

IMAP and POP

A Summary of the Protocols

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Abstract

POP3 and IMAP are two ways of accessing email over the Internet. POP3, the older of the two methods, works well for users who have one computer and who want keep all of their mail on that one computer. IMAP provides server-side storage and manipulation of email. It works better where users have multiple computers and need to be able to access their mail from any of them, plus via the Web. This document explains both protocols and argues softly for the deployment of IMAP.

Terms In Un-Alphabetical Order

Protocol - Rules determining the format, processing and transmission of data.

POP - Post Office Protocol, a method of delivering email.

IMAP - Internet Message Access Protocol, another email delivery method.

SMTP Server - Software for transporting mail across the Internet.

Email Server - Software for delivering messages to email accounts.

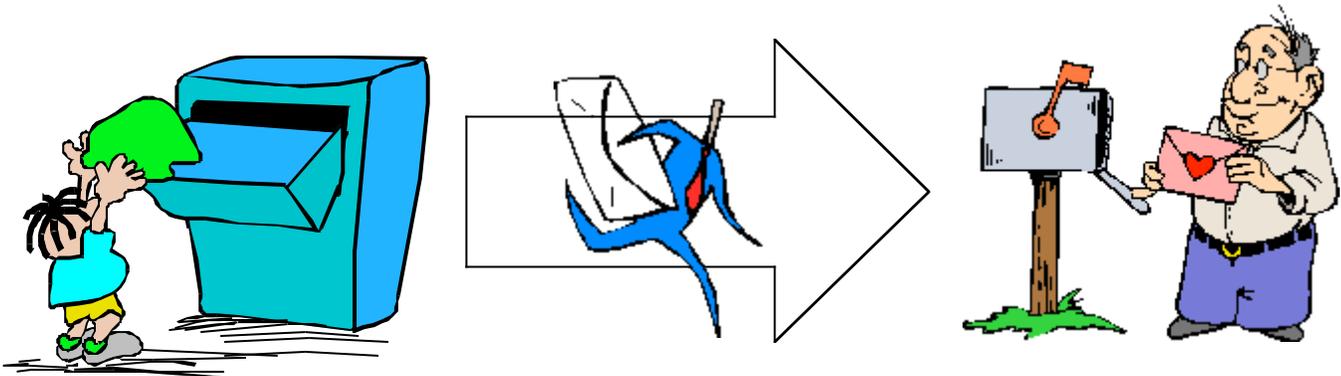
Some Simple Analogies

All analogies break down, but they are still useful tools for helping people understand esoteric concepts.

-- Anonymous

POP (Post Office Protocol)

In the world of snail mail, the sender writes a letter and drops it into a mail box. When this happens, the letter has just entered a sorting and transportation system where it stays for some amount of time. Eventually the letter ends up with a mail carrier who delivers it into the mail box of the receiver. The receiver opens the mail and, ah, lets it lay on the front hall table until someone throws it away. To find the mail later, the receiver must dig through the trash. If the receiver needs the mail while away from home and the trash, well, too bad.



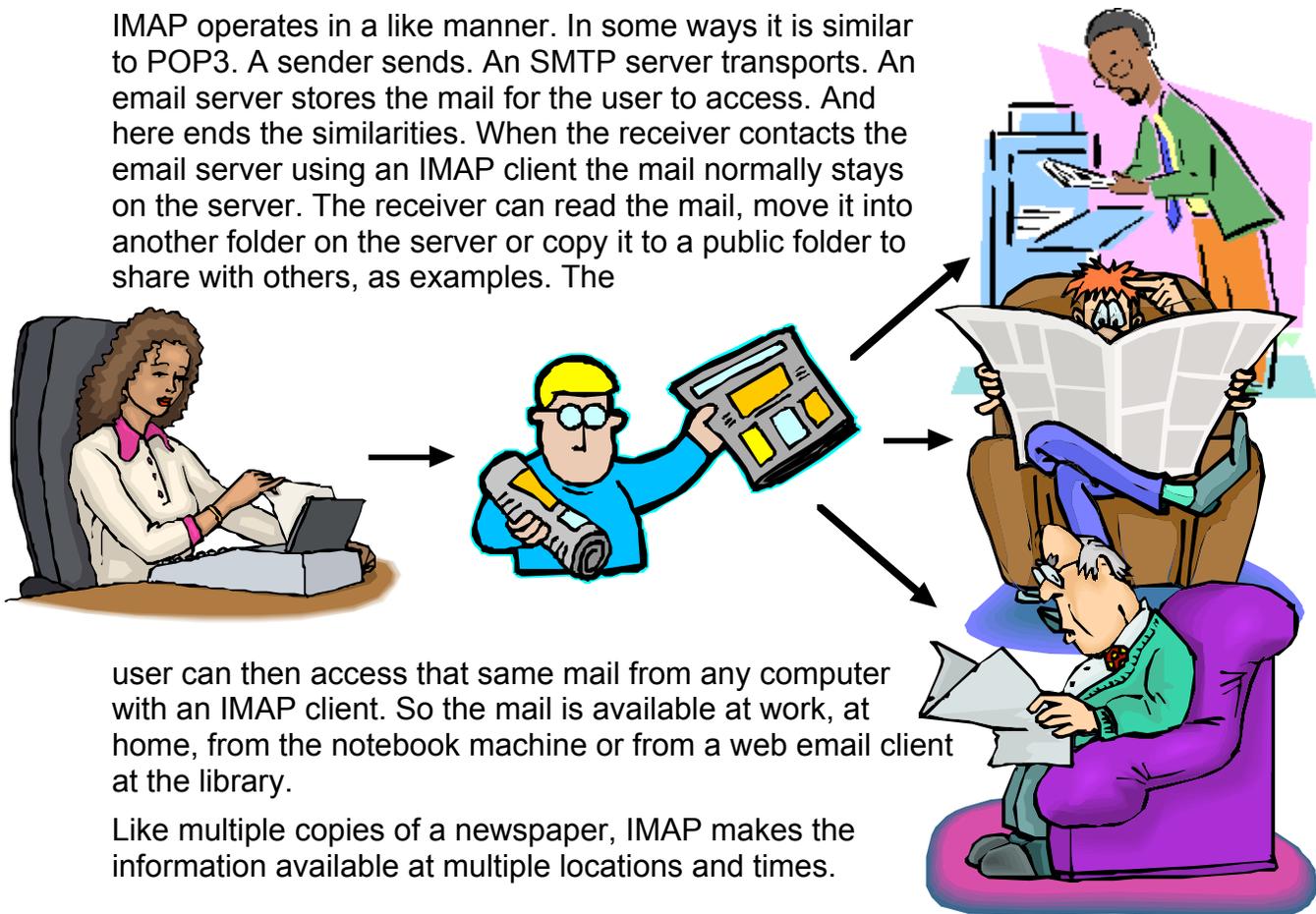
The Post Office Protocol (POP) for delivering email works somewhat similarly to this. A person sends an email from a computer, similar to dropping it into a mail box. An SMTP server routes it across the Internet to an email server, analogous to sorting and transporting. The receiver contacts the email server using POP and downloads the email to a local computer, like the mail carrier delivering a letter. Once on the computer it can be moved from the inbox into a different email folder, so much for the hall table. The mail stays on the computer until the user deletes it.

Both snail mail and POP move the message from the hands of the sender to the hands of the receiver with reliable efficiency. There is not a trace of the mail left in the transportation and sorting system, at least from the user's point of view. Some technical types refer to POP as a storage and forwarding system. The last forwarding stage is from the POP server to the local computer.

IMAP (Internet Message Access Protocol)

In the world of mass media, a reader writes a letter and sends it to the newspaper editor. The editor publishes it in the next day's paper. That morning another reader reads the letter then sets the newspaper aside. At lunch that day the reader picks up another copy of the newspaper and shares the letter with a co-worker. During a public forum at the library that evening the reader grabs a third copy of the paper and shares the letter again. Everywhere there is a newspaper there is a copy of the letter.

IMAP operates in a like manner. In some ways it is similar to POP3. A sender sends. An SMTP server transports. An email server stores the mail for the user to access. And here ends the similarities. When the receiver contacts the email server using an IMAP client the mail normally stays on the server. The receiver can read the mail, move it into another folder on the server or copy it to a public folder to share with others, as examples. The



And Your Point Is?

POP and IMAP both do efficient jobs of delivering email between senders and receivers. They are the two most widely deployed Internet email protocols. POP is useful for simple requirements where all email goes to one computer. IMAP is more complex. By keeping email on the server it enables access to email from multiple computers. Its multiple-folder system provides for content sharing.

Email Delivery Models

Email delivery models describe how email servers and email clients work together. There are three different models of how to deliver email on the Internet:

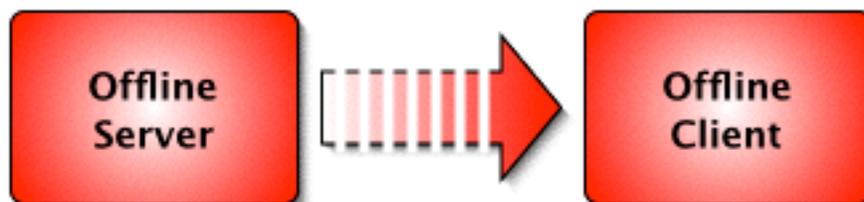
- Offline
- Online
- Disconnected

Each model defines a different method of delivery. The model names summarize the intended status of the email client during the time when the user is creating, reading and organizing email. Each model has strengths and weaknesses. In practice, the email server and client software products have fluid borders and draw from multiple models.

POP was designed to work using the offline model. IMAP employs all of the delivery models and does so fairly seamlessly.

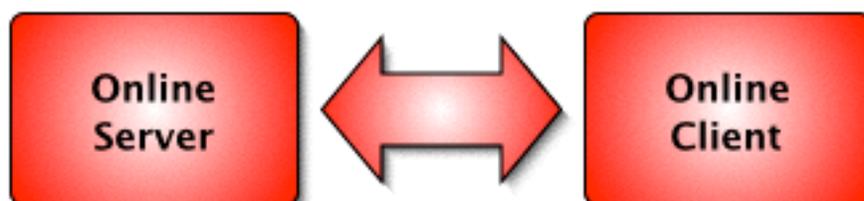
Offline

In this model, a client goes online with an email server, downloads the mail, then goes offline. All mail and attachments are stored on the client machine and deleted from the email server. The user processes — reads, prints, deletes and so on — the mail while the client is offline, giving the model its name. The illustration shows the messages moving one way when the client is connected to the server.



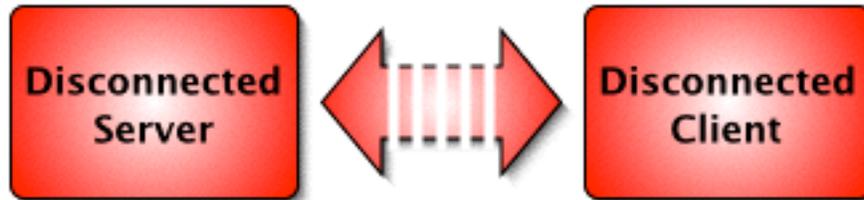
Online

With the online model, the client connects to the server and stays connected while the user processes the mail. In addition to processing the email, the user can add, change and delete email mailbox folders for personal and public accounts. Multiple users can simultaneously access a single public folder. All mail is stored on the server. The illustration shows a continuous two-way connection between the server and client.



Disconnected

The disconnected model allows the user to download messages, edit while disconnected, reconnect later and restore the messages to the server. As with the online method, this one uses the server as the official location for all email. This model uses unique identifiers for messages to assure synchronization when uploading modified messages. The illustration shows messages moving back and forth between the client and server when they are connected.



Advantages and Disadvantages

In their pure implementation each model has specific feature advantages and disadvantages. The table shows feature availability for each model. This table was adapted from Internet RFC-1733, from the University of Washington.

Feature	Delivery Models		
	Offline	Online	Disc
Multiple client support	NO	YES	YES
Minimum server connection time	YES	NO	YES
Minimum server CPU and disk usage	YES	NO	NO
Minimum client disk usage	NO	YES	NO
Multiple remote mailboxes	NO	YES	YES
Mail processing when not online	YES	NO	YES

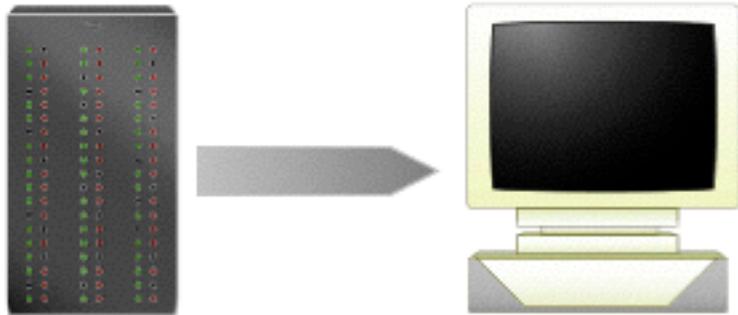
POP and IMAP Specifics

POP and IMAP are the two email protocols used on the Internet.

POP

POP is the oldest and most recognizable Internet email protocol. Its current widespread implementation is POP3. POP is a simple protocol to configure, operate and maintain.

When POP was first designed, the cost of constantly staying online was very high. Because of this, POP was built around the offline mail delivery model. This means the end-user connects to an email server, downloads



messages, disconnects from the server, then reads email while offline. In other words, POP was designed to collect mail for a single email client.

POP Messages are stored on the mail server until downloaded to the client. They are then stored on the client machine and deleted from the server. The client can contain multiple folders for organizing email. Filters can place mail into specific folders during the download process. The user can mark mail with flags such as read, unread and urgent.

A change to the POP standard includes the option to leave email on the server after downloading it. This enables a user to download the same mail using multiple clients on more than one computer. However, there are no server-side file manipulation capabilities, such as marking mail as read or unread. There are also no facilities for creating server-side directories. Instead, leaving email on a server, allows each client to download the same messages one time.

POP Benefits

Local Storage. When not connected, the user can still access and read downloaded email.

Server Saving. POP frees server disk space because it downloads emails and attachments then deletes them from the server.

Legacy Systems. For people with older systems, POP may be the only choice. IMAP is mostly available only on recent email clients, many of which cannot run on older machines.

POP Drawbacks

Single Computer and Client. Despite the "leave-mail-on-server" enhancements of newer POP servers and clients, POP is primarily designed for use with a single email client on a single computer. When implemented, the "leave-mail-on-server" feature forces the downloading of the same emails multiple times, eating bandwidth, server resources and client disk space on multiple machines.

IMAP

IMAP is a more recent development in email technology. Its current implementation is IMAP4. IMAP can do all POP functions, plus many more. It can be simple or complex to configure, operate and maintain.

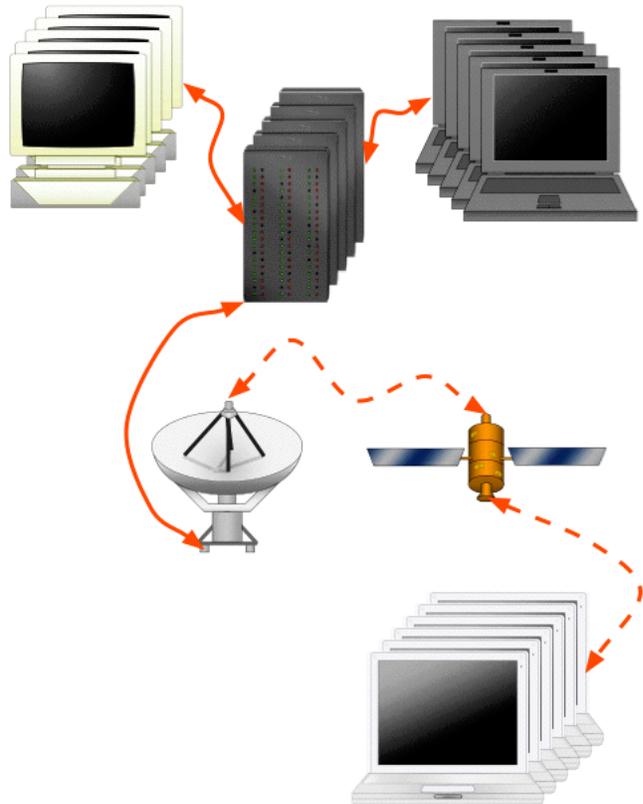
IMAP was designed for users to stay connected to one or more email servers while reading, creating and organizing messages. Users can manipulate both mail and mailboxes on the server side. Mailboxes can be added, nested, renamed, moved and deleted; they can be for private and public access. Shared mail boxes are available for such uses as mailing lists, announcements and common projects.

Messages can be freely copied and moved between mailboxes on one or more accounts; they can also be moved between clients and servers, as shown in the illustration. Email accounts can be accessed from various clients on many machines. All clients see the same mailboxes and messages in each account. *Appendix A* contains illustrations of one account viewed from multiple IMAP clients.

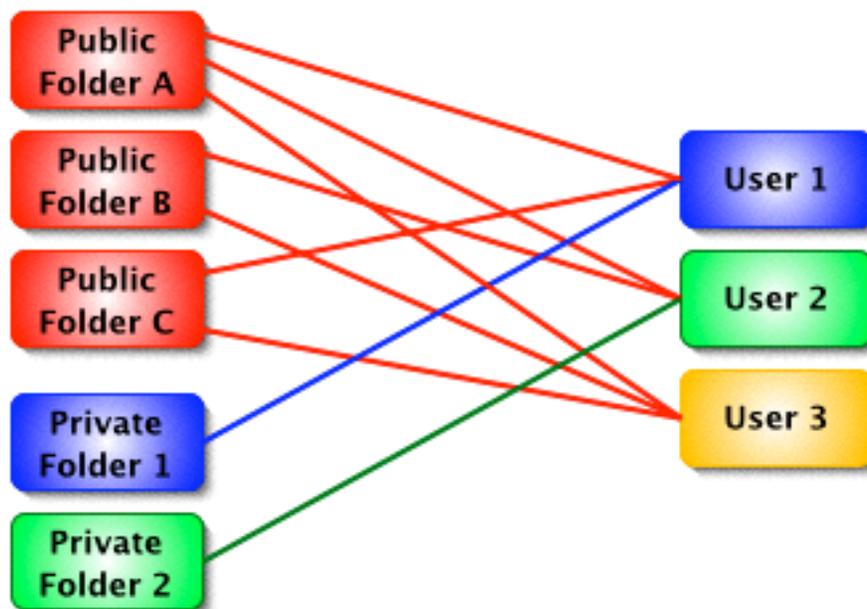
While IMAP email is stored on the server, messages can also be cached on a local machine for offline use. Deleting the cached messages does not delete the messages on the server.

According to its standard, IMAP clients can filter messages to mailboxes on the client. In addition, MDAemon allows server-side filtering as email arrives at a user account. This happens even when the IMAP client is not attached.

IMAP can potentially save bandwidth by downloading just the headers (To, From, Subject) of emails without transferring the message or any attachments to the client. This gives the user the choice to download the message and any attachments.



Private and Public IMAP folders enable either confidentiality or collectivity of email and attachments. Each private folder is typically available to one user only, the owner of the email account for that folder. With public folders, multiple users can connect simultaneously to the same mailbox and share all of its messages and attachments. Message status flags for public folders can be unique to each user or shared among the members of a group. Unique message flags are private for each user. These are useful when everyone in a group should see all messages in a public folder. Shared message flags tell all members of a group if someone has opened a message. This can be efficient, for example, within a customer support group where all incoming mail goes to a collective mailbox, but not everyone needs to see every inbound message. The illustration shows several users accessing public and private mail folders.



IMAP Benefits

- Multiple Client Support. Messages can be viewed on any computer with an IMAP client.
- Public and group folders. Because they are on the server everyone can see and use them.
- Configurability. It has dozens of options based on all three mail delivery models.

IMAP Drawbacks

- Future Shock. Too many options.
- Server Intensive. Consumes server CPU and disk resources.

Conclusion

POP and IMAP both offer viable email capabilities.

POP is design to be used by one client on one computer. IMAP is client and computer independent with each client seeing the same information for every IMAP account.

POP stores mail on the client computer. IMAP stores mail on the server and caches it on the computer.

POP clients have facilities for organizing mail into client-side folders. IMAP folders can be on the server or client side.

POP sends messages one way, from the server to the client. IMAP can copy and move messages back and forth between mailboxes on multiple accounts as well as between servers and clients.

POP allows one user to connect to one mailbox. IMAP supports both private and public folders. Each public folder can have either unique or shared status flags for its messages.

MDaemon supports both POP and IMAP.

Appendix A: IMAP Views of One Account

The following illustrations show several email accounts viewed from various IMAP clients. The content is the same for the mail.altn.com account. The messages are sorted by data.

WorldClient

WorldClient

Bob@altn.com - Inbox - 83 Messages
Unread - #Discussions: 1 #ld-beta: 217 #ld-support: 4
#md-beta: 8640 #md-support: 341 #rf-beta: 610
#TestingProjects: 29 #wa-beta: 209 #wc-beta: 8
#wc-templates: 24

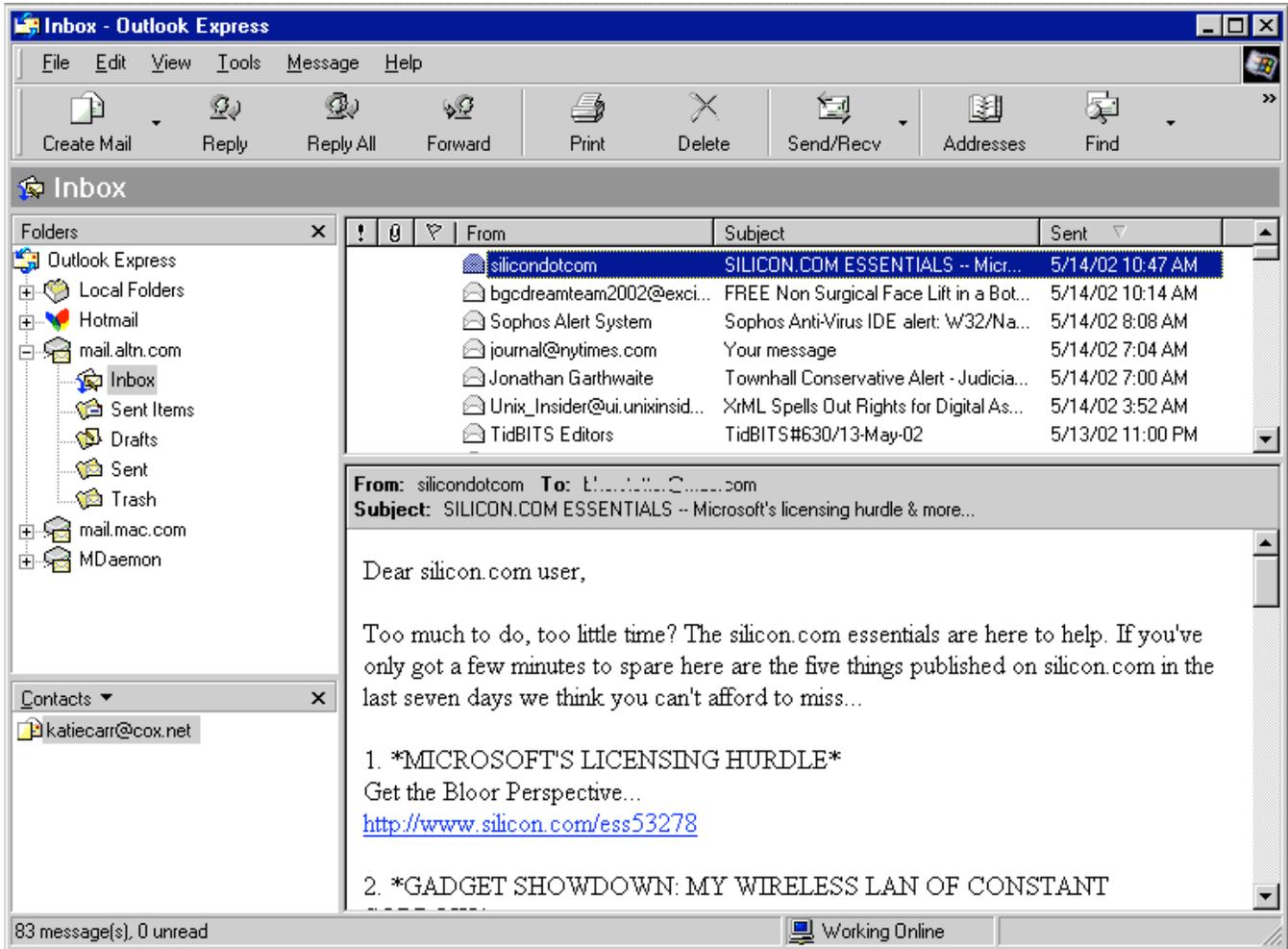
WorldClient

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Inbox (83/0)

	Subject	From	Date	Size
<input type="checkbox"/>	SILICON.COM ESSENTIALS -- Microsoft's licensing hurdle & more...	silicondotcom	05/14/2002 10:47 AM	3k
<input type="checkbox"/>	FREE Non Surgical Face Lift in a Bottle fuy	bgcdreamteam2002@excite.com	05/14/2002 10:14 AM	3k
<input type="checkbox"/>	Sophos Anti-Virus IDE alert: W32/Nahata-D	Sophos Alert System	05/14/2002 08:08 AM	3k
<input type="checkbox"/>	Your message	journal@nytimes.com	05/14/2002 07:04 AM	2k
<input type="checkbox"/>	Townhall Conservative Alert - Judicial Roadblock	Jonathan Garthwaite	05/14/2002 07:00 AM	7k
<input type="checkbox"/>	XrML Spells Out Rights for Digital Assets	Unix_Insider@ui.unixinsider.com	05/14/2002 03:52 AM	7k
<input type="checkbox"/>	TidBITS#630/	TIDBITS	05/14/2002 11:00 PM	2k

Outlook Express



Eudora

The screenshot shows the Eudora email client window titled "Eudora - [Inbox (Bob@Alt-N)]". The menu bar includes File, Edit, Mailbox, Message, Transfer, Special, Tools, Window, and Help. The toolbar contains various icons for file operations and communication. The inbox table below has columns for Who, Date, and Subject.

Who	Date	Subject
silicon.com	04:47 PM 5/14/0	SILICON.COM ESSENTIALS -- Microsoft's licer
bgcdreamteam2l	11:14 AM 5/14/0	FREE Non Surgical Face Lift in a Bottle fuy
Sophos Alert Sy	02:08 PM 5/14/0	Sophos Anti-Virus IDE alert: W32/Nahata-D
journal@nytimes	08:04 AM 5/14/0	Your message
Jonathan Garthw	08:00 AM 5/14/0	Townhall Conservative Alert - Judicial Roadblock
Unix_Insider@ui	04:52 AM 5/14/0	XrML Spells Out Rights for Digital Assets
TidBITS Editors	09:00 PM 5/13/0	TidBITS#630/13-May-02
William Franklin	10:50 AM 5/14/0	RE: How is Nat's Knee?
Apple Developer	07:44 PM 5/13/0	ADC News #301

83/OK/OK

Dear silicon.com user,

Too much to do, too little time? The silicon.com essentials are here to help. If you've only got a few minutes to spare here are the five things published on silicon.com in the last seven days we think you can't afford to miss...

1. *MICROSOFT'S LICENSING HURDLE*
Get the Bloor Perspective...
<http://www.silicon.com/ess53278>
2. *GADGET SHOWDOWN: MY WIRELESS LAN OF CONSTANT SORROW*
Or 'Why I fie on DIY WiFi'...
<http://www.silicon.com/ess53266>
3. *WHAT IF... YOU NEEDED TO MAKE AN ROI CASE FOR EVERYTHING?*

Pegasus Mail

The screenshot shows the Pegasus Mail application window. The title bar reads "Pegasus Mail - [Folders]". The menu bar includes File, Edit, Addresses, Tools, Folders, Messages, Window, and Help. Below the menu bar is a toolbar with various icons for file operations and a dropdown menu set to "<Default>".

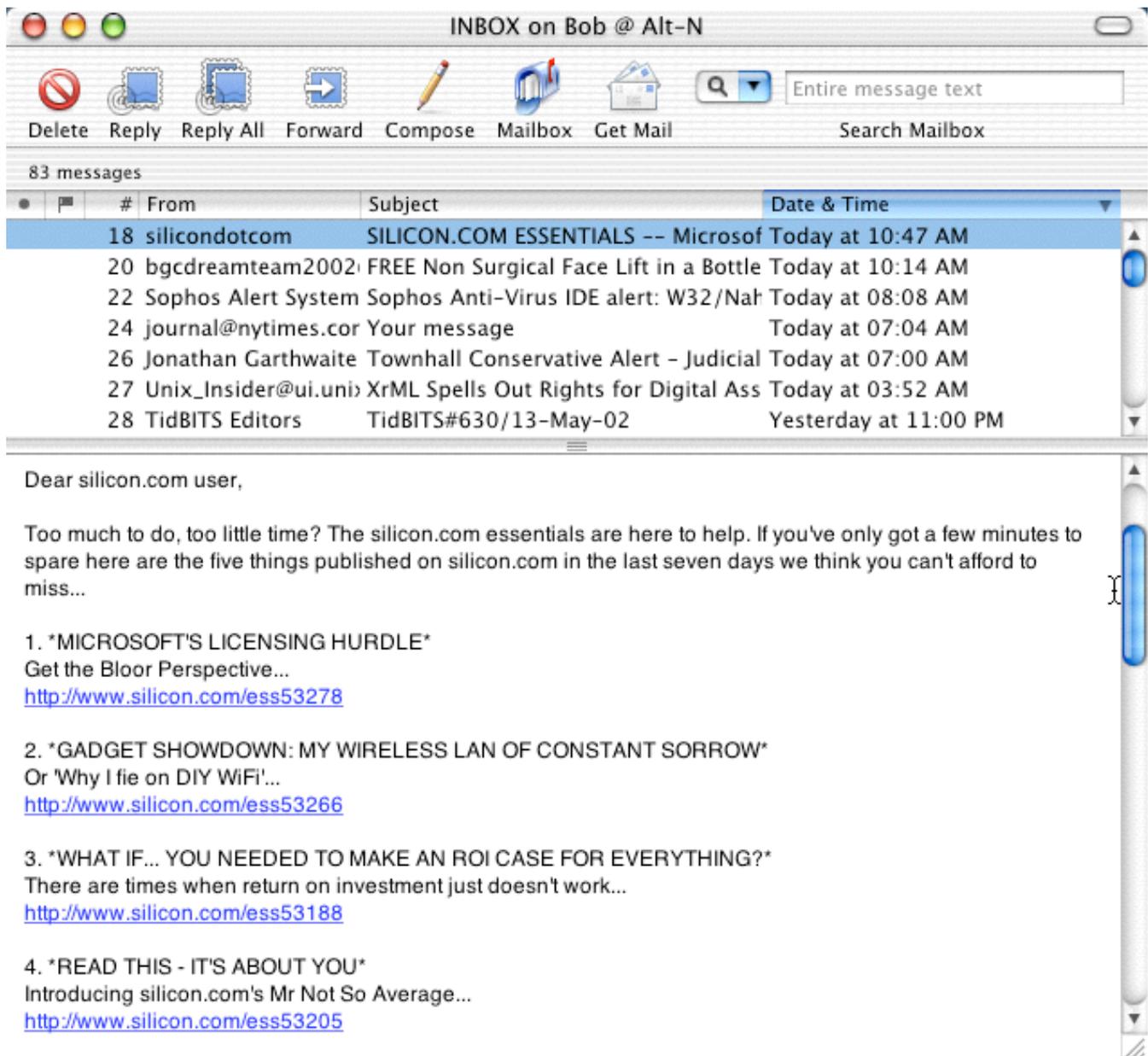
The main interface is divided into three panes:

- Left Pane (Folders):** A tree view showing the folder structure. "My mailbox" is expanded to show "New mail" (3:3). Below it is "Bob@Alt=N" with several sub-folders including #Announcements, #Discussions, #ld-beta, #ld-support, #md-beta, #md-support, #rf-beta, #rf-support, #support, #Test Public Calendar, #TestingProjects, #wa-beta, #wa-support, #wc-beta, #wc-templates, Drafts, New or unread mail (INBOX) (83:0), Sent, Sent Items (5:0), and Trash.
- Middle Pane (Message List):** A table listing messages. The selected message is from "silicon.com" with the subject "SILICON.COM ESSENTIALS --" and a date of "14 May 02, 10:47" and size of "3.3k". Other messages include "FREE Non Surgical Face Lift in...", "Sophos Anti-Virus IDE alert: W3", "Your message", "Townhall Conservative Alert - Ju...", "XML Spells Out Rights for Digit...", "TidBITS#630/13-May-02", "RE: How is Nat's Knee?", "ADC News #301", "Fw: Looking for jobs on-line", "new Addendum", "Sophos Anti-Virus IDE alert: VB...", "[breakpoint] Folios and Feminism", and "Celine Dion disagrees with Mac...".
- Right Pane (Message Content):** Displays the content of the selected message. It shows the header: "From: silicon.com To: b...@...ac.com" and "Subject: SILICON.COM ESSENTIALS -- Microsoft's licensing hur...". The body text reads: "Dear silicon.com user, Too much to do, too little time? The silicon.com essentials are here to h...". A link is provided: "1. *MICROSOFT'S LICENSING HURDLE* Get the Bloor Perspective... http://www.silicon.com/ess53278".

At the bottom of the window, there is a status bar with the text "Press <F1> for help", the name "pendrago", and "3 new" with a red exclamation mark icon.

Mail

Mail is a lightweight IMAP client for Macintosh System OS X.



83 messages

#	From	Subject	Date & Time
18	silicon.com	SILICON.COM ESSENTIALS -- Microsof	Today at 10:47 AM
20	bgcdreamteam2002	FREE Non Surgical Face Lift in a Bottle	Today at 10:14 AM
22	Sophos Alert System	Sophos Anti-Virus IDE alert: W32/Na	Today at 08:08 AM
24	journal@nytimes.cor	Your message	Today at 07:04 AM
26	Jonathan Garthwaite	Townhall Conservative Alert - Judicial	Today at 07:00 AM
27	Unix_Insider@ui.uni	XrML Spells Out Rights for Digital Ass	Today at 03:52 AM
28	TidBITS Editors	TidBITS#630/13-May-02	Yesterday at 11:00 PM

Dear silicon.com user,

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- *MICROSOFT'S LICENSING HURDLE***
Get the Bloor Perspective...
<http://www.silicon.com/ess53278>
- *GADGET SHOWDOWN: MY WIRELESS LAN OF CONSTANT SORROW***
Or 'Why I fie on DIY WiFi'...
<http://www.silicon.com/ess53266>
- *WHAT IF... YOU NEEDED TO MAKE AN ROI CASE FOR EVERYTHING?***
There are times when return on investment just doesn't work...
<http://www.silicon.com/ess53188>
- *READ THIS - IT'S ABOUT YOU***
Introducing silicon.com's Mr Not So Average...
<http://www.silicon.com/ess53205>