OSI Retrospect and Prospect

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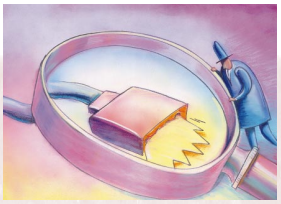
At a recent IEEE meeting, I struck up a conversation about OSI networking with Jerry Foley. As we talked, it occurred to me that enough time may have passed to talk openly about the myths and reality regarding the ISO OSI networking efforts and how they relate to TCP/IP networking as the two technologies evolved over the late 1970s and 1980s. In late 1976, working within the ANSI Information Systems infrastructure, Foley was authorized to write a study on "standards for distributed information systems." From this study ANSI's Open Systems Interconnect standards committee evolved, and for the next 16 years Foley served on the committee, about 12 of them as chair. Foley was a US delegate to ISO OSI committees and he represented the US State Department to the CCITT work on ISO. He also served as liaison to the Manufacturing Automation Task Force, which implemented OSI, and managed MAP implementations in General Motors plants.

—Charles Severance

How much effort went into developing OSI?

The US OSI committee involved more than 140 people. We met at least six times a year, one to two weeks at a time, and we continued the work in our home offices and labs. The first ISO OSI meeting brought about 40 people to Washington, D.C.; we all fit in one room. Later, meetings were held concurrently in Vienna, Paris, and London to accommodate all the delegates. Representatives of 17 countries eventually made up ISO OSI. Delegates came from industry, government agencies, universities, and consultants under contract to governments. One or more ISO OSI technical groups would be meeting somewhere in the world on more than 40 out of the 52 weeks of the year, frequently with overlapping meetings.



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Were OSI committee members aware of ARPANet, SNA, DECNet, and others?

Yes, many US OSI people were also developers of these systems, users, or had continuing liaisons with the respective organizations. They ensured the OSI groups' awareness of these other network technologies.

How did the OSI folks view TCP/IP at the beginning?

We saw a fundamental difference in scope. To us, OSI was an international system of standards to provide complete support for cooperating, interconnected computer systems. TCP/IP was viewed as a data-communications networking system. OSI was predicated on attaining error-free performance using an international mix of underlying transmission services—including some of very low quality. TCP/IP was perceived to be based on the higher quality US transmission capabilities. Most important, TCP/IP was viewed as a US Defense Department system that would therefore not be acceptable in international work.

Why did OSI gain such strong support?

The then-new information systems networking technology was being developed as proprietary systems and so was not interoperable. Coincidentally, there was a demand for standards to facilitate cooperating processes independent of platforms. Large users and computer manufacturers supported the demand with resources. Initially, it was the US, the UK, and European countries that supplied enough highly qualified technical people to give OSI momentum. Participation then snowballed because no company or country that wanted a major role in information processing could stay away.

What were the barriers to acceptance?

OSI penetrated too deeply in too many vendors' proprietary interests. This kept the vendors from giving their full support to OSI in the area of delivering OSI to customers on their systems.

While many people think that OSI was too late, this is overemphasized as a barrier. In 1984, full OSI implementations were networked in a demonstration by the multivendor MAP consortium. At that time, the Internet had not yet become the de facto worldwide network.

However, this does not mean that the ANSI and ISO administrative structures were particularly quick, either. These groups were organized to produce blue-ribbon standards. Their operating procedures required multiple approval cycles, and most committee communications and balloting had to be done by reg-

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ular post. Also, the number of standards required at each layer gradually increased over time as new uses evolved. Each OSI layer required a services definition and one or more protocol specifications. Each layer protocol required several documents; some layers required multiple versions of these documents.

Which OSI protocols have been outdistanced by the TCP/IP protocol suite?

According to the sheer number of implementations, the basic TCP/IP applications such as Telnet, File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), and Simple Network Management Protocol (SNMP) are quite dominant when compared to their OSI counterparts.

And in what areas did OSI succeed?

The OSI Reference Model is a stabilizing foundation and a useful network development tool. The full OSI stack has been widely adopted: The North American Power Grid, in the electrical domain, under the Open Meter Access Initiative will deploy 8 million full OSI stack implementations for meter reading. The Utility Communications Architecture has adopted OSI for metering and for use in the networking of utility control centers and security centers.

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In network management, the Communications Management Information Protocol (CMIP) is being specified by the major telephone companies to accomplish national and international network management because CMIP can manage a large number of objects. CMIP will be used for "electronic bonding," which, for example, will pass trouble reports between telcos worldwide. And the International Telecommunications Union and the US Federal Aviation Administration will use a modified OSI stack in next-generation radars and cockpit electronics. The InterLibrary Loan Protocol used the OSI services and protocol approach and ASN.1, the Abstract Syntax Notation. The OSI directory services will be used worldwide as Lightweight Directory Access Protocol (see C. Severance, "Could LDAP Be the Next Killer DAP?" *Computer*, Aug. 1997, pp. 88-89). A major part of Directory Service is the Directory Authentification Framework that provides public-key certificates. ❖

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