Post Office Protocol

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In computing, the **Post Office Protocol** (**POP**) is an application-layer Internet standard protocol used by local e-mail clients to retrieve e-mail from a remote server over a TCP/IP connection.[1] POP has been developed through several versions, with version 3 (**POP3**) being the last standard in common use before largely being made obsolete by the more advanced IMAP as well as webmail.

Contents

Overview

POP supports download-and-delete requirements for access to remote mailboxes (termed maildrop in the POP RFC's).[2] Although most POP clients have an option to leave mail on server after download, e-mail clients using POP generally connect, retrieve all messages, store them on the user's PC as new messages, delete them from the server, and then disconnect. Other protocols, notably IMAP, (Internet Message Access Protocol) provide more complete and complex remote access to typical mailbox operations. In the late 1990s and early 2000s, fewer Internet Service Providers (ISPs) supported IMAP due to the storage space that was required on the ISP's hardware. Contemporary e-mail clients supported POP, then over time popular mail client software added IMAP support.

A POP3 server listens on well-known port 110. Encrypted communication for POP3 is either requested after protocol initiation, using the STLS command, if supported, or by POP3S, which connects to the server using Transport Layer Security (TLS) or Secure Sockets Layer (SSL) on well-known TCP port 995.

Available messages to the client are fixed when a POP session opens the maildrop, and are identified by message-number local to that session or, optionally, by a unique identifier assigned to the message by the POP server. This unique identifier is permanent and unique to the maildrop and allows a client to access the same message in different POP sessions. Mail is retrieved and marked for deletion by message-number. When the client exits the session, the mail marked for deletion is removed from the maildrop.

History

POP1 was specified in RFC 918 (1984), POP2 by RFC 937 (1985).

POP3 originated with RFC 1081 (1988). Its current specification is RFC 1939, updated with an extension mechanism, RFC 2449 and an authentication mechanism in RFC 1734.

The original POP3 specification supported only an unencrypted USER/PASS login mechanism or Berkeley .rhosts access control. POP3 currently supports several authentication methods to provide varying levels of protection against illegitimate access to a user's e-mail. Most are provided by the POP3 extension mechanisms. POP3 clients support SASL authentication methods via the AUTH extension. MIT Project Athena also produced a Kerberized version. RFC 1460 introduced APOP into the core protocol. APOP is a challenge/response protocol which uses the MD5 hash function in an attempt to avoid replay attacks and disclosure of the shared secret. Clients implementing APOP include Mozilla Thunderbird, Opera Mail, Eudora, KMail, Novell Evolution, RimArts' Becky!,[3] Windows Live Mail, PowerMail, Apple Mail, and Mutt. RFC 1460 was obsoleted by RFC 1725, which was in turn obsoleted by RFC 1939.

"POP4" exists only as an informal proposal adding basic folder management, multipart message support, as well as message flag management to compete with IMAP; but has not progressed since 2003.[4]

Extensions and Specifications

An extension mechanism was proposed in RFC 2449 to accommodate general extensions as well as announce in an organized manner support for optional commands, such as TOP and UIDL. The RFC did not intend to encourage extensions, and reaffirmed that the role of POP3 is to provide simple support for mainly download-and-delete requirements of mailbox handling.

The extensions are termed capabilities and are listed by the CAPA command. Except for APOP, the optional commands were included in the initial set of capabilities. Following the lead of ESMTP (RFC 5321), capabilities beginning with an X signify local capabilities.

STARTTLS

The STARTTLS extension allows the use of Transport Layer Security (TLS) or Secure Sockets Layer (SSL) to be negotiated using the *STLS* command, on the standard POP3 port, rather than an alternate. Some clients and servers instead use the alternate-port method, which uses TCP port 995 (POP3S).

SDPS

Demon Internet introduced extensions to POP3 that allow multiple accounts per domain, and has become known as *Standard Dial-up POP3 Service* (SDPS).[5] To access each account, the username includes the hostname, as *john@hostname* or *john+hostname*.

Google Apps uses the same method.

Kerberized Post Office Protocol

In computing, local e-mail clients can use the **Kerberized Post Office Protocol** (**KPOP**), an application-layer Internet standard protocol, to retrieve e-mail from a remote server over a TCP/IP connection. The KPOP protocol is based on the POP3 protocol with the differences that it adds Kerberos security and that it runs by default over TCP port number 1109 instead of 110. One mail server software implementation is found in the Cyrus IMAP server.

Comparison with IMAP

- POP is a much simpler protocol, making implementation easier.
- POP mail moves the message from the email server onto your local computer, although there is usually an option to leave the messages on the email server as well.

- IMAP defaults to leaving the message on the email server, simply downloading a local copy.
- POP treats the mailbox as one store, and has no concept of folders
- An IMAP client performs complex queries, asking the server for headers, or the bodies of specified messages, or to search for messages meeting certain criteria. Messages in the mail repository can be marked with various status flags (e.g. "deleted" or "answered") and they stay in the repository until explicitly removed by the user—which may not be until a later session. In short: IMAP is designed to permit manipulation of remote mailboxes as if they were local. Depending on the IMAP client implementation and the mail architecture desired by the system manager, the user may save messages directly on the client machine, or save them on the server, or be given the choice of doing either.
- The POP protocol requires the currently connected client to be the only client connected to the mailbox. In contrast, the IMAP protocol specifically allows simultaneous access by multiple clients and provides mechanisms for clients to detect changes made to the mailbox by other, concurrently connected, clients. See for example RFC3501 section 5.2 which specifically cites "simultaneous access to the same mailbox by multiple agents" as an example.
- When POP retrieves a message, it receives all parts of it, whereas the IMAP4 protocol allows clients to retrieve any of the individual MIME parts separately - for example retrieving the plain text without retrieving attached files.
- IMAP supports flags on the server to keep track of message state: for example, whether or not the message has been read, replied to, or deleted.

Dialog example

The APOP usage is a direct example from RFC 1939 page 18.

RFC 1939 APOP support indicated by <1896.697170952@dbc.mtview.ca.us> here:

```
S: <wait for connection on TCP port 110>
C: <open connection>
S:    +OK POP3 server ready <1896.697170952@dbc.mtview.ca.us>
C:    APOP mrose c4c9334bac560ecc979e58001b3e22fb
S:    +OK mrose's maildrop has 2 messages (320 octets)
C:    STAT
S:    +OK 2 320
C:    LIST
S:    +OK 2 messages (320 octets)
S:    1 120
S:    2 200
S:    .
C:    RETR 1
S:    +OK 120 octets
S:    <the POP3 server sends message 1>
S:    .
C:    DELE 1
S:    +OK message 1 deleted
C:    RETR 2
S:    +OK 200 octets
S:    <the POP3 server sends message 2>
S:    .
C:    DELE 2
S:    +OK message 2 deleted
C:    QUIT
S:    +OK dewey POP3 server signing off (maildrop empty)
C: <close connection>
S: <wait for next connection>
```

POP3 servers without the optional APOP command expect the client to log in with the USER and PASS commands:

```
C:    USER mrose
S:    +OK User accepted
C:    PASS tanstaaf
S:    +OK Pass accepted
```

Server implementations

- Apache James
- Citadel/UX
- Courier Mail Server
- Cyrus IMAP server
- Dovecot
- Eudora Internet Mail Server
- HMailServer
- Ipswitch IMail Server
- Kerio Connect
- Mailtraq
- Nginx
- qmail-pop3d
- Qpopper
- RePOP
- UW IMAP
- WinGate
- Zimbra

Related requests for comments (RFCs)

- RFC 918 – POST OFFICE PROTOCOL
- RFC 937 – POST OFFICE PROTOCOL – VERSION 2
- RFC 1081 – Post Office Protocol – Version 3
- RFC 1939 – Post Office Protocol – Version 3 (STD 53)
- RFC 1957 – Some Observations on Implementations of the Post Office Protocol (POP3)
- RFC 2195 – IMAP/POP AUTHorize Extension for Simple Challenge/Response
- RFC 2384 – POP URL Scheme
- RFC 2449 – POP3 Extension Mechanism
- RFC 2595 – Using TLS with IMAP, POP3 and ACAP
- RFC 3206 – The SYS and AUTH POP Response Codes
- RFC 5034 – The Post Office Protocol (POP3) Simple Authentication and Security Layer (SASL) Authentication Mechanism

See also

- Email encryption

References

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5. Demon Online Help Centre (http://e.demon.net/helpdesk/producthelp/mail/sdps-tech.html/). E.demon.net (2013-01-23). Retrieved on 2013-07-17.

Further reading

- Hughes, L (1998). *Internet e-mail Protocols, Standards and Implementation*. Artech House Publishers. ISBN 0-89006-939-5.
- Johnson, K (2000). *Internet Email Protocols: A Developer's Guide*. Addison-Wesley Professional. ISBN 0-201-43288-9.
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- Rhoton, J (1999). *Programmer's Guide to Internet Mail: SMTP, POP, IMAP, and LDAP*. Elsevier. ISBN 1-55558-212-5.
- Wood, D (1999). *Programming Internet Mail*. O'Reilly. ISBN 1-56592-479-7.
- *Post Office Protocol – Version 3*. IETF. May 1996.

External links

- IANA port number assignments
- POP3 Sequence Diagram (PDF)
- Thexyz POP3 servers and ports