Microsoft Internet Explorer 3.0 (Beta) White Paper

A Step Ahead

July 1996

TABLE OF CONTENTS

INTRODUCING MICROSOFT INTERNET EXPLORER 3.0

Internet Explorer 3.0 is the Web browser that puts you a step ahead on the Internet! Now with unique HTML, ActiveX, Java, and Netscape Plug-in support, Internet Explorer provides the best browsing experience and most technically advanced development platform for end users, organizations and content developers. And with innovative Internet conferencing, collaboration, and browser customization, Internet Explorer 3.0 provides the richest feature set of any browser while still offering an easy to use and personalized Internet experience.

Learn more about what's cool in Microsoft Internet Explorer 3.0:

- **HTML and Stylesheet Support**
- **Component Architecture**
- **ActiveX Support**
- **Java Support**
- **Netscape Plug-in Support**
- **Multimedia**
- **NetMeeting**
- **Internet Mail and News**
- **Performance**
- **Personalization**
- **Ease of use**
- **Security**
- **Cross Platform**

HTML and Stylesheet Support

HTML Web Authoring

All the cool content on the Web can be viewed in Internet Explorer 3.0 because it supports the latest HTML standards, including HTML 3.2. Plus, it is the first browser to fully implement W3C specifications for stylesheets, tables (RFC 1942), objects and scripts. Its implementation of stylesheets includes background colors and images for individual table cells, and more.

This full-scale implementation of HTML enables you to present a greater variety of information in a more interesting, dynamic format than before. A table of all the HTML tags that Microsoft Internet Explorer 3.0 supports is available in the Site Builder Workshop on http://www.microsoft.com/workshop/author/newfeat/ie30html-f.htm

Brand New Stylesheet Support

Internet Explorer 3.0 is the first commercial browser to support the Cascading Stylesheets (CSS), the HTML stylesheet standard set by the W3C. Stylesheets give you the same flexibility with design and layout that you have with desktop publishing programs by enabling you to attach style (for example, fonts, colors, and spacing) to HTML text tags.

By applying separate style tags to text tags, you ensure that all browsers can view the basic text and structure of your Web page while presenting more sophisticated designs for browsers that support stylesheets, such as Internet Explorer 3.0. Stylesheets give you greater Web page design flexibility by enabling you to control margins, line spacing, and placement of design elements, and specify colors, fonts, and point sizes. If you wish to change the look of a page, just update the style in one place, instead of changing all of your HTML tags throughout your page. In addition, stylesheets provide the following advantages:

- **Linked Stylesheets.** Enables you to apply a stylesheet to diverse documents to create a standard design, saving time and letting a company develop a signature Web style. This is a fundamental requirement for Intranet web site design because you can alter the look and feel of the an entire Web site with changes to a single style sheet.
- **Indexing and Searching.** Makes it easier to index pages because indexing software only has to read the structural tags.
- **Full Font Control.** Provides full font control of font families (typeface), weighting, and typographic measurement units (centimeters, inches, pixels, percentages, em's, etc.) for sizing. This means you are no longer restricted to seven Netscape font sizes. Now, you can increase or decrease a font's point size and weight−in whatever increments you want. Plus, you can change your font color, your leading (line height), choose whether a font is italic or underlined, and more.
- **Backgrounds.** Creates background colors and images for table cells, paragraphs, or anywhere else on a Web page.
- **Indenting.** Provides indenting for a line or paragraph on a Web page.
- **Non-tiled-backgrounds.** Also known as direct-position-backgrounds, Allows the content developer to place an image behind a text object, for example, a table cell, without the image being tiled as it is on most page backgrounds today.

- **Full white-space control.** Enables setting margins in typographic units around all edges of elements. This is the critical first step toward realizing real desktop publishing-style page design and layout.
- **Typographic space control.** Enables setting inter-line and intra-line spacing (font 'leading')
- **Negative margins. Enables** elements to float over other elements on a page--a very rich control.
- **CSS Layout.** An experimental specification from W3C for handling frames, floating frames, multi-column layout, 2D direct placement of elements, z-ordering and overlapping of elements, all in a rich and well-architected HTML syntax. (The HTML Layout Control, which provides desktop publishing capabilities for Web page designers, is based on this specification.)

For more information about Cascading Style Sheets, visit http://www.microsoft.com/workshop/author/howto/css.htm.

Enhanced Frame Support

Internet Explorer's implementation of Netscape frames, an HTML extension, improves their look and behavior by including support for borderless and floating frames. Support for frames enables you to divide a Web page into several panes, or frames. Each frame displays a different HTML page, so you can display many levels of information without requiring the user to navigate to a different page or leave your site. Microsoft Internet Explorer 3.0 support for borderless, non-scrolling, and floating frames enables you to seamlessly open several panes within the browser window or embed a single frame anywhere in the Web page where you can insert a graphic. This comprehensive implementation of frames gives you the following advantages when designing Web pages:

- Opening multiple frames (HTML pages) in one place enables a wholly new kind of Web page. With frames, you can create sophisticated layouts that add and mix a greater variety of sounds, video, animation, and different background colors and patterns in one place. You can even add a bitmap to the border of a frame, giving you complete control over the appearance of your page.

-

- **Figure 3** HTML Frames: Design Web pages to display information in seamless, multiple panes.

- Elimination of borders and scroll bars on individual frames enables you to create seamless sections on your Web page that can simulate and surpass the look and feel of magazine pages.
- Plus, with multiple frames you can organize information more effectively. For example, you can include a menu in one frame from which people can select items to view in a separate frame, giving end users an easy, consistent user interface, preventing them from losing their place.
- Floating frames, an exciting new feature, enables you to embed a Web page in another Web page. While standard frames enable you to create a layout composed of several different Web pages, they also require that the Web page be divided into tiled regions. With floating frames, you can embed a frame anywhere in a Web page that you can put an image, and you specify its size and align it with the right or left margins.

Figure 4 Floating Frames: Insert a Web page into a Web Page as easily as embedding a graphic. Clicking on the icons at the bottom of the window changes the content of the frame.

- **Frames Syntax Change** Floating frames were introduced in IE 3.0 Beta 1, using the <FRAME> tag. For Beta 2, the syntax has been changed to <IFRAME> ... </IFRAME>. You must supply both an opening and closing IFRAME tag. The <IfRAME> tag is a container, and Internet Explorer 3.0 ignores any HTML in the container. Other browsers that don't support floating frames do display the HTML in the container. This allows people to author pages that look good in other browsers, and great in Internet Explorer 3.0 using floating frames. All attributes (SRC, FRAMEBORDER, HEIGHT, WIDTH, etc.) remain the same as in Beta 1. In addition, you can now supply negative values for "margin-left" and "margin-right" with stylesheets. This allows sophisticated text overlay effects.
- **Coming Soon.** Keep your eyes open for a whole new level of frames standards which will emerge from the W3C this fall.

HTML 3.2 Table Support
Support for the latest HTML 3.2 table tags gives you greater control over how you can align text and improves how you can displaying external borders and internal rules, enabling you to create more graphically interesting, easily readable tables. With Microsoft Internet Explorer 3.0's implementation, you can:

- Align text along a baseline.
- Specify that borders be displayed internally or externally. Before, you could only turn on or off borders for each cell and the table itself. You can even control which borders are visible: top, bottom, left, or right.
- Specify that a cell span more than one column or row in a table.
- Group cells

Figure 5 HTML Table tags: Provides more control over aligning text and graphics with Microsoft Explorer 3.0's support for the latest HTML table tags.

HTML 3.2 Font Support

Enables you to specify the size, face, and color of a font so that you can control exactly how your text looks. Plus, Internet Explorer enables end users to specify multiple fonts and a default font to use in case they don't have a particular font loaded on their computer.

Even greater font control is included in Internet Explorer's implementation of the W3C stylesheet standard. With stylesheets, you can specify font typeface (family), size, weight, color, underlining, italics, and more. In addition to this giving you greater control over your design, stylesheets enable you define styles that include any of these font attributes. This means you don't have to repeatedly specify font attributes on your HTML page.

TrueType Font Support

Microsoft Internet Explorer 3.0 supports TrueType® font technology, which is a standard feature of both the Windows and Macintosh operating systems. TrueType provides the highest quality screen fonts available, which is critical as people read more and more information on screen from the Internet. They use anti-aliasing, which smooths out jagged fonts, and rich hinting, which makes small text more readable on screen.

Authors can specify fonts they want to use in their HTML documents by using the <FONT> tag or CSS1 Style Sheets. Microsoft provides a set of free TrueType fonts for

Webmasters to incorporate in their sites to improve readability and give them more control over the typographic image of their site. TrueType Web fonts for both Windows and the Macintosh are available free of charge on www.microsoft.com/truetype/.

Microsoft is also working closely with Adobe to develop OpenType fonts, an extension to the TrueType format aimed at streamlining the management of existing fonts and the next generation.

W3C OBJECT Tag

Internet Explorer's support for the W3C OBJECT tag enables content developers to insert objects, such as ActiveX Controls, Java applets, and proprietary Netscape Plug-ins, into a Web page. This tag specification is the first of the post 3.2 HTML specifications from the W3C. It is similar in functionality and replaces the proprietary APPLET and EMBED tags. Internet Explorer's support for the OBJECT tag provides critical functionality for content developers because it allows less sophisticated browsers to view content substitute in place of the object, applet, or plug-in that a more sophisticated browser can view.

Enhanced Multimedia Support

- **Scrolling Marquees.** By including support for the MARQUEE tag, which enables you to specify a section of text to be used as a moving marquee on a page. These eye-catching callouts are great for special sales offers and other time-critical information.
- **Inline Video Playback.** Using the W3C Object tag, you can insert and play AVIs on Web pages. You can specify whether the video plays immediately after people open the page, in response to a mouse click, or even when a user moves their mouse over the movie.
- **Background Sounds.** By including support for the BGSOUND tag, you can play background sounds in your Web page, including sounds recorded in any of the popular formats available on the Internet today including WAV, MIDI, AU, and AIFF. You can use background sounds to create dramatic introductions to pages, or to continually play in the background. You can specify that sounds overlap one another, or repeat in a continuous loop.

Enhanced Layout Support

- **HTML Layout Control.** Internet Explorer 3.0 gives you the power of graphics placement previously only found in desktop publishing. Through the innovative HTML Layout Control, you can now place graphics at precise locations on your Web page, just as you would with a desktop publishing program. The gives you exact, coordinate control over object layout, layering and transparency. Objects can be specifically placed within a fixed region with respect to the top and the left of the region, and also given specific height, width, and z-order attributes.
- The HTML Layout is based on **CSS Layout specification** from the W3C. For more information, see the HTML Layout Control in the ActiveX Controls section of this white paper.

ActiveX Support

Activating the Internet with ActiveX Technologies

- Microsoft Internet Explorer 3.0 is the cross-platform Internet client that supports the ActiveX standard. ActiveX is a standard that enables software components to interact with one another in a networked environment, regardless of the language they were created in. With ActiveX, web sites come alive using multimedia effects, interactive objects, and sophisticated applications that create a user experience comparable to that of high quality CD-ROM titles. ActiveX provides the glue that ties together a wide assortment of technology building blocks to enable these "active" web sites.

Most Web users will experience the ActiveX standard as controls, documents and scripts (described below), but the ActiveX standard also embraces client, server and tools technologies, including:

- **ActiveX Controls** are software components that run in Web pages, providing interactive and user-controllable functions. This enables users to view and interact with animation, audio, and video without opening separate programs. Plus, Controls can be reused in applications and written in many popular programming languages, including Java, Visual Basic, Visual C++.
- **ActiveX Control Pad**. This updated, HTML format of the ActiveX Control Pad tutorial assist developers and multimedia designers in developing their first ActiveX™ Web site. The tutorial includes instructions for authoring advanced layout and multimedia features, such as exact object placement, object layering, and transparency effects. To download your copy of the ActiveX Control Pad, visit http://www.microsoft.com/workshop/author/cpad/tutorial-f.htm.
- **Active Scripting** supports any popular scripting language, including Visual Basic® Script and Javascript. Scripts can be used to integrate the behavior of several ActiveX Controls and/or Java Applets from the browser or server, extending their functionality.
- **ActiveX Documents** enable you to open a program, complete with its own toolbars and menus, in Microsoft Internet Explorer 3.0. This means you can open non-HTML documents, such as Microsoft Excel or Word files, through a Web browser.
- **Java™ Virtual Machine** is the code that enables any ActiveX-supported browser such as Internet Explorer 3.0 to run Java applets and to integrate Java applets with ActiveX controls.
- **ActiveX Server Framework** provides a number of web server-based functions such as security, database access, and others.
- **Development Tools** from Microsoft and third parties let you use familiar tools and techniques to create controls and Web content. These include Visual Basic, Visual C++, Macromedia Shockwave, Adobe Photoshop, Borland Delphi, tools from Sybase and Borland, Java enable-tools, and other new Internet technologies.

ActiveX ™Controls

Imagine having the power of today's applications redesigned for use on the Internet. That's what you get with the new Microsoft Internet ActiveX Controls. In creating

ActiveX Controls, Microsoft redesigned OLE by leveraging those features of OLE that meet Internet requirements for small and fast computing while retaining basic COM technology.

With ActiveX Controls, you no longer need to download a separate application to make your pages come alive with movies, animations, audio, and more. They can be downloaded and run from within a Web page that is running on cross platforms, including Macintosh, Windows and Unix. Using popular programming languages, such as Visual C++, Visual Basic or Java, content developers can easily learn to create controls and insert them into Web pages. It's as simple as inserting a control in Visual Basic or Microsoft Access. Plus, using ActiveX Scripting, developers can link controls together, extending the functionality of Java applets and controls. Here are a few examples how controls can create more dynamic Web pages:

- Dynamically update themselves based on user interactions, author-specified events, or their own internal state. For example, the New Item control displays an image until a certain date, or a Timer control can animate and synchronize other controls, or prompt the user after a period of inactivity.
- Solve bandwidth restrictions by rendering visually rich content from tiny amounts of data. For example, the ActiveX Chart control which can be downloaded from www.microsoft.com/ie, displays colorful, data-rich charts. This is a great improvement over use of the IMG tag to add visual content to Web pages. Instead of waiting for large images to download, data can quickly fill a chart.
- Display text at any angle or in an animated sequence along an author-defined path. Vertical or diagonal text can save space or create a graphically more interesting page.

To view these controls, visit the ActiveX Component Gallery (http:www.microsoft.com//activex/gallery/)

ActiveX Controls Easy Downloading
ActiveX Controls are automatically installed on your system when viewing a site utilizing them. Unlike other plug-in technology, you do not need to run a setup program and restart your browser to enjoy these activated Web sites.

In addition, ActiveX Control licensing ensures the software you install is safe by letting you know the publisher and underwriter. If a control does not already exist on the user's computer, Microsoft Explorer 3.0 checks to see if it has been digitally signed by a software publisher. For more information about code signing (Authenticode™ technology), see the "Security" section later in this White Paper.

Licensing also protects the publisher by only installing the software after the user accepts the terms and conditions. Palette management has also been updated, so content developers can have a finer degree of control over the appearance of their software components.

ActiveX Controls Available Now
A variety of controls, tools and information is available today from Microsoft.

ActiveX Component Gallery
Check out our new ActiveX Gallery on (http:www.microsoft.com//activex/gallery/) The gallery is a of ActiveX™ controls and samples--a gallery of components and resources offered by our partners for your Web authoring and development tasks. This gallery will

continue to grow as we add more controls, samples, and information. We hope that you will visit this area frequently for the most up-to-date listing of ActiveX components available. To see another example of cool control, check out http://www.carpoint.msn.com.

ActiveMovie Control

With ActiveMovie, you can embed all popular video and audio formats into your HTML pages, including AVI and QuickTime video formats, and MPEG video and audio, and audio formats including WAV, AU, AIFF, and MIDI. This unprecedented level of support in an Internet browser means that you have the freedom to embed the content that you want in your page - all is readily available for playback by users of Internet Explorer 3.0.

The extensible architecture of ActiveMovie enables other media formats and functionality to be supported and enhanced by Microsoft and third-parties—ensuring a rich media solution for today and the future.

You can download the ActiveMovie Control from the download area (http://www.microsoft.com/ie/download/) for Microsoft Internet Explorer 3.0 Beta 2. For more information about ActiveMovie, see the multimedia section later in this White Paper and visit www.microsoft.com/imedia/activemovie/activem.htm

PowerPoint Animation Player

The new Microsoft PowerPoint® Animation Player for ActiveX is the easiest and fastest way to animate a static HTML page without having to learn a complex programming language or buying expensive, complex multimedia software. Millions of PowerPoint users can now take advantage of the enhanced animation, hyperlinks, sound and special effects they are familiar with in PowerPoint for Windows 95 to create animated banners, advertisements, image maps and more. The all-new PowerPoint Animation Publisher, a free add-in to PowerPoint 95, allows you to compress PowerPoint animations prior to posting, making downloading and viewing effects on the web faster than ever.

For more information, see
www.microsoft.com/mspowerpoint/internet/player/default.htm.

VRML Add-in

Supports Virtual Reality Modeling Language (VRML) by providing an ActiveX control add-in for fast viewing of 3-D objects and 3-D virtual worlds on the Internet. This add-on supports VRML 1.0 plus extensions, and lets you download background textures and inline content, embed VRML worlds in a Web page, and display 3-D objects with texture mapping (GIF, JPEG and BMP formats). After the VRML content is downloaded, users can click the graphic and choose how to explore it—by walking, spinning, sliding, or tilting. Navigation of 3-D spaces and manipulation of 3-D objects can be performed with a mouse, keyboard, or joystick. Support for VRML 2.0 will be provided in a future release.

You can download the ActiveMovie Control from the download area (http://www.microsoft.com/ie/download/ieadd.htm) for Microsoft Internet Explorer 3.0 Beta 2.

HTML Layout Control

The HTML Layout Control enables you to create more compelling Web pages by providing exact, coordinate control over object layout, layering and transparency. Objects can be specifically placed within a fixed region with respect to the top and the left of the region, and also given specific height, width, and z-order attributes. The

HTML Layout Control provides a preview implementation for incorporating these 2D regions within HTML documents for display in the Microsoft Internet Explorer 3.0. The HTML Layout Control creates a 2D layout format that hosts other ActiveX Controls. This Control can also take advantage of the ActiveX Control specification for transparent and windowless controls. For example, consider the following Web page as displayed in Microsoft Internet Explorer 3.0:

Figure 2 HTML Layout Control

The illustration shows a Web page created with HTML Layout Control. The HTML Layout Control pictured above hosts a number of other controls to make up the complete page. In particular, the page includes:

- **Exact 2D placement**: Controls are placed exactly where the author intended them to be placed within the 2D region. On a typical HTML page, the client Web browser determines the placement of each element; using 2D authoring and the HTML Layout Control, the author maintains this control, ensuring consistency of the user interface.
- **Overlapping regions**: The author can also specify the exact Z-order of each control on the page. In the example above, the box containing the "Breaking Grounds" text overlaps part of the larger box containing the "Good Vibrations" image. Both of these regions are overlapped by the "Volcano Coffee" logo image.
- **Transparency**: The text label "Good Vibrations" is overlapping both the background and the large shaded box in the middle of the page. The text control which implements this label is transparent, so that users can see through the text to objects underneath. Also, the cup (a Windows® metafile) is overlapped by the text label, and is itself a transparent control overlapping both the background and large shaded box. Any ActiveX Control implementing the ActiveX Control '96 specification (published on the Microsoft Web site) for windowless controls can be transparent and used in this manner within the HTML Layout Control.
- **Scripting**: The HTML Layout Control also fully supports scripting, including both Visual Basic Script and JavaScript™. Thus, any object contained in a 2D region can script other objects in that region. In this example page, clicking on various label controls will cause the images within the region to change. Clicking on other objects on the page causes navigation—switching the browser to a different page. In this example, this is handled with VB Script.

You can download the HTML Layout Control from the download area (http://www.microsoft.com/ie/download/ieadd.htm) for Microsoft Internet Explorer 3.0 Beta 2.

RealAudio ActiveX Control.
Enables you to embed a RealAudio player right in your Web page.

Marquee ActiveX Control.
Enables you to scroll through the contents of an HTML document that you have inserted into a frame on a Web page. In addition, the Marquee control enables you to set the frame parameters and scrolling speed.

Other Cool Controls

You can download a set of controls that help you easily activate your Web pages from ActiveX Gallery (http://www.microsoft.com/ie/appdev/controls/default.htm).

- **Label.**. This control displays text any angle, or renders it along an author-defined path. This is a familiar capability to desktop publishers, but to HTML authors, it is exciting and new. Vertical text or diagonal can be used to save space on the page or simply create a graphically more interesting page; or you can place text along a wavy path that jumps out, calling attention to important information. You can then use a scripting language to control the label object: animate it, make it grow or shrink, even have it change colors as often as you like.
- **Preloader**. The preloader control eliminates long download times. By initiating downloads before they are actually needed, the perceived time to load a page can be greatly reduced. Authors can also use the preloader as a gateway, preventing access to a certain page until all the material has been downloaded.
- **Timer**. Combined with simple scripts, the timer control brings Web pages to life. The timer control makes a Web page perform certain actions at certain times, including being used to animate other controls, prompt the user after periods of inactivity, initiate validation code, periodically update a floating frame and more.
- **ViewTracker**. Updates Web pages dynamically as the user scrolls through them, creating a more active Web page.
- **StockTicker**. Changes data continuously, enabling you to display stock information or other types of information that are continually updated.
- **Popup Menu**. Displays a Windows popup menu through ActiveX Scripting, enabling you create lists of choices for visitors to your site.
- **Chart.** Creates charts that display graphically and statistically complex information. The Chart control can display multiple series of data in many different chart styles. It works with inline data or can point to text files.
- **Animated Button**. Displays frames of an AVI to create cool button behavior.

For more information about implementing ActiveX Controls, see the section describing the HTML Layout Control, or visit http://www.microsoft.com/workshop/author/cpad/.

ActiveX ™Scripting

With its support for Visual Basic® Script or Javascript, Microsoft Internet Explorer 3.0 provides the fastest, most comprehensive, language-independent, script handling capability on the Internet today. With scripting, you can build pages that ask questions, respond to queries, check user data, calculate expressions, link to other programs, and connect to other controls, applets, and 3-D animations.

You can also add scripting language to your HTML code to develop Web-based applications. Unlike other browsers that support scripting, you can create interactive pages that connect and control ActiveX Controls, including Java applets, other software components, and the different components of Internet Explorer, for example, the HTML document, the frame, or the toolbar. This means you can create a rich Internet application controlled by many kinds of scripting languages, including. VB Script and Javascript in your Web pages. Plus, you can easily plug in other scripting languages by adding a DLL.

Visual Basic Scripting Edition

VB Script, which is a subset of the Visual Basic language, is a high-performance scripting language designed to help create active content on Web. With it, you can link and automate a wide variety of objects in Web pages, including Java applets and other ActiveX Controls. Plus, it is fully compatible with Visual Basic and Visual Basic for Applications. Microsoft will make the VBScript source code available under license free of cost to any browser vendors and application vendors who want to support VBScript in their applications. With VBScript, developers can trap events from ActiveX Controls, invoke methods, and modify properties of ActiveX Controls.

Because VBScript code is simple to write and is always maintained in source code in the Web page, it is easy to modify. Plus, developers can enable their VBScript code to run across platforms, including Windows, Macintosh, and all major UNIX systems.

Java Scripting

Javascript, which provides the same functionality as VBScript, also enables you to create active content on Web. Microsoft's implementation of Javascript enables you to link and automate a wide variety of objects, link together ActiveX controls and Java applets, and build pages that respond to queries and calculate expressions.

ActiveX Documents

ActiveX Documents enables you to open an application with its own toolbars and menus in the Internet Explorer window. This means you can open richly formatted documents, such as a Microsoft Excel spreadsheet, without having to open another application. You can do your work and then go back to the Web page you were last viewing.

Like all ActiveX technologies, ActiveX Documents is an open, published specification available to all parties. Support for ActiveX Documents enables you Internet Explorer becomes the frame in which users can browse and view these non-HTML documents and applications. To the users, it seems as if they are running the stand-alone application complete with toolbars, menus, and all other user interface elements, while network administrators can use existing documents and applications on their intranet site without having to convert them all to HTML format.

The Internet Explorer frame is not only an ActiveX Document host, but also packages the HTML viewer as an ActiveX Document. This means that other vendors can use Internet Explorer as a document viewer for files in other formats.

ActiveX Documents are a set of extensions to OLE Documents, the compound document technology of OLE. The extensions are in the form of additional interfaces that allow what looks like an embeddable in-place object to represent an entire document instead of a single piece of embedded content. As with OLE Documents, ActiveX Documents involve a container that provides the display space for ActiveX Documents and servers that provide the user interface and manipulation capabilities for DocObjects themselves.

Tools for ActiveX Technology

Developers can create ActiveX Controls in any language using any tool, including a wide variety of familiar tools, such as Visual Basic, Visual C++, or new tools, such as Microsoft's Java development tool.

With the upcoming release of Visual Basic 5.0, developers will be able to write ActiveX Controls and convert existing VB code to ActiveX Controls with a simple point and click operation. With Microsoft's Java Development Tool, you will be able to use all the features of Microsoft Developer's Studio—a great debugger and editor to integrate with COMs and Windows® APIs—to create Java applets that will run in Internet Explorer 3.0. Plus,

developers can use all the macros and documents that they write for Microsoft Office applications in Microsoft Internet Explorer 3.0.

To get a jump-start on building ActiveX Internet applications and content, developers can use the Microsoft ActiveX Development Kit (MADK). It includes all the tools and information developers need to successfully create active content for the Web using ActiveX Technologies and to build Internet or intranet solutions using Internet Information Server.

Webmasters can author and manage their entire website with Microsoft FrontPage, the easiest and fastest way to create and manage a Web site. Microsoft FrontPage comes with templates and editors that let you easily create HTML pages, including links, hotspots, tables and frames. And, in the next version, FrontPage will support inserting ActiveX Controls into Web pages.

ActiveX Technologies Server Side

Microsoft Internet Explorer 3.0 is fully integrated with ActiveX technologies for servers, including integration with the Microsoft Internet Server API (ISAPI). This integration allows content developers to easily extend Web servers in a fast and scaleable manner. Plus, with the Internet Database Connection, content developers can insert database capabilities into Web pages.

Using the ActiveX server framework, content developers can use the same tools for server-side development as they use for creating Web pages. For more information about the Microsoft Internet Server and its integration into ActiveX technologies, visit //www.microsoft.com/infoserv/

Java Support

Internet Explorer is designed to be an open, Internet standards-based platform. This platform enables content developers to create and end users to view all the latest active Web content. With its Beta 2 release, Internet Explorer provides the fastest implementation of Java on the Web today.

Java Applets

Microsoft Explorer 3.0 Beta 2 enhances the power of Java by merging it with ActiveX technologies to make them one and the same. In fact, the Java language is one of the best languages with which to create ActiveX components. This initial release of Java support for the Microsoft Internet Explorer 3.0 beta provides one of the fastest implementations of Java available with its own Just-in-Time (JIT) Java compiler.

Plus, because it uses standard component architecture, Microsoft Internet Explorer 3.0 enables you to use scripting languages, including ActiveX Scripting or JavaScript, to link Java applets to other ActiveX controls, making it one of the most functional and complete implementations available.

With the Java reference implementation for Windows, developers can invoke interfaces on other ActiveX Controls, and can write ActiveX Controls in other languages (Visual Basic, Visual C++) that call Java interfaces. In addition, Java is an ideal language for creating and implementing ActiveX Controls and all other COM controls.

Internet Explorer Java Support Features

Microsoft is committed to delivering first class Java development tools, as well as the reference implementation of the Java virtual machine for Windows platforms. Microsoft's Component Object Model is the cornerstone of the ActiveX™ platform. It provides tight integration between Java and COM technologies, which enables customers and developers to build upon their knowledge of development tools, applications, and other infrastructure while still being able to take advantage of new and exciting technologies such as Java.

Internet Explorer Java support includes the following features:

- View a wide set of set of Java applets reliably
- Provides the reference implementation for Win32 of the Sun Microsystems virtual machine.
- Enables content developers to script Java applets with other Java applets and Active Controls, using the scripting language of their choice.
- Provides built-in Java security. A primary concern for all levels of users is that a browser provides standard security schemes such as code-signing for trusted code in addition to the Java sandbox security scheme.
- The JIT compiler provides tool vendors with the richest debugging support on the market.
- Fast JIT support. The Microsoft Just-In-Time Java compiler provides the fastest way to run Java applications as shown in recent performance tests that Microsoft conducted against Netscape Navigator 3.0 (Beta 5).

•

Microsoft Performance Test (higher numbers are faster)	Netscape Navigator 3.0 Beta 5	Internet Explorer 3.0 with JIT
Sieve	4263	4665
Loop	7654	8112
Logic	2108	2181
String	36	132
Float	1228	2661
Method	2305	2903
Image	26	137
Graphics	61	47
Dialog	171	31
OVERALL	**1383**	**1705**

This table shows that with the Java Just-in-Time compiler, Internet Explorer 3.0 (Beta 2)'s implementation of Java is 18% to 21% faster than Netscape Navigator 3.0 (Beta 5). Note that higher numbers mean faster speed.

Other independent parties have also run performance tests that show Internet Explorer's implementation to be faster than Netscape Navigator. For example Microbenchmark and Linpack performance tests showed that currently, Microsoft's JIT beats Netscape's. In their tests, Internet Explorer is faster at accessing variables, marginally slower on simple math operations, and much faster at creating objects and using synchronized methods. On the math-intensive Linpack benchmark, Internet Explorer is 50% faster than Netscape. To view their data, visit http://www.cs.cmu.edu/~jch/java/optimization.html.

Netscape Plug-in Support

To ensure that users can see all content available on the Internet, Microsoft Internet Explorer 3.0 is compatible with Netscape's proprietary Plug-in technology and the non-standard <EMBED> tag--as well as with ActiveX Controls. This support provides backwards compatibility with existing Web content, and so developers can build pages with ActiveX Technologies without altering the content of their Web site. When a user opens a page that asks for a plug-in, Internet Explorer checks to see if it is installed. If not, the user is automatically brought to a page where either the Plug-in or an equivalent ActiveX control can be downloaded.

Multimedia

As an industry leader, Microsoft is working with Internet organizations, such as W3C, to define and drive the adoption of HTML standards for multimedia. HTML extensions that were first presented in Microsoft Internet Explorer 2.0 for inline AVI video and background sounds have been adopted and formerly included in the W3C HTML specification. Microsoft is continuing to innovate and bring new multimedia capabilities to Web pages with Internet Explorer 3.0.

Web pages come to life with rich support of integrated multimedia functionality in Internet Explorer 3.0, making it the best browser for viewing all popular media formats for video, audio, and graphics on the Internet.

Whether linked to Web pages or embedded in Web pages via standard HTML commands, an unprecedented level of media playback support is provided in Internet Explorer 3.0. In addition, the flexible architecture of leading edge technologies like ActiveMovie Control means that new and emerging media formats can be quickly supported without having to get a new version of the browser or plug-in application.

Microsoft Internet Explorer 3.0 continues Microsoft's leadership in advancing multimedia to the Internet through its support for:
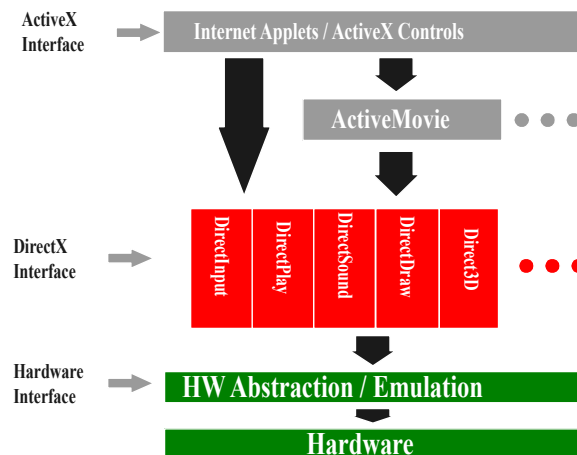
- The most sophisticated multimedia architecture on which to build Internet applications.
- ActiveMovie Control provides cross-platform digital video technology, which enables you to play AVI and QuickTime video formats, and industry-standard MPEG video and audio formats within your Web pages.
- Playback of all popular Internet video, audio, and graphic media formats, and services for defining and supporting new formats as they emerge.
- Internet Explorer supports today's current hardware acceleration schemes to enhance the performance of multimedia playback, bringing multimedia to life for the user.
- HTML multimedia standards, including animated GIFs, inline video, and background sounds, bring the richest and most exciting content to Web pages.
- A platform for enabling next-generation, online gaming on the Internet, building upon the proven game technologies already shipping for Microsoft Windows 95.
- Internet Explorer extends support secured Java applets by providing access to multimedia features of the operating system, such as full motion video playback and audio capabilities.
- VRML add-in supports Virtual Reality Modeling Language (VRML) 1.0 by providing an ActiveX Control add-in for fast viewing of 3D objects and 3D virtual worlds on the Internet.

Advanced Multimedia Architecture for Building Internet Applications

Microsoft Internet Explorer 3.0 builds on an advanced architecture of multimedia services to bring a rich, compelling experience to the user. The following figure illustrates the Microsoft multimedia architecture and shows how it integrates different multimedia services.

ActiveX Controls are at the highest level and take advantage of the lower-level services. ActiveMovie, which provides playback of digital video and audio, is an example of a

control that makes use of the DirectX technology to leverage the acceleration features of the underlying hardware. The DirectX Technologies provide services by which developers can take direct advantage of hardware features to accelerate media playback (for example, 2D, 3D, animations, sound, and more), thus ensuring the highest level of performance possible.

Figure 6 Microsoft Multimedia Architecture

Built-in functionality of ActiveX controls such as ActiveMovie brings next generation multimedia to your Internet browser, and support of ActiveX controls by third-parties brings additional innovative multimedia solutions to your desktop.

Additional information about Direct3D and ActiveMovie is available on the Internet at http://www.microsoft.com/imedia.

Microsoft ActiveMovie Control
Internet Explorer 3.0 comes fully loaded with support for all standard video and audio formats including audio-video interleaved (AVI), QuickTime, MPEG video, WAV, AU, AIFF and MPEG audio using Microsoft's ActiveMovie technology. You no longer need to download other helper applications to enjoy multimedia on the Internet.

ActiveMovie provides a universal playback mechanism for video or audio streams through an extensible architecture that exposes all elements of the media stream.

For developers, ActiveMovie services are exposed via a set of APIs. For content producers and higher-level developers, ActiveMovie includes an ActiveX control for embedding in Web pages with Internet Explorer 3.0 as well as for use in any OLE client application (e.g., Microsoft Word or Excel). The combination of ActiveX and DirectX technologies enable developers and content producers to create experiences never before possible over the Internet.

More than 20 industry companies have announced support for ActiveMovie, including the OpenMPEG consortium (representing 32 companies), and the Japanese Open MPEG Windows® Forum (representing 32 companies). This support signals that ActiveMovie will be a key API and solution for the next generation of digital video on the desktop and the Internet.

Microsoft ActiveMovie Streaming Format
The ActiveMovie Streaming Format (ASF) allows multiple data objects (for example, audio, still images, and URLs) to be combined and stored into a single, synchronized

multimedia stream. ASF data is network transport neutral and can be transmitted over a variety of industry standard protocols and networks, including TCP/IP, UDP, RTP, IPX/SPX and ATM. Because ASF files can be streamed, playback of these files begins as soon as a Web page opens.

The ActiveMovie add-on toolkit contains a streaming format editor that enables developers to create rich multimedia content specifically targeted toward the Internet and intranet environments. More than 50 leading multimedia, content provider, tools and Webmaster companies have announced plans to support the ActiveMovie Streaming Format. Some of these major companies include Adobe Systems Inc., Aimtech Corp., Aspect Computer Pty Ltd., Asymetrix Corp., Avid Technology Inc., Macromedia Inc., Progressive Networks, Gold Disk Inc, Xing Technology, and VDONet.

Additional information about ActiveMovie Streaming Format is available on the Internet at http://www.microsoft.com/imedia.

Video and Audio
ActiveMovie supports popular video and audio formats including AVI video, QuickTime, .WAV, MIDI, AU, and AIFF.It also supports playback of **MPEG video and audio**. With the support of MPEG video, ActiveMovie gives you television-quality video on your PC. Plus, MPEG video files are typically smaller than .AVI or QuickTime files due to a higher level of compression, thus decreasing the time to download video over the Internet. MPEG can also be of a higher visual quality than .AVI or QuickTime files. MPEG audio has similar benefits, supplying high level compression for smaller files, while delivering CD-quality audio files.

2D Animation and Graphics
Internet Explorer 3.0 supports viewing and interacting with the latest in animation on the Internet, providing the best browsing experience available. Support for animated GIF files provides the basics in animation capability, while new and innovative solutions like the HTML layout control provide web content creators with unparalleled flexibility to create immersive multimedia web pages. Internet Explorer 3.0 also supports a variety of graphic formats for displaying images within an HTML page, including JPEG, GIF, BMP, and more.

Support for ActiveX in Internet Explorer 3.0 means that the built-in support for multimedia in the browser is not the end, it's only just the beginning. Support for solutions including ShockWave and the PowerPoint Animation Player are examples of solutions that leverage the power of the Internet.

Virtual Reality - 3D
For 3D, Microsoft has been leading the way to make 3D on the Internet a reality. With the release of Direct3D comes an industry standard API and services for interactive, real-time 3D graphics on the desktop. Direct3D also defines a way for developers to transparently access hardware acceleration to speed up the graphics rendering process, and to enhance the quality of the 3D scene—this common device driver model is supported by virtually every hardware vendor doing mainstream 3D graphics hardware.

Microsoft is committed to continuing to support industry standards and popular media formats. Internet Explorer 3.0 provides support in Beta 2 for VRML 1.0 with the VRML Add-in, and will be supporting VRML 2.0 and offering browsing support through an ActiveX control.

Platform for Next Generation Online Gaming

Games are more fun if they can be played against real players, and the personal computer has richer connectivity options than any game platform in history. Microsoft's DirectPlay API, an extension of the popular DirectX multimedia API set, brings multi-player gaming to the Internet. DirectPlay continues Microsoft's aggressive initiative to offer leading-edge tools for the Internet and for gaming on the Windows platform. DirectPlay enhances the social aspect of gaming and enables the creation of vibrant, online gaming "communities."
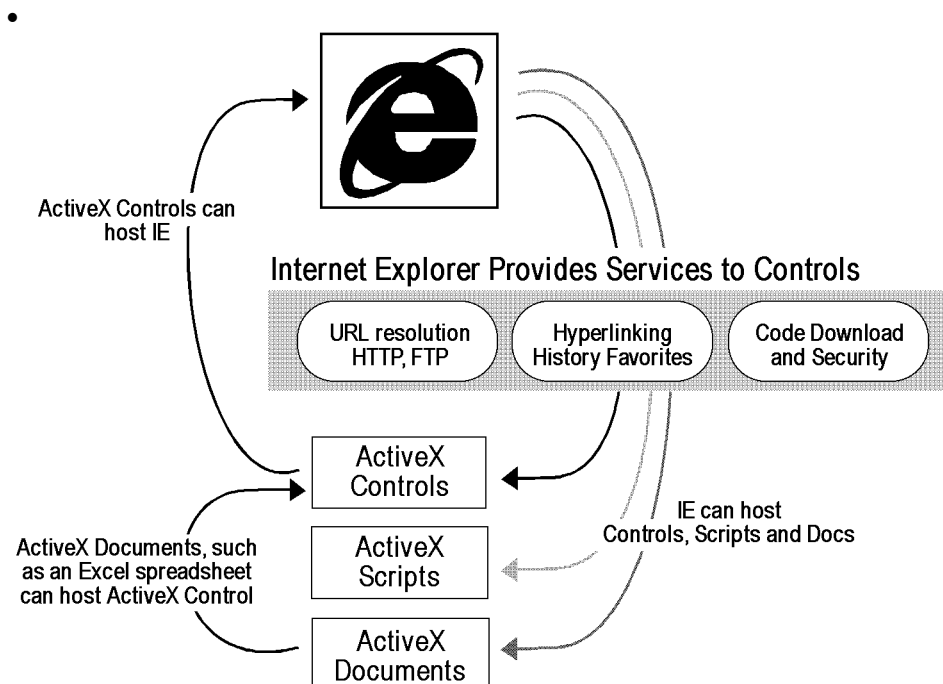
Using Microsoft Internet Explorer 3.0, players can connect to Internet-based "lobby servers" to find opponents online and organize or join games. DirectPlay games can be Web-based, delivered as ActiveX controls, or can be high-performance, stand-alone Internet applications. Internet Explorer is the launch pad for finding and playing games online.

Component Architecture

The Microsoft Internet Explorer 3.0 is the cross-platform client that delivers ActiveX technologies. Embracing both Java and Microsoft's industry-standard COM technology, ActiveX preserves your investments in applications, tools, and source code while letting you create innovative Internet applications. The Internet Explorer client is built with standard Microsoft components that have been revised to communicate to and from the Internet. These components make writing Internet applications as easy as writing applications for the operating system. Plus, you can reuse these components in your current networking and stand-alone applications, making them Internet-ready.

This open component architecture enables content developers to create dynamic Internet content and applications because of its:

- **Open Component Model.** Using proven COM technology, scripts, software components--including Java applets-- and stand-alone applications can interact with each other, creating unlimited, possibilities for enriching the Internet experience. This true component architecture enables you to run applications and software components in Internet Explorer, and run Internet Explorer as a software component in other applications and components. For example, a database access applet can interact with a script that displays a Shockwave multimedia graphic of the data in Internet Explorer.

-

ActiveX Controls can host IE

Internet Explorer Provides Services to Controls

URL resolution HTTP, FTP

Hyperlinking History Favorites

Code Download and Security

ActiveX Controls

ActiveX Documents, such as an Excel spreadsheet can host ActiveX Control

ActiveX Scripts

IE can host Controls, Scripts and Docs

ActiveX Documents

- **Figure 1** ActiveX Architecture:
- The preceding figure illustrates how the Internet Explorer provides services, such as navigation (URL resolution) and downloading for other software components (controls), and also functions as a host for software components. This enables other components to be small and fast, making it easy to link them together, creating more dynamic Web pages.
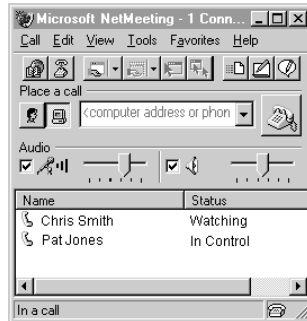
- As a software component, Internet Explorer can be inserted into other standalone, network, or custom intranet application, extending Internet capability to them. For custom applications, you can decide which features of Internet Explorer you would like to expose to your users.

- Internet Explorer can also host applications (ActiveX Documents), such as spreadsheets, complete with their own toolbars and menus, in the browser window. It can also host ActiveX Scripting engines, such as VB Scripting and Java Scripting, which can then be reused in other applications.

- **Application Independent Programming Model**. Because ActiveX controls and scripts are built on top of COM, they can be embedded in any application or tool. Plus, you can write ActiveX components in any programming language using any tool, including Visual Basic, Visual C++, Microsoft Office, Lotus Notes, Macromedia Shockwave, Adobe Photoshop, Borland Delphi, tools from Sybase and Borland, and Java-enabled tools. This is in contrast to Netscape's proprietary Plug-ins architecture.

- **Extensive, Independent Scripting Support**. Microsoft Internet Explorer provides the fastest, most comprehensive, language-independent scripting capability of any browser. Through ActiveX scripting interfaces, Microsoft Internet Explorer 3.0 supports scripts written in any language and has built-in support for Visual Basic Scripting and JavaScript.

- **Open Set of Services.** No longer a limited, monolithic entity, Microsoft Internet Explorer 3.0 offers a complete set of services with open interfaces. Applications can use components of the Internet Explorer client platform to retrieve data, post data, parse incoming Internet data, render HTML, render other data types, cache data, execute scripts, and more. With ActiveX technologies, Internet capabilities are no longer restricted to the browser—your custom applications can mix internet and desktop application functionality.
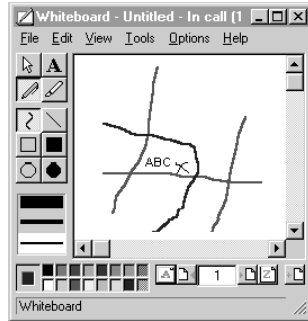
NetMeeting

NetMeeting

Make telephone calls to people around the world and share applications and data with them at the same time. With NetMeeting, you can chat with groups of people while sharing thoughts on a group whiteboard. Microsoft NetMeeting is the only communication software that enables groups of people to share applications, allows more than two people to participate in a conference, and is based on international standards, ensuring worldwide communications.

Figure 11 Make a telephone call on the Internet with NetMeeting

While you're talking on the phone over the Internet, you can also share data with the people you're talking to in the following ways:

- **Share applications.** You can open an application on one computer and share it with all connected computers even when the connected computers do not have that application installed. For example, you can share a Microsoft Word document with three co-workers. Each person now sees an image of your program on his or her computer. You can review the document together and take turns editing, and everyone sees all the changes in real time. This will also allow support personnel to help users fix problems by taking control of their applications remotely to show them what to do. This is much more advanced than the cut and pasting of bitmap images offered in other solutions.
- **Transfer files.** Use the same modem connection to transfer files without interrupting the conversation.
- **Chat area**. Type messages in your own private chat room. Perfect for online meetings on an Intranet or an online social gathering on the Internet.
- **Draw on a whiteboard.** Brainstorm ideas or sketch out a design by opening a whiteboard on all connected computers. The whiteboard comes with drawing and text tools, which you can use to sketch an organization chart, draw a diagram, type action items, and perform similar tasks. You can point out specific areas by using a remote pointer or highlighting tool, or take a "snapshot" of a window and then paste the graphic on a page.

-
- **Figure 12** Draw on a shared whiteboard while talking.

You can also host just a voice conference or just a data conference. On an intranet, you might have the voice connection over the office phone system and the data connection over the LAN. Users can also use a "do not disturb" option that declines calls automatically without interrupting your work. NetMeeting can also be configured to run in the background, listening for calls out of the user's way. If a call comes in, you just double-click a new Windows 95 tray icon to bring up the application. NetMeeting also allows a user to refuse a file being sent to them. And, with the new speed dial ability, you can make calls more quickly. This also provides one-button access to your NetMeeting home page and ULS server, making the connection process much easier.

NetMeeting adheres to major international standards from both the International Telecommunications Union (ITU)and the Internet Engineering Taskforce, to guarantee broad interoperability between applications and across platforms. For example, you can share a whiteboard between different applications on different platforms thanks to support for standard protocols such as the ITU's T.120. Additional standards supported by Internet Explorer include G.723, H.323, POP3, HTML, and MIME. So, unlike proprietary competitive solutions, NetMeeting can interoperate with solutions from Intel, Ptel, Vtel, Confertech, MCI, ATT, Apple and over a hundred other vendors solutions.

NetMeeting also supports "multipoint" connections, which allow more than two people to join in conversations. Voice conferencing is currently limited to connections between two points, but up to five points for data conferencing, and even more simultaneous users through network-based conferencing services. It includes a tool for connecting to and scheduling the use of network-based conferencing services.

You can download the NetMeeting from the download area (http://www.microsoft.com/ie/download/) for Microsoft Internet Explorer 3.0 Beta 2.

Internet Mail and News
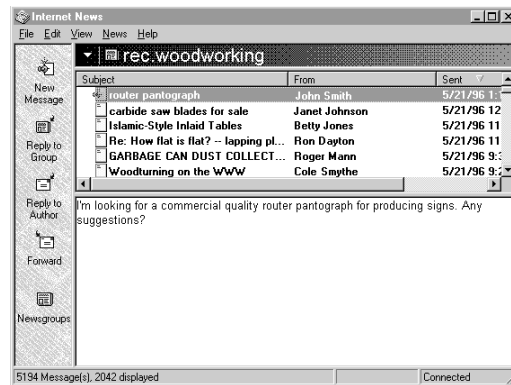
Microsoft Internet Mail and News

Small, fast, and simply designed, Internet Mail and News lets you send and receive mail quickly on the Internet, and subscribe to your favorite newsgroups with its flexible newsreader. Its complete integration with Internet Explorer 3.0 lets you check your favorite newsgroups or send mail while you're running Internet Explorer 3.0. By incorporating the same interface of Internet Explorer 3.0, users can start using Internet Mail and News quickly, without having to learn a new application.

Cool features of Internet Mail and News include hyperlinks that are inside e-mail messages and news postings. Any text that begins with http:, ftp:, mailto:, telnet:, file:, or is an Internet e-mail address (jdoe@nowhere.com) automatically becomes a hyperlink. By simply clicking on an address listed in an e-mail message, Internet Mail and News will open a new message and enter the address on which you clicked into the To: line. Or, by selecting a URL in an e-mail message, Internet Explorer 3.0 will launch and bring you directly to that Web site.

Internet Mail and News also includes HTML support, which enables viewing and sending messages in either plain text, or HTML for rich formatting. Internet Explorer is the only browser that lets you create mail messages in HTML.

Continuing Internet Explorer 3.0's international support, Internet Mail and News allows users to select any character set to send and read messages written in different languages.

You can download Internet Mail and News from the download area (http://www.microsoft.com/ie/download/) for Microsoft Internet Explorer 3.0 Beta 2.

Figure 10 Microsoft Internet Mail and News provides Internet e-mail and newsgroup capabilities.

Microsoft Internet Mail

This simple yet powerful client uses Internet-standard SMTP and POP3 protocols to let users send and receive Internet e-mail through their Internet Service Providers' mail servers. The user interface is consistent with Internet Explorer 3.0's, including its easy-to-use hot tracking toolbar, which provides access to the most commonly used e-mail functions.

Internet Mail incorporates a variety of features that make using e-mail easier. For example, Inbox Assistant will manage your messages according to rules you create. You can also sort mail on a variety of columns and configure the columns used to display messages. Message organization is easy with the ability to organize messages in folders

and easily move them to and from the file system. There is also an address book with distribution lists, searching, and sorting functions that enable you to keep commonly used e-mail addresses at your fingertips.

It's also easy to make the switch from Microsoft Exchange to Internet Mail. Messages can be imported to or exported from either application. Plus, you can export your Microsoft Exchange Personal Address Book to Internet Mail.

In addition, Microsoft Internet Mail provides the following features:

- Full support for Internet standards, including SMTP/POP3 and MIME
- Spell-checking of mail if Microsoft Office 95 spell checking is installed
- Remote usage and online usage
- A preview pane for fast reading of messages
- Ability to personalize your mail with automatic signatures
- Automatically empty the Deleted Items folder when Internet Mail is closed

Microsoft Internet News

This Internet newsreader supports full participation in Internet newsgroups, enabling you to easily subscribe, post, and read messages on Internet USENET newsgroups and intranet discussion groups.

Microsoft Internet News shares the same user interface as the Internet Mail client, including the preview pane and folder hierarchy, with additional options specific to newsreading. It also offers high performance and support for multiple simultaneous news servers. Performance is increased with caching of messages and headers, and batch downloading allows for efficient off-line news reading.

A wide array of options allows users to personalize their news reading experience. You can specify a default newsgroup that Internet News will point to when the application is launched. SSL support allows you to read newsgroups privately by connecting to secure news servers. With automatic signatures, you can personalize your messages. And, you can automatically copy the author of a message when replying to a posting in a newsgroup.

In addition, Internet News offers the following features:

- Full support for Internet NNTP standards
- Conversation threads displayed to help you easily follow a topic
- Ability to switch between your favorite newsgroups with a single click of the mouse
- Automatic decoding of binary attachments
- Folders representing an Outbox, Posted Items, and Saved Messages help users manage the items that they have sent, posted, or saved

Performance

People browsing the Web today are easily frustrated by the amount of time it takes to download graphics or software, view all the material on a site, and connect to different sites.

Microsoft Internet Explorer 3.0 works with the currently available bandwidth by providing mechanisms to quicken the pace of browsing.

Fast startup

Internet Explorer's streamlined code provides a fast start for a good end user experience.

Fast Java performance

Performance tests show Internet Explorer's "Just-In-Time" (JIT) compiler executes Java applets up to 30% faster than Netscape Navigator's JIT compiler. This is increasingly important because content developers are extending their sites with Java applets. For detailed information, please see the Java Applets section earlier in this white paper.

Optimization with Web servers

Internet Explorer improves performance for accessing information because it takes advantage of servers that support HTTP KeepAlive. Support for HTTP KeepAlive protocol provides fast access to complex pages, such as those containing many images, by maintaining a connection until the page is fully loaded instead of establishing a separate connection for each image. This enhancement to HTTP allows for much better performance retrieving information over the wire.

Immediate content download

Internet Explorer provides immediate access to content for reading a Web page online, because it:

- Displays text tags and window sizes while the graphic is being downloaded
- Uses fast text mode for fast display of text
- Uses HTML extensions for custom font typefaces and sizes (reduces page size)
- Uses multithreaded execution
- Can handle multiple server connections during download
- Progressively renders GIF and JPEG images
- Provides for Audio and Video Streaming
- Provides client-side image maps

Improved Caching of Expired Pages

Internet Explorer enables you to cache pages and graphics between Internet sessions, letting you work with Web content offline (for example, from the seat of an aircraft). Caching pages also enables you to connect more quickly to frequently used pages. Plus, improvements to Internet Explorer 3.0's caching mechanism let you set when you want Internet Explorer to refresh the page. Internet Explorer 2.0 refreshed the page every time you visited a site even if the content hadn't changed.

When browsing to a page that was generated from a script, even if the page exists in the cache, Internet Explorer 3.0 will automatically reload the page to get the most up-to-date information.

The HTTP Last-Modified-Since and Expires attributes are used to determine when a cache page is stale. Internet Explorer takes a relatively conservative approach to cache management, checking the Last-Modified-Since and Expires attributes of every object on a Web page. Other browsers only validate the page itself, and not the content, leaving them vulnerable to stale caching errors.

ISDN Support

Internet Explorer 3.0 enables you to connect to the Internet through an ISDN line, a high-speed digital telephone line that enables you to transmit information on the Internet two to four times faster than 28.8 modem speeds. .

Quick Links

Internet Explorer 3.0 comes pre-loaded with useful and cool sites on the Web, helping people quickly get up and running on the Internet.

Fastest Scripting

Internet Explorer 3.0 provides the fasted scripting support for any programming language of all Internet browsers on the market.

32-bit Multithreading

Internet Explorer 3.0 is a complete 32-bit application, building on Windows services such as the Telephony API (TAPI), and on the native 32-bit TCP/IP stack. Internet Explorer uses multiple threads of execution to deliver excellent responsiveness. This means that Internet Explorer 3.0 is more robust than 16-bit browsers and provides smooth multitasking performance, which is an advantage during lengthy downloads.

Progressive Rendering

Progressive rendering delivers complex graphics quickly, enabling users to view a low-resolution version of graphics during download, eliminating the need to wait for the entire transfer before viewing the image. Progressive rendering support is included for both GIF and JPEG format images.

Fast Connect

Supports HTTP KeepAlive, a protocol enhancement that lets Internet Explorer 3.0 open and download multiple items over the same HTTP connection when used in conjunction with a KeepAlive-enabled server.

Fast Text Mode

Instead of waiting for large graphics to download before displaying text and hyperlinks, Internet Explorer 3.0 loads the text first and inserts placeholders for slow loading images while they are downloading. This enables you to view the most important information and links much faster than conventional browsers.

Personalization

Though the Internet provides great promise as an exciting new communications tool, many people cannot reap its benefits, for simple reasons. Research shows that new users still find it too difficult to connect, navigate, download, and communicate on the Web. Microsoft Internet Explorer 3.0 removes the mystery from getting up and running on the Internet. Improvements to the toolbar reduce the confusion about downloading, and pre-loaded favorites quickly link you to cool sites.

Plus, you can customize your toolbar, Favorites folder, user preferences, and start page to personalize your experience of the Web, making it match your personal characteristics and preferences.

Customizable Toolbar

You can change the size of the toolbar by dragging the Address bar or the Quick Links button up or down, or to the left or right, to remove or display them. You can even turn off any of the toolbars so that you have more room to see web content. Independent software vendors can customize the toolbar by putting their own graphic on the toolbar, adding their sites to the Quick Links button, and adding their own start and search pages.

Figure 13 Toolbar with Address Bar

Figure 14 Toolbar without Address bar and compressed buttons

Figure 15 Toolbar with Expanded QuickLinks
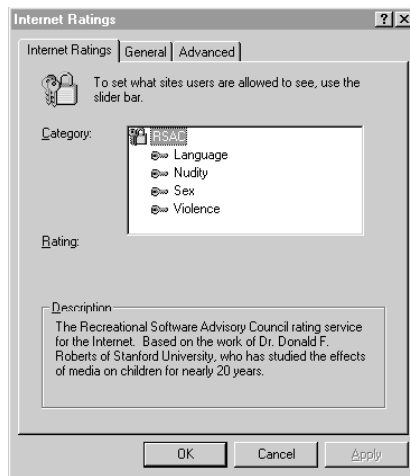
Customizable Quick Links

Microsoft Internet Explorer 3.0 comes pre-loaded with Quick Links to cool Web sites to help people easily connect to the Web. Though these are preset, , with the Internet Explorer Administrative Kit, Information Systems managers can customize the links to match specific needs of their organizations. For more information on the Internet Explorer Administrative Kit, please see the section titled Customizing and Managing Internet Explorer earlier in this document.

Customizable Internet Ratings

Many people are hesitant to browse the Web because of security concerns. Parents want assurances that children cannot visit sites that display inappropriate information. Corporations have similar concerns, wanting to block the use of sites that offer no business value. Microsoft has been working closely with the Platform for Internet Content Selection (PICS) committee to help define standards for rating Internet content.

Microsoft Internet Explorer 3.0 is the first browser to support the PICS standard, which enables you to control access to rated Web sites, or use third-party rating bureaus (see PICS specification for more details, at http://www.w3.org/pub/WWW/PICS) to control the types of content you want to see. By choosing different levels of allowable language, nudity, sex, and violence, you can filter out unwanted sites, effectively blocking users from being able to access objectionable material. Parents or supervisors can set passwords to allow access to any Web site, and you can block users from being able to access Web sites that aren't rated. Since the system is open and extensible, you can set up your own ratings system to further enforce limitations on site access.

Figure 17 Set access to Web sites based on their content.

Internet Explorer 3.0 reads special tags placed on pages by Internet content providers to determine whether that page meets your criteria for what types of content should be displayed. Web site authors can obtain a rating from the Recreational Software Advisory Council (RSAC), the organization that created and now maintains these ratings. RSACi distributes these PICS tags from their Web site (http://www.rsac.org).

These ratings are based on the PICS technology for defining and creating rating systems. RSAC used the PICS "language" to define it's rating system. Rating can be generated by both the Web site managers and independent bureaus. This way, parents and corporations have a choice of which rating system best meets their needs and preferences.

Managing The Favorites Folder

You can organize and save your favorite sites by creating and naming folders in which to store them. This makes it easier and quicker to find the one you're looking for. Plus, anything you can do with a file, such as copying, renaming, deleting, moving, or including it in a mail message, you can do with the contents of your Favorites list.

You can mail a favorite shortcut to someone else by copying it into an e-mail message. Plus, you can use that shortcut as part of a signature file, so that people reading your message could double-click your shortcut, and go automatically to your WWW site.

Netscape Bookmark Conversion Tool

When you install Microsoft Internet Explorer 3.0, it automatically converts all Netscape Bookmarks into shortcuts in your Favorites folder.

Customizable Start Page

Enables you to customize the Microsoft Network home page (www.msn.com) to reflect your personal preferences. You can set the MSN home page to retrieve and update the latest information about your favorite stocks, cartoons, news, sports and more, including the following:

Favorite Links	Weather	Ski Reports
Search Engines	News Services	United Media Comic Strips
Ziff-Davis Computer News	Music Clips	Movie Links
Stock Quotes	Sports Scores	TV Listings

Figure 16 Customizable MSN Home Page

Accessibility

Microsoft Internet Explorer 3.0 provides greater Internet accessibility for all people by being the first browser to provide any significant accessibility features. It enables keyboard navigation of the Web, and provides the option to increase font size on any Web page, and other accessibility features.

Keyboard Navigation

With Microsoft Internet Explorer 3.0, you can explore the Web from the keyboard by pressing TAB and SHIFT+TAB to navigate back and forth between image and text links, hotspots in client-side image maps, and more.

As you move to or click a hyperlink or image, a one-pixel border is drawn around it so you can see what is selected. This works for client-side image maps, too—even for hotspots that are circles or polygons!

Other keyboard shortcuts include the following.

ENTER to go to a link	ALT+LEFT ARROW and ALT+RIGHT ARROW to go back and forward	BACKSPACE and SHIFT+BACKSPACE to go back and forward
SHIFT+F10 to display a context menu for a link	CTRL+R to refresh the current page	ESC to stop downloading the page
CTRL+O to go to a new location	CTRL+N to generate a new window	CTRL+S to save the current page
CTRL+TAB to cycle between frames	SHIFT+TAB and SHIFT+CTRL+TAB to go backwards through links and frames	F5 to refresh the page

Large Font Option
With the Font button on the toolbar, you have complete control over the size in which fonts are displayed.

Other Accessibility Features
Provides features that let text-only browsers read your page, including tooltips for pictures that tell you the location (URL) of a link and support for the ALT tag that enables you to display alternate text for images.

Ease of Use

Improvements to the look and behavior of Internet Explorer make browsing more trouble-free and smooth. Other improvements close the gap between working on the Web and working on your desktop computer.

Smooth Exploring
Larger toolbar buttons that change colors when you point to them, smooth scrolling, and simplified URL addressing are just a few of the ways navigating the Web is easier with Internet Explorer. To help you find information more quickly, the Search button provides instant access to the most powerful search engines on the Web. And, you can create Internet Shortcuts just by dragging hyperlinks to your desktop.

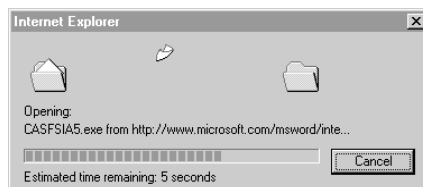### Enhanced Internet Printing
Microsoft Internet Explorer provides better printing support with the ability to print a table of hyperlinks when you print a Web page. That way you'll know the URL of a hyperlink without revisiting the site.

Hot Tracking Button
Larger, friendlier buttons that change color when the mouse hovers over them increase the ease with which people can navigate. Plus, text descriptions under the buttons can be sized according to your Windows appearance.

Download Information Dialog Box
Provides information about the size of the file and an ongoing estimate about the time remaining before the download is complete.
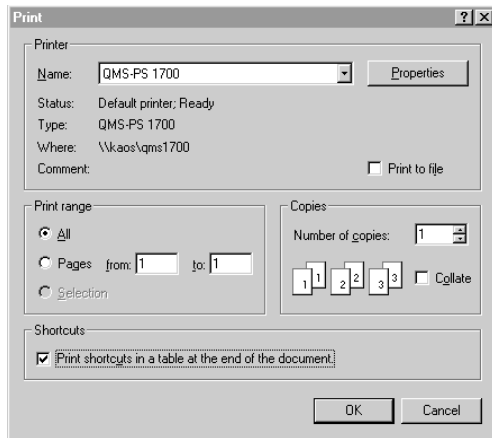

Figure 18 Keep track of the status of file as it is downloading.

Enhanced Internet Printing
Microsoft Internet Explorer provides enhanced Internet printing capabilities, including:

- **Print Table of Links.** When you print a Web page from within Internet Explorer 3.0, you can also choose to print a table of links that specifies URLs. Instead of just seeing underlined links on your printed page, a table appears at the end of the document telling you the address of each link.

- **Figure 19** Print a table that tells you where all the links on a Web page go.

The following printing enhancements will be available in later releases of Internet Explorer:

- **Print Preview**. A screen representation of how the page will be printed, a feature similar to wordprocessing applications, such as Microsoft Word.
- **Drag and Drop Printing**. Drag a URL onto your printer icon, and it will launch IE and print the page.
- **Selective Printing**. Print only the portion of a Web page that the user has highlighted.
- **Recursive Printing**. Print the current Web page, plus print all of the Web pages that this page links to, plus all of the pages that they link to, etc. The user may specify a variety of limits, such as maximum levels of recursion, maximum pages printed, pages at this site only, etc.
- **Background Printing.** When the user elects to print the current page, the page is copied and printed in a separate thread, leaving the user free to move to another page in the browsing window.

In addition, we are working on a number of enhancements to image printing, including better resolution, images spanning pages, and background image options.

Improved Frames Navigation

Microsoft Internet Explorer 3.0 reduces the confusion about navigating and printing frames. Now, when you click the Back button, you can retrace the frames you visit instead of simply jumping back to the last Web page (URL) you visited.

Smooth Scrolling

Lets you keep track of content while scrolling through a page packed with information. Pressing the PAGE UP or PAGE DOWN keys, or using the scrolling arrows, makes the page scroll like a video without any jerky movements.

Search Button

A search button on the Internet Explorer toolbar (the globe with the magnifying glass) provides instant access to powerful Internet search engines like Yahoo, Lycos, and Infoseek. These search engines are accessible at any time just by clicking the Open Search Page button. Plus, you can change your default search page whenever you want
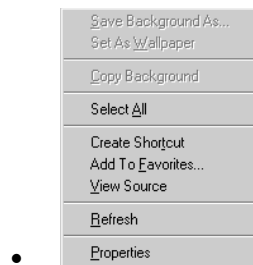
by clicking the View menu, clicking Options, and then clicking the Start And Search Pages tab and following the instructions on the screen.

Simplified URLs

Microsoft Internet Explorer 3.0 intelligently determines the protocol of a particular site. Plus, you can type simplified site addresses. For example, you don't have to type "http" before a Web or intranet site address.

Shortcut Menus

Internet Explorer follows Windows 95 conventions of providing context menus for both graphics and Web page information displayed on Internet sites. These are accessed by right-clicking the item. Shortcut menus provide quick access to those commands that apply to the selected item.

-

- **Figure 20**
  Shortcut menu for
  Web page

-

- **Figure 21**
  Shortcut
  menu for
  graphic with
  link

Internet Shortcuts

Internet Explorer extends shortcuts to include global Internet sites. Instead of pointing to a file on the LAN or on a PC, an Internet shortcut can now point to a URL (Uniform Resource Locator) on the Internet. An Internet shortcut can be embedded in a document, mailed to a friend or colleague, or stored in a folder on your computer. Microsoft Internet Explorer 3.0 is "drag-and-drop enabled" for creating shortcuts and much more.

Security

With a built-in set of Internet security technologies, Microsoft Internet Explorer 3.0 lets you communicate privately, download code you can trust, and identify yourself to others across the Internet. This means you can conduct transactions and participate in consumer services on the Internet with the same privacy and security as in the real world.

The following security technologies are supported in Internet Explorer 3.0.

Authenticode ™ Technology

Authenticode enables developers to digitally sign their software code, allowing you to verify the publisher of the software before you download it from the Internet. Verifying the digital signature also ensures that the software hasn't been tampered with during downloading.

-
- **Figure 8** Microsoft Internet Explorer checks to see if software or software components are authentic before you download them from the Internet.
-
- **Open.** Authenticode supports existing certificate standards, X.509 certificate format, and PKCS #7 signed data standards. This commitment to supporting security standards is also evidenced by Microsoft's recently submitted code signing proposal and presentation to the World Wide Web Consortium (W3C). Microsoft Authenticode technology is an implementation of this widely supported proposal.
- **Software Publishing Certificate program.** Microsoft is working with industry-leading certification authorities such as VeriSign and GTE who will issue certificates, based on standard X.509 and PKCS #7 formats, which software publishers can use to digitally sign their code. Tools for code-signing are available through the ActiveX SDK, and will be integrated into Microsoft and leading third-party development tools.

-
- **Figure 9** Publishers' Public Key Certificate

Secure Sockets Layer 2.0/3.0 (SSL), Private Communication Technology 1.0 (PCT)

Support for SSL 2.0/3.0 and PCT 1.0 ensures that your personal or business communications using the Internet or intranets are private. The SSL and PCT protocols create a secure channel, so that no one can eavesdrop on your communications. With secure communications guaranteed, you can send e-mail, buy consumer goods, reserve airplane tickets, or even conduct personal banking on the Internet.

Client authentication. Client authentication lets you present your personal certificates to Web servers that request it. In this way, Internet Explorer functions as your virtual wallet, storing your personal certificates and then presenting them to Web servers when they need to verify your identity.

Personal certificates also make it easier to connect to Web services. You no longer need to type your user name and password to connect to your favorite Web subscription service. Instead, it automatically requests your personal certificate and validates your identity. In future versions, the Microsoft Wallet will also store a wider variety of personal information such as credit card numbers, passwords, or private keys.

Server authentication. Server authentication ensures that you are communicating with your intended party. Internet Explorer caches site certificates of Web services that you can use to verify the identity of any Web merchant or other Web server before you purchase goods or communicate with them. In addition, you know that only the sender of the message could have sent the message, and the message has not been altered in transit.

With the release of Microsoft Internet Explorer 3.0 (Beta 2), Internet Explorer enables you to view personal, site, and certificate authority digital certificates. Soon, you will be able to obtain your personal certificates from Certificate Authorities, such as VeriSign and GTE, when they become available.

Microsoft is working with Netscape and others, as part of the Internet Engineering Task Force (IETF) Transport Layer Security working group, to create a unified, standard secure channel protocol. Microsoft has written a discussion draft that combines the best features of SSL 3.0 and PCT 2.0, using SSL 3.0 as a base and adding features from PCT 2.0 based on feedback from cryptographers and implementers.

"Cookie" Privacy

Some web sites use a technology called "cookies" to store a small amount of information on you computer. These "cookies" are usually used to provide web site customization features. With Internet Explorer 3.0 Beta 2, you can choose to be warned before a "cookie" is stored on your computer and then elect to accept the "cookie" or not.

SOCKS Firewall Support

Many corporations provide their employees access to the Internet through firewalls that protect the corporation from unwanted access. SOCKS is a standard protocol for traversing firewalls in a secure and controlled manner. This version of Internet Explorer is compatible with firewalls that use the SOCKS protocol. This support was provided by Hummingbird Communications Ltd., a leading provider of firewalls.

NTLM Challenge/Response

Corporations can take advantage of Windows NT Server's challenge/response authentication that may already be in use on their Windows NT Server network. This enables users to have increased password protection and security while remaining interoperable with their existing Internet information servers.

CryptoAPI 1.0

CryptoAPI, the foundation of the Microsoft Internet Security Framework, provides the underlying security services for secure channels and code signing. The delivery of CryptoAPI 1.0 through Internet Explorer 3.0 allows you to easily integrate strong cryptography in your applications. Cryptographic Service Provider (CSP) modules interface with CryptoAPI and perform functions including key generation and exchange, data encryption and decryption, hashing, digital signatures, and signature verification. Internet Explorer 3.0 will install the Microsoft RSA Base Provider CSP on Windows 95.

CryptoAPI 2.0, scheduled for beta release in third quarter of 1996, will provide high level APIs for authentication, signing, and encryption and decryption services as well as a complete public key infrastructure. With this infrastructure, your applications can take advantage of certificate management functionality such as requesting that a certificate be created, stored, or verified.

- **Extensible security.** CryptoAPI isolates the application from the CSP modules and allows different CSPs to be used without modifying application code. CryptoAPI allows vendors to develop and efficiently deliver strong encryption CSPs to customers to the maximum extent allowed by existing law.
- **Open.** CryptoAPI's open architecture allows you a choice of CSPs. CryptoAPI will also be made available across the Windows, Macintosh, and UNIX operating systems. In addition, CryptoAPI 2.0 will support the following standard certificate formats: X.509 version 3, ASN.1, and DER.
- **Leverages existing skills and solutions.** CryptoAPI lets you use your existing programming expertise to incorporate cryptography in applications or existing solutions.

Commitment to Internet Standards
This set of security technologies, which is part of the Microsoft Internet Security
Framework, supports Internet standards such as X.509 and PKCS#7 certificate formats.
In addition, Microsoft actively participates in the Internet Engineering Task Force
(IETF), World Wide Web Consortium (W3C), and other groups to develop Internet
security standards. Recent Microsoft security initiatives include the code signing
proposal submitted to the W3C and the Transport Layer Security (TLS) efforts through
the IETF, aimed at creating a single secure channel standard.

Cross Platform

Because ActiveX technology is language independent and platform neutral, you can create content and applications, using tools and programming languages, such as Java, that run on cross platforms, including Windows, Macintosh, and UNIX.

Plus, the Microsoft Internet Explorer is a family of products that unlocks the potential of the Internet for people at home or at work because it supports a broad range of platforms and is produced in the most languages. By providing cross-platform and international language support, Microsoft provides the best Internet browser for individuals and organizations.

Microsoft Internet Explorer 2.0 for Windows 95 is currently available in 23 different languages, including Russian, Chinese, and Hungarian, helping bring people together from all over the world. The new Internet Explorer 3.0 for Windows 95 continues to set the standard for international support by providing the ability to view Web pages created in many countries from within the local browser. Within 90 days of final release, Microsoft Internet Explorer 3.0 will be available in 23 languages. Microsoft Internet Explorer for Windows 3.1 will be available in 20 languages and Microsoft Internet Explorer for the Macintosh will be available in nine languages.

Microsoft offers Internet Explorer for the Macintosh, Windows 95, Windows 3.1, and Windows NT platforms. Its built to take advantage of the strengths of all major platforms and provides a common look and feel across each. This means that end users can take advantage of key operating system features, such as shortcuts on Windows 95 and aliases on Macintosh, while easily changing platforms based on UI consistency. For support desks, the UI consistency also helps in problem solving.

Internet Explorer 3.0 Beta for Windows 95 and Windows NT
Includes a common executable for both the Windows NT 4.0 and Windows 95 operating systems. Microsoft Internet Explorer for Windows NT 4.0 will be released within 30 days of the release of Microsoft Internet Explorer 3.0 for Windows 95. This browser includes support for Java applets, Netscape Plug-ins, and HTML extensions for frames, stylesheets, tables and fonts, giving designers more control over layout and typography. Plus, it supports ActiveX technologies, letting application developers create ActiveX Controls that provide inline, interactive viewing and editing.

Internet Explorer 2.01 for the Macintosh
Supports all the features of Internet Explorer 2.0 for Windows 95 and adds a number of important features, such as support for Netscape Plug-ins. In addition, it supports a richer set of dynamic cross-platform media features.

Internet Explorer 2.0 for Windows 95
Supports existing HTML standards, such as tables, while advancing HTML with new improvements such as inline video, background sounds, and marquee effects. Microsoft Internet Explorer 2.0 delivers SSL support and support for Internet shopping applications. And Internet Explorer delivers increased performance with extensions to the HTTP protocol that maintain open channels between the server and the browser.

Internet Explorer 2.01 for Windows 3.1
Supports all existing Microsoft Internet Explorer 2.0 features, except HTML support for inline video and background sounds. Microsoft is committed to the Windows 3.1 platform, and we will continue to upgrade this browser in the future.