

(1944–), founder of **Silicon Graphics**, and **Marc Andreessen** (1972–), developer of the user-friendly Web browser, **Mosaic**. It released its first products in December 1994 and leapt to world attention in August 1995, when its stock market initial public offering (IPO) valued the company at over U.S.\$2 billion. Industry analysts saw Netscape as a potential challenger of **Microsoft** domination, and that fall Microsoft's share price plunged by 7 percent. In the months that followed, **Bill Gates** (1955–) declared that Microsoft would place the Internet at the center of its business, giving away its Internet Explorer Web browser at no cost with its Windows operating system in a direct challenge to Netscape Navigator.

An aggressive battle for Internet domination ensued, at the height of which Andreessen commented: "Everybody in the software industry just takes it for granted that Microsoft wants to put us out of business." In August 1996, Netscape complained to the Department of Justice with allegations of "anticompetitive" behavior, and the following month the department announced an investigation of Microsoft's practices. A lengthy trial followed, during which the U.S. government claimed that Microsoft had threatened to "cut off the air supply" of Netscape, an allegation Gates dismissed as "an unbelievable lie." In October 1996, Netscape announced it planned to concentrate on the lucrative intranet market (forecast to be worth U.S.\$8 billion in 1998). But the damage was done. By January 1998, Netscape had posted an U.S.\$88 million loss and fired 400 of its employees. It was subsequently taken over by AOL in November 1998. Its share of the browser market stood at the end of 1999 at around 35 percent (compared to Microsoft's Internet Explorer, which has approximately 60 percent of the market).

FURTHER READING

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—Chris Woodford

NetWare

There was a time in the mid-1980s when the only high-quality networking software for the **IBM personal computer** (PC) and compatible computers was provided by **Novell**. The Novell NetWare system has gone through many releases and still exists, although its importance has been greatly reduced by the incorporation of networking functionality into the **operating systems** for PCs. From the beginning, NetWare was not an operating system but rather, a *network operating system*.

NetWare was introduced in 1983. The first versions were written by a four-person team: Drew Major, Kyle Powell, Dale Niebaur, and Mark Hurst. The name of the product was accidental, because the first name they had selected (Sharenet) was already taken, so they opted for another. NetWare 4.0 was the first commercial release. Coming from the mainframe and minicomputer world, with its centralized administration of resources, the four programmers tried to give the data sharing functionality of larger computers to **networks** of PCs.

NetWare was initially a proprietary system that ran using **Motorola** processors. Later, the IBM PC was made a client of the system. This meant that users wanting to install a network could use PCs as clients but had to buy the server machine from Novell. Later, NetWare-X was introduced, which also allowed the IBM PC-XT to function as server. The proprietary server product was renamed NetWare-S.

Novell made sure that each new release of NetWare would run using the most popular networking cards available, especially **Ethernet** boards. A kind of symbiosis resulted from this strategy, because Ethernet networks became an option in the PC world due to NetWare, while NetWare itself became popular due to the high transmission speed of Ethernet cards.

Releases of NetWare began with 1.0 again when Advanced NetWare was introduced in 1985. Many new features were added in the next releases, such as the option to network **Macintosh** computers and the use of nondedicated servers, that is, machines that could do other useful work.

In 1998, **intra-** and **Internet** features were added to NetWare. Later, **Java** was incorporated and better inte-

gration with the Web was achieved. For example, using a **browser**, network administrators can manage a Novell network from any other computer in the Internet. The latest version of NetWare is the 5.1 release.

The market share of Novell networking software began falling steadily once PC operating systems started incorporating network functionality, management of users, and providing some security features. From its 70 percent of the market in 1993, Novell's market share fell to less than 57 percent in 1997. Its adoption of Internet technology happened rather late, and some ill-advised acquisitions added to a climate of uncertainty about Novell's future. In 1994 Novell bought WordPerfect Corporation for U.S.\$855 million, a company that at the time produced and marketed the highly popular WordPerfect text processor. However, only a few months later WordPerfect was divested and the product disappeared.

Novell has been struggling in the last years trying to focus again on the networking arena, which has been transformed so profoundly by the Internet. The main asset of the company is a set of software protocols called Novell Directory Services (NDS). The main purpose of NDS is to provide the end user a structured view of all documents in a network. Every computer has its own tree of subdirectories, but they are integrated into a global tree accessible by other computers according to rules that specify security levels and bind together subdirectories of different groups. NDS is more than having links between computer directories—it helps manage the network and enforce security policies. Network managers, accessing the network from many distributed geographic points, can collaborate and modify the structure and policies of the global directory easily.

NDS is the main directory service for networks of PCs, but other alternatives have been put forward, notably by **Microsoft** and **Cisco**. The latest release of **Windows**, Windows 2000, integrates many networking functions in the operating system and is based on Microsoft's own brand of directory services, called Active Directory.

Novell has been repositioning itself vigorously as an Internet company, and NetWare and NDS have become just part of its long-time strategy to provide global net-

working services. In 1999, 3.8 million servers in the world, with 80 million users, were using Novell software.

FURTHER READING

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—Raúl Rojas

Network Computer

A network computer (NC) is a simple machine optimized for electronic communication. It can not be used without a **network**, as the **software** is not stored in a local **hard disk**. Programs are loaded directly onto the network from a **file server**.

Lawrence Ellison (1944–), chief executive officer of **Oracle**, announced the first NC in 1995. His aim was to bypass the personal computer and increase computer sales into U.S. homes with a sealed, appliance-style computer that did not require software installation or **hardware** upgrades. The NC should be capable of running **word processing** software, and **spreadsheet** and database programs, to send and receive **electronic mail**, and to allow **Internet** browsing using a low-cost processor, 4-megabyte (MB) random access memory (**RAM**), television or computer monitor, **keyboard**, **mouse**, and connection to the Internet.

Microsoft countered with the announcement of a *simply interactive personal computer* (SIPC), which would bundle a television set and a videocassette recorder with a **Pentium**-based computer and **multimedia** applications. This was also a sealed unit, but with expansion through a *universal serial bus* (USB) for slow devices, and IEEE 1394 (Firewire) to connect video devices. Separately, **Intel** planned a *networked PC* (NetPC) with capabilities similar to those of the NC. The *NetPC Systems Design Guidelines* were written in association with **Dell**, **Compaq**, **Hewlett-Packard**, and Microsoft (which quietly dropped its plans for the SIPC).