

Data Communications and Networking for Today's Enterprise

Effective and efficient data communication and networking facilities are vital to any enterprise. In this section, we first look at trends that are increasing the challenge for the business manager in planning and managing such facilities. Then we look specifically at the requirement for ever-greater transmission speeds and network capacity.

Trends

Three different forces have consistently driven the architecture and evolution of data communications and networking facilities: traffic growth, development of new services, and advances in technology.

Communication **traffic**, both local (within a building or business campus) and long distance, has been growing at a high and steady rate for decades. Network traffic is no longer limited to voice and data and increasingly includes image and video.

Increasing business emphasis on web **services**, remote access, online transactions, and social networking means that this trend is likely to continue. Thus, business managers are constantly pressured to increase communication capacity in cost-effective ways.

As businesses rely more and more on information technology, the range of services that business users desire to consume is expanding. For example, mobile broadband traffic growth is exploding as is the amount of data being pushed over mobile networks by business users' smart phones and tablets. In addition, over time, mobile users are increasingly demanding high-quality services to support their high-resolution camera phones, favorite video streams, and high-end audio. Similar demand growth is seen in landline access to the Internet and private networks. To keep up with mushrooming traffic generated by both consumers and business users, mobile service providers have to keep investing in high-capacity networking and transmission facilities. In turn, the growth in high-speed network offerings at competitive price points encourages the expansion of mobile applications and services.

Finally, trends in **technology** enable the provision of increasing traffic capacity and the support of a wide range of services. Four technology trends are particularly notable:

1. The **trend** toward faster and cheaper, in both computing and communications, continues. In terms of computing, this means more powerful computers and clusters of computers capable of supporting more demanding applications, such as multimedia applications. In terms of communications, the increasing use of optical fiber and high-speed wireless has brought transmission prices down and greatly increased capacity. For example, for long-distance telecommunication and data network links, dense wavelength division multiplexing (DWDM) enables communication traffic to be carried by fiber optic cables at rates of multiple terabits per second.
2. Today's networks are more "intelligent" than ever. Two areas of intelligence are noteworthy. First, today's networks can offer differing levels of quality of service (QoS), which include specifications for maximum delay, minimum throughput, and so on to ensure high-quality support

for applications and services. Second, today's networks provide a variety of customizable services in the areas of network management and security.

3. The Internet, the Web, and associated applications have emerged as dominant features for both business and personal network landscapes. The migration to "everything over IP" continues and has created many opportunities and challenges for information and communications technology (ICT) managers. In addition to exploiting the Internet and the Web to reach customers, suppliers, and partners enterprises have formed intranets and extranets² to isolate proprietary information to keep it free from unwanted access.

4. Mobility is newest frontier for ICT managers, and popular consumer devices such as the iPhone, Droid, and iPad have become drivers of the evolution of business networks and their use. While there has been a trend toward mobility for decades, the mobility explosion has occurred and has liberated workers from the confines of the physical enterprise. Enterprise applications traditionally supported on terminals and office desktop computers are now routinely delivered on mobile devices.