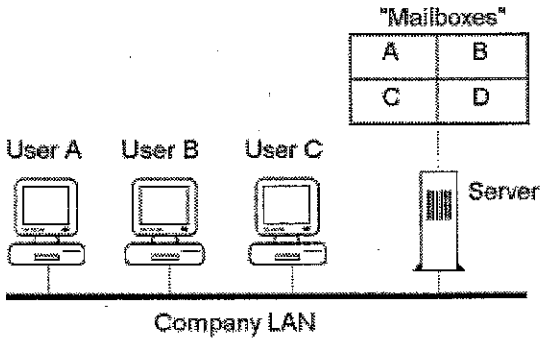
Electronic Mail Fundamentals

Electronic mail (e-mail) has been key to the popularity of networks. E-mail allows:

- fast communication
- permanent record of the communication
- attaching additional information to a message
- copying a message to more than one recipient
- temporary storage of information if recipient is not immediately available

Internal Mail

The diagram below illustrates the principles of e-mail on a network.



Each user on the network is allocated a "mailbox" on the server. When user A sends an e-mail message to user C, the message is placed on user C's mailbox on the server. When user C wants to see her e-mail, she has to "fetch" the mail that is waiting for her in her mailbox. If she is away on vacation, or simply not at her desk at the moment user A sent the message, it is not lost because it is placed in the mailbox on the server rather than going to user C directly.

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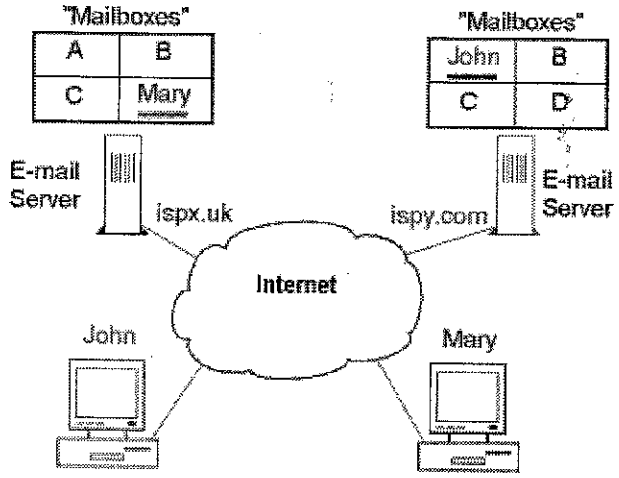
Internet E-mail

The situation with e-mail on the Internet is similar but is complicated a little by the fact that the Internet is a WAN consisting of many interconnected networks. The diagram below will illustrate the concepts. For simplicity we will use individual users:



Each user of e-mail must obviously have a unique e-mail address. As with the LAN, e-mail messages are stored on a server. When a user sets up an e-mail account with an Internet service provider (ISP), the ISP allocates a mailbox on the e-mail server for the user. The mailbox is usually identified by the user's name.

The e-mail server itself has a unique address on the Internet, referred to as the *domain name* (we will discuss domain names in more detail later). So in our example above, John has an e-mail account with an ISP called "ispy". The domain name of the e-mail server is ispy.com. The full address of John's mailbox is then

john@ispy.com

This is pronounced "john at ispy dot com".

Similarly in our example, Mary's full e-mail address is

mary@ispx.uk

Let us suppose John sends an e-mail message to Mary. He would address the message to mary@ispx.uk. The message is routed through the Internet to the e-mail server with domain name ispx.uk. The server will put the message in Mary's mailbox on the server. The protocol used when one sends an e-mail to an e-mail server is *simple message transfer protocol (SMTP)*.

If Mary wants to see if she has received an e-mail, she requests her e-mail server to send any mail in her mailbox down to the e-mail program on her computer. The server does not send the mail to just anyone and will request that Mary first identify herself by giving her username and password. If these are valid, the server sends all the mail in Mary's mailbox to her e-mail program, where it is placed in the Inbox folder. The protocol used to request and download e-mail from the mailbox is called *post office protocol (POP)*.

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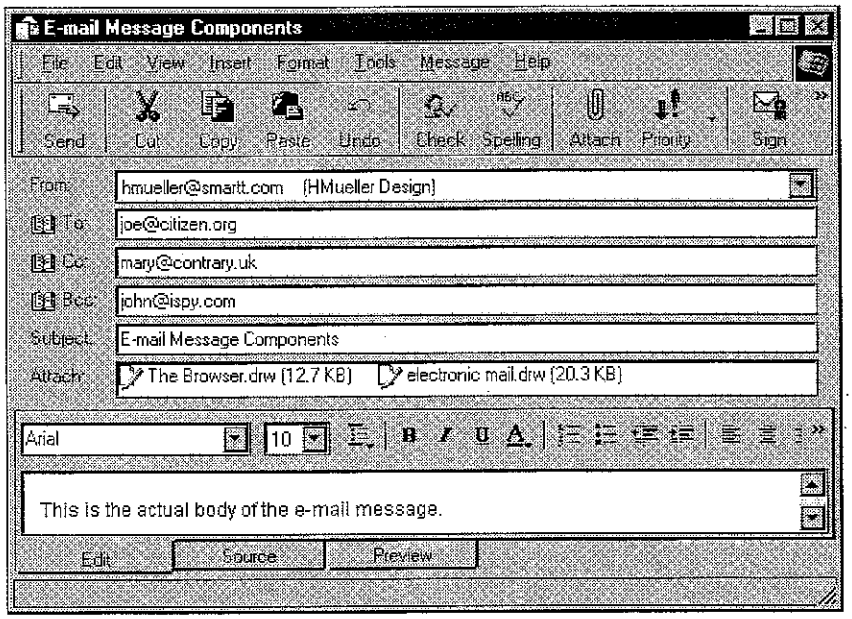
E-mail Message Components

Regardless of what e-mail program you use, the components of an e-mail message are the same because they are determined by the Internet e-mail protocols. The components of an e-mail message are:

1) Addressing
2) Subject Line
3) Body
4) Attachments

Following are examples of two different e-mail programs:



Outlook Express (comes with Internet Explorer)

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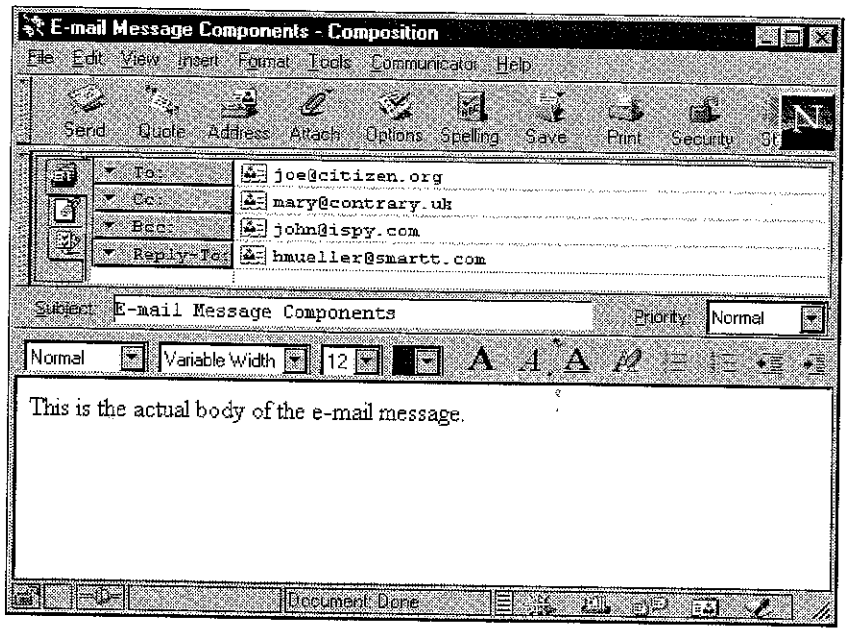

Netscape Messenger (comes with Netscape Navigator)

Notice how the two program screens contain the same e-mail message components.

Addressing

The addressing portion of the e-mail is very important. There are many addressing options, we will discuss the main features.

To This is the destination address. Without it the e-mail cannot be sent. You can send the e-mail to several recipients, with their addresses separated in the To: line by semicolons (;). Depending on your e-mail program, you may also be able to use a comma (,) as the separator.

Cc This is the Carbon Copy address. The recipient in this line gets a copy of the e-mail and knows that it was sent for information and that the recipient in the To: line is the main recipient. There can be more than one address in the Cc: line.

Bcc The Blind Carbon Copy is used when you need to hide the fact that this recipient is receiving a copy. There can be more than one address in the Bcc: line.

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The Subject Line

The subject line is very important. Here you should put a short description of the content or purpose of the e-mail. People receive many e-mails. It is useful to scan through the list of recently received e-mails by looking at the subject lines — then one can decided which message to read first.

You can send an e-mail without a subject line but because it is so useful most e-mail programs will prompt you if you forget to enter a subject in the subject line.

The Message Body

This part of the e-mail message is where you type your actual message.

Attachments

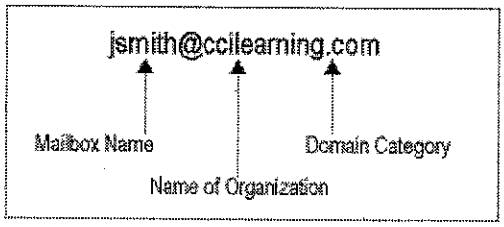
A very powerful feature of e-mail is that you can attach files to the message. People use this feature to send pictures, spreadsheets, word processing documents and many other items. It is much more convenient and faster than sending the files on a diskette using regular mail (commonly known as "snail mail").

E-mail Address Features

You can learn a number of useful things by looking at the different parts that make up an e-mail address.

The Domain Name Format

All computers connected to the Internet have a unique number (called the IP address or IP number), just like every telephone on the telephone network has a unique number. Fortunately, most owners of servers connected to the Internet will have registered a domain name for their servers. As far as the Internet is concerned IP numbers and domain names can be used interchangeably — but it is far easier to remember a domain name like *hartford.edu* than 207.230.244.190.



Mailbox Name This identifies a particular mailbox on the e-mail server. Usually it would be some combination of the e-mail account holder's first and last names because this is the easiest to remember.

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Name of Organization This label is used to identify the organization owning the server. It does not have to be the full formal name of the organization but a short version is chosen that is easy to remember, e.g., orders@ibm.com.

Domain Category This label is also called the *Top Level Domain* and identifies the server's information domain.

Top-Level Domains

The Internet was originally established in the US to facilitate research and development of military projects. A set of domain categories were defined to distinguish the different groups involved in these projects. These domains are usually called the "original top-level domains":

.mil	US military
.gov	US government
.com	commercial companies
.edu	universities
.org	organizations
.net	network sites

So we could tell from *jsmith@hartford.edu* that the address belongs to someone from Hardford University (or college) whose last name is Smith and first name starts with a "J".

Country Codes

The original top-domain categories were adequate for their original purpose but soon became inadequate when the Internet became international. The top-level domains were expanded to include two letter country codes. The following are examples:

.au	Australia	.de	Germany
.ca	Canada	.uk	United Kingdom

Larger countries may expand their domain names to indicate the region within the country, e.g., pittmeadows.bc.ca is located in British Columbia, a province of Canada.

Other countries use an expansion similar to the original domain names, e.g., amazon.co.uk is a commercial company in the UK and oxford.edu.uk is a university.

Proposed New Domains

Several new top-level domains have been proposed and may be available by the time this course goes to print. The list below gives a selection:

.aero	Air-transport industry
.biz	Businesses
.coop	Cooperatives
.ecom	electronic commerce
.info	Unrestricted use
.museum	Museums
.name	For registration by individuals
.new	news-related sites
.pro	Accountants, lawyers, and physicians

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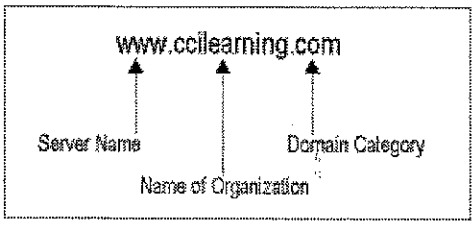
Other Servers

Organizations frequently own more than one type of server. The domain name convention for other server types is as follows:



The *server name* label is used to identify the server at the organization. Traditionally this label indicates the type of server, i.e., www for web servers, ftp for ftp servers, but this is not mandatory.

Many organizations have several servers. So you could have *www1.mit.edu*, *www2.mit.edu*, and *library.mit.edu* for different web servers at MIT.

So chances are that if you get an e-mail from *jsmith@betterbuilders.com* that they also would have a web server with URL *www.betterbuilders.com* where you can find out more information about jsmith's organization.

Creating E-mail Options

There are basically four options when sending an e-mail: create, reply, reply all, forward.

Creating New

When you want to create a new e-mail, the program will give you a blank form in which you can put all the necessary message components and type in the message body. When the message is complete, you click on the Send button (or select the Send command from the menu bar). The e-mail program then uses the STMP protocol to send the message to the server on which the recipient's mailbox is located.

Reply Options

When you have received an e-mail there are basically three things you can do:

- Reply to the sender only
- Reply to sender and to those who received copies
- Forward the message to another person

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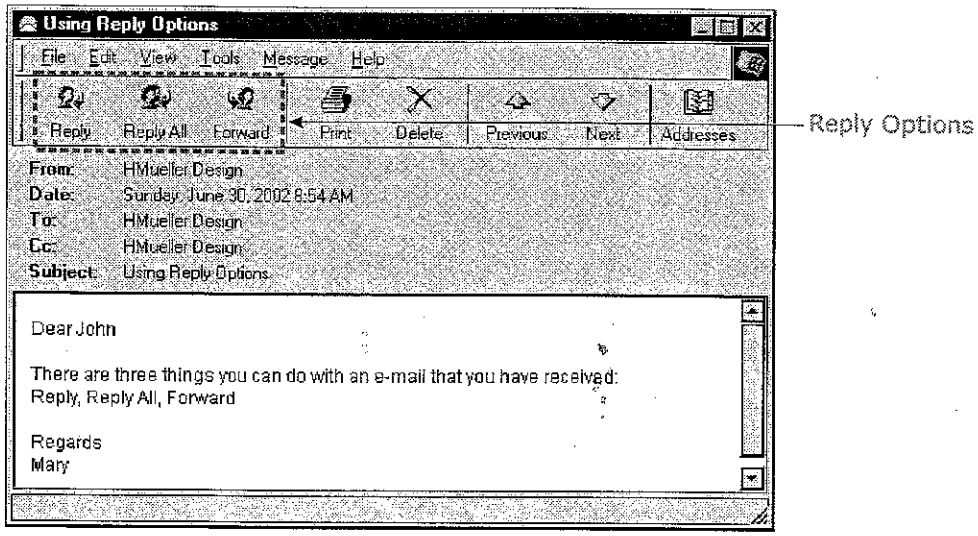
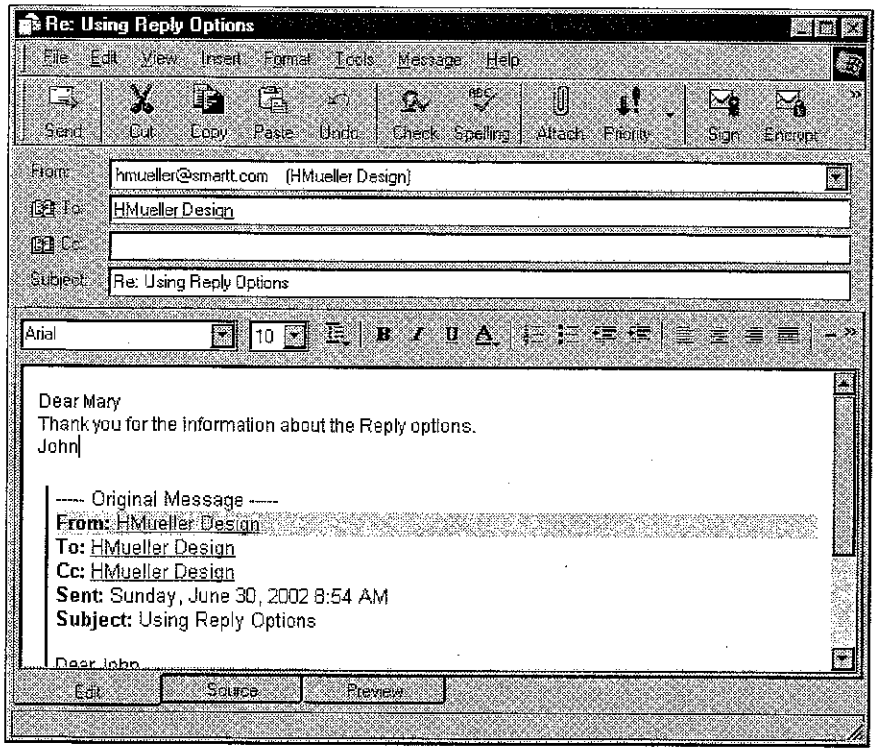


Replying

When you have received an e-mail from someone, it is normal that you would reply to it. When you click on the Reply button, the e-mail program will display a similar screen as the new message screen, except that the *To:* is already completed with the address of the person you are replying to (sending). The Subject line stays the same except that *Re:* is added so that you can recognize that it is a reply to a previous message.

The original message is placed at the bottom of the message body — this allows you to make specific comments to points in the original message.



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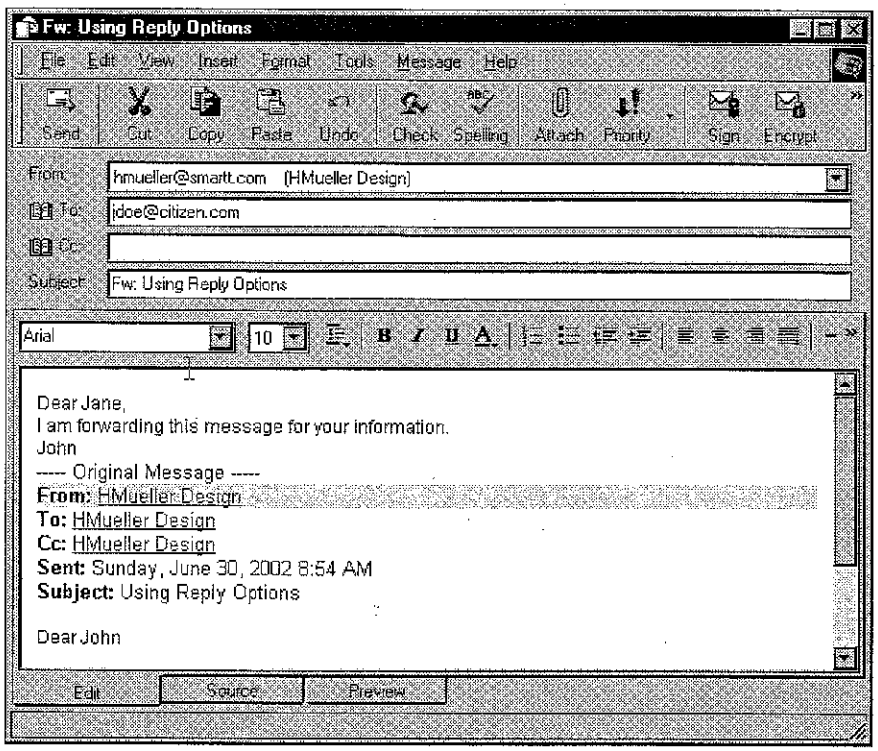
Replying to All

This is similar to the previous option except that the reply will go to all who had, like you, received the original message. This is a useful option when several people are working together on a project, or are planning a vacation together.

Forwarding

This option allows you to send the message you received to a third person, e.g., for further action. The original message is again appended at the bottom of the body. A *Fw:* is added in the Subject line.



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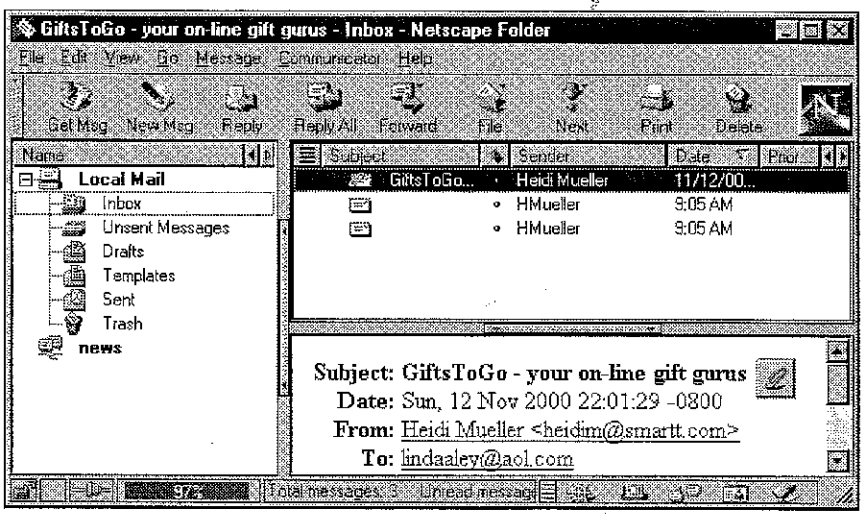
Viewing and Managing E-mail

When you request your e-mail from your server (using the POP protocol), the e-mail program will put the mail in a folder, which is usually called the *Inbox*. The program usually also has the following folders: *Outbox*, *Sent*, *Draft*, and *Deleted Items*. Although the folder names may vary slightly in different programs, their use is self-explanatory. The opening view of your e-mail program will be similar to the following:



The screen is split into three panes. The left pane contains the list of your e-mail folders — the standard ones as well as any you might create. The top right pane lists all the e-mails in the selected folder — when the program opens the *Inbox* is usually the selected folder so you can see the mail you have received from your e-mail server. The bottom right pane gives a preview of the e-mail selected above.

You can delete any e-mail once you have read it. However there are many reasons why you would want to keep e-mail messages to refer back to them later. Soon, you could have hundreds or even thousands of e-mail messages in the *Inbox* folder and it becomes hard to find any particular message. It is vital that you create a filing system so you can organize your e-mail according to categories. The folders that you create will be determined by your individual needs.

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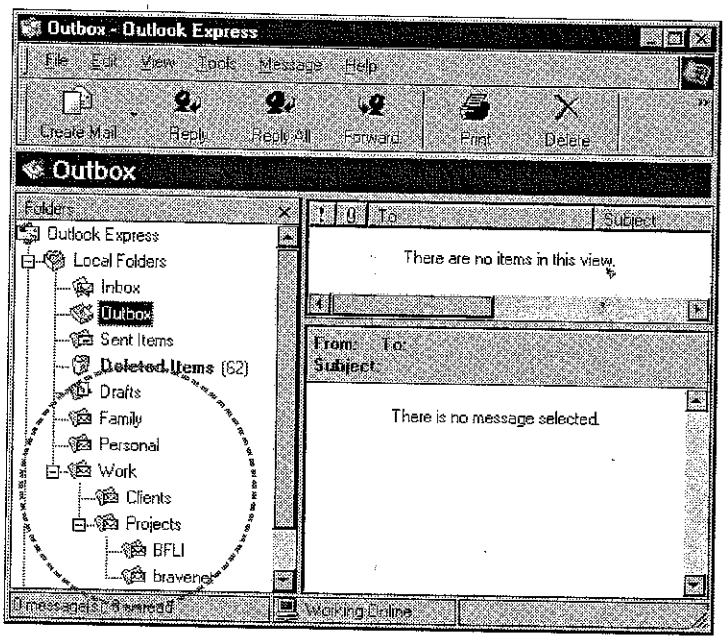
The following is an example of a folder system:



Once you have created folders, you can copy, move, and drag e-mails into folders. Once you have read an e-mail in the *Inbox* folder and you decide to keep it, you would typically move (drag) it to the appropriate folder.

Attaching Files

One of the most useful features of e-mail is that you can attach electronic files to the message.

For example, you could send an e-mail to a colleague explaining that you have written a draft report and that you would like her to read and comment on the report. Then you "*attach*" the report, which is a word processing document, to the e-mail.

When the colleague receives the e-mail, there will be an indication that there is an attachment (usually a paperclip icon).

Your colleague could then either save the attached document to a folder to work on it later or she could open it immediately in her word processor.

You can attach any kind of file: pictures, video clips, mp3 sound files, programs, games etc. Many of these files can be very large and ISP's may put a limit on the size of attachments that they will allow — typically 2 to 5 Mb.

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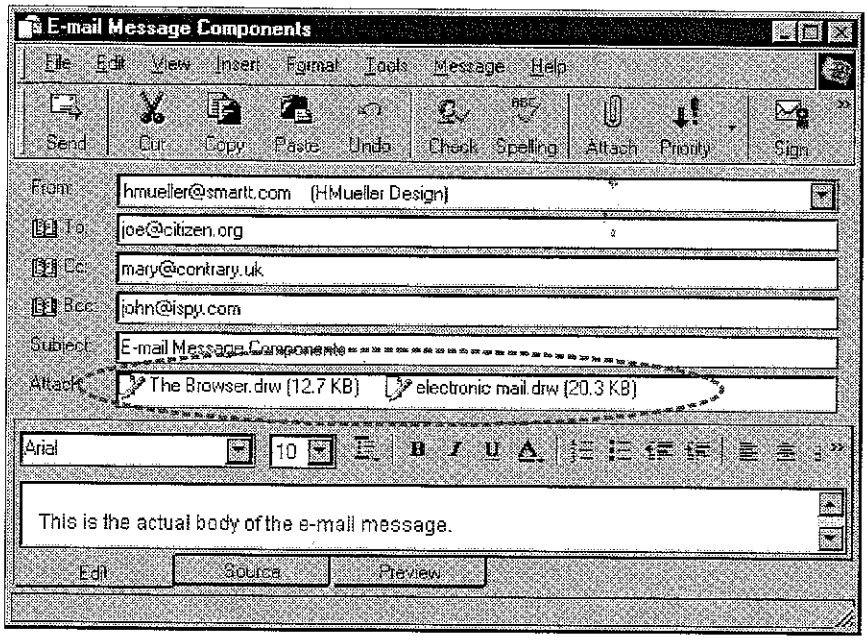
Different e-mail programs indicate that their attachments in different ways. Sometimes there is a line in the addressing section of the e-mail as shown in the example below, sometimes the program may list the attachments in the body of the e-mail.



Virus Hazard

Unfortunately there is a potential danger with attachments in that many viruses have been designed to spread as attachments to e-mail messages. One can debate what it is that makes people design viruses but it is a fact of life when you "live online". We will discuss some of the precautions that you should take. But bear in mind that the virus scenario is changing constantly and new viruses appear all the time.

A virus attachment has to be a program file and so would have a file extension like ".exe" or ".bat". Picture files (".jpg" or ".gif"), text files (".txt") are not executable programs and cannot contain viruses. Word processing documents (".doc") should be virus-free; however, they can contain macro viruses.

The creators of viruses are very astute and can make an attachment look safe, for example *teddybear.jpg.vbs*. If you are not careful you may assume that this is a jpeg graphic file.

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Precautions

- Use an up-to-date virus protection program that scans in-coming e-mail as well. Regularly check for updates.
- Do not open attachments from people that you do not know.
- Some viruses appear to come from people you know. Do not open attachments even from people you do know where it is not totally clear from the e-mail message what the attachment is, e.g., a message with no content, suspicious subject matter, etc. Rather send them a quick e-mail and ask if the attachment is safe.

Hoaxes

There are frequent false warnings of viruses (i.e. hoax warnings) with dire consequences and you are asked to forward the warning to all your friends and colleagues. The message may also say that the virus is not detected by any of the major virus protection programs (e.g. McAfee, Norton, Dr Solomon, etc.) — of course they are not detected because they are not actual viruses.

Fortunately most of these hoax warnings are harmless enough. However, some hoax messages will ask you to search for the virus file on your computer and then to delete it, but the deleted file turns out to be an essential file that your computer needs.

If you are not sure of any virus, visit the web sites of the suppliers of anti-virus software. They have extensive information on viruses and hoaxes.

Using Microsoft Outlook

Outlook is more than an e-mail program. Outlook consists of several modules or components that allow you to perform a variety of tasks. It is considered a "personal information manager" (PIM) program that can be used for sending and reading e-mail, scheduling appointments, managing a contact list, creating a to-do list, or for recording notes. In this module, we only look at the e-mail features of Outlook.

As an overview, a brief description is provided of the various Outlook modules:

- *Outlook Today* gives you a quick look at your day. You can work with the calendar, tasks and e-mail — all from one central location.
- The *Inbox* is used to compose, send and read e-mail messages.
- The *Calendar* is used to schedule appointments, meetings and events, similar to a day-timer that you may use in your office.
- The *Contacts* module is used to manage your contact list, similar to an address book.

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