was originally created
(6 bytes identifying Sync Issues folder)	**GlobalCounter**	UID identifies specific folder within database
00 00	**Pad**	Zero
00	**RestrictType**	**AndRestriction**
03 00	**RestrictCount**	3
02	**RestrictType**	**NotRestriction**
00	**RestrictType**	**AndRestriction**
02 00	**RestrictCount**	2
08	**RestrictType**	**ExistRestriction**
1F 00 1A 00	**PropTag**	PidTagMessageClass
03	**RestrictType**	**ContentRestriction**
02 00	**FuzzyLevelLow**	FL_PREFIX
00 00	**FuzzyLevelHigh**	
1F 00 1A 00	**PropertyTag**	PidTagMessageClass
49 00 50 00 4D 00 2E 00 53 00 63 00 68 00 65 00 64 00 75 00	**PropValue**	"IPM.Schedule"

Bytes	Field	Meaning
6C 00 65 00 00 00		
06	**RestrictType**	**BitMaskRestriction**
00	**BitmapRelOp**	BMR_EQZ
03 00 07 0E	**PropTag**	PidTagMessageFlags
04 00 00 00	**Mask**	MSGFLAG_SUBMIT
01	**RestrictType**	**OrRestriction**
02 00	**RestrictCount**	2
04	**RestrictType**	**PropertyRestriction**
04	**RelOp**	**RelationalOperatorEqual**
0B 00 + (2-byte mapped prop id)	**PropTag**	PidLidReminderSet
01	**PropValue**	TRUE
00	**RestrictType**	**AndRestriction**
02 00	**RestrictCount**	2
08	**RestrictType**	**ExistRestriction**
0B 00 + (2-byte mapped prop id)	**PropTag**	PidLidRecurring
04	**RestrictType**	**PropertyRestriction**
04	**RelOp**	**RelationalOperatorEqual**
0B 00 + (2-byte mapped prop id)	**PropTag**	PidLidRecurring
01	**PropValue**	TRUE

3.2 PropertyRow Example

In this example, the client sends RopGetPropertiesSpecific ([MS-OXCROPS]) to the server requesting the properties from an open Message object:

Hexadecimal value	Property ID	Property type
0E070003	PidTagMessageFlags ([MS-OXPROPS])	**PtypInteger32**
00370001	PidTagSubject ([MS-OXPROPS])	**PtypUnspecified**
1000001F	PidTagBody ([MS-OXPROPS])	**PtypString**

Additional assumptions used in this example:

- This message had been sent to this mailbox from a different user.
- The message contained an attachment.
- The message had been already read by the user but had not been modified.
- The subject of this message is "Hello".
- The body of the message is so large that the server requires the client to stream the body to the client.

Under these conditions, the **PropertyRow** data returned from the server would use the **FlaggedPropertyRow** structure variant (see section 2.11.5) to return the data from RopGetPropertiesSpecific with the following data:

Bytes	Field	Meaning
01	Flag for PropertyRow	There were either errors retrieving values or some values were not returned.
00	Flag for **FlaggedPropertyValue** (see section 2.11.5)	The value for this property is returned.
13 00 00 00	**PtypInteger32 PropertyValue**	MSGFLAG_READ |MSGFLAG_UMODIFIED |MSGFLAG_HASATTACH
1F 00	PropertyType for **FlaggedPropertyValueWithType** (see section 2.11.6)	PtypString
00	Flag for **FlaggedPropertyValueWithType**	PropertyRestriction
48 00 65 00 6C 00 6C 00 6F 00 00 00	String PropertyValue	"Hello"
0A	Flag for **FlaggedPropertyValue**	The value for this property was not returned. RopOpenStream ([MS-OXCROPS]) can be used to obtain the property value.

Bytes	Field	Meaning
0E 00 07 80	32-bit SCODE	NotEnoughMemory error (see section 2.4).

4 Security Considerations

There are no special security considerations for this protocol over and above those specified in [MS-OXCRPC].

5 Appendix A: Product Behavior

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

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

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

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

<1> Section 2.2.2: Exchange 2007 does not support the obsolete NNTP Newsgroup Folder EntryID.

<2> Section 2.2.5.3: Office Outlook 2003 and Office Outlook 2007 can leave three extra bytes not filled at the end of the contact Address EntryID structure; in other words, the sum of all fields specified in this protocol can be three bytes less than the count of bytes of the entire EntryID. The value of the extra three bytes has no meaning to either the server or the client.

<3> Section 2.2.5.4: Office Outlook 2003 and Office Outlook 2007 can leave three extra bytes not filled at the end of the Personal distribution list EntryID structure; in other words, the sum of all fields specified in this protocol can be 3 bytes less than the count of bytes of the entire EntryID. The value of the extra 3 bytes has no meaning to either the server or the client.

<4> Section 2.8.2: Exchange 2003, Exchange 2007, and Exchange 2010 can return values larger than 255 bytes or characters.

<5> Section 2.12.5.1: Exchange 2003, Exchange 2007, Office Outlook 2003, Office Outlook 2007, and Outlook 2010 support **RelationalOperatorEqual** and **RelationalOperatorNotEqual** when **PropTag** is single-valued and **TaggedValue** is multi-valued. The value of property **PropTag** is compared with each value of **TaggedValue**. If there are any matches, **RelationalOperatorEqual** is satisfied. If there are no matches, then **RelationalOperatorNotEqual** is satisfied.

6 Change Tracking

This section identifies changes that were made to the [MS-OXCDATA] protocol document between the May 2010 and August 2010 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

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

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

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- 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
1.1 Glossary	56835 Added Deleted Items folder to the list of terms defined in [MS-OXGLOS].	N	Content update.
1.2.1 Normative References	55751 Moved [MS-OXGLOS] from Normative References section to Informative References section.	N	Content update.
1.2.1 Normative References	56209 Removed reference to [MS-OXCNOTIF].	N	Content update.
1.2.1 Normative References	57595 Added [MS-OXCMAIL] and [RFC2045] to list of references.	N	Content update.
2.2.1.1 Folder ID (FID)	56609 Revised description of folder ID.	N	Content update.
2.2.1.3 Global Identifier (GID)	55191 Updated the section title.	N	Content update.
2.2.1.3 Global Identifier (GID)	56439 Revised description of "GlobalCounter" field.	N	Content update.
2.2.3 General EntryID Structure	55834 Removed table number.	N	Editorially updated.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
2.2.4.1 Folder EntryID	55834 Added cross-reference to table of values for "FolderType" field.	N	Content update.
2.2.4.2 Message EntryID	55834 Added cross-reference to table of values for "MessageType" field.	N	Content update.
2.2.4.2 Message EntryID	56439 Revised introductory text.	N	Content update.
2.2.5.2 Address Book EntryID	55834 Removed table number.	N	Editorially updated.
2.2.5.3 Contact Address EntryID	56611 Revised product behavior note.	N	Product behavior note updated.
2.2.5.4 Personal Distribution List EntryID	56611 Revised product behavior note.	N	Product behavior note updated.
2.4 Error Codes	56210 Renamed duplicate "ObjectDeleted" error to "SyncObjectDeleted" and corrected hexadecimal value.	N	Content update.
2.4.1 Additional Error Codes	53953 Added new error codes.	N	Content update.
2.4.1 Additional Error Codes	55251 Added "SearchFolderScopeViolation" error code.	N	Content update.
2.4.3 Warning Codes	55478 Corrected type and value in example.	N	Content update.
2.6.1 PropertyName	56248 Replaced "FLATUID" with "FlatUID".	N	Content update.
2.7 PropertyProblem	55834 Added cross-reference for error codes.	N	Content update.
2.8.1 PropertyRow	56209 Removed reference to table notification structures.	N	Content update.
2.11.1 Property Data Types	56304 Replaced "value type" with "data type".	N	Content update.
2.11.1.2 Multi-Valued Property Value Instances	55834 Added cross reference for property types.	N	Content update.
2.11.1.5	56304	N	Content

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
WebDAV Property Data Types	Replaced "value type" with "data type".		update.
2.11.1.5.1 Multi-Valued WebDAV Property Data Types	56304 Replaced "value type" with "data type".	N	Content update.
2.11.2.1 PropertyValue	55834 Removed table number.	N	Editorially updated.
2.11.6 FlaggedPropertyValueWithType	55191 Added a link to the section containing the Property Value Types table.	N	Content update.
2.11.6 FlaggedPropertyValueWithType	56266 Revised description of "PropertyValue" field.	N	Content update.
2.11.7 TypedString	55832 Moved possible values of "StringType" field into a table.	N	Editorially updated.
2.12.5.1 PropertyRestriction	55493 Replaced "Boolean" with "PtypBoolean".	N	Content update.
2.12.6.1 CompareProperties Restriction	55493 Replaced "Boolean" with "PtypBoolean".	N	Content update.
2.12.7.1 BitMaskRestriction	55832 Moved possible values of "BitmapRelOp" field into a table.	N	Editorially updated.
2.12.10.1 SubObjectRestriction	55494 Moved possible values of "Subobject" field into a table.	N	Editorially updated.
3.1 Restriction Example	56208 Removed normative language from example.	N	Content update.
3.1 Restriction Example	56439 Revised organization and numbering in description text for example.	N	Content update.
3.1 Restriction Example	56835 Added Deleted Items folder as a glossary term.	N	Content update.
Global	55921 Changed reference [W3C-XML] to [XMLSCHEMA2/2].	N	Content update.
6 Change Tracking	56302 Removed section 2.8.	Y	Content removed.

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