

Post Office Protocol 邮局协议

In computing, the **Post Office Protocol (POP)** is an application-layer Internet standard protocol used by e-mail clients to retrieve e-mail from a mail server.^[1] Today, POP version 3 (**POP3**) is the most commonly used version. Together with IMAP, it is one of the most common protocols for email retrieval.

在计算中，邮局协议（POP）是电子邮件客户端用来从邮件服务器检索电子邮件的应用层 Internet 标准协议。^[1] 今天，POP 版本 3（POP3）是最常用的版本。与 IMAP 一起，它是最常见的电子邮件检索协议之一。

Purpose 目的

The Post Office Protocol provides access via an Internet Protocol (IP) network for a user client application to a mailbox (*maildrop*) maintained on a mail server. The protocol supports list, retrieve and delete operations for messages. POP3 clients connect, retrieve all messages, store them on the client computer, and finally delete them from the server.^[2] This design of POP and its procedures was driven by the need of users having only temporary Internet connections, such as dial-up access, allowing these users to retrieve e-mail when connected, and subsequently to view and manipulate the retrieved messages when offline.

邮局协议允许用户客户端应用程序通过因特网协议（IP）网络访问邮件服务器上维护的邮箱（maildrop）。该协议支持消息的列表、检索和删除操作。POP3 客户端连接，检索所有邮件，将它们存储在客户端计算机上，最后从服务器中删除它们。^[2] POP 及其过程的这种设计是由用户仅具有临时 Internet 连接（如拨号访问）的需要驱动的，这些用户允许这些用户在连接时检索电子邮件，随后在脱机时查看和操作检索到的邮件。

POP3 clients also have an option to leave mail on the server after retrieval, and in this mode of operation, clients will only download new messages which are identified by using the UIDL command (unique-id list). By contrast, the Internet Message Access Protocol (IMAP) was designed to normally leave all messages on the server to permit management with multiple client applications, and to support both connected (*online*) and disconnected (*offline*) modes of operation.

POP3 客户端还可以选择在检索后将邮件保留在服务器上，在此操作模式下，客户端将仅下载使用 UIDL 命令（唯一 id 列表）标识的新邮件。相比之下，Internet 邮件访问协议（IMAP）设计为通常将所有邮件保留在服务器上，以允许使用多个客户端应用程序进行管理，并支持连接（联机）和断开连接（脱机）操作模式。

A POP3 server listens on well-known port number 110 for service requests. 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 number 995.

POP3 服务器在已知端口号 110 上侦听服务请求。POP3 的加密通信可以在协议启动后使用 STLS 命令（如果支持）请求，也可以由 POP3S 请求，POP3S 使用传输层安全性（TLS）或安全套接字层（SSL）在已知的 TCP 端口号 995 上连接到服务器。

Messages available to the client are determined when a POP3 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 the message-number. When the client exits the session, mail marked for deletion is removed from the maildrop.

客户端可用的邮件在 POP3 会话打开邮件投递时确定，并由该会话的本地邮件编号标识，或者由 POP 服务器分配给邮件的唯一标识符（可选）标识。此唯一标识符是永久的，并且对于邮件投递是唯一的，并允许客户端在不同的 POP 会话中访问相同的邮件。检索邮件并按邮件编号标记为删除。当客户端退出会话时，标记为删除的邮件将从邮件投递中删除。

History 历史

The first version of the Post Office Protocol, POP1, was specified in RFC 918 (1984) by Joyce K. Reynolds. POP2 was specified in RFC 937 (1985).

邮局协议的第一个版本POP1由Joyce K. Reynolds在RFC 918（1984）中指定。POP2 在 RFC 937（1985）中指定。

POP3 is the version in most common use. It originated with RFC 1081 (1988) but the most recent specification is RFC 1939, updated with an extension mechanism (RFC 2449) and an authentication mechanism in RFC 1734. This led to a number of POP implementations such as Pine, POPmail, and other early mail clients.

POP3 是最常用的版本。它起源于 RFC 1081（1988），但最新的规范是 RFC 1939，在 RFC 1734 中使用扩展机制（RFC 2449）和身份验证机制进行了更新。这导致了許多POP实现，如Pine，POPmail和其他早期邮件客户端。

While the original POP3 specification supported only an unencrypted USER/PASS login mechanism or Berkeley .rhosts access control, today POP3 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.

虽然最初的 POP3 规范仅支持未加密的 USER/PASS 登录机制或 Berkeley .rhosts 访问控制，但如今 POP3 支持多种身份验证方法，以提供不同级别的保护，防止非法访问用户的电子邮件。大多数由 POP3 扩展机制提供。POP3 客户端通过 AUTH 扩展支持 SASL 身份验证方法。麻省理工学院雅典娜计划也制作了一个Kerberized版本。RFC 1460将APOP引入核心协议。APOP 是一种质询-响应协议，它使用 MD5 哈希函数来避免重放攻击和共享密钥泄露。实现APOP的客户包括Mozilla Thunderbird，Opera Mail，Eudora，KMail，Novell Evolution，RimArts的Becky！，Windows Live Mail，PowerMail，Apple^[3] Mail和Mutt。RFC 1460 被 RFC 1725 淘汰，而 RFC 1939 又已过时。

POP4

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

POP4 仅作为非正式提案存在，增加了基本的文件夹管理、多部分邮件支持以及邮件标志管理，以与 IMAP 竞争；然而，自2003年以来，其发展没有进展。^[4]

Extensions and specifications

扩展和规格

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.

RFC 2449 中提出了一种扩展机制，以适应常规扩展，并以有组织的方式宣布对可选命令（如 TOP 和 UIDL）的支持。RFC 并不打算鼓励扩展，并重申 POP3 的作用是为邮箱处理的主要下载和删除要求提供简单的支持。

The extensions are termed capabilities and are listed by the CAPA command. With the exception of 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.^[6]

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 – differing in 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.

Session example

The following POP3 session dialog is an example in RFC 1939:^[7]

```
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
```

Comparison with IMAP

The Internet Message Access Protocol (IMAP) is an alternative and more recent mailbox access protocol. The highlights of differences are:

- POP is a simpler protocol, making implementation easier.
- POP moves the message from the email server to the local computer, although there is usually an option in email clients 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 a single 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.
- POP provides a completely *static* view of the current state of the mailbox, and does not provide a mechanism to show any external changes in state during the session.
- IMAP provides a *dynamic* view, and sends responses for external changes in state, including newly arrived messages, as well as changes made to the mailbox by other concurrently connected clients.

- POP can either retrieve an entire message with the RETR command, and for servers that support it, the headers, as well as a specified number of body lines can be accessed with the TOP command.
- IMAP allows clients to retrieve any of the individual MIME parts separately – for example, retrieving the plain text without retrieving attached files, or retrieving only one of many 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, forwarded, or deleted.

Related requests for comments (RFCs)

- RFC 918 (<https://datatracker.ietf.org/doc/html/rfc918>) – POST OFFICE PROTOCOL
- RFC 937 (<https://datatracker.ietf.org/doc/html/rfc937>) – POST OFFICE PROTOCOL – VERSION 2
- RFC 1081 (<https://datatracker.ietf.org/doc/html/rfc1081>) – Post Office Protocol – Version 3
- RFC 1939 (<https://datatracker.ietf.org/doc/html/rfc1939>) – Post Office Protocol – Version 3 (STD 53)
- RFC 1957 (<https://datatracker.ietf.org/doc/html/rfc1957>) – Some Observations on Implementations of the Post Office Protocol (POP3)
- RFC 2195 (<https://datatracker.ietf.org/doc/html/rfc2195>) – IMAP/POP AUTHorize Extension for Simple Challenge/Response
- RFC 2384 (<https://datatracker.ietf.org/doc/html/rfc2384>) – POP URL Scheme
- RFC 2449 (<https://datatracker.ietf.org/doc/html/rfc2449>) – POP3 Extension Mechanism
- RFC 2595 (<https://datatracker.ietf.org/doc/html/rfc2595>) – Using TLS with IMAP, POP3 and ACAP
- RFC 3206 (<https://datatracker.ietf.org/doc/html/rfc3206>) – The SYS and AUTH POP Response Codes
- RFC 5034 (<https://datatracker.ietf.org/doc/html/rfc5034>) – The Post Office Protocol (POP3) Simple Authentication and Security Layer (SASL) Authentication Mechanism
- RFC 8314 (<https://datatracker.ietf.org/doc/html/rfc8314>) – Cleartext Considered Obsolete: Use of Transport Layer Security (TLS) for Email Submission and Access

See also

- [List of mail server software](#)
- [Comparison of email clients](#)
- [Comparison of mail servers](#)
- [Email encryption](#)
- [Internet Message Access Protocol](#)

References

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7. RFC 1939, page 19

Further reading

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- Rhoton, J (1999). *Programmer's Guide to Internet Mail: SMTP, POP, IMAP, and LDAP*. Elsevier. ISBN 1-55558-212-5.
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- *Post Office Protocol – Version 3* (<http://www.rfc-editor.org/std/std53.txt>). IETF. May 1996.

External links

- IANA port number assignments (<https://www.iana.org/assignments/port-numbers>)
 - POP3 Sequence Diagram (<http://www.eventhelix.com/RealtimeMantra/Networking/POP3.pdf>) Archived (<https://web.archive.org/web/20150503041335/http://www.eventhelix.com/RealtimeMantra/Networking/POP3.pdf>) 2015-05-03 at the [Wayback Machine](https://web.archive.org/web/20150503041335/http://www.eventhelix.com/RealtimeMantra/Networking/POP3.pdf) (PDF)
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