

Foundation

What distinguishes a computer network from these other types of networks? Probably the most important characteristic of a computer network is its generality. Computer networks are built primarily from general-purpose programmable hardware, and they are not optimized for a particular application like making phone calls or delivering television signals. Instead, they are able to carry many different types of data, and they support a wide, and ever growing, range of applications. Today's computer networks are increasingly taking over the functions previously performed by single-use networks. This chapter looks at some typical applications of computer networks and discusses the requirements that a network designer who wishes to support such applications must be aware of

Once we understand the requirements, how do we proceed? Fortunately, we will not be building the first network. Others, most notably the community of researchers responsible for the Internet, have gone before us. We will use the wealth of experience generated from the Internet to guide our design. This experience is embodied in a network architecture that identifies the available hardware and software components and shows how they can be arranged to form a complete network system.

In addition to understanding how networks are built, it is increasingly important to understand how they are operated or managed and how network applications are developed. Most of us now have computer networks in our homes, offices, and in some cases in our cars, so operating networks is no longer a matter only for a few specialists. And, with the proliferation of programmable, network-attached devices

such as smartphones, many more of this generation will develop networked applications than in the past. So we need to consider networks from these multiple perspectives: builders, operators, application developers.