area network (LAN) architectures of today have evolved rapidly in terms of the bandwidth offered to the end user, with current and emerging LAN standards such as gigabit Ethernet and 10-Gbps Ethernet utilizing high-speed optical fiber links. As the need for bandwidth in the local area increases with the emergence of high-speed applications, optical networks will become the indispensable communication solution.

FURTHER READING

Chlamtac, I. "Lightpath Communications: A Novel Approach to High Bandwidth Optical WANs." *IEEE Transactions on Communications*, Vol. 40, No. 7, July 1992.

———. "Optical Networking—Editorial." *SPIE/Kluwer Optical Networks Magazine,* Vol. 1, No. 1, 2000.

Chlamtac, I., et al. "Purely Optical Networks for Terabit Communication." *IEEE Infocom*, Apr. 1989.

Sivalingam, K. M., and S. Subramaniam, eds. *Optical WDM Networks: Principles and Practice.* Boston: Kluwer Academic, 2000.

—Imrich Chlamtac

Oracle Corporation

Oracle Corporation, headquartered in Redwood Shores, California, is best known for its **database management system** (DBMS), called Oracle. When it was introduced in 1979, Oracle was the first commercial DBMS based on the relational database model. Its cofounder and chief executive officer, Lawrence J. Ellison (1944–), is one of the wealthiest and most prominent figures in the computer industry and is well known for his extravagant lifestyle, his provocative speeches, and his harsh criticisms of competitors.

The Oracle DBMS is used primarily by large and medium-sized enterprises for implementing information systems. One of its most impressive features is its efficient handling of large numbers of concurrent transactions requiring sophisticated access synchronization and advanced parallel computing techniques. Its standard user interface for defining, populating, and modifying tables and for asking queries is the database manipulation language SQL. Together with SQL, the Oracle DBMS has evolved from a purely relational to an object-relational system. Triggered by the overwhelming success of the **World Wide Web**, Oracle added a number of new features to its DBMS to make it an **Internet**-enabled DBMS. The extensions include an Internet File System for storing multimedia contents and **HTML** (Hypertext Markup Language) documents in an Oracle database and for retrieving them via HTTP (Hypertext Transfer Protocol) and **FTP** (File Transfer Protocol), as well as the support of the programming language **Java** and the metalanguage **XML**.

Oracle Corporation (originally called Software Development Laboratories) was founded in 1977 by Ellison, Bob Miner, and Ed Oates. Their first project was a contract for the U.S. government with the code name Oracle, which would later become the name of their first product and of the company. Being the world's largest DBMS software company since 1987, Oracle's annual revenue rose from U.S.$12.7 million in 1984 to U.S.$8827 million in 1999, making it the world's second-largest independent software company today.

To increase its business opportunities and to change its image as a single-product vendor, Oracle has developed a suite of enterprise applications for manufacturing and supply chain management, financial accounting, human resources, and customer relationship management, which are being marketed under the name of *Oracle Applications*. Since DBMS software is in danger of becoming a commodity for which the prices and revenues may decline, this second major product line is considered important for the future growth of the company.

FURTHER READING

Wilson, Mike. *The Difference Between God and Larry Ellison: Inside Oracle Corporation*. New York: Morrow, 1997.

—Gerd Wagner

OS/2

OS/2 (Operating System Two) is an **operating system** for **personal computers** (PCs) distributed by **IBM**. Designed originally in collaboration with **Microsoft**, OS/2 is similar to **Windows**, but the **graphical user interface** (GUI) is somewhat different. Both operating systems differ in many other respects.

After the introduction of the **Macintosh** in the early 1980s, Microsoft and IBM started developing a succes-

sor to **DOS**, the original operating system delivered with each IBM PC and its **clones**. The new OS was to have a GUI and allow **multitasking**—that is, the simultaneous execution of several programs. At the same time, Microsoft was developing the first version of its Windows operating system.

OS/2 was delivered for the first time in 1987, still without the GUI. Although it was announced that legacy MS-DOS programs could run in the compatibility box of OS/2, this proved to be untrue for many important programs. The lack of third-party applications and the serious bugs contained in the first versions of OS/2 did not allow it to substitute DOS as was planned. Moreover, Microsoft soon pulled out of the project altogether and left IBM free to develop OS/2 on its own, while Microsoft concentrated on improved versions of Windows. For some time it was uncertain if OS/2 or Windows would become the successor to the venerable, text-oriented DOS. Eventually, IBM tried to position OS/2 mainly as an operating system for the corporate environment, which could link IBM mainframes and PCs in enterprise networks.

OS/2, now called the OS/2 Warp system, can execute DOS and Windows applications. The scripting language is called REXX. Full networking functionality has been added to OS/2 and the **software** bundled with the operating system allows the exchange of data with large IBM machines. IBM's vision has long been to transform OS/2 into the operating system of choice for its corporate users.

OS/2 is based in preemptive multitasking. This means that the OS allocates the running time for each process. This is different from cooperative multitasking in which if one process fails or refuses to yield the processor, all other processes stop running, that is, what happens when the screen of a Windows computer freezes because a program misbehaves. OS/2 also uses **multithreaded architecture**, which means that any program can start parallel processes that are serviced by the OS in the background.

Although IBM has steadily lowered the price of OS/2 and has introduced many new features in the Warp software (e.g., speech recognition technology), OS/2 has failed to reduce significantly the market share of Windows. The free operating system **Linux** has been more successful in this regard.

FURTHER READING

Stokes, Neil. *Getting to Know OS-2 Warp 4.* Upper Saddle River, N.J.: Prentice Hall, 1996.

—Raúl Rojas