Solution Building

IV. Composition of the IT Infrastructure

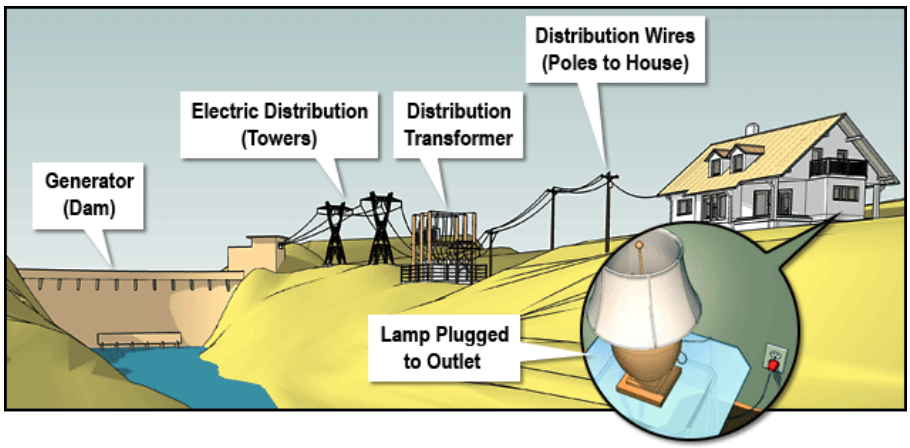
As we have seen, the planning activities that we have been discussing are designed to get the most from a company's resources in an effort to achieve its objectives over some time period. The composition of a company's IT infrastructure is the result of managerial decisions, based on the IT plan and its maintenance. As we noted above, Strnadl (2006, p. 67) states that "information systems (IS) and the organization's IT infrastructure have evolved into an 'IT fabric,' or 'nervous system,' inextricably entangled and intertwined with the business processes and information processing activities they support (Strndal, 2001; Calvano and John, 2004; Field and Stoddard, 2004)."

We will redefine the major components of infrastructure as hardware, software, telecommunications, services, and facilities so that they conform to the categories that are standards for the industry.

It is imperative that all of these areas are coordinated so that they work together. As new business requirements arise, the solutions developed must fit into that framework and all facets must be adjusted accordingly so that they remain in sync with one another.

We are all familiar with the concept of infrastructures because we use them every day in our normal daily activities. Let's look at an infrastructure with which we are all familiar but don't think much about—the electrical infrastructure, as shown in figure 2.9.

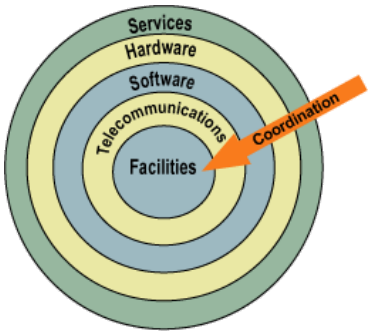
Figure 2.9
Electrical Infrastructure



We buy electrical devices or appliances, plug them in, and expect them to work. The reason they do work is that there is a standard electrical infrastructure. This means that there had been a plan put in place, with which everyone is familiar and the design and procurement of new devices conforms. When an infrastructure exists, it is because there was recognition that for a **system** (a group of equipment and processes) to function efficiently, there must be a long-term plan with which the key participants are familiar and comply. This is true for an electrical or an IT infrastructure.

Figure 2.10 shows the five major components of the IT infrastructure that will be used to support business strategy.

Figure 2.10
IT Infrastructure Components



For the infrastructure to perform its tasks, all of these elements must be present to varying degrees based on the IT plan that is supporting the strategic business model of a company. In order for the infrastructure to function optimally, the components must be coordinated effectively.

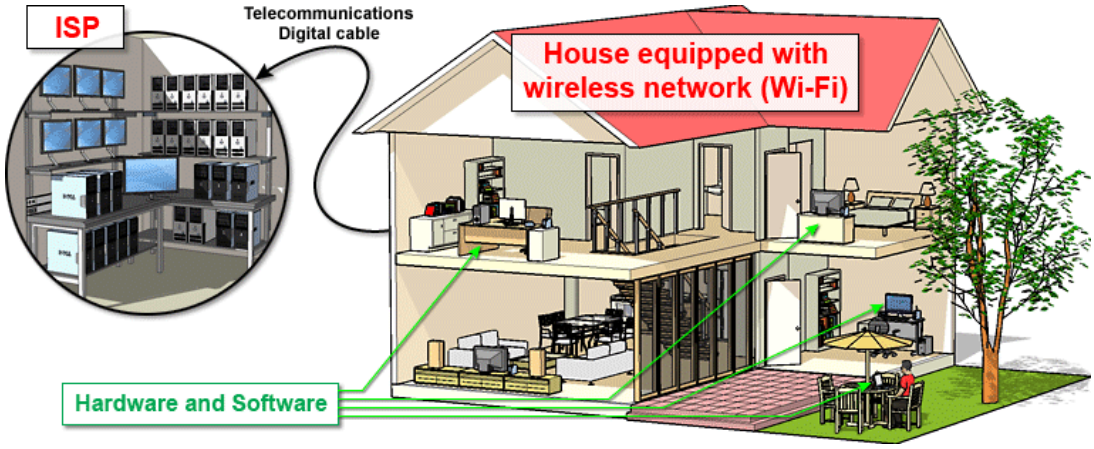
The major components of the IT infrastructure are:

- **services—**the people or organizations that run, support, and manage the other infrastructure components; can be internal staff or external contractors or service providers
- **hardware—**devices that perform the input, storage, processing, and output functions
- **software—**instructions that enable the hardware to perform its functions, enabling these assets to meet the needs of the business; includes (1) operating systems that control the hardware, (2) data management software that accesses and moves data to storage, and (3) application software, which supports the business processes
- **telecommunications—**the tools that provide connectivity and communication among individuals, companies, governments, or hardware assets; includes networking hardware and software and telecommunications services, both audio and data
- **facilities—**the buildings or spaces that house the equipment and staff that provide service and support

We have selected these categories of components to facilitate your understanding and because they are consistent with standard industry categories used by the Gartner Group.

All IT infrastructures contain all five of these components, regardless of the organization's size. Even in your home, you have an IT infrastructure, albeit a small one, as shown in figure 2.11.

Figure 2.11
Home IT Infrastructure



Source: Cisco Systems, Inc. (2007)

Figure 2.11 represents a modern home with a true IT infrastructure containing all of the components that the largest businesses use to support their business strategies. Because you may own one personal computer and use it, you recognize the need for stability and upgrading the equipment and software. You also know that it is flexible because you can add a printer or an external DVD drive to provide backup of critical data. You have also encountered devices that caused problems because they did not provide a smooth upgrade path, like ZIP drives or devices that have only a parallel port capability. You also are aware of the potential problems that may occur when you make changes to your infrastructure, and probably plan them for times that will have the smallest impact on your strategy, or objective.

The degree to which the actual components are used varies among industries and companies, and it must be balanced to provide the greatest benefit to the organization. Referring to figure 2.11, the home infrastructure became out of balance because of the availability of music, movies, graphics, and games on the Internet. Although hardware and software were capable of supporting these types of information, users and hardware were constrained because they had to wait so long for the communications process to occur with dial-up communication. To bring the infrastructure into balance, telecommunications had to improve. This has led home users to migrate from dial-up to broadband or DSL as their preferred method of communicating with the Internet.

Because a business's IT infrastructure can be regarded as its "nervous system," it is imperative that it be stable, robust, secure, and flexible so that it can support business requirements reliably, especially in times of heavy usage. Before any IT decision is made, it must be consistent with the infrastructure. The infrastructure must be able to accept both changes in the business and radical changes in technology.

This may sound contradictory, but think back to our electrical system model. Radically different electrical or electronic devices are constantly becoming available, but the electrical infrastructure stays relatively constant and the devices operate as designed. Changes to a component of the infrastructure could require special efforts and added costs if they are made. In the past, printers were connected to PCs using a parallel connector, but today's new computers no longer have parallel ports. To maintain the printing capability, you must purchase either a new printer that connects using a USB port or an adapter that will allow the old printer to connect to the new computer.

Because of the constant changes in technology, an infrastructure must change to take advantage of those changes that will provide a business benefit to the company. This must be part of the IT plan so that transitions to newer technology can be integrated smoothly, with no disruption or degradation of service level.

Suppose a new computer is under evaluation to replace an aging computer to gain the advantages of increased speed and more storage. The impact on all of the components of the infrastructure must be considered:

- Will our existing peripherals operate with the new computer?
- Will our existing software work on the new computer?
  - If it does, will it still permit us to achieve the benefits of the new computer?
  - If not, will new software have to be purchased?
- Will our applications run on the new computer, or will changes have to be made?
- Will our communication protocols work?
- Will our networks support the higher volume of data, or will there be a bottleneck that will prevent the new computer from functioning as well as we planned?
- Will users or the technical staff require training to support the new computer hardware and software?

The interrelationship that must be coordinated indicates just how important the IT plan is, because the infrastructure cannot provide the support for the business strategy without planning and coordination. We pointed out earlier that the planning process must be coordinated with the budgeting process because businesses have limited financial resources, and those resources must be allocated among prospective projects based on the benefits to be obtained from the investment. This leads us to our next section, in which we will discuss the costs of supporting the infrastructure.

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