The Microsoft ActiveX Platform Backgrounder

June 1996

The Internet has captured the imagination and excitement of the business community and is being hailed as the most important technology development since the introduction of the personal computer in the late ’70s. As with the personal computer, the Internet’s popularity and growth have been fueled by people wanting easier access to information. Instead of requiring all information to be stored locally, the Internet allows users to reach information stored anywhere around the world, at any time, from any computer. In the past year, the World Wide Web, with its colorful images and easy-to-navigate documents, has been the fastest-growing segment of the Internet. Recently, as corporations have become more comfortable with the Internet as a communications vehicle, the use of intranets — private, internal Web sites used for sharing corporate information — has grown rapidly.

Today’s Challenge: Activating the Web

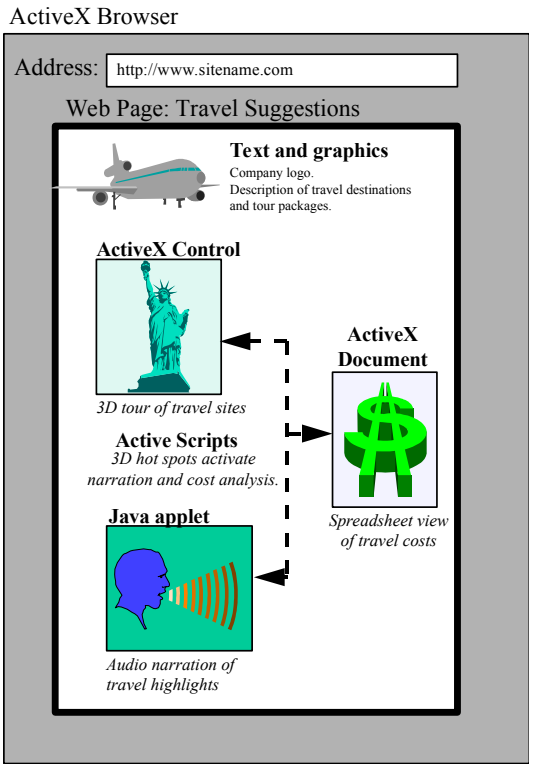
Along with the Internet’s growth and popularity have come rapid advances in the technology. Bandwidth and compression rates are improving continually, enhancing the quality of content and the experience of the user. Development tools are taking advantage of the improved bandwidth and making possible the creation of more interesting content. Search engines are becoming more powerful and making information easier to find. Improvements in network security are giving users greater trust and confidence in the Internet as a reliable communications medium.

While improvements continue to be made on many fronts, the developer community is looking to enhance the quality of Web sites and to put more useful tools in the hands of Web site producers while protecting their investments in existing tools and technologies. Today, with users accustomed to the faster response times and greater interactive capabilities of traditional PC applications, Web developers and Web site producers are struggling to satisfy users’ hunger for more active and responsive content. Rather than viewing a static picture of a travel destination on a travel company’s Web site, for example, a user might prefer to experience a full 3-D tour of a given city, complete with audio narration of the historical, cultural or entertainment

highlights and a cost analysis of various travel options.

The ActiveX Platform

ActiveX™ is an umbrella term for the Microsoft® technologies that enable developers to create interactive content for both the personal computer and the Internet. The ActiveX platform is based on an open set of specifications and protocols and has been extended to incorporate existing specifications (i.e., OLE) for the Windows® operating system. The ActiveX platform provides both client and server technologies, as well as a set of network protocols for enhanced performance across the Internet. ActiveX technologies include a collection of tools and APIs that enable the creation of interactive content.



Sample Web page with ActiveX Client technologies

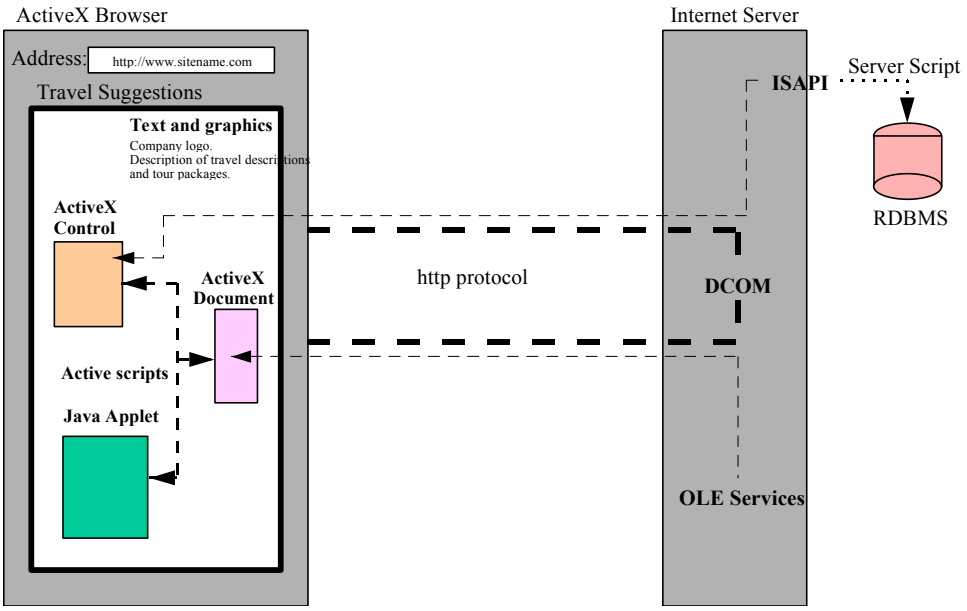
Client Framework

Client technologies, also referred to as the ActiveX Client Framework, currently work in conjunction with a Web browser to carry out functions on a user's PC. The diagram above illustrates these client technologies and how they work together in a sample Web page for a hypothetical travel company. Client technologies include the following:

- **ActiveX Controls,** formerly called OLE Controls, the interactive objects in a Web page that provide user-controllable functions and hence enliven the experience of a Web site. In the example, an ActiveX Control provides a 3-D, virtual reality tour of the Statue of Liberty and other travel destinations. ActiveX Controls are passed to the browser along with HTML code when first accessed, and remain with the client to speed the performance when run again.
- **Java™ Virtual Machine,** the code that enables Microsoft Internet Explorer 3.0 to run Java Applets and that enables any ActiveX-supported browser to integrate Java Applets with ActiveX Controls. For example, the ActiveX 3-D tour control shown above can work with the Java Applet that narrates the tour by communicating through Java Virtual Machine. In addition, by working directly with the operating system, Java Virtual Machine optimizes the performance of Java Applets in Windows.
- **ActiveX Documents,** which enable users to view non-HTML documents, such as Microsoft Excel or Word files, through a Web browser. In the travel example, a spreadsheet containing cost analyses of travel options could be accessed as an ActiveX Document.
- **Active Scripting,** which controls the integrated behavior of several ActiveX Controls and/or Java Applets from the browser. In the travel Web page, an ActiveX Script would control coordination between the 3-D tour, the audio narration and the cost analysis. Clicking a certain region of the screen during the 3-D tour, for example, could activate the narration or the spreadsheet.

Server Framework

ActiveX Server technologies, included in the ActiveX Server Framework, run on a Web server such as Microsoft Internet Information Server (IIS) and return their results to an HTML document for communication to a browser. The diagram below illustrates how ActiveX Server technologies work with the ActiveX Client Framework in the hypothetical travel Web site.



Sample interaction between ActiveX client and server technologies

ActiveX Server technologies include the following:

- **Internet server application programming interface (ISAPI) and ActiveX Server Scripts,** the interface and scripting language that provide access to server functions or databases for transactions or other complex tasks. In the travel example, a user might have a preselected set of preferred travel sites stored in a SQL database. When the user chooses the 3-D tour, the ActiveX Server Script can access the SQL database, find the user's preferences, and send only those options to the browser for display.
- **DCOM,** or distributed component object model (COM), which provides for enhanced communication between server and browser and, hence, greater control for Web developers. This is what enables the full communication of ActiveX Controls and Documents between browser and server.
- **OLE services,** which enable non-HTML files stored on the server to be viewed as ActiveX Documents by a browser. These services would provide access to the travel cost-analysis spreadsheet in the example and package the information in a format that could be read by the browser.

Microsoft Builds on Existing Knowledge and Investments

While the Internet and the World Wide Web represent exciting new environments and hot growth markets, they don't need to represent a steep and intimidating learning curve for developers for Windows. Microsoft Corp.'s goal is to help developers for Windows take full advantage of their existing knowledge and to help current Microsoft customers leverage their

investments in technology while providing the opportunity for both to take advantage of exciting new Web tools and applications.

The Microsoft ActiveX platform enables Web developers to draw from an existing collection of hundreds of ActiveX Controls and embed these interactive objects in their Web pages. The ActiveX platform also enables developers for Windows to use their existing knowledge of the Visual Basic® programming system, the Visual C++® development system and other Windows-based programming tools to write ActiveX Controls for the growing population of Web designers and developers.

For ISVs, the ActiveX platform enables users to access data files such as Microsoft Excel spreadsheets or Word documents from an Internet browser, giving ISVs broad exposure for their applications. ActiveX also enables users to access all types of information, created by many different applications, through the single interface of a Web browser, and eliminates the need for users to learn multiple desktop programs.

Microsoft Embraces Java

The August 1995 introduction of the Java language by Sun Microsystems Inc. has given developers another tool for creating interactive Web objects called Java Applets. Microsoft has licensed Java from Sun and has announced plans to create its own Java development tools, currently code-named "Jakarta." Java Virtual Machine for Windows takes advantage of Java Applets by exposing them to the ActiveX COM specification and enabling the integration of Java Applets and ActiveX Controls within a single Web page.

Developing for the ActiveX Platform

The ActiveX platform supports programming in many languages. Developers can use traditional Windows-based development tools such as Visual C++ or future versions of Visual Basic to create ActiveX Controls or expose a program's functionality to an ActiveX Control. ISVs can turn their existing applications into ActiveX OLE Servers and reach an entirely new market of Web users using ActiveX Documents. Java developers can tie their Java Applets together with

ActiveX Controls using Visual Basic Script or JavaScript™. Whichever way developers choose to approach the ActiveX platform, it will be an evolutionary step — building on their existing knowledge and extending it into the new world of the Internet.

In addition to the ActiveX developer tools used for creating controls and other objects, Microsoft also offers a selection of authoring tools for Web producers to facilitate the creation of HTML pages and the integration of ActiveX Controls and Java Applets into a Web site. The FrontPage™ Web authoring and management tool and Microsoft Internet Assistant for desktop applications are HTML editors that assist in creation of static text and graphics. The ActiveX Control Pad is an authoring utility providing visual tools to embed ActiveX Controls in HTML code with simple point-and-click ease.

Keeping Windows Open

In order to preserve the open spirit of the Internet and to provide ActiveX capabilities on any platform, Microsoft has published and will continue to publish specifications as well as sample code for its ActiveX technologies. The ActiveX developers kit, which can be downloaded from Microsoft's Web site, includes the following specifications, available to anyone who wants to support or implement the ActiveX platform:

- COM specification, for writing ActiveX Controls or exposing program functionality to ActiveX Controls
- ISAPI specification, for writing ActiveX Server Scripts and filters
- OLE Document Objects specification, for providing access to active documents
- Visual Basic Script specification, for writing script engines that plug into ActiveX browsers
- HTML extensions, working drafts of HTML extensions being designed in cooperation with the World Wide Web Consortium (W3C)
- Win32® API, for downloading data from the Internet into Windows-based applications

- Also included are many other technical documents and specifications supporting the ActiveX object model.

In addition to publishing all specifications, Microsoft also offers developers extensive training

and support to help them learn and implement the ActiveX platform and build exciting Web sites. This summer, Microsoft is slated to sponsor Developer Days training in 19 U.S. cities; to host WorldWide Live!, a satellite downlink of Web development training in 60 cities in the United States and Canada; and to host a user group tour in 19 U.S. cities to provide training on Microsoft's Internet development tools.

Microsoft has also established relationships with several leading vendors to extend the ActiveX specification to multiple operating system platforms and Web browsers. Metroworks Inc. has adapted ActiveX COM for the Macintosh®, while Bristol Technology Inc. and Mainsoft Corp. have implemented ActiveX in UNIX®. Microsoft has also worked with NCompass Labs Inc. to provide support for ActiveX in the Netscape™ Navigator Web browser.

Conclusion

The popularity of the Internet and users' desire for more interesting and active content have created an enormous business opportunity for developers. Microsoft is interested in helping developers take advantage of this opportunity with the shortest learning time possible.
The Active X platform includes a broad selection of integrated technologies that enable the creation of interactive Web sites. These technologies are based on established Microsoft OLE component technology, which many developers have already learned and for which hundreds of ActiveX Controls already exist. The ActiveX platform extends OLE to the Internet, allowing existing controls or OLE-supported applications to be accessed by any ActiveX-based browser, on any operating system platform.

In short, the ActiveX platform brings the development community for Windows to the Internet and bridges the gap between existing knowledge and investments and the exciting promise of the future. By openly publishing specifications and APIs, and by working closely with the W3C to standardize extensions, Microsoft is committed to enabling and encouraging the Internet development community to bring exciting, interactive content to Internet users.

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