                  Post Office Protocol - Version 3
                     Extended Service Offerings

Status of This Memo

   This memo suggests a simple method for workstations to dynamically
   access mail from a discussion group server, as an extension to an
   earlier memo which dealt with dynamically accessing mail from a
   mailbox server using the Post Office Protocol - Version 3 (POP3).
   This RFC specifies a proposed protocol for the Internet community,
   and requests discussion and suggestions for improvements. All of the
   extensions described in this memo to the POP3 are OPTIONAL.
   Distribution of this memo is unlimited.

Introduction and Motivation

   It is assumed that the reader is familiar with RFC 1081 that
   discusses the Post Office Protocol - Version 3 (POP3) [RFC1081].
   This memo describes extensions to the POP3 which enhance the service
   it offers to clients. This additional service permits a client host
   to access discussion group mail, which is often kept in a separate
   spool area, using the general POP3 facilities.

   The next section describes the evolution of discussion groups and the
   technologies currently used to implement them. To summarize:

      o An exploder is used to map from a single address to
      a list of addresses which subscribe to the list, and redirects
      any subsequent error reports associated with the delivery of
      each message. This has two primary advantages:
            - Subscribers need know only a single address
            - Responsible parties get the error reports and not
              the subscribers

o Typically, each subscription address is not a person's private
maildrop, but a system-wide maildrop, which can be accessed
by more than one user. This has several advantages:
- Only a single copy of each message need traverse the
net for a given site (which may contain several local
hosts). This conserves bandwidth and cycles.
- Only a single copy of each message need reside on each
subscribing host. This conserves disk space.
- The private maildrop for each user is not cluttered
with discussion group mail.

Despite this optimization of resources, further economy can be
achieved at sites with more than one host. Typically, sites with
more than one host either:

1. Replicate discussion group mail on each host. This
results in literally gigabytes of disk space committed to
unnecessarily store redundant information.

2. Keep discussion group mail on one host and give all users a
login on that host (in addition to any other logins they may
have). This is usually a gross inconvenience for users who
work on other hosts, or a burden to users who are forced to
work on that host.

As discussed in [RFC1081], the problem of giving workstations dynamic
access to mail from a mailbox server has been explored in great
detail (originally there was [RFC918], this prompted the author to
write [RFC1081], independently of this [RFC918] was upgraded to
[RFC937]). A natural solution to the problem outlined above is to
keep discussion group mail on a mailbox server at each site and
permit different hosts at that site to employ the POP3 to access
discussion group mail. If implemented properly, this avoids the
problems of both strategies outlined above.

ASIDE: It might be noted that a good distributed filesystem
could also solve this problem. Sadly, "good"
distributed filesystems, which do not suffer
unacceptable response time for interactive use, are
few and far between these days!

Given this motivation, now let's consider discussion groups, both in
general and from the point of view of a user agent. Following this,
extensions to the POP3 defined in [RFC1081] are presented. Finally,
some additional policy details are discussed along with some initial
experiences.

What's in a Discussion Group

   Since mailers and user agents first crawled out of the primordial
   ARPAnet, the value of discussion groups have been appreciated,
   (though their implementation has not always been well-understood).

   Described simply, a discussion group is composed of a number of
   subscribers with a common interest. These subscribers post mail to a
   single address, known as a distribution address. From this
   distribution address, a copy of the message is sent to each
   subscriber. Each group has a moderator, which is the person that
   administrates the group. The moderator can usually be reached at a
   special address, known as a request address. Usually, the
   responsibilities of the moderator are quite simple, since the mail
   system handles the distribution to subscribers automatically. In
   some cases, the interest group, instead of being distributed directly
   to its subscribers, is put into a digest format by the moderator and
   then sent to the subscribers. Although this requires more work on
   the part of the moderator, such groups tend to be better organized.

   Unfortunately, there are a few problems with the scheme outlined
   above. First, if two users on the same host subscribe to the same
   interest group, two copies of the message get delivered. This is
   wasteful of both processor and disk resources.

   Second, some of these groups carry a lot of traffic. Although
   subscription to an group does indicate interest on the part of a
   subscriber, it is usually not interesting to get 50 messages or so
   delivered to the user's private maildrop each day, interspersed with
   personal mail, that is likely to be of a much more important and
   timely nature.

   Third, if a subscriber on the distribution list for a group becomes
   "bad" somehow, the originator of the message and not the moderator of
   the group is notified. It is not uncommon for a large list to have
   10 or so bogus addresses present. This results in the originator
   being flooded with "error messages" from mailers across the Internet
   stating that a given address on the list was bad. Needless to say,
   the originator usually could not care less if the bogus addresses got
   a copy of the message or not. The originator is merely interested in
   posting a message to the group at large. Furthermore, the moderator
   of the group does care if there are bogus addresses on the list, but
   ironically does not receive notification.

   There are various approaches which can be used to solve some or all
   of these problems. Usually these involve placing an exploder agent
   at the distribution source of the discussion group, which expands the
   name of the group into the list of subscription addresses for the

group. In the process, the exploder will also change the address
that receives error notifications to be the request address or other
responsible party.

A complementary approach, used in order to cut down on resource
utilization of all kinds, replaces all the subscribers at a single
host (or group of hosts under a single administration) with a single
address at that host. This address maps to a file on the host,
usually in a spool area, which all users can access. (Advanced
implementations can also implement private discussion groups this
way, in which a single copy of each message is kept, but is
accessible to only a select number of users on the host.)

The two approaches can be combined to avoid all of the problems
described above.

Finally, a third approach can be taken, which can be used to aid user
agents processing mail for the discussion group: In order to speed
querying of the maildrop which contains the local host's copy of the
discussion group, two other items are usually associated with the
discussion group, on a local basis. These are the maxima and the
last-date. Each time a message is received for the group on the
local host, the maxima is increased by at least one. Furthermore,
when a new maxima is generated, the current date is determined. This
is called the last date. As the message is entered into the local
maildrop, it is given the current maxima and last-date. This permits
the user agent to quickly determine if new messages are present in
the maildrop.

> NOTE: The maxima may be characterized as a monotonically
>   increasing quanity. Although sucessive values of the
>   maxima need not be consecutive, any maxima assigned
>   is always greater than any previously assigned value.

Definition of Terms

To formalize these notions somewhat, consider the following 7
parameters which describe a given discussion group from the
perspective of the user agent (the syntax given is from [RFC822]):

          NAME   Meaning: the name of the discussion group
                              Syntax: TOKEN (ALPHA *[ALPHA / DIGIT / "-"])
                                       (case-insensitive recognition)
                              Example: unix-wizards

          ALIASES   Meaning: alternates names for the group, which
                                       are locally meaningful; these are
                                       typically used to shorten user typein
                              Syntax: TOKEN (case-insensitive recognition)
                              Example: uwiz

          ADDRESS   Meaning: the primary source of the group
                              Syntax: 822 address
                              Example: Unix-Wizards@BRL.MIL

          REQUEST   Meaning: the primary moderator of the group
                              Syntax: 822 address
                              Example: Unix-Wizards-Request@BRL.MIL

          FLAGS   Meaning: locally meaningful flags associated
                                       with the discussion group; this memo
                                       leaves interpretation of this
                                       parameter to each POP3 implementation
                              Syntax: octal number
                              Example: 01

          MAXIMA   Meaning: the magic cookie associated with the
                                       last message locally received for the
                                       group; it is the property of the magic
                                       cookie that it's value NEVER
                                       decreases, and increases by at least
                                       one each time a message is locally
                                       received
                              Syntax: decimal number
                              Example: 1004

          LASTDATE   Meaning: the date that the last message was
                                       locally received
                              Syntax: 822 date
                              Example: Thu, 19 Dec 85 10:26:48 -0800

   Note that the last two values are locally determined for the maildrop
   associated with the discussion group and with each message in that
   maildrop. Note however that the last message in the maildrop have a
   different MAXIMA and LASTDATE than the discussion group. This often
   occurs when the maildrop has been archived.

   Finally, some local systems provide mechanisms for automatically
   archiving discussion group mail. In some cases, a two-level archive
   scheme is used: current mail is kept in the standard maildrop,
   recent mail is kept in an archive maildrop, and older mail is kept
   off-line. With this scheme, in addition to having a "standard"
   maildrop for each discussion group, an "archive" maildrop may also be
   available. This permits a user agent to examine the most recent
   archive using the same mechanisms as those used on the current mail.

The XTND Command

   The following commands are valid only in the TRANSACTION state of the
   POP3. This implies that the POP3 server has already opened the
   user's maildrop (which may be empty). This maildrop is called the
   "default maildrop". The phrase "closes the current maildrop" has two
   meanings, depending on whether the current maildrop is the default
   maildrop or is a maildrop associated with a discussion group.

   In the former context, when the current maildrop is closed any
   messages marked as deleted are removed from the maildrop currently in
   use. The exclusive-access lock on the maildrop is then released
   along with any implementation-specific resources (e.g., file-
   descriptors).

   In the latter context, a maildrop associated with a discussion group
   is considered to be read-only to the POP3 client. In this case, the
   phrase "closes the current maildrop" merely means that any
   implementation-specific resources are released. (Hence, the POP3
   command DELE is a no-op.)

   All the new facilities are introduced via a single POP3 command,
   XTND. All positive reponses to the XTND command are multi-line.

   The most common multi-line response to the commands contains a
   "discussion group listing" which presents the name of the discussion
   group along with it's maxima. In order to simplify parsing all POP3
   servers are required to use a certain format for discussion group
   listings:

                         NAME SP MAXIMA

   This memo makes no requirement on what follows the maxima in the
   listing. Minimal implementations should just end that line of the
   response with a CRLF pair. More advanced implementations may include
   other information, as parsed from the message.

      NOTE: This memo STRONGLY discourages implementations from
                   supplying additional information in the listing.

     XTND BBOARDS [name]
     Arguments: the name of a discussion group (optionally)
     Restrictions: may only be given in the TRANSACTION state.
     Discussion:

     If an argument was given, the POP3 server closes the current
     maildrop. The POP3 server then validates the argument as the name of
     a discussion group. If this is successful, it opens the maildrop
     associated with the group, and returns a multi-line response
     containing the discussion group listing. If the discussion group
     named is not valid, or the associated archive maildrop is not
     readable by the user, then an error response is returned.

     If no argument was given, the POP3 server issues a multi-line
     response. After the initial +OK, for each discussion group known,
     the POP3 server responds with a line containing the listing for that
     discussion group. Note that only world-readable discussion groups
     are included in the multi-line response.

     In order to aid user agents, this memo requires an extension to the
     scan listing when an "XTND BBOARDS" command has been given.
     Normally, a scan listing, as generated by the LIST, takes the form:

             MSGNO SIZE

     where MSGNO is the number of the message being listed and SIZE is the
     size of the message in octets. When reading a maildrop accessed via
     "XTND BBOARDS", the scan listing takes the form

             MSGNO SIZE MAXIMA

     where MAXIMA is the maxima that was assigned to the message when it
     was placed in the BBoard.

     Possible Responses:
         +OK XTND
         -ERR no such bboard
     Examples:
         C: XTND BBOARDS
         S: +OK XTND
         S: system 10
         S: mh-users 100
         S: .
         C: XTND BBOARDS system
         S: + OK XTND
         S: system 10
         S: .

     XTND ARCHIVE name
     Arguments: the name of a discussion group (required)
     Restrictions: may only be given in the TRANSACTION state.
     Discussion:

     The POP3 server closes the current maildrop. The POP3 server then
     validates the argument as the name of a discussion group. If this is
     successful, it opens the archive maildrop associated with the group,
     and returns a multi-line response containing the discussion group
     listing. If the discussion group named is not valid, or the
     associated archive maildrop is not readable by the user, then an
     error response is returned.

     In addition, the scan listing generated by the LIST command is
     augmented (as described above).

     Possible Responses:
         +OK XTND
         -ERR no such bboard Examples:
         C: XTND ARCHIVE system
         S: + OK XTND
         S: system 3
         S: .

     XTND X-BBOARDS name
     Arguments: the name of a discussion group (required)
     Restrictions: may only be given in the TRANSACTION state.
     Discussion:

     The POP3 server validates the argument as the name of a
     discussion group. If this is unsuccessful, then an error
     response is returned. Otherwise a multi-line response is
     returned. The first 14 lines of this response (after the
     initial +OK) are defined in this memo. Minimal implementations
     need not include other information (and may omit certain
     information, outputting a bare CRLF pair). More advanced
     implementations may include other information.

             Line   Information (refer to "Definition of Terms")
             ----   -----------
               1   NAME
               2   ALIASES, separated by SP
               3   system-specific: maildrop
               4   system-specific: archive maildrop
               5   system-specific: information
               6   system-specific: maildrop map
               7   system-specific: encrypted password
               8   system-specific: local leaders, separated by SP

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      9      ADDRESS
     10      REQUEST
     11      system-specific: incoming feed
     12      system-specific: outgoing feeds
     13      FLAGS SP MAXIMA
     14      LASTDATE
```

Most of this information is entirely too specific to the UCI Version
of the Rand MH Message Handling System [MRose85]. Nevertheless,
lines 1, 2, 9, 10, 13, and 14 are of general interest, regardless of
the implementation.

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        Possible Responses:
            +OK XTND
            -ERR no such bboard
        Examples:
            C:    XTND X-BBOARDS system
            S:    + OK XTND
            S:    system
            S:    local general
            S:    /usr/bboards/system.mbox
            S:    /usr/bboards/archive/system.mbox
            S:    /usr/bboards/.system.cnt
            S:    /usr/bboards/.system.map
            S:    *
            S:    mother
            S:    system@nrtc.northrop.com
            S:    system-request@nrtc.northrop.com
            S:
            S:    dist-system@nrtc-gremlin.northrop.com
            S:    01 10
            S:    Thu, 19 Dec 85 00:08:49 -0800
            S:    .
```

Policy Notes

   Depending on the particular entity administrating the POP3 service
   host, two additional policies might be implemented:

   1. Private Discussion Groups

   In the general case, discussion groups are world-readable, any user,
   once logged in (via a terminal, terminal server, or POP3, etc.), is
   able to read the maildrop for each discussion group known to the POP3
   service host. Nevertheless, it is desirable, usually for privacy
   reasons, to implement private discussion groups as well.

   Support of this is consistent with the extensions outlined in this

memo. Once the AUTHORIZATION state has successfully concluded, the
POP3 server grants the user access to exactly those discussion groups
the POP3 service host permits the authenticated user to access. As a
"security" feature, discussion groups associated with unreadable
maildrops should not be listed in a positive response to the XTND
BBOARDS command.

2. Anonymous POP3 Users

In order to minimize the authentication problem, a policy permitting
"anonymous" access to the world-readable maildrops for discussion
groups on the POP3 server may be implemented.

Support of this is consistent with the extensions outlined in this
memo. The POP3 server can be modified to accept a USER command for a
well-known pseudonym (i.e., "anonymous") which is valid with any PASS
command. As a "security" feature, it is advisable to limit this kind
of access to only hosts at the local site, or to hosts named in an
access list.

Experiences and Conclusions

All of the facilities described in this memo and in [RFC1081] have
been implemented in MH #6.1. Initial experiences have been, on the
whole, very positive.

After the first implementation, some performance tuning was required.
This consisted primarily of caching the datastructures which describe
discussion groups in the POP3 server. A second optimization
pertained to the client: the program most commonly used to read
BBoards in MH was modified to retrieve messages only when needed.
Two schemes are used:

> o If only the headers (and the first few lines of the body) of
>   the message are required (e.g., for a scan listing), then only
>   these are retrieved. The resulting output is then cached, on
>   a per-message basis.

> o If the entire message is required, then it is retrieved intact,
>   and cached locally.

With these optimizations, response time is quite adequate when the
POP3 server and client are connected via a high-speed local area
network. In fact, the author uses this mechanism to access certain
private discussion groups over the Internet. In this case, response
is still good. When a 9.6Kbps modem is inserted in the path,
response went from good to almost tolerable (fortunately the author
only reads a few discussion groups in this fashion).

   To conclude: the POP3 is a good thing, not only for personal mail but
   for discussion group mail as well.

References

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