CHAPTER 13

Microsoft Exchange: E-Mail, Faxes and More

Personal computers today are being used for an increasingly wide range of tasks, beyond simply creating and editing documents. Electronic mail has not only become a primary communication vehicle within many companies, but also among individuals, families, and the public at large. Additionally, usage of online information services has dramatically increased, due in large part to e-mail—witness the astounding 15% *per month* growth rate seen by the Internet, in addition to the rapid growth in online commercial services, such as CompuServe® and others.

The growing use of messaging and communication services has resulted in a plethora of software tools. A very real problem users face today is that each of these different information sources and services comes with its own unique software and user interface. Users often have software for an email client such as Microsoft Mail®, a groupware client such as Lotus Notes®, and an online services client such as CompuServe Information Manager®, and perhaps some electronic fax software that came with their modem—all in addition to the basic File Manager they use for accessing and manipulating documents.

Windows 95 addresses this growing complexity by including an integrated messaging and workgroup communication system that provides universal e-mail, fax, and information-sharing solutions right out of the box. These different services are all presented in Windows 95 with a single user interface—called Microsoft Exchange. Microsoft Exchange is built on the open MAPI architecture, so it can work with many different e-mail systems and information services simultaneously—providing a *universal inbox* for communication between individuals and workgroups.

This section of the guide will introduce you to the Microsoft Exchange client and other components of the *Windows Messaging Subsystem*, including Microsoft At Work Fax software, the Messaging API (MAPI), and the Microsoft Mail Post Office.

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Microsoft Exchange Highlights:

u   Send and receive rich-text e-mail messages over virtually any e-mail system, including public networks like the Internet.

u   Send faxes directly from your desktop. Receive incoming faxes directly in Microsoft Exchange's *universal inbox.*

u   Complete, built-in e-mail system to quickly get your workgroup up & running - includes a *Microsoft Mail Post Office*. Easily upgrade to a full Microsoft Mail Server or Microsoft Exchange Server to connect multiple workgroups, or the entire enterprise.

u   Move messages & documents between the file system and your mail folders. Organize them the way you want using sophisticated *custom views*, searching, and filtering.

u   Take full advantage of MAPI-enabled applications, ranging from desktop productivity to workflow and document management.

Windows Messaging Subsystem - MAPI 1.0

Because e-mail and other messaging-enabled applications are becoming so ubiquitous, Windows 95 includes a set of operating system-level components that provide built-in messaging services to any application that wishes to take advantage of them. The term *Windows Messaging Subsystem* is sometimes used synonymously with MAPI 1.0, because Windows 95 represents the first complete implementation of the "extended" MAPI architecture.

Windows 95 ships with a number of components which together make up the *Windows Messaging Subsystem:*

u   **Microsoft Exchange Client.** The built-in "Universal Inbox" in Windows 95, which is used to send, receive, and organize e-mail, faxes, and other information. It includes an OLE-compatible rich text editor used for composing and reading messages, as well as powerful custom views, searching, and filtering. Through the use of MAPI drivers (described below), the Microsoft Exchange client can work directly against most public or private e-mail systems.

u   **Personal Address Book**. The Personal Address Book contains not only email addresses, but names, phone/fax numbers, mailing addresses, and other personal contact information. Through the open MAPI interfaces, it is accessible from a wide variety of applications. Through the use of MAPI drivers , the Address Book is also the user interface for corporate email and information services directories. The Personal Address Book can store addresses for multiple email systems at the same time.

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u **Personal Information Store**. A sophisticated local "database" file that allows users to store e-mail messages, faxes, forms, documents, and other information in a common place. This functions as the user's Mailbox—including a *universal inbox* & *outbox*, as well as any other mail or document folders the user wishes to create. It supports long filenames, plus sorting and filtering on various fields of the stored objects. *Custom views* can be created and saved in the Personal Information Store.

u **MAPI 1.0**. The core system components that seamlessly connect the Microsoft Exchange client and other applications to the various information services. MAPI's namesake component is the Messaging Application Programming Interface—the set of services that any mail-enabled or workgroup application can make use of. MAPI also defines a Service Provider Interface (SPI) that allows MAPI drivers to be written for nearly any messaging and workgroup service.

u **Microsoft Mail drivers.** A set of MAPI drivers which allow the Microsoft Exchange client to be used with a Microsoft Mail Post Office, either the "workgroup edition" that's provided with Windows 95, or the "full" server edition that's available separately.

u **Microsoft At Work Fax drivers.** MAPI drivers that allow the Microsoft Exchange client to send and receive electronic faxes just like any other piece of e-mail. See the second half of this section for more information on Microsoft At Work Fax software.

u **Microsoft Internet Mail drivers.** Set of MAPI drivers which let the Microsoft Exchange client send and receive mail directly on the Internet, using the built-in TCP/IP and PPP communication protocols provided with Windows 95.

u **(Optional) Third-party MAPI drivers.** Drivers for other messaging systems will be available separately from a large number of vendors. Examples of vendors working on MAPI drivers that will integrate into the Microsoft Exchange client include:

America OnLine	Apple
AT&T	Banyan
CompuServe	DEC
Hewlett-Packard	Novell
Octel	RAM Mobile Data
Skytel	

Open Architecture for Open Connectivity

The Microsoft Exchange client is designed to work with virtually any messaging or workgroup system—whether it's LAN-based, host-based, or an online service. Likewise, transparent access to these various messaging systems is available to *any* application, not just Microsoft Exchange. The key to this open architecture is MAPI.

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Figure 1. MAPI Provides an Open Architecture

MAPI defines both an Applications Programming Interface (API) and a Service Provider Interface (SPI). The API is used by end-user applications, including Microsoft Exchange, while the SPI is used to write *drivers* (sometimes called *providers*). As the above diagram shows, MAPI defines three different types of *drivers*:

u   **Transport** drivers provide the ability to send & receive e-mail on any messaging system.

u   **Address Book** drivers allow seamless access to any directory service, mailing lists, or other name databases.

u   **Store** drivers let MAPI applications read & write to local or server-based message stores, mailboxes, and workgroup databases.

A user of Windows 95 can install any combination of drivers so that their Microsoft Exchange client can be used for multiple email or workgroup systems *at the same time* as the following example indicates:
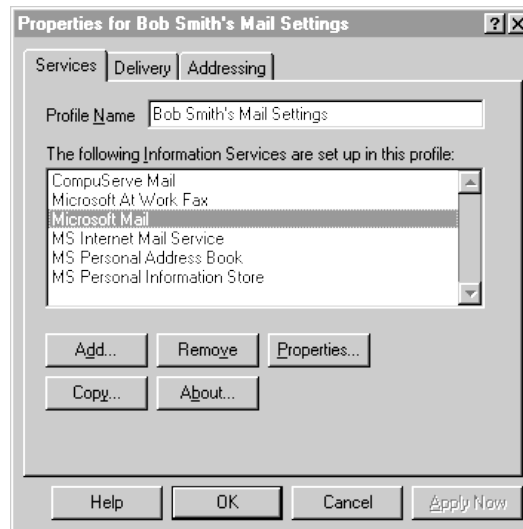
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Figure 2. Configuring the Microsoft Exchange client for use with Multiple Services

Microsoft Exchange

As described earlier, Windows 95 has a built-in advanced e-mail and workgroup client called Microsoft Exchange. Far more than a "basic" e-mail client that's simply bundled in, Microsoft Exchange actually supersets the features of almost all existing e-mail clients on the market, including the current version of Microsoft Mail.

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Summary of Improvements over Current Microsoft Mail

Microsoft Mail is currently available as part of Windows for Workgroups, Windows NT, as well separately for Windows 3.1 users. The Microsoft Exchange client goes beyond today's Microsoft Mail in the following ways:

u   Rich text e-mail, including full use of fonts, colors, bullets, etc. Uses drag & drop text editing, supports Find/Replace

u   Full OLE support, including Visual Editing, and cross-application drag/drop

u   Built-in Remote Mail capability - doesn't require a separate "remote" product. Uses TAPI and Remote Network Access to support all common modems and network protocols.

u   Fully integrated with Windows 95 file system - simply drag messages out to hard drive directories, or drag files into your mail folders.

u   Customizable toolbar with Tooltips and right-click "shortcut" menus to commonly used tasks

u   Blind Carbon Copy (BCC:)

u   Intelligent message replies - reply text is automatically indented and rendered with your personal font/color. Better track who made which comments.

u   Connect to multiple mailbox files simultaneously.

u   Custom Views on any folder - define the columns, select the sorting/filtering/categorization.

u   Integrated with Windows 95 registry to use Master Password logon.

Working in Microsoft Exchange

*Note: Microsoft Exchange and the rest of the Windows Messaging Subsystem (MAPI) are optional components in Windows 95. You need to select **Custom** setup in order to select these components. If you did not select Custom when you installed Windows 95, you can simply go into **Control Panel**, run **Add/Remove Programs**, click the **Maintain** tab page, and select **Microsoft Exchange**.*

There are several ways to start using Microsoft Exchange. You can simply double-click the Microsoft Exchange icon, and start viewing your email & messages.

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Figure 3. Windows 95 Desktop showing Microsoft Exchange client

If you want to read your new e-mail, by far the easiest way to begin working with Microsoft Exchange is to select **Open Inbox** from the Start menu on the Taskbar, as shown in Figure 4.
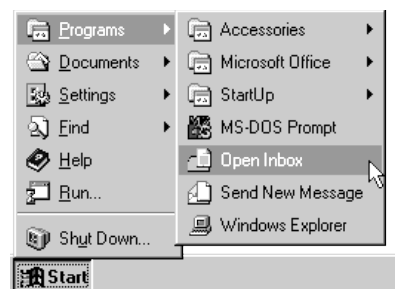

Figure 4. The Open Inbox item on the Start menu

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When using Windows 95, no matter what application you're working in, you'll always be able to tell at a glance whether you have any new e-mail, by looking at the *notifications* on the Taskbar, in the lower right-hand corner. You'll see whether you're currently sending or receiving mail, or whether there is new mail that you haven't yet seen—in addition to the other standard system notifications that include print status, time, and battery power indicator.

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Figure 5. New Mail Notification on the Taskbar

Rich Text Mail Messages

In designing Microsoft Exchange, Microsoft conducted extensive *activity-based planning* research into how people actually use e-mail throughout their business day. One of the strongest findings was that people use their e-mail 6-8 times more often than their word processor for tasks like sending memos to other people. Customers expressed a strong desire to be able to combine the power and immediacy of e-mail with the expressive capabilities of their word processor. To accomplish that, the Microsoft Exchange client includes a complete *rich-text editor*, which is fully compatible with OLE.

Note: most e-mail packages on the market today limit messages to a single typefont only.

Because the Microsoft Exchange client works as a *universal* e-mail client, it's been designed to correctly transmit the rich text and formatting over any mail system, even one that was not originally designed to handle rich text, like the Internet. The rich text information is automatically packaged as a separate compressed file attachment, and de-compressed on the receiving end by another Windows 95 client. If the mail is addressed to someone who doesn't use Windows 95—over the Internet, for example—then they will simply receive the "plain text" equivalent of your message, with any embedded objects sent as binary attachments.
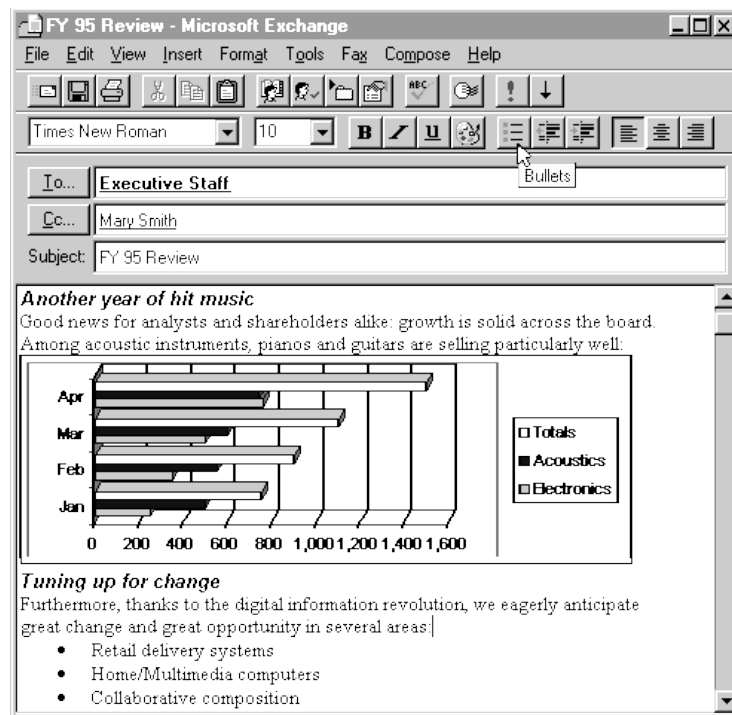
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Figure 6. Rich Text E-Mail Message with an embedded OLE object

Saving Messages

Messages received in the inbox can be saved for future reference, if the user so chooses. The user simply drags the messages into any of the other folders in the mailbox (message stores). The user can also drag the message to any directory on their local or network hard drives. In the latter case, the message becomes a .MSG file—but maintains all of the messaging-specific fields such as Sender, Recipient, and so on. At any time in the future, the user can still double-click the .MSG file, open it and forward it to other e-mail users.

Personal Address Book

A "universal" e-mail client needs to work with a "universal" address book, one that can seamlessly handle e-mail addresses of all different types. Windows 95 includes a *Personal Address Book*, which is implemented as a MAPI service. This means that in addition to the local address book that you maintain yourself,

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Microsoft Exchange also has transparent access to the address books & directory services of any other e-mail systems that support MAPI. For example, the same Address Book could show you your Microsoft Mail global address list, or a corporate X.500 directory service.

For each new set of MAPI drivers you install, the Address Book adds a new "template" to aid the user in composing addresses of different types. If Mary Smith gives you her Internet e-mail address, you can simply type it in on a pre-defined "Internet" template. From then on you simply address her as "Mary Smith" on all of your e-mail—*no need to remember complex addressing conventions.*

The Personal Address Book also allows you to keep vital personal information on people, like telephone numbers, postal addresses, office locations. You can auto-dial any phone number in the address book using the built-in Windows 95 TAPI services.
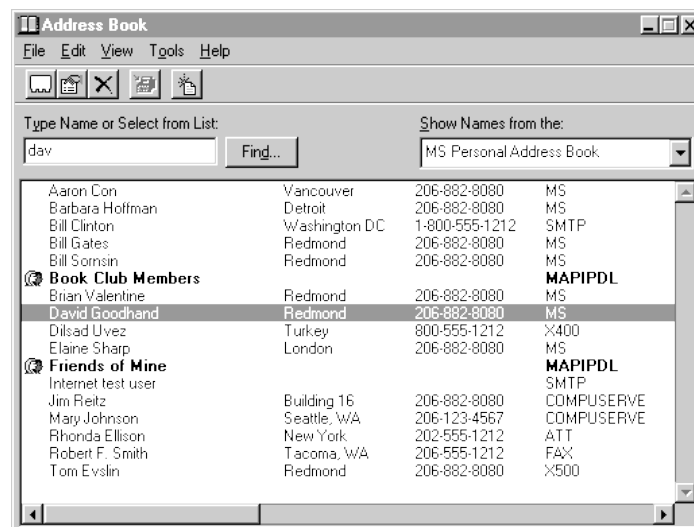

Figure 7. Personal Address Book with users from different e-mail systems

Information Stores

Mail is typically stored in the user's *Personal Information Store*. Although a Personal Information Store is a single file, the user sees this file as sets of folders containing messages or documents. Normally, the user has a single information

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store, which contains their Inbox, Outbox, or other mail folders. Microsoft Exchange, however, lets the user create as many "stores" as they like - for example one store for current e-mail, and another for backup or archive purposes. Also, the built-in Personal Information Store is only one kind of *information store*. Any e-mail or workgroup system can expose their mailboxes or databases to users as information stores, by creating an appropriate MAPI driver. Information stores can be physically stored in local files, or represent a database on a network server.

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For example, when the Microsoft Exchange client is connected to a Microsoft Exchange Server, the user will see new sets of folders (information stores) that represent replicated databases or "groupware" applications on the server— in addition to their standard Mailbox folders.

Messages, Documents, and Forms. Users can store more than just mail messages in their information stores - they can also store files or documents by dragging them into these folders. Additionally, any MAPI-compatible *forms software* can store their form data and form definitions in an information store.

Why store these items in an information store, rather than the regular file system?

- **MAPI properties.** All items in information stores have additional fields that MAPI associates with them - like *Sender, Subject, Received Time, Size, Importance, Sensitivity*, etc. These "properties" can then be used for searching, filtering, and sorting.

- **OLE Document Properties**. Documents that are stored as OLE 2.0 *compound documents* have lots of additional built-in properties, like *Title, Author, Keywords, Comments, Last Edited Time, Number of Pages*, etc. When a document is placed in an information store - all of these built-in properties are made available to the user through Custom Views.

- **Rich Custom Views**. Finally, information stores offer the ability to create rich *custom views* of information, unlike the regular file system which displays only a few standard views based on filename, date, size, etc. Users create views by defining:
  - Which columns to show - including any of the MAPI or OLE document properties mentioned above.
  - How to sort, and filter the items to show only those of interest.
  - Custom *grouping*, which allows for multi-level categorized (or "outline") views of your information.

Figure 8 shows a folder that a user has created in one of their *information stores.* The user has also created a *custom view* on this folder -- to display the OLE properties of the documents they have stored there. This particular view uses the *grouping* feature to categorize the information by author.
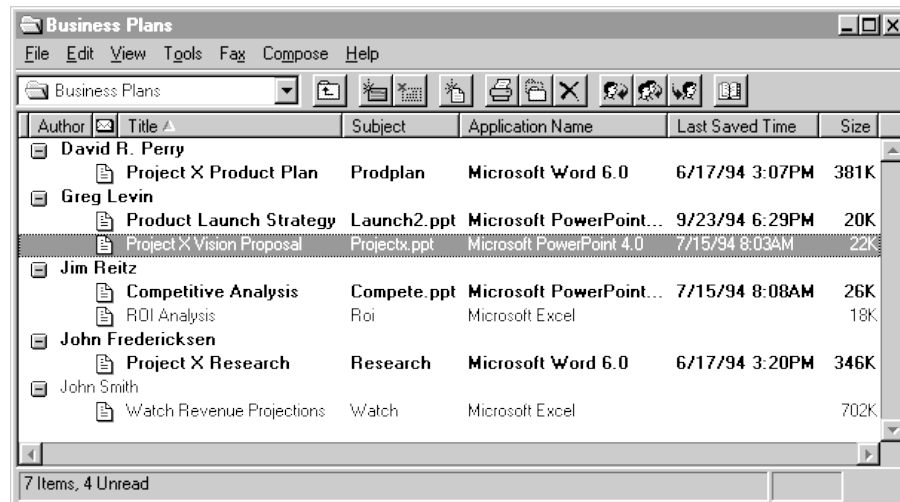
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Figure 8. Custom View showing OLE Document Properties

You can create as many *custom views* as you like in each of your folders individually, or create views that are shared among all folders. Custom views are useful in your *universal inbox* as well as any other folders you create. Some example uses of views:

u   View by Subject in your Inbox to create a "conversation thread" view -- all of the messages and responses on a particular topic, categorized together.

u   View by From in your Inbox to quickly locate and track all e-mail from a particular individual.

Microsoft Mail drivers

Windows 95 includes MAPI drivers for the Microsoft Mail e-mail system. This means that the Microsoft Exchange client can send and receive mail as a member of a Microsoft Mail network - either a full, enterprise-wide mail system, or a local workgroup mail system that uses Windows 95's built-in *Microsoft Mail Post Office*. Microsoft Exchange users can fully interoperate with existing Microsoft Mail users on other platforms, although rich-text messages are converted to plain-text messages when sent to an existing MS Mail client.

Remote Mail. To use mail on the road or from home, existing users of Microsoft Mail typically purchase a separate product called "Microsoft Mail Remote for Windows," and dial-in to a special MS Mail remote gateway. They then have special abilities to *preview* their waiting mail messages, decide which ones they really want to receive, then download only the selected messages. They can

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compose new messages or responses *offline*, and these are automatically sent whenever they next connect.

In keeping with the Windows 95 focus on great mobile and remote computing, the Microsoft Exchange client is designed to provide the benefits of Remote Mail, *without* requiring any additional client software, or a special gateway to dial-in to. Remote or mobile users can easily send and receive e-mail using the following features:

u **Remote Preview**. Using the built-in Microsoft Mail drivers, Microsoft Exchange users can dial-in to their network and preview just the *headers* of their new mail messages. That is, they can see who has sent them new mail, what the subject is, how large the message is, and the estimated time it will take to download that message.

u **Selective Download**. Once the *headers* are retrieved, the user can *mark* which messages they'd like to download, and which messages should be deleted without downloading. Users can either stay on the line after getting the headers, or make another call later to download their selected messages.

u **Remote Network Access.** Rather than using a specialized e-mail gateway for remote mail, Microsoft Exchange relies on the standard Dial-Up Networking that's built into Windows 95. Users can dial into another machine running Windows 95, Windows NT Server, or 3rd-party remote access servers—such as a Shiva™ LanRover™. Remote e-mail then becomes protocol-independent, since RNA supports standard network protocols such as TCP/IP, IPX, and NetBEUI.

u **Offline use.** Microsoft Exchange users can compose mail while *offline,* that is, while they're not connected to a network. Download new messages at the airport, read your mail and compose replies while on the airplane, then send your responses automatically the next time you dial-in from the hotel. Messages are queued up in the *outbox* until the next time you're connected to the appropriate mail service.

u **Scheduled Connections.** Users can dial-in as needed to retrieve mail remotely, or they can set up *scheduled connections* to dial in at a specific time, or on a regular basis (for example, if the user is on a permanently remote machine).

u **A Good TAPI Application.** Microsoft Exchange uses the Windows 95 TAPI facilities to dial & retrieve mail remotely. This allows for effective sharing of modem resources between applications. For example you can set your modem to listen for incoming faxes, but still make a call to get your e-mail—TAPI handles the resource management between applications. Microsoft Exchange also uses the TAPI *Dial Helper* feature to easily handle multiple locations, hotel dialing prefixes, and credit card calls.

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Microsoft Mail Post Office

Windows 95 includes a *Microsoft Mail Post Office* - workgroup edition. This means that everything is included that you need to set up and manage a complete e-mail system for your workgroup. A Post Office is simply a shared directory where e-mail is stored - users connect to the Post Office in order to send or retrieve mail.

Typically, one of the users in your workgroup is designated as the *Mail Administrator.* They create the Post Office on their machine by using the "Workgroup PO" applet in the Windows 95 Control Panel. A wizard is used to step the administrator through the process of creating the post office. The administrator can then use this wizard to add new users, delete users, or manage shared folders. The administrator shares the Post Office directory, and the users enter the shared directory name the first time they start their Microsoft Exchange.

The Microsoft Mail Post Office included in Windows 95 is a *workgroup edition*, meaning it is limited to exchanging mail with users on a single Post Office. A single Post Office can potentially support dozens of users, depending on the server performance of the Post Office machine. At some point, however, you may need to split people into separate workgroups, each accessing their own Post Office. At this point you will need to upgrade to a *full* Microsoft Mail Server. The full edition of the Post Office allows mail to be routed between multiple Post Offices, as well as to other e-mail gateways.

You can also easily upgrade your Post Office to a Microsoft Exchange Server, a client/server messaging system that provides not only e-mail services, but also personal/group scheduling, information sharing applications ("groupware") and forms and application design tools.

Microsoft Internet Mail drivers

Windows 95 also includes a set of MAPI drivers that allows the Microsoft Exchange client to send and receive mail directly on the Internet. Because Windows 95 already includes great support for TCP/IP, including remote TCP/IP over PPP dial-up lines, everything you need is "in the box" to connect to the Internet and start sending and receiving mail. You can make a LAN connection if your company has direct access to the Internet, or you can obtain access through one of many Internet "Service Providers." Thanks to MAPI, you can configure the Microsoft Exchange client to *simultaneously* support Internet Mail along with other mail systems, such as the built-in Microsoft Mail.

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Features of MS Internet Mail drivers:

u   Supports Internet electronic mail standards, including SMTP and POP.

u   True *Windows Sockets* application - leverages the great built-in TCP/IP support of Windows 95

u   Runs either via direct LAN connection or using Dial-Up Networking and PPP protocol.

u   Supports MIME (Multipurpose Internet Mail Extensions) - to allow interchange of video, images, voice, text, and graphics with other Internet users in mail messages. MIME Associations Option lets you associate multimedia elements with a program on your PC so you can directly "launch" them from your favorite applications.

u   Remote Preview. Supports Microsoft Exchange *header* and *selective download* options to make the most of your connect time on the Internet (see *Remote Mail*, above).

u   Automatically uses standard encoding (UUENCODE) to send & receive binary attachments with other Internet or Unix mail users.

u   Great International support - including support for character sets of all countries with rapidly growing Internet usage.

u   Ability to send Rich-Text e-mail over the Internet to other Windows 95 users (other users receive plain text messages).

u   Complete integration with all other Microsoft Exchange client features, including Custom Views, Filtering, Searching, etc.

u   Simple, graphical configuration and management tools, including detailed troubleshooting and logging facilities.

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Figure 9. Graphical Configuration for the Microsoft Internet Mail driver

Send and Receive Faxes from your Desktop

Windows 95, in conjunction with Microsoft Exchange, provides PC users with the ability to send and receive faxes directly from their desktop. This capability, called Microsoft Fax, sets the standard for desktop fax as an easy to use messaging facility that is well-integrated with Windows.

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Microsoft Fax in Windows 95 provides the following key features:

u Fax high-resolution printed documents from within your favorite Windows applications using a fax printer driver.

u Microsoft At Work Binary File Transfer (BFT) capability sends original documents to users of Windows 95, Windows for Workgroups 3.11 and other Microsoft At Work-enabled platforms as e-mail attachments via fax.

u Secure exchange of confidential documents using encryption and digital signatures.

u High-speed communications with popular Class 1 fax modems, and the millions of traditional Group 3 fax machines worldwide.

u Networked Windows 95 users can send and receive faxes through a shared fax modem on one of the Windows 95 workstations on the network.

u A fax viewer that allows you to browse multi-page faxes using either 'thumbnails' or full-page view mode.

u A cover page designer that lets you easily create new fax cover pages that incorporate graphics and text, or customize one of the predefined cover pages that are included with Microsoft Fax.

u Connect easily to fax-on-demand systems using a built-in 'poll retrieve' feature that allows you to download faxes directly to your desktop.

Microsoft Fax is integrated into Windows 95 as a MAPI transport service provider, leveraging Microsoft Exchange's "universal inbox," rich message creation, and browsing capabilities to deliver ease of use and consistency to the management of fax messages. The fax provider coexists with other information or messaging services that the user may have installed, and leverages Microsoft Exchange's common address book and inbox.

Windows 95 users can take advantage of Microsoft Fax innovations that provide the secure exchange of editable documents, where the majority of faxed documents are created.

Faxes can be sent from within Windows applications using the 'File/Send' menu option for mail-enabled applications such as Microsoft Word and Microsoft Excel. Additionally, a fax printer driver lets a user 'print' a document to their local fax modem either via 'File/Print' or by dragging a document onto the fax icon.

Microsoft Fax leverages the power of the Windows 95 operating system through the Win32 API. As a 32-bit application, fax integrates seamlessly with other Windows 95 applications through its support for the Windows Messaging System (MAPI), Windows Telephony (TAPI) and OLE 2.

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In addition to tight integration with Windows 95, Microsoft Fax incorporates Microsoft At Work technologies that support Binary File Transfer (BFT), security and high quality document rendering. These technologies deliver powerful desktop fax messaging at the fingertips of the Windows 95 user.

When faxes are sent to other users of Windows 95 (or Windows for Workgroups 3.11 and other Microsoft At Work fax devices), the Microsoft At Work Binary File Transfer capability can be used to send the original file over the fax connection. For example, Suzan can attach a Microsoft Word document to an E-mail message and address the message to Dave's fax number. If Dave receives the fax via
Microsoft Fax, he will receive the Word document attached to an incoming e-mail message. By clicking on the Word icon, Dave can open the original document.

However, if the fax number that Suzan addressed is a traditional Group 3 fax machine then Microsoft At Work fax will automatically render the Word document into an appropriate Group 3 fax image. The highest speed and image compression that is supported by the recipient fax machine will be used when transmitting the fax.

Fax at your Fingertips

Microsoft Fax has been designed to allow Windows 95 users to exchange printed documents and binary files easily and with a minimum of setup. Since fax is provided in Windows 95 as a core system service, it is always available from within Windows 95 applications or via Microsoft Exchange. Faxes may be transmitted using Microsoft Exchange's e-mail paradigm, or by printing a document to a fax printer. Faxes that have been received from other sources are always delivered via the Microsoft Exchange client.

A fax recipient can be identified by selecting a Fax Address from an address book (for example, the Personal Address Book), or addressed using a *one-off* address such as [fax:*555-1212*]. The MAPI service provider architecture allows the Windows 95 user to mix different types of recipients in the *same* message. For example, it is possible to send a message simultaneously to a Microsoft Mail, CompuServe, Internet and fax user as long as the Microsoft Exchange client contains profiles for these destinations.

The Send menu item on the File menu within any MAPI-enabled applications (for example, Microsoft Word or Excel) will activate Microsoft Exchange's Send dialog. The fax user can address the intended recipient within this dialog, and will see the faxed document attached as an icon in the message body.

The attachment of a document to a Microsoft Exchange mail message is the easiest way to fax original or 'editable' documents from Windows 95.

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An easy way to send traditional faxes to Group 3 fax machines is to print a document to the Microsoft At Work fax printer using either the Print menu item on the File application menu item, or Drag and Drop a document onto the fax icon. Windows 95 fax will activate a dialog box asking the user to address the fax recipient and the rendered fax will be transmitted.

Rich Messaging Capabilities

Microsoft Fax in Windows 95 supports the rich text capabilities of the Microsoft Exchange client and the advanced capabilities provided by Microsoft At Work Binary File Transfer (BFT) and Rendering technologies.

The Microsoft At Work capabilities are effective when a Windows 95 fax user connects to another user of a Windows 95, Windows for Workgroups 3.11 or Microsoft At Work-enabled device. Microsoft Fax will query and exchange its capabilities with the receiving devices to determine whether the receiving device is a Group 3 fax machine, or a Microsoft At Work-enabled device.

If the receiving fax device supports Microsoft Fax and the originating machine attached an editable document to the message then the file is transferred in its native format. In this scenario, fax works exactly like electronic mail between the originator and recipient. This fax capability in Windows 95 supports the universal inbox provided by Microsoft Exchange.

If the receiving fax device is a traditional Group 3 fax machine then Microsoft Fax will convert the document to the most compact fax supported by the machine (i.e. MH, MR or MMR format) and transmit the image at the highest speed supported by the mutual connection. (i.e. up to 14.4 kbps).

However, if the receiving fax device is Windows 95 or Windows for Workgroups 3.11 and the originating machine sent a printed document, then the file will be transmitted between the two machines using a special Microsoft At Work rendered (printed) document format. The exchange of printed documents between Microsoft At Work devices is always faster than between Group 3 fax machines because the Microsoft At Work rendered image format achieves greater compression rations than Group 3 MMR.

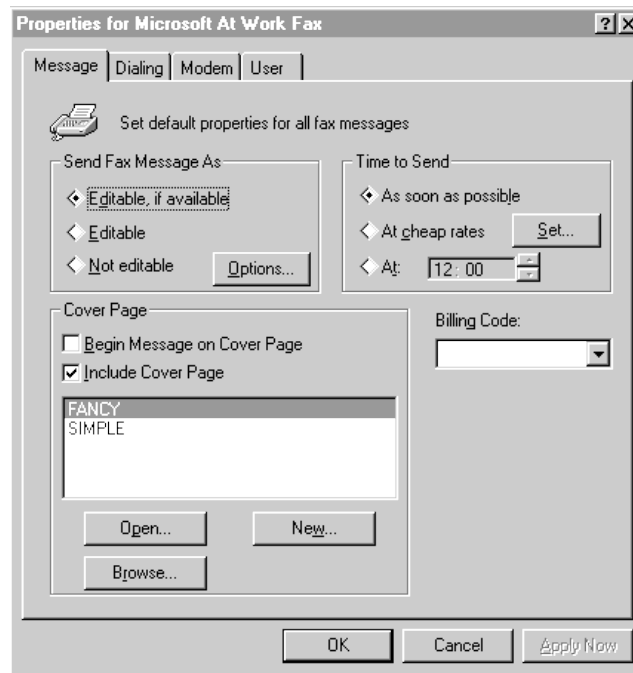Figure 10 shows the fax property sheet that is activated from Microsoft Exchange's "Fax" menu item:

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Figure 10. Fax Messaging Properties

Workgroup Fax Features for MIS

Microsoft Fax supports Windows 95 users on local area networks by providing a shared modem fax capability. If a local fax modem is installed in one Windows 95 workstation, then all other Windows 95 users who are on the same physical network can send and receive faxes through the shared modem. The Windows 95 workstation that includes the modem is called the fax server.

Other Windows 95 users who are connected via the shared modem can have their incoming faxes routed directly to their desktops. Otherwise, faxes can be manually routed from the fax server to the final recipients by an administrator, using Microsoft Exchange.

In a similar way, Windows users can connect to Microsoft At Work-enabled fax servers and fax machines over a network connection. Microsoft is partnering with a variety of hardware and software vendors to develop fax products and services that incorporate Microsoft At Work technologies. These products and services will all be compatible with and leverage the capabilities of Microsoft Fax in Windows 95.

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Easy Access to Fax Information Services

Microsoft Fax provides the capability to retrieve documents, software, binary files and fax images from Fax-on-Demand systems and fax machines that support the Group 3 'Poll Retrieve' capability. The ability to easily download information directly into a Windows 95 workstation via fax will help increase the popularity of fax on demand as a way for companies and information services to distribute information cost-effectively.

This distribution of information could include the automatic distribution of software updates. A Windows 95 workstation with Microsoft Fax could make a connection to a fax-on-demand server, and request the name of a binary file via its Poll Retrieve capability. The server would respond to the request by downloading the binary file to the Windows 95 workstation. This exchange can be accomplished on a single fax call to the fax-on-demand system.

Figure 11 illustrates how a Windows 95 user can request that a binary file be downloaded from a fax information service that supports 'Poll Retrieve'.

Figure 11. Poll Retrieve Form

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Fax Viewer and Cover Page Designer

Windows 95 includes two special tools that allow users to view incoming faxes and to create customized cover pages for faxes that they send to other users. These tools are provided in Windows 95 as accessories.

Fax Viewer

When a Windows 95 user receives a fax image (as opposed to an editable document), the fax viewer is automatically activated when the fax message is opened in Microsoft Exchange. The viewer allows the user to scale, rotate, print and visually enhance 'fuzzy' faxes.

For multiple-page faxes, the viewer provides a thumbnails view of the fax that makes it very easy to scan the contents of the fax very quickly. Figure 12 illustrates this capability.
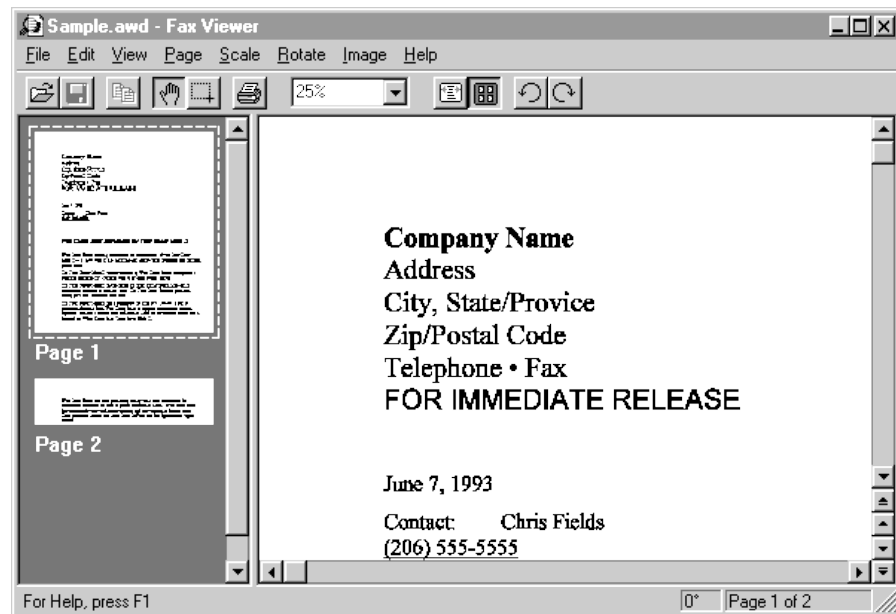
Figure 12. Fax Viewer with 'thumbnails' view

Fax Cover Page Editor

The Microsoft Fax cover page editor allows users to create their own customized fax cover pages, or to modify one of the predefined cover pages that are included in Windows 95. The Cover Page editor is an OLE 2 application that makes it very

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easy for the casual user to create cover pages that visually get the attention of fax recipients!

Secure Faxing with Encryption and Digital Signatures

Microsoft Fax protects valuable and confidential documents through encryption and digital signature capabilities. The sender of a document, or traditional fax can encrypt a fax using either a simple password, or using sophisticated RSA public/private key security.

The fax software includes the capability to exchange public keys with other users. The public keys that a user receives from other users can be stored and maintained in their personal address book.

When an encrypted fax is transmitted to a recipient, it cannot be read unless the recipient knows the password that was used to encrypt the file, or the originator's public key, depending on the security mechanism that is used.
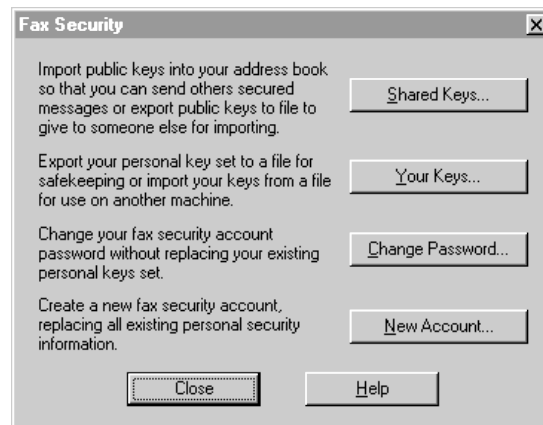

Figure 13. Encryption and Digital Signature Support

Faxed documents can be 'signed' with a digital signature to ensure that the fax data has not been modified during transmission. The sender uses their private key to 'sign' the fax. Anyone with that sender's public key can read it, but with the knowledge that only the owner of that specific private key could have sent the fax.

The ability to protect confidential documents in a fax environment is an extremely important feature that sets Microsoft Fax ahead of other desktop fax applications.

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Compatible with Popular Fax Modems and Fax Machines

Microsoft delivered the first Microsoft At Work desktop fax capability with Windows for Workgroups 3.11. This large installed base, along with the installed base of millions of Group 3 fax machines, has made compatibility a priority for fax in Windows 95.

In order to ensure fax connectivity with the widest possible variety of fax applications, fax machines and fax modems, Microsoft Fax in Windows 95 supports:

u   The ITU (International Telecommunications Union, formerly the CCITT) T.30 standard for Group 3 fax. Microsoft At Work capabilities such as BFT are implemented as T.30 NSF (non-standard facilities), thereby maintaining compatibility with the installed base of G3 fax machines.

u   The ITU V.17, V.29 and V.27ter standards for high-speed fax communications (up to 14.4kbps).

u   Class 1 and Class 2 fax modems. A Class 1 modem, or a Class 2 modem that supports NSF and ECM, is required for Microsoft At Work BFT and Security. Fax 'printing' to traditional Group 3 fax devices is available on both Class 1 and 2 modems. Microsoft is working directly with fax modem manufacturers to ensure excellent compatibility.

u   MH, MR and MMR compression for Group 3 fax communication.

Coexistence with Windows–based Telecommunications Applications

The ability of the Microsoft Exchange client to support multiple simultaneous MAPI service providers in Windows 95 means that users will want to have connections to The Internet, CompuServe and fax at their fingertips. Well-behaved telecommunications applications that support the Windows Telephony (TAPI) API will all coexist and share a local modem in a computer running Windows 95.

The implication of TAPI support for Windows 95 fax is that fax can be listening to the phone line in auto-answer mode, while other telecommunications applications and Microsoft Exchange providers dial out to information sources over the phone network. TAPI provides the call arbitration to ensure that physical modem resources are allocated to the appropriate telephony applications when they are needed.

Fax also leverages TAPI concepts such as 'locations' and the 'dial helper' common dialog, ensuring that fax calls are made consistently whether the fax user is on the LAN, at home or on the road.

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MAPI Integrates Fax with Applications

Microsoft At Work fax evolves the fax capability in Windows for Workgroups 3.11 by creating an powerful and extensible integration platform for fax-enabled applications. The extensibility, through MAPI, of Microsoft Fax and Microsoft Exchange will make it easier for third-party software developers to deliver new fax-enabled applications and enhanced fax services.

Since fax is implemented in Windows 95 as a MAPI transport service provider, any MAPI-enabled application can fax information to other users using File/Send. In addition, fax features such as poll retrieve have been added to ensure that Microsoft Fax is an excellent client for enhanced fax services.

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