Persistent Virtual Folder extension to the IMAP Protocol

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Abstract

   Persistent Extensions to the IMAP Protocol (LPSEARCH) defines
   extension parameters to the [RFC3501] CREATE command to allow virtual
   mailboxes to be created which are views of other mailboxes narrowed
   by search criteria.

Conventions used in this document

   In examples, "C:" and "S:" indicate lines sent by the client and
   server respectively.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
document are to be interpreted as described in [RFC2119].

An implementation is not compliant if it fails to satisfy one or more
of the MUST or REQUIRED level requirements for the protocol(s) it
implements. An implementation that satisfies all the MUST or REQUIRED
level and all the SHOULD level requirements for a protocol is said to
be "unconditionally compliant" to that protocol; one that satisfies
all the MUST level requirements but not all the SHOULD level
requirements is said to be "conditionally compliant." When
describing the general syntax, some definitions are omitted as they
are defined in [RFC3501].

Table of Contents

1. Introduction

The LVFOLDER extension is present in any IMAP4 implementation which
returns LVFOLDER as one of the supported capabilities in the
CAPABILITY command.

A virtual folder is an IMAP4 folder with attached search criteria.
The search criteria specify the backing mailbox, as well as a subset
IMAP SEARCH grammar which may be applied to the immutable properties
of messages in the backing mailbox. Once created, all operations
applied to the virtual mailbox, such as APPEND and STORE, are
actually applied to the backing mailbox. For all intents and
purposes, the virtual folder looks and behaves like a real IMAP4
folder.

Any changes made to the underlying folder must pass the search
criteria for the virtual folder before being visible. UIDs are
preserved, and as well as the UIDVALIDITY value. In general, most
mailbox state and metadata present on the backing folder should be
identical on the virtual folder, except where it doesn t make sense.
(e.g. EXISTS, RECENT, in general, values which are based on then
number of messages which have/do not have a certain property in the
mailbox)

Message sequence numbers will be different, but the order of the
messages in the sequence, and the ordering of UIDs, MUST be
preserved.

From the client s perspective, whether or not a mailbox is a vfolder
is not visible, and for all intents and purposes, it appears as any
other mailbox name. This includes the ability for a new virtual
folder to be created by using another virtual folder as a backing
mailbox.

 For the purposes of this draft, immutability refers to message
flags and non-immutable messages annotations.

2. LVFOLDER Capability

A server which supports LVFOLDER returns LVFOLDER as one of the
responses of the CAPABILITY command. LPSEARCH adheres to
[CREATEPARAM] and [ABNFEXTEND] syntax so a server MAY also wish to
report additional capabilities for extended CREATE.

3. CREATE Command Extension

Arguments: mailbox name
            Optional LPSEARCH backing mailbox name &
            search criteria

   Responses: optional NO responses BADSEARCH,BADBACKING
   Result: OK created lpsearch completed
           NO can t create mailbox with that name
           BAD command unknown or arguments invalid

   All of the semantics of CREATE as defined in 6.3.3 of [RFC3501] must
   hold. Additionally, if the backing mailbox name doesn t exist, the
   creation MUST fail with a NO result and BADBACKING response code. If
   the search criteria are invalid because the search would violate some
   of the required properties (immutable message properties only),
   BADSEARCH must be reported with a NO response, or if the SEARCH
   contains an error in one of its argument values, a NO with a
   BADSEARCH response is returned.

4. Response Codes

   A.1.
         BADBACKING
      The mailbox name used for the backing mailbox doesn t exist.

   A.2.
         BADSEARCH
      The search criteria violates the pre-conditions mentioned in
   section 1, or some of the arguments of the search are invalid.

5. Formal Syntax

   The following syntax specification uses the Augmented Backus-Naur
   Form (ABNF) notation. Elements not defined here can be found in
   the formal syntax of the [ABNF], [RFC3501], and [ABNFEXTEND].

   The create ABNF grammar in [RFC3501] is hereby modified to the
   grammar defined in [ABNFEXTEND]. An additional CREATE param
    LPSEARCH is introduced whose value is a list containing the backing
   store mailbox and the search parameters.

   create_param =/ LVFOLDER SP (backing-mailbox psearch)
                    ;; conforms to generic "create-param" syntax as
   defined in [ABNFEXTEND]

   backing-mailbox = mailbox

   psearch   = search-program
                        ; defined in [ABNFEXTEND]

6. Examples

```
C: a1 CREATE lemonade (LPSEARCH (INBOX HEADER  Sender   lemonade-
bounces ))
```

   S: a1 OK CREATE LPSEARCH Completed

      Create a persistent mailbox which shows only messages sent to
   lemonade mailing list.

   C: a2 CREATE mobile (LPSEARCH (INBOX FROM boss@mycompany.com))
   S: a2 OK CREATE LPSEARCH Completed

      Create a mailbox to be synchronized (not in scope of this
   document) with a mobile device.

   C: a2 CREATE mobile (LPSEARCH (INBOX FROM boss@mycompany.com WITHIN
   259200))
   S: a2 OK CREATE LPSEARCH Completed

      Create a mailbox that contains all messages from
   boss@mycompany.com that were sent within the last 3 days according to
   the timezone of the server, utilizing the [WITHIN] draft extension.

   C: a3 CREATE foo (LPSEARCH (INBOX FROM boss@mycompany.com))
   S: a3 NO [BADBACKING] CREATE failed. IMBOX is not a valid mailbox.

      Attempt to create a mailbox with a non-existence backing mailbox
   (fail)

   C: a3 CREATE foo (LPSEARCH (INBOX FLAGGED))
   S: a3 NO [BADSEARCH] CREATE failed. SEARCH refers to mutable
   properties

      Attempt to create a mailbox with a search for flagged messages
   (fail)_

7. **Message and Mailbox changes**

   When new messages arrive, or messages are expunged, an untagged
   response MUST be sent to the client just as it would if the backing
   mailbox was selected. Modifications to mutable state (flags,
   annotations) have no affect on the whether or not messages are
   included virtual folders, nor do they generate events. A client
   fetching the FLAGS of a message in a virtual folder will however see
   the latest value of those values in the backing mailbox.

If a backing mailbox is deleted, then all vfolders attached to that
backing mailbox as deleted as well.

Changes to UIDVALIDITY, UIDNEXT, and other underlying properties of
the backing mailbox are reflected in all attached vfolders.

Security Considerations

The LVFOLDER extension does not raise any security considerations
which are not present in the base protocol. Considerations are the
same as for IMAP [RFC 3501].

IANA Considerations

When using the LVFOLDER extension, the names of created mailboxes
MUST not overlap with existing mailboxes. Therefore the following
mailbox names are reserved and not suitable as names of mailboxes
created by VFOLDER:
- INBOX*
- OUTBOX*
- SENT*
- DELETED*
- DRAFTS*
- CONTACTS*
- CALENDAR*
- TASKS*

Where * denotes are other combination of characters.

These mailbox names are reserved.

References

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   ABNF , RFC 2234, November 1997.
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[CREATEPARAM] Melnikov, A., IMAP CREATE/RENAME parameters , draft-
melnikov-imap-createparams-01.txt, September 2005.

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   IMAP Protocol , draft-ietf-lemonade-search-within-0x.txt, February
   2006 (Work in progress)

   [P-IMAP] Maes, S.H., Lima R., Kuang, C., Cromwell, R., Ha, V. and
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   M., Xiaohui F. and Lijun Z., "Push Extensions to the IMAP Protocol
   (P-IMAP)", draft-maes-lemonade-p-imap-xx.txt, (work in progress).

   [RFC3501] Crispin, M. "IMAP4, Internet Message Access Protocol
      Version 4 rev1", RFC 3501, March 2003.
      http://www.ietf.org/rfc/rfc3501

Normative Appendices

A.
  SEARCH extensions

   In order to support certain mobile uses cases, the ABNF search-key
   grammar of [RFC3501] has been extended with a new search key: WITHIN
   <interval seconds>

      search-key /= WITHIN nz-number

   The key returns messages whose sent date is within the specified
   interval starting from the current date of the server.

B.
  Dealing with mutable message state

   In order to gain implementation simplicity, vfolder prohibits the
   usage of mutable message state in search criteria when creating a
   folder. It does not however, prevent searching on mutable state
   elsewhere.

   Clients that wish to create virtual folders based on mutable state
   such as flags, are urged to create a virtual folder containing the
   non-mutable search criteria, and then implement the mutable criteria
   by issuing IMAP SEARCH commands from the client within the virtual
   folder.

Future Work

   [1] Decide whether virtual mailboxes may have their own annotations
   and whether messages in a virtual mailbox may have their own
   annotations, both of which are not reflected in the backing mailbox.
   View dependent annotations may be useful for multi-device
   synchronization.
   [2] Determine whether section 6 conflicts with RFC3501 guarantees or
   any IMAP extensions, and if so, how to resolve such conflicts.

Version History

    Release 00 (was 03 of draft-maes-lemonade-vfolder)
        Separate WITHIN extension to separate draft
        Additional section on IANA considerations
    Release 02 of draft-maes-lemonade-vfolder
        Update to address comments from Alexey Melnikov, and a new
        restricted model using immutable message properties
    Release 01 of draft-maes-lemonade-vfolder
        Update to address comments from Alexey Melnikov to follow
    appropriately the generic syntax provided in draft-melnikov-imap-ext-
    abnf-05.txt.
    Release 00 of draft-maes-lemonade-vfolder
        Initial release

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