Just what is an operating system?

At core of Microsoft-Justice Department dispute is a question whose answer is clearly fuzzy

ANALYSIS
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Is your Web browser part of your computer's operating system? Should it be? That's the question behind the Justice Department's action Monday against Microsoft.

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IF MICROSOFT'S INTERNET Explorer is a separate product, the company may well be doing what it promised not to do in 1995: forcing PC makers to buy one of its products before they could get Windows 95. But if the Web browser is really part of the operating system, and Internet Explorer 4.0 is really just a beta-release of Windows 98, than the Justice Department doesn't have a case. (Microsoft is a partner in the joint venture that operates MSNBC.)

Unfortunately, there's no simple way to decide this question. That's because operating systems are amorphous things. Nevertheless, the way this question is decided could have big implications for the future of desktop computers.

THAT WAS THEN ...

Back in the 1960s, computers didn't have operating systems. They had computer operators. An operator would load a deck of punch cards, run the program, and then hand the cards and the printout back to the person who asked that the program be run.

Then a group of engineers at the Massachusetts Institute of Technology wrote the Compatible Timesharing System. CTS automated the tasks of those human operators. It also allowed more than one person — or more than one program — to use the computer at the same time. This was revolutionary.

Since CTS, operating systems have been regarded as computational "traffic cops." Operating systems control the fundamental operations of the computer's hardware. They load programs into the computer's memory, run these programs and manage peripherals like disks, printers and the network interface.

The operating system, then, was something that controlled the computer's basic operations, and application programs were separate programs that ran on top of operating systems to help users get their work done.

... THIS IS NOW

But things aren't so simple now. Modern operating systems come with hundreds of programs. Some of these are critical to the functioning of the computer. Others are merely "bundled in." Sometimes it's hard to figure out which are which. But one thing is sure: Whenever products are bundled in, sales of competing products suffer.

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Attorney General Janet Reno announces the action against Microsoft.

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For example, early versions of the UNIX operating system came with copies of the C and Pascal programming languages. Third-party programming languages didn't appear on the scene until this bundled software was removed. The Macintosh operating system has always come with built-in support for networking. As a result, companies selling file-sharing software for the Mac have always had a tough time in the marketplace. But DOS and early versions of Windows didn't have file sharing, and the result was Novell.

Early versions of the DOS operating system didn't come with online documentation: There was no "help" command. At least one company distributed its own version of online documentation for DOS. But eventually, disks got large enough that Microsoft started bundling in its own online documentation with the operating system. Today, nobody sells third-party online documentation for a Microsoft operating system.

IS IT IN OR OUT?

Now consider a critical piece of Internet technology, the TCP/IP stack. TCP/IP is the Transmission Control Protocol/Internet Protocol. It's the binary communications system that lets different computers on the Internet speak to one another. The TCP/IP stack that is part of your computer's operating system knows how to dial the phone and connect to a remote computer. It knows the complicated formula for taking large pieces of information and breaking them down into packets, as well as how to reassemble those packets at the other end. More than your Web browser, it's your TCP/IP stack that is responsible for your connection to the Web.

For years, TCP/IP stacks were separate from the operating system. Back then, not many people had even heard of the Net. But if you were at a university or company and you had to connect your PC to the Net, you could go out and buy a TCP/IP stack of your own. FTP Software sold a TCP/IP stack in a suite of Internet tools called PC TCP at a cost of $400. Other companies sold cheaper stacks with fewer features. A company in Australia distributed a shareware stack called Trumpet Winsock. Back then, Internet service providers spent a lot of time negotiating site licenses for these stacks, so their customers would have the necessary software to get online.

Then Microsoft shipped Windows 95, which had a built-in TCP/IP stack and a telephone dialer. Over the next year, the bottom fell out of the TCP/IP stack business. Microsoft's TCP/IP offering wasn't

particularly good or innovative, but it didn't have to be installed. That was good for users, bad for companies like FTP. Today FTP Software is on the skids: Its stock price is at an all-time low, and it recently had a round of layoffs.

Is the TCP/IP stack part of the operating system? I always thought so, but that's because I was using the UNIX operating system, which has had a bundled TCP/IP stack since 1983. PC users, for the most part, didn't think that the TCP/IP stack was part of the operating system in 1991. Today, they do.

WHAT'S GOOD FOR THE USER?

What all this means is that the line between what is and what is not part of a computer's 'operating system' is pretty arbitrary.

What all this means is that the line between what is and what is not part of a computer's "operating system" is pretty arbitrary. Today, the U.S. Justice Department seems to think that the TCP/IP stack is part of the operating system, but the Web browser is not. A few years ago, the Justice Department might have ruled that the network stack was a separate program. Perhaps a few years before that, Justice would have been angry at Microsoft for bundling Minesweeper.

Ultimately, drawing lines between the operating system and application programs doesn't help anybody. Drawing those lines today might create more choices for consumers, but it won't make computers easier to use or ensure the widespread adoption of new technologies. Ultimately, computer users need all of these things. And if somebody is going to draw a line between what is and what is not part of the operating system, it makes about as much sense to draw that line using today's definition of an "operating system" as it does to draw it using the definition that we were using in 1995.