opentext™

GroupWise® Software Developer Kit
IMAP Support

Legal Notices

Contents

About This Guide

IMAP is a protocol that provides access to and manipulation of electronic mail messages that are stored on a server. IMAP includes operations for creating, deleting, and renaming mailboxes, checking for new messages; permanently removing messages; setting and clearing flags; and searching and filtering message attributes and texts.

Support for the GroupWise implementation of IMAP is based on RFC 2060, version 4rev1 and RFC 3501. For more information on the specification, see RFC 2060 (http://www.faqs.org/rfcs/rfc2060.html) and RFC 3501 (http://www.faqs.org/rfcs/rfc3501.html).

Note that IMAP does not specify a protocol for sending messages (or message delivery). For this functionality, use a mail transfer protocol such as SMTP (http://www.ietf.org/rfc/rfc821.txt).

IMPORTANT: Unless otherwise marked, the features in GroupWise IMAP will work with GroupWise 8 and later versions.

This guide contains the following sections:

Audience

This guide is intended for designed for developers that are using Internet Message Access Protocol (IMAP) to access GroupWise email.

Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the User Comment feature at the bottom of each page of the online documentation and enter your comments there.

Additional Documentation

For additional GroupWise SDK documentation, see the GroupWise documentation Web site.

1 RFC Information

This section details compliance with RFC2060 required, recommended, optional, and prohibited behaviors of an IMAP server. RFC3501 compliance is assumed unless specifically documented otherwise.

RFC2222 SASL

The Simple Authentication and Security Layer (SASL) is a method based on RFC2222 for adding authentication support to connection-based protocols. To use this specification, a protocol includes a command for identifying and authenticating a user to a server and for optionally negotiating a security layer for subsequent protocol interactions. The command has a required parameter that identifies an SASL mechanism.

SASL mechanisms are named by strings, from 1-20 characters in length, that consist of uppercase letters, digits, hyphens, and underscores. SASL mechanism names must be registered with the IANA. Exact registration procedures are given in the "Registration Procedures" section of RFC2222.

Mechanisms	Owner	Reference
KERBEROS_V4	IESG <iesg@ietf.org>	RFC2222
		For more information, see "Simple Authentication and Security Layer (SASL)" by J. Myers in the October 1997 issues of Netscape Communications.
GSSAPI	IESG <iesg@ietf.org>	RFC2222

Mechanisms	Owner	Reference
SKEY (OBSOLETE)	IESG <iesg@ietf.org>	RFC2444
		For more information, see "The One-Time-Password SASL Mechanism" by C. Newman in October 1998.
EXTERNAL	IESG <iesg@ietf.org>	RFC2222
CRAM-MD5	IESG <iesg@ietf.org>	RFC2195
		For more information, see "IMAP/POP Authorize Extension for Simple Challenge/Response" by J. Klensin, R. Catoe, and P. Krumviede from MCI in September 1997.
ANONYMOUS	IESG <iesg@ietf.org>	RFC2245
		For more information, see "Anonymous SASL Mechanism" by C. Newman at Innosoft in November 1997.
OTP	IESG <iesg@ietf.org>	RFC2444
GSS_SPNEGO	Paul Leach <paulle@microsoft.com>	Leach
PLAIN	IESG <iesg@ietf.org>	RFC2595
		For more information, see "Using TLS with IMAP, POP3, and ACAP" by C. Newman at Innosoft in June 1999.
SECURID	Magnus Nystrom <magnus@rsasecurity.com>	RFC2808
		For more information, see "The SecurID(r) SASL Mechanism" by M. Nystrom in April 2000.
NTLM	Paul Leach <paulle@microsoft.com>	Leach
NMAS_LOGIN	Mark G. Gayman <mgayman@novell.com>	Gayman
NMAS_AUTHEN	Mark G. Gayman <mgayman@novell.com>	Gayman
DIGEST-MD5	IESG <iesg@ietf.org>	RFC2831
		For more information, see "Using Digest Authentication as a SASL Mechanism" by P. Leach and C. Newman in May 2000.
9798-U-RSA-SHA1-ENC	robert.zuccherato@entrust.com	RFC3163
		For more information, see "ISO/IEC 9798-3 Authentication SASL Mechanism" by R. Zuccherato and M. Nystrom in August 2001.

Mechanisms	Owner	Reference
9798-M-RSA-SHA1-ENC	robert.zuccherato@entrust.com	RFC3163
9798-U-DSA-SHA1	robert.zuccherato@entrust.com	RFC3163
9798-M-DSA-SHA1	robert.zuccherato@entrust.com	RFC3163
9798-U-ECDSA-SHA1	robert.zuccherato@entrust.com	RFC3163
9798-M-ECDSA-SHA1	robert.zuccherato@entrust.com	RFC3163

Protocol Overview (RFC Section 2)

This section briefly outlines the following overall functions of IMAP:

Link Level (RFC Section 2.1)

Full compliance.

The RFC states that "an IMAP4rev1 server listens on port 143." (Port 993 is used for SSL connections.) By default, that is where the GroupWise IMAP agents listen. However, GroupWise allows an administrator to change the IMAP port (and the SSL port) on which to listen, in case there is a need to run more than one IMAP agent on the same server.

Commands and Responses (RFC Section 2.2)

Full compliance.

The initial greeting from the GroupWise IMAP agents is as follows:

```
S: * OK GroupWise IMAP4rev1 Server Ready
```

Client Protocol Sender and Server Protocol Receiver (RFC Section 2.2.1)

Full compliance.

Server Protocol Sender and Client Protocol Receiver (RFC Section 2.2.2)

Full compliance.

No data is sent unilaterally by the server.

Message Attributes (RFC Section 2.3)

Full compliance.

For details on subsections of 2.3, see the following:

Message Numbers (RFC Section 2.3.1)

Full compliance.

The GroupWise IMAP agents are fully compliant with the message numbers as described in the RFC. However, they are not viewable from a GroupWise client and are not accessible from other GroupWise APIs.

Unique Identifier (UID) Message Attribute (RFC Section 2.3.1.1)

Full compliance.

The GroupWise IMAP agents are fully compliant with the message uniqueidentifiers described in the RFC. Also, the mailbox unique identifier validity values returned by the GroupWise IMAP agents are in compliance with the RFC.

Message Sequence Number Message Attribute (RFC Section 2.3.1.2)

Full compliance.

The GroupWise IMAP agents are fully compliant with the message sequence numbers as described in the RFC.

Flags Message Attribute (RFC Section 2.3.2)

Full compliance.

The IMAP system flags map to the following GroupWise fields:

\Sent	Item Status field, Read bit (Setting this bit also sets the Opened bit. Clearing this bit does not clear the Opened bit.)
\Answered	Item Status field, Replied bit
\Flagged	Follow-up Flag **NOTE:** Prior to GroupWise 2014 R2, this mapped to Priority field, Priority High bit.
\Deleted	Special IMAP Item Deleted bit on the Folder Flags field (This is not the Deleted bit on the Item Status field.)
\Draft	Box Type field, Draft bit
\Recent	Recent is a calculation determined by the Delivered Date being newer than the last time the mailbox was selected with SELECT or the last NOOP. This calculation holds true for each session, even if multiple sessions are simultaneously active on the same mailbox.

The GroupWise IMAP agents support client-defined keywords. Only permanent keywords are supported. GroupWise defines one such keyword, $ImapSent, which (when used with the APPEND command) sets the Box Type field of the message to Sent. (This is known in GroupWise as a sent item.)

Internal Date Message Attribute (RFC Section 2.3.3)

Full compliance.

The IMAP internal date is the same as the GroupWise Delivered Date field.

Size Message Attribute (RFC Section 2.3.4 [RFC 822])

Full compliance.

GroupWise messages do not always store data as a MIME. Because of this, the first time the MIME is generated, a size is calculated. The calculated size is stored with the message for future reference to improve performance when retrieving this attribute.

If the MIME representation is generated again, the calculated size is updated (if any changes to the MIME generation code have been made).

Envelope Structure Message Attribute (RFC Section 2.3.5)

Full compliance.

Body Structure Message Attribute (RFC Section 2.3.6)

Full compliance.

Message Texts (RFC Section 2.4)

Full compliance.

State and Flow Diagram (RFC Section 3)

The GroupWise 6.5 POA IMAP agent implemented a new Trusted Application Authenticated state.

NOTE: The GroupWise IMAP agents do not support pre-authenticated connections.

This section briefly outlines the following state and flow functions of IMAP:

- "Non-Authenticated State (RFC Section 3.1)" on page 13
- "Authenticated State (RFC Section 3.2)" on page 13
- "Selected State (RFC Section 3.3)" on page 14
- "Logout State (RFC Section 3.4)" on page 14

Non-Authenticated State (RFC Section 3.1)

Full compliance.

The Trusted Application Authenticated state is entered from this state.

Trusted Application Authenticated State (RFC Section 3.1.1)

To enter the intermediate GroupWise Trusted Application Authenticated state, use the GroupWise XGWTRUSTEDAPP authentication mechanism (using the IMAP AUTHENTICATE command) and provide the Trusted Application credentials, as outlined in the GroupWise Trusted Application API documentation.

When the Authenticated state is entered from the Trusted Application Authenticated state, the LOGOUT command logs out the current user and returns to the Trusted Application Authenticated state. A LOGOUT command from the Trusted Application Authenticated state closes the connection.

Enter the Authenticated state by using the normal LOGIN command. The user's password is not required.

If a LOGIN command is issued while in the Authenticated state, the current user is first logged out, the connection returns to the Trusted Application Authenticated state, and the login is attempted.

Some GroupWise extensions are available in the Trusted Application Authenticated state, such as XGWTAULIST (which lists all the users on the current Post Office).

The GroupWise XGWTRUSTEDAPP extension to the AUTHENTICATE command uses the "+" continuation character to indicate the server's readiness to receive the Trusted Application credentials.

Authenticated State (RFC Section 3.2)

Full compliance.

When the Authenticated state is entered from the Trusted Application Authenticated state, the LOGOUT command logs out the current user and returns to the Trusted Application Authenticated state. A LOGOUT command from the Trusted Application Authenticated state closes the connection.

If a LOGIN command is issued while in the Authenticated state, the current user is first logged out, the connection returns to the Non-Authenticated state, and the login is attempted.

Selected State (RFC Section 3.3)

Full compliance.

The GroupWise predefined folders named Work in Progress, Documents, and Contacts are not returned in the LIST response.

GroupWise also predefines several folder types (such as: query, IMAP, NNTP, hidden, or accepted). These folder types are not included in the LIST response.

Logout State (RFC Section 3.4)

Full compliance.

When the Authenticated state is entered from the Trusted Application Authenticated state, the LOGOUT command logs out the current user and returns to the Trusted Application Authenticated state. A LOGOUT command from the Trusted Application Authenticated state closes the connection.

To switch access to a different user's account (without having to disconnect and reconnect), use the LOGIN command. Using the LOGIN command (when you are already authenticated) logs out the current user, returns the connection to the Non-Authenticated state, and then tries to log into another user's account.

Data Formats (RFC Section 4)

This section briefly outlines the following data formats of IMAP:

- "Atom (RFC Section 4.1)" on page 15
- "Number (RFC Section 4.2)" on page 15
- "String (RFC Section 4.3)" on page 15
- "Parenthesized List (RFC Section 4.4)" on page 15
- "NIL (RFC Section 4.5)" on page 15

Atom (RFC Section 4.1)

Full compliance.

Number (RFC Section 4.2)

Full compliance.

String (RFC Section 4.3)

Full compliance.

8-Bit and Binary Strings (RFC Section 4.3.1)

Partial compliance.

The GroupWise IMAP agents do not consider any amount of CTL characters within a string to be excessive.

Parenthesized List (RFC Section 4.4)

Full compliance.

NIL (RFC Section 4.5)

Full compliance.

Operational Considerations (RFC Section 5)

This section briefly outlines the following operational considerations of IMAP:

Mailbox Naming (RFC Section 5.1)

Full compliance.

IMAP mailboxes are known in GroupWise as folders. For example, the IMAP INBOX mailbox maps to the GroupWise Mailbox folder. Prior to GroupWise 6.5 SP1, GroupWise listed the predefined Mailbox folder as Inbox. For SP1 and later versions, the Mailbox folder is now designated as INBOX (in accordance with the RFC).

The GroupWise IMAP agents prevent renaming GroupWise predefined folders (such as Cabinet and Calendar). These GroupWise predefined folders are returned using the language of the IMAP agent or Post Office (in the LIST or LSUB command response).

Mailbox Hierarchy Naming (RFC Section 5.1.1)

Full compliance.

The GroupWise hierarchy separator character is "/".

Mailbox Namespace Naming Convention (RFC Section 5.1.2)

Full compliance.

Mailbox International Naming Convention (RFC Section 5.1.3)

Full compliance.

Mailbox Size and Message Status Updates (RFC Section 5.2)

The GroupWise IMAP agents do not send unsolicited mailbox size or message status updates. Commands that return the mailbox size and the message status flags (such as FETCH FLAGS, STATUS, SELECT, and NOOP) do so appropriately.

The NOOP command indicates message EXPUNGES or FLAGS command updates in the server response.

Response When No Command In Progress (RFC Section 5.3)

The GroupWise IMAP agents do not send responses when no command is in progress.

Auto Logout Timer (RFC Section 5.4)

Full compliance.

The GroupWise IMAP agents automatically logout a connection that has no activity in the last 30 minutes. (This same 30-minute inactivity period is also enforced on all GroupWise client connections.)

Client Commands (RFC Section 6)

Full compliance, except as noted.

The GroupWise specific XGWTAULIST extension is supported only by the GroupWise POA—and not by the GWIA.

This section briefly outlines the following client commands of IMAP:

Client Commands - Any State (RFC Section 6.1)

The GroupWise IMAP agents support the following client commands in any state:

CAPABILITY Command (RFC Section 6.1.1)

Full compliance.

One example of a CAPABILITY command response from a GroupWise IMAP agent that is configured to support STARTTLS follows:

```
C; A001 CAPABILITY
S: * CAPABILITY IMAP4rev1 STARTTLS
S: A001 OK CAPABILITY completed
```

If the agent supports the Trusted Application authentication method, one example of a response follows:

```
C: A001 CAPABILITY
S: * CAPABILITY IMAP4rev1 STARTTLS AUTH=XGWTRUSTEDAPP XGWEXTENSIONS
S: A001 OK CAPABILITY completed
```

CAPABILITY returns XGWEXTENSIONS to indicate that the XGWEXTENSIONS command should be issued to get a list of all the supported GroupWise specific extensions.

NOOP Command (RFC Section 6.1.2)

Full compliance.

The GroupWise IMAP agents return the untagged EXPUNGE or FLAGS responses.

One example of a GroupWise IMAP agent response follows:

```
C: A004 NOOP
S: * 21 EXISTS
S: * 1 RECENT
S: * OK [UNSEEN 15]
S: A004 OK NOOP completed
```

LOGOUT Command (RFC Section 6.1.3)

Full compliance.

One example of a GroupWise IMAP agent response follows:

```
C: A010 LOGOUT
S: * BYE IMAP4rev1 Server Disconnect
S: A010 OK LOGOUT completed
```

If the Authenticated state was entered from the Trusted Application Authenticated state, the LOGOUT command logs out the user and returns to the Trusted Application Authenticated state. In this case, the untagged BYE response is omitted.

An example of what might be returned follows:

```
C: A009 LOGOUT
S: A009 OK LOGOUT completed
```

Client Commands - Non-Authenticated State (RFC Section 6.2)

The GroupWise IMAP agents support the user name and plain text password pair for the LOGIN command but do not support the anonymous user name.

For specific information about subsections, see the following:

- "AUTHENTICATE Command (RFC Section 6.2.1)" on page 19
- "LOGIN Command (RFC Section 6.2.2)" on page 20

AUTHENTICATE Command (RFC Section 6.2.1)

The only authentication mechanism (other than plain text) that the GroupWise IMAP agents support is the GroupWise Trusted Application authentication. The Trusted Application authentication requires the application to provide a valid application name and key (concatenated and base64 encoded as outlined in the GroupWise Trusted Application API documentation).

One example of a GroupWise IMAP agent response follows:

```
C: A002 AUTHENTICATE XGWTRUSTEDAPP
S: +
C: XGWTRUSTEDAPP VHJ1c3RlZEFwcCBEZW1vADdFNUQ3NjkwMDM4ODAwMDBBRTJF
OEUwMDlBMDBCQjAwN0U1RDc2OTEwMzg4MDAwMEFFMkU4RTAwOUEwMEJCMDA=
S: A002 OK XGWTRUSTEDAPP authentication successful
```

Once authenticated, the connection is moved to the Trusted Application Authenticated state. From this state, some GroupWise specific commands and a passwordless LOGIN are available.

GroupWise IMAP agents use the "+" continuation character to indicate that a response should follow.

LOGIN Command (RFC Section 6.2.2)

Full compliance.

One example of a GroupWise IMAP agent response follows:

```
C: A002 LOGIN User1 secret
S: A002 OK LOGIN completed
```

If the LOGIN command is used after authenticating as a Trusted Application, the LOGIN command requires only the user name. If a password is provided, it is verified. A subsequent LOGOUT command returns the connection to the Trusted Application Authenticated state.

The GWIA supports logins for users from any reachable post office. The POA supports logins for users only on that post office.

An untagged BYE is returned when the POA terminates the connection (unless the application requested a logout).

LOGIN is allowed from the EXAMINE state.

Client Commands - Authenticated State (RFC Section 6.3)

For specific information about subsections, see the following:

SELECT Command (RFC Section 6.3.1)

Full compliance.

The GroupWise IMAP agents return the optional PERMANENTFLAGS and UNSEEN responses. The GroupWise IMAP agents are fully compliant with the mailbox unique identifier validity values as described in the RFC.

An untagged UIDNEXT response is returned on SELECT (for RFC3501 compliance).

The first 4962 items are returned.

The Contacts predefined folder is not selectable. Hidden or accepted folder types are also not selectable.

One example of an agent response follows:

```
C: A003 SELECT Inbox
S: * 20 EXISTS
S: * 0 RECENT
S: * OK [UNSEEN 15]
S: * OK [UIDVALIDITY 1027023936]
S: * FLAGS (\Answered \Flagged \Deleted \Draft \Seen)
S: * OK [PERMANENTFLAGS (\Answered \Flagged \Deleted \Draft \Seen \*)]
S: A003 OK [READ-WRITE] SELECT completed
```

If the SELECT command is used without specifying a mailbox name, it selects the GroupWise root folder (which is the GroupWise folder that is labeled with the user's name). If SELECT is used in this manner, one example of a response follows:

```
C: A003 SELECT
S: * 0 EXISTS
S: * 0 RECENT
S: * OK [UIDVALIDITY 1047685046]
S: * FLAGS (\Answered \Flagged \Deleted \Draft \Seen)
S: * OK [PERMANENTFLAGS (\Answered \Flagged \Deleted \Draft
   \Seen \*)]
S: A003 OK [READ-WRITE] SELECT completed
```

EXAMINE Command (RFC Section 6.3.2)

Full compliance.

The GroupWise IMAP agents return the optional PERMANENTFLAGS and UNSEEN responses. GroupWise IMAP agents are fully compliant with the mailbox unique identifier validity values as described in the RFC.

The Contacts predefined folder is not selectable. Hidden or accepted folder types are also not selectable.

One example of an agent response follows:

```
C: A003 EXAMINE Inbox
S: * 20 EXISTS
S: * 0 RECENT
S: * OK [UNSEEN 15]
S: * OK [UIDVALIDITY 1027023936]
S: * FLAGS (\Answered \Flagged \Deleted \Draft \Seen)
S: * OK [PERMANENTFLAGS ()]
S: A003 OK [READ-ONLY] EXAMINE completed
```

If the EXAMINE command is used without specifying a mailbox name, it examines the GroupWise root folder (which is the GroupWise folder that is labeled with the user's name). If EXAMINE is used in this manner, one example of a response follows:

```
C: A003 EXAMINE
S: * 0 EXISTS
S: * 0 RECENT
S: * OK [UIDVALIDITY 1047685046]
S: * FLAGS (\Answered \Flagged \Deleted \Draft \Seen)
S: * OK [PERMANENTFLAGS ()]
S: A003 OK [READ-ONLY] EXAMINE completed
```

CREATE Command (RFC Section 6.3.3)

Full compliance.

GroupWise IMAP agents do not require the server's hierarchy separator character. If the character is present, it is ignored.

One example of an agent response follows:

```
C: A003 CREATE "Current Projects"
S: A003 OK CREATE completed
```

DELETE Command (RFC Section 6.3.4)

Partial compliance.

GroupWise IMAP agents do not allow the deletion of GroupWise predefined folders (including the Inbox). Also, the agents do not permit the deletion of a mailbox that has inferior hierarchical names (or sub-mailboxes).

Recreating a GroupWise mailbox with the same name as an existing mailbox generates a different unique identifier validity value. Because of this functionality, the GroupWise IMAP agents do not keep track of the last used UID of the mailbox.

One example of an agent response follows:

```
C: A004 DELETE "Current Projects"
S: A004 OK DELETE completed
```

RENAME Command (RFC Section 6.3.5)

Partial compliance.

The GroupWise IMAP agents do not permit the renaming of GroupWise predefined folders (including the Inbox). However, the agents preserve both the unique identifier validity value of the mailbox being renamed and the UIDs for all messages in the mailbox.

One example of an agent response follows:

```
C: A004 RENAME "Current Projects" "Old Projects"
S: A004 OK RENAME completed
```

SUBSCRIBE Command (RFC Section 6.3.6)

Partial compliance.

The GroupWise IMAP agents remove an existing mailbox name from the subscription list when the mailbox is deleted. (Subscription is an attribute of the mailbox.) The agents also validate the mailbox name before subscribing.

The SUBSCRIBE command is disallowed on mailboxes that have the \NoSelect attribute set.

One example of an agent response follows:

```
C: A004 SUBSCRIBE "Current Projects"
S: A004 OK SUBSCRIBE completed
```

UNSUBSCRIBE Command (RFC Section 6.3.7)

Full compliance.

One example of an agent response follows:

```
C: A005 UNSUBSCRIBE "Current Projects"
S: A005 OK UNSUBSCRIBE completed
```

LIST Command (RFC Section 6.3.8)

Full compliance.

The GroupWise hierarchy character separator character is "/".

One example of an agent response follows:

```
C: A003 LIST "" ""
S: * LIST (\Noselect) "/" ""
S: A003 OK LIST completed
C: A004 LIST "" *
S: * LIST (\Noinferiors \Marked) "/" "Inbox"
S: * LIST (\Noinferiors \Unmarked) "/" "Sent Items"
S: * LIST (\Noinferiors \Unmarked) "/" "Calendar"
S: * LIST (\Noinferiors \Unmarked) "/" "Checklist"
S: * LIST (\Unmarked) "/" "Cabinet"
S: * LIST (\Unmarked) "/" "Cabinet/New Folder"
S: * LIST (\Noinferiors \Unmarked) "/" "Trash"
S: A004 OK LIST completed
```

LSUB Command (RFC Section 6.3.9)

Partial compliance.

The GroupWise IMAP agents remove an existing mailbox name from the subscription list when the mailbox is deleted. (Subscription is an attribute of the mailbox.)

The GroupWise hierarchy separator character is "/".

One example of an agent response follows:

```
C: A003 LSUB "" ""
S: * LSUB (\Noselect) "/" ""
S: A003 OK LSUB completed
C: A004 LSUB "" *
S: * LSUB (\Noinferiors \Marked) "/" "Inbox"
S: * LSUB (\Noinferiors \Unmarked) "/" "Sent Items"
S: * LSUB (\Noinferiors \Unmarked) "/" "Calendar"
S: * LSUB (\Noinferiors \Unmarked) "/" "Checklist"
S: * LSUB (\Unmarked) "/" "Cabinet"
S: * LSUB (\Unmarked) "/" "Cabinet/New Folder"
S: * LSUB (\Noinferiors \Unmarked) "/" "Trash"
S: A004 OK LSUB completed
```

STATUS Command (RFC Section 6.3.10)

Full compliance.

The STATUS command is disallowed on mailboxes that have the \NoSelect attribute set.

One example of an agent response follows:

```
C: A005 STATUS Inbox (MESSAGES UIDNEXT RECENT)
S: * STATUS "Inbox" (MESSAGES 20 RECENT 0 UIDNEXT 162)
S: A005 OK STATUS completed
```

APPEND Command (RFC Section 6.3.11)

Partial compliance.

An untagged EXISTS response is not sent as a result of the APPEND command, nor is the mailbox created (if it is missing). Appending a message does not send that message. Instead, it inserts the message in the user's box.

Appending to the GroupWise Sent Items predefined folder or using the reserved, permanent $ImapSent keyword results in setting the Box Type field to Sent.

Appending to the predefined TRASH folder is allowed. APPEND to the Calendar folder creates the item as a GroupWise Note. Also, if iCal information is provided as a text/calendar multi-part alternative, the GroupWise item type is set appropriately.

For RFC compliance, the APPEND command is disallowed on mailboxes that have the \NoSelect attribute set.

One example of an agent response follows:

```
C: A005 APPEND Inbox (\Seen \Draft) {310}
S: + Ready
C: From:
  more data
S: A005 OK APPEND completed
```

Client Commands - Selected State (RFC Section 6.4)

For specific information about subsections, see the following:

CHECK Command (RFC Section 6.4.1)

Partial compliance.

The GroupWise IMAP agents do not perform any housekeeping as a result of the CHECK command. To identify changes or updates to a mailbox, use the NOOP command.

One example of an agent response follows:

```
C: A004 CHECK
S: A004 OK CHECK completed
```

CLOSE Command (RFC Section 6.4.2)

Full compliance.

The CLOSE command expunges messages marked as IMAP \Deleted. These messages are not moved to the TRASH folder, unless the email retention feature is enabled.

One example of an agent response follows:

```
C: A004 CLOSE
S: A004 OK CLOSE completed
```

EXPUNGE Command (RFC Section 6.4.3)

Full compliance.

The EXPUNGE command permanently deletes messages marked as IMAP \Deleted. These messages are not moved to the TRASH folder, unless the email retention feature is enabled.

Untagged EXPUNGE responses are returned on the NOOP command.

One example of an agent response follows (when message 14 is the only message that has the \Delete flag set):

```
C: A004 EXPUNGE
S: * 14 EXPUNGE
S: A004 OK EXPUNGE completed
```

SEARCH Command (RFC Section 6.4.4)

Partial compliance.

The GroupWise IMAP agents do not support HEADER searching or non-system flag KEYWORD or UNKEYWORD searching. Also, searching with SMALLER and LARGER uses an approximated size.

One example of an agent response follows:

```
C: A005 SEARCH 1:* OR ANSWERED FLAGGED
S: * SEARCH 4 8 10 13 17 19
S: A005 OK SEARCH completed
```

FETCH Command (RFC Section 6.4.5)

Full compliance.

If the GroupWise message does not contain a MIME attachment, the size returned by the FETCH RFC822.SIZE, FETCH ALL, and FETCH FAST commands is approximated. When the MIME is generated by the FETCH BODY or FETCH RFC822 commands, the size is not approximated.

FETCH returns the tagged NO response when the POA closes the connection prematurely and aborts the command.

One example of an agent response follows:

```
C: A004 FETCH 13:18 FLAGS UID
S: * 13 FETCH (FLAGS (\Answered \Seen) UID 150)
S: * 14 FETCH (FLAGS (\Deleted \Seen \Draft) UID 153)
S: * 15 FETCH (FLAGS () UID 156)
S: * 16 FETCH (FLAGS () UID 157)
S: * 17 FETCH (FLAGS (\Flagged) UID 158)
S: * 18 FETCH (FLAGS () UID 159)
S: A004 OK FETCH completed
```

STORE Command (RFC Section 6.4.6)

Full compliance.

If the .SILENT suffix is not used, the GroupWise IMAP agents return an untagged FETCH response with the updated value of the flags for each specified message.

The FETCH response does not include flag updates made outside the current IMAP session.

One example of an agent response follows:

```
C: A005 STORE 16:18 +FLAGS (\Seen)
S: * 16 FETCH (FLAGS (\Seen))
S: * 17 FETCH (FLAGS (\Seen \Flagged))
S: * 18 FETCH (FLAGS (\Seen))
S: A005 OK STORE completed
```

COPY Command (RFC Section 6.4.7)

Full compliance.

The GroupWise IMAP agents preserve the flags and internal date of the messages. If the destination mailbox does not exist, it is not created by the COPY command. In this case, GroupWise IMAP agents returns an error and do not create the mailbox.

COPY and UID COPY are not allowed in the EXAMINE state. Also, COPY to the currently selected mailbox is not allowed.

For RFC compliance, the COPY command is disallowed on mailboxes that have the \NoSelect attribute set.

One example of an agent response follows:

```
C: A005 COPY 5:8 "Cabinet/New Folder"
S: A005 OK COPY completed
```

UID Command (RFC Section 6.4.8)

Full compliance.

One example of an agent response follows:

```
C: A004 UID FETCH 160:161 FLAGS
S: * 19 FETCH (FLAGS (\Seen \Flagged) UID 160)
S: * 20 FETCH (FLAGS () UID 161)
S: A004 OK UID FETCH completed
```

Client Commands - Experimental/Expansion (RFC Section 6.5)

The GroupWise IMAP agents implemented several experimental commands.

X<atom> Command (RFC Section 6.5.1)

For specific information about experimental commands, see the following:

Server Responses (RFC Section 7)

This section briefly outlines the following server responses of IMAP:

Status Responses (RFC Section 7.1)

This section defines the general response codes. For specific information about optional response codes, see the following:

The defined general response codes include the following:

ALERT	Two ALERT responses are returned (see Alerts).
NEWNAME	No NEWNAME responses are returned because GroupWise does not keep track of the prior name for a mailbox.
PARSE	No PARSE responses are returned.
PERMANENTFLAGS	Full compliance. The PERMANENTFLAGS list includes the special flag "*", which indicates it is possible to create new keywords.
READ-ONLY	Full compliance.
READ-WRITE	All mailboxes are opened in read-write mode.
TRYCREATE	Full compliance.
UIDVALIDITY	Full compliance. A unique identifier validity value is assigned to each mailbox.
UNSEEN	Full compliance.

No untagged X responses are returned, except as a response to a GroupWise extension (see GroupWise Extensions).

OK Response (RFC Section 7.1.1)

Full compliance.

NO Response (RFC Section 7.1.2)

Full compliance.

If the command cannot be processed, NO is returned. Where possible, the response includes a GroupWise specific error message or number. For possible errors and their descriptions, see GroupWise Error Message (http://www.novell.com/documentation/lg/gw65/gw65_tsh1/data/a4ehiyt.html).

BAD Response (RFC Section 7.1.3)

Full compliance.

If the command is issued in the wrong state or a malformed expression is detected, BAD is returned. An informational string is usually included in the response.

PREAUTH Response (RFC Section 7.1.4)

Pre-authenticated connections are not supported.

BYE Response (RFC Section 7.1.5)

Full compliance.

The BYE response is returned as a result of a LOGOUT command or if the IMAP agent shuts down. The connection is disconnected by the LOGOUT command, except when returning to the Trusted Application Authenticated state.

Server and Mailbox Status (RFC Section 7.2)

For specific information about subsections, see the following:

CAPABILITY Response (RFC Section 7.2.1)

Full compliance.

STARTTLS is included in the CAPABILITY response.

XGWEXTENSIONS is included in the GroupWise IMAP agent's CAPABILITY response.

LIST Response (RFC Section 7.2.2)

Full compliance.

The four name attributes (\Noinferiors, \Noselect, \Marked, and \Unmarked) are all supported.

The mailboxes flagged as \Noselect are not returned by the LIST command.

The \Marked flag is used to indicate the mailbox has unread messages in it, otherwise it is flagged as \Unmarked. If the mailbox is the GroupWise predefined CALENDAR folder, \Marked indicates there are appointments scheduled for today (which is the current GroupWise definition of interesting).

The hierarchy delimiter character for GroupWise is "/".

LSUB Response (RFC Section 7.2.3)

Full compliance.

The four name attributes (\Noinferiors, \Noselect, \Marked, and \Unmarked) are all supported.

The \Marked flag is used to indicate the mailbox has unread messages in it, otherwise it is flagged as \Unmarked. If the mailbox is the GroupWise predefined CALENDAR folder, \Marked indicates there are appointments scheduled for today (which is the current GroupWise definition of interesting).

The hierarchy delimiter character for GroupWise is "/".

STATUS Response (RFC Section 7.2.4)

Full compliance.

SEARCH Response (RFC Section 7.2.5)

Full compliance.

FLAGS Response (RFC Section 7.2.6)

Full compliance.

Mailbox Size (RFC Section 7.3)

For specific information about subsections, see the following:

EXISTS Response (RFC Section 7.3.1)

Partial compliance.

The only time EXISTS responses are returned by the GroupWise IMAP agents is in response to the following commands: NOOP, SELECT, and EXAMINE. GroupWise does not send unilateral untagged EXISTS responses.

RECENT Response (RFC Section 7.3.2)

Partial compliance.

The only time RECENT responses are returned by the GroupWise IMAP agents is in response to the following commands: NOOP, SELECT, and EXAMINE. GroupWise does not send unilateral untagged RECENT responses.

Message Status (RFC Section 7.4)

For specific information about subsections, see the following:

EXPUNGE Response (RFC Section 7.4.1)

Partial compliance.

The untagged EXPUNGE response is returned by the GroupWise IMAP agents in response to the EXPUNGE or NOOP command. GroupWise does not send unilateral untagged EXPUNGE responses.

EXPUNGE responses are ordered lower to higher.

FETCH Response (RFC Section 7.4.2)

Partial compliance.

The untagged FETCH response is returned by the GroupWise IMAP agents in response to the FETCH, STORE, or NOOP commands. GroupWise does not send unilateral untagged FETCH responses.

Command Continuation Request (RFC Section 7.5)

Full compliance.

GroupWise IMAP agents use the "+" continuation character as part of the XGWTRUSTEDAPP authentication sequence.

Sample IMAP4rev1 Connection (RFC Section 8)

The steps shown in the RFC's example produce similar results when run against the GroupWise IMAP agents.

Formal Syntax (RFC Section 9)

Full compliance.

Author's Note (RFC Section 10)

Nothing to report.

Security Considerations (RFC Section 11)

Full compliance.

The GroupWise IMAP agents can be configured to support STARTTLS on port 143 (in order to upgrade to an SSL connection) or SSL connections on port 993. The availability of the STARTTLS command is reported by the CAPABILITY command.

2 GroupWise Extensions

This section lists the following GroupWise specific extensions to RFC 2060 (http://www.faqs.org/rfcs/rfc2060.html):

- "Alerts" on page 33
- "Commands" on page 33
- "$ImapSent Keyword" on page 36

Alerts

Two alerts can be returned by GroupWise:

Command Where Returned	Condition of Use
LOGIN command	If LDAP authentication is used and the LDAP server detected that the user's password has expired.
SELECT command	When more than 4962 items are in the mailbox.

Commands

This section lists the following GroupWise specific extension commands:

- "XGWCONF" on page 34
- "XGWDISPMODE" on page 34
- "XGWEXTENSIONS" on page 35
- "XGWEXTHELP" on page 35
- "XGWMOVE" on page 35
- "XGWRETENTION" on page 35
- "XGWTAULIST" on page 35
- "XGWTRUSTEDAPP" on page 36
- "XGWUNDELETE" on page 36

XGWCONF

The XGWCONF command is available from the Trusted Application Authenticated, Authenticated, Selected, or Examined states.

The XGWCONF command returns information about the GroupWise IMAP agent with the following untagged XGWCONF responses:

- The GroupWise agent that responded to your request, followed by the agent's release version
- The name of the post office to which your application is connected (if it is connected using a post office agent)
- The name of the domain to which your application is connected

XGWCONF is allowed from the EXAMINE state.

One example of a response to the XGWCONF command from a POA follows:

```
C: A004 XGWCONF
S: * XGWCONF GroupWise POA Version 6.5.0
S: * XGWCONF Post Office: PO_1
S: * XGWCONF Domain: Domain_1
S: A004 OK XGWCONF completed
```

XGWDISPMODE

XGWDISPMODE enables new information to be viewed. You can set the parameters to ON or OFF. If they are left blank, the current state is returned.

The RFC specifically states that an application should not be able to view any extension data without requesting it so XGWDISPMODE is Open Text's way to extend existing commands without violating the RFC.

LIST Command (RFC Section 6.3.8) returns the GroupWise record ID (which is the same ID as viewed using Object API) of the folder and the following folders that are not currently being displayed:

- Documents folder
- Work In Progress folder
- any NNTP or IMAP folders

The NNTP or IMAP folders are included so that the contents can be viewed. However, no NNTP or IMAP functionality is available.

The FETCH ALL, FAST, and FULL commands also return extra information about an item when this mode is on. Extra fields can be individually or collectively requested on any FETCH command using

- X-GWAll
- X-GWItemType
- X-GWBoxType
- X-GWMessageID (Object API common message ID)
- X-GWRecordID (Object API message ID)

Also, when the GroupWise enhanced display mode is on and no folder is selected, a NOOP command refreshes the folder list and allows the application to view the changes made to the folder list (using the LIST command) without having to re-login.

XGWEXTENSIONS

XGWEXTENSIONS returns a list of all the GroupWise specific extensions that are supported by the currently connected GroupWise IMAP agent.

XGWEXTHELP

XGWEXTHELP can return a quick description for an individual GroupWise extension. If the parameter is left blank, XGWEXTHELP returns a description for the whole set of extensions.

XGWMOVE

XGWMOVE mimics the GroupWise move to folder functionality. This command works like COPY but also does the EXPUNGE for you.

An untagged XGWMOVE response with the sequence number is returned.

UID XGWMOVE is also supported.

Moving to the Trash folder works just like a GroupWise delete command.

XGWRETENTION

XGWRETENTION gives access to the GroupWise retention timestamp. If this command is issued without any parameters, the current value of the retention timestamp is returned. If a date is passed as a parameter, the retention timestamp is updated.

If the administrator enables the purge option (not to purge items until they have been retained), the user cannot delete items that have been delivered since the current retention timestamp.

XGWTAULIST

XGWTAULIST is one of the GroupWise specific POA experimental commands that are available in the Trusted Application Authenticated State. It returns a list of users and resources for the post office with untagged XGWTAULIST responses. For more information, see Trusted Application Authenticated State (RFC Section 3.1.1).

The untagged responses return a flag indicating that this is a User or a Resource, followed by the user name.

One example of a response to this command from a POA follows:

```
C: A003 XGWTAULIST
S: * XGWTAULIST (\User) "User1"
S: * XGWTAULIST (\User) "User2"
S: * XGWTAULIST (\Resource) "ConfRoom14A"
S: A003 OK XGWTAULIST completed
```

XGWTRUSTEDAPP

You can enter the Trusted Application Authenticated State by using the GroupWise XGWTRUSTEDAPP extension and by providing the Trusted Application credentials through the IMAP AUTHENTICATE command (defined in section 3.2 of RFC 2060). For more information, see Trusted Application Authenticated State (RFC Section 3.1.1).

For an example of how this extension in used in an AUTHENTICATE command response, see AUTHENTICATE Command (RFC Section 6.2.1).

Additionally, the GroupWise XGWTRUSTEDAPP extension to the AUTHENTICATE command uses the "+" continuation character to indicate the server's readiness to receive the Trusted Application credentials.

XGWUNDELETE

XGWUNDELETE works like XGWMOVE. However, XGWUNDELETE moves the item back to the folder it came from before residing in the Trash folder. XGWUNDELETE is available only when the Trash folder is selected.

An untagged XGWUNDELETE response with the sequence number is returned.

UID XGWUNDELETE is also supported.

$ImapSent Keyword

GroupWise defines the $ImapSent keyword, which (when used with the APPEND command) sets the BOX_TYPE field of the message to BOX_TYPE_OUT. (This is known in GroupWise as a sent item.)