5.4 Network Applications

Hopefully you now have a working knowledge of what a network is and how you can access it. At this point, the key question is, How do businesses use networks to improve their operations? This section addresses that question. Stated in general terms, networks support businesses and other organizations in all types of functions. These functions fall into the following major categories: discovery, communication, collaboration, and Web services. We discuss each of these categories in the following sections.

Discovery

The Internet permits users to access information located in databases all over the world. By browsing and searching data sources on the Web, users can apply the Internet’s discovery capability to areas ranging from education to government services to entertainment and to commerce.

In some ways, however, the Web’s major strength is also its greatest challenge. The amount of information on the Web can be overwhelming, and it doubles approximately each year. This makes navigating through the Web and gaining access to necessary information more and more difficult. The solution is the use of search engines, directories, software agents, toolbars, and portals.

Search Engines and Directories  Search engines and directories are two different types of search facilities available on the Web. A search engine (e.g., www.altavista.com, www.google.com, www.mamma.com) is a computer program that searches for specific information by key words and reports the results. A search engine maintains an index of hundreds of millions of Web pages (more than 8 billion pages in the case of Google). It uses that index to find pages that match a set of user-specified keywords. Such indexes are created and updated by software robots called spiderbots, which execute routine tasks for the benefit of their users.

Directories differ slightly from search engines. A directory (e.g., Yahoo, About.com) is a hierarchically organized collection of links to Web pages. Directories are compiled manually, unlike search engine indexes, which are generated by computers.

Search engines and directories often present users with links to thousands or even millions of pages. It is quite difficult to find information of interest within such a large number of links. In these cases we can use additional tools to refine the search. Three of these tools are metasearch engines, software agents, and toolbars.

Metasearch engines  Metasearch engines search several engines at once and integrate the findings of the various search engines to answer queries posted by users. Examples include SurfWax (www.surfwax.com), Metacrawler (www.metacrawler.com), Ungoogle (www.ungoogle.com), Ixquick (www.ixquick.com), and Dogpile (www.dogpile.com). Figure 5.6 shows the SurfWax home page.
Software Agents  A large number of Internet software agents can be used to automate and expedite discovery. Software agents are computer programs that carry out a set of routine computer tasks on behalf of the user and in so doing employ some sort of knowledge of the user's goals. Agents that help us access information include Web-browsing-assisting agents, frequently-asked-questions (FAQ) agents, and intelligent-indexing agents.

Web-browsing-assisting agents, known as tour guides, facilitate browsing by offering the user a tour of the Internet. For example, NetCaptor (www.netcaptor.com) is a custom browser application that makes browsing more productive. In contrast, FAQ agents guide people to the answers to frequently asked questions. AskJeeves (www.ask.com) is a popular FAQ agent that makes it easy to find answers on the Internet to questions asked in plain English. Finally, intelligent-indexing agents—also called Web robots and spiders—can carry out a massive autonomous search of the Web for a user. These agents retrieve requested pages, as well as all other pages referencing the requested page.

Toolbars  To get the most out of search engines, you may use add-on toolbars and special software. A toolbar is a horizontal row or vertical column of selectable image icons or buttons. By clicking on an icon, the user can access desktop or other application functions, such as saving or printing a document or moving pages forward or backward within a Web browser. The toolbar also reminds users of what functions are available. Figure 5.7 illustrates the Microsoft Internet Explorer toolbar.

![Figure 5.6](image)

SurfWax.

![Figure 5.7](image)

Microsoft Internet Explorer toolbar.
Some toolbars are attached to the popular search engines, and others are independent. Most are free. Examples are Google Toolbar (wwwtoolbar.google.com), Copernic Agent Basic (www.copernic.com), KartOO (www.kartoo.com), Yahoo Companion (http://companion.yahoo.com), and Grokker (www.groxis.com).

**Discovery of Material in Foreign Languages** Not only is there a huge amount of information on the Internet, but it is written in many different languages. How, then, do you access this information? The answer is that you use an automatic translation of Web pages. Such translation is available, to and from all major languages, and its quality is improving with time. Some major translation products are Altavista (http://babelfish.altavista.com) and Google (www.google.com/language_tools), and products and services available at http://www.trados.com and http://www.translationzone.com.

For translation, you enter the text of what you want translated. You then select the “from-to” languages for the translation (e.g., from English to German). The Web site then presents the translated text. See Figure 5.8. However, problems remain, as the following example shows.

**How Not to Translate Your Web Page** Language has the power to bring marketing directors to their knees. Consider the following translation faux pas:

- Mercedes-Benz shortened the name of its Grand Sports Touer to GST. In Canada, however, the acronym stands for the widely loathed goods and services tax, also known as the “gouge and screw tax.”

- Ikea, the $7 billion household products company that is headquartered in Denmark, sells a workbench called Fartfull and a computer table named Jerker. These are common names in Danish.
• Coca-Cola’s attempt to render its name in Chinese characters came off as “Bite the Wax Tadpole.”

• The Perdue Farms slogan, “It takes a tough man to make a tender chicken,” translated into Spanish as, “It takes a sexually aroused man to make a chicken affectionate.”

To survive, companies should not rely on translator products. They should find native speakers who know dialects and slang. Companies also should hire foreign marketing people because translations can be perfect but have no cultural resonance. Finally, when in doubt, be original. Try a new foreign name when adaptations are not working. (Sources: Compiled from M. Lasswell, “Lost in Translation,” Business 2.0, August 2004; and http://babelfish.altavista.com and www.google.com, accessed March 25, 2005.)

**Portals** Most organizations and their managers encounter information overload. Information is scattered across numerous documents, e-mail messages, and databases at different locations and systems. Finding relevant and accurate information is often time-consuming and may require access to multiple systems.

One solution to this problem is to use portals. A portal is a Web-based, personalized gateway to information and knowledge that provides relevant information from different IT systems and the Internet using advanced search and indexing techniques. We distinguish among five types of portals below.

1. **Commercial (public) portals** offer content for diverse communities, and they are the most popular portals on the Internet. They are intended for broad audiences, and they offer fairly routine content, some in real time (e.g., a stock ticker). Examples are www.yahoo.com, www.lycos.com, and www.msn.com.

2. **Affinity portals** support communities such as a hobby group or a political party. They offer a single point of entry to an entire community of affiliated interests. For example, your university most likely has an affinity portal for its alumni. Figure 5.9 shows the affinity portal for the Auburn University Alumni Association. Other examples include www.techweb.com and http://www.zdnet.com.

3. **Mobile portals** are portals that are accessible from mobile devices. One example is i-mode from DoCoMo (www.nttdocomo.com) in Japan. We discuss mobile portals, including i-mode, in Chapter 7.

4. **Corporate portals** offer a personalized, single point of access through a Web browser to critical business information located inside and outside an organization. They are also known as enterprise portals, information portals, or enterprise information portals. In addition to making it easier to find needed information, corporate portals offer customers and employees self-service opportunities. Figure 5.10 provides a framework for corporate portals and IT’s About Business 5.1 discusses a corporate portal at British Aerospace.

5. **Industrywide portals.** In addition to single-company portals, there are also portals for entire industries. An example is www.chaindrugstore.net, which links retailers and product manufacturers and provides product and industry news and recall and promotional information. The site has an offshoot for independent pharmacies (called CommunityDrugStore.net). The service reaches more than 130 retailers representing 32,000 stores. The service is free to the retailers. Suppliers pay annual fees in exchange for being able to use the portal to communicate information to retailers (e.g., to advertise special deals, to notify retailers about price changes). The portal also provides industry news, and it can be personalized for individual retailers.

**Communication**

The second major category of network applications is communication. There are many types of communications, including e-mail, call centers, chat rooms, voice, blogging, and Wikis. We discuss each one in this section.
FIGURE 5.9
Auburn University affinity portal.

FIGURE 5.10
5.1 Corporate Portal Improves Productivity at British Aerospace

According to some estimates, more than 80 percent of employees waste, on average, 30 minutes of each day simply retrieving information. British Aerospace (www.baesystems.com) believes this. The defense and aerospace company knew it was sitting on an information gold mine. Unfortunately, the wealth of information sources available to its employees was hampering, not enhancing, productivity. To address this problem, the company decided to develop a corporate portal that would be easy to navigate and employees would no longer waste time searching for the information they needed.

The first step was to make the information easier to find. To accomplish this, British Aerospace used Autonomy's (www.autonomy.com) software to integrate all internal and external information resources. The result was easy-to-navigate, Yahoo-like topical directories. To make it even simpler for employees to hone in on what they were looking for, British Aerospace used hypertext links throughout the portal. Finally, the company used personalized reports and alerts to keep employees up to speed on job-related developments.

The corporate portal has already improved access to the wealth of information available from the Web and within British Aerospace's databases, file servers, and desktops. The portal has also markedly improved the productivity of British Aerospace's employees.


QUESTIONS

1. What are the problems in deciding which information to put in the portal? In finding the information to put in the portal? In formatting the information in the portal?
2. How would British Aerospace's portal improve the decision making of its employees?

Electronic Mail

Electronic mail (e-mail) is the largest-volume application running over the Internet. However, e-mail is beginning to have serious problems. In the spring of 2003, for example, spam (unsolicited e-mail) accounted for more than half of all e-mail traffic. Even worse, MessageLabs (www.message labs.com), a leading provider of e-mail security services, maintains that in 2004, the ratio of virus-infected messages to other e-mail traffic increased by nearly 85 percent. These viruses caused PCs to serve as "open relays," giving spammers still more launchpads for their anonymous attacks. For many users, e-mail has all but replaced the telephone. However, people can waste as much as one hour every week simply managing their e-mail. Despite the problems, a recent study found that almost 90 percent of companies conduct business transactions via e-mail, and nearly 70 percent confirm that e-mail is tied to their means of generating revenue.

Web-Based Call Centers

Effective personalized customer contact is becoming an important aspect of Web-based customer support. Such service is provided through Web-based call centers, also known as customer care centers. For example, if you need to contact a software vendor for technical support, you will usually be communicating with
the vendor’s Web-based call center, using e-mail, a telephone conversation, or a simultaneous voice/Web session. Web-based call centers may be located in countries such as India. Such outsourcing has lately become an issue for U.S. companies.

**Electronic Chat Rooms** Electronic chat refers to an arrangement whereby participants exchange conversational messages in real time. A chat room is a virtual meeting place where groups of regulars come to “gab.” Chat programs allow you to send messages to people who are connected to the same channel of communication at the same time. Anyone can join in the online conversation. Messages are displayed on your screen as they arrive, even if you are in the middle of typing a message.

Two major types of chat programs exist. The first type is a Web-based chat program, which allows you to send messages to Internet users by using a Web browser and visiting a Web chat site (e.g., [http://chat.yahoo.com](http://chat.yahoo.com)). The second type is an e-mail-based (text-only) program called Internet Relay Chat (IRC). A business can use IRC to interact with customers, provide online experts’ answers to questions, and so on.

**Voice Communication** When people need to communicate with one another from a distance, they use the telephone more frequently than any other communication device. With the Plain Old Telephone System (POTS), every call opened up a dedicated circuit for the duration of the call. (A dedicated circuit connects you to the person you are talking with and is devoted only to your call.) In contrast, as we discussed, the Internet divides data into packets, which traverse the Internet in random order and are reassembled at their destination.

With **Internet telephony (voice-over IP or VoIP)**, phone calls are just another kind of data. Your analog voice signals are digitized, sectioned into packets, and then sent over the Internet. VoIP significantly reduces your monthly phone bills. In addition, it allows you to customize your phone service to do exactly what you want. For example, you can forward your calls to any phone you desire (including your cell phone), and you can set up a conference call online by entering the other numbers on a Web site. In addition, with VoIP, your area code no longer has to correspond with your physical address. (Vonage, [www.vonage.com](http://www.vonage.com), and other VoIP providers claim that 212 (Manhattan) and 310 (Beverly Hills) are in high demand.)

In the past, VoIP required a computer with a sound card and a microphone. Today, however, you do not need special phones or headsets for your computer. Vonage sells do-it-yourself kits through retailers such as Best Buy and Radio Shack. Skype ([www.skype.com](http://www.skype.com)) even provides voice-over IP services for free. Figure 5.11 shows the Skype interface. VoIP has the potential to revolutionize corporate communications, as IT’s About Business 5.2 demonstrates.

**Weblogging (Blogging)** Blogs and blogging enable individuals to publish personal materials on the Internet. A **Weblog** (blog for short) is a personal Web site, open to the public, in which the site creator expresses his or her feelings or opinions. **Bloggers**—people who create and maintain blogs—write stories, tell news, and provide links to other articles and Web sites that are of interest to them.

The simplest method to create a blog is to sign up with a blogging service provider, such as [www.blogger.com](http://www.blogger.com) (see Figure 5.12), [www.pitas.com](http://www.pitas.com), [www.livejournal.com](http://www.livejournal.com), and [http://www.moveabletype.com](http://www.moveabletype.com).

Bloggers are creating their own rich terminology. For a blogger’s dictionary, see [www.marketingterms.com/dictionary/blog](http://www.marketingterms.com/dictionary/blog). Blogs are becoming powerful business tools, as IT’s About Business 5.3 shows.
IT's About Business

5.2 H. J. Heinz Becomes Its Own Phone Company

Traditional telephone companies may soon find that their best and biggest customers are their biggest competitors. Let's look at the European operations of H. J. Heinz, the Pittsburgh condiments maker.

Heinz has installed VoIP systems at eight sites in the Netherlands and five sites in the United Kingdom. The company has deployed 7,000 VoIP phones on the Continent and another 1,000 at its U.S. headquarters. The Wincanton Group in Wigan, England, sits next to the Heinz factory. Wincanton moves bottles of Heinz ketchup around the United Kingdom. When Wincanton built its distribution center next to the ketchup factory, the two companies paid about 7.5 cents (U.S.) per minute to talk with one another.

So, Heinz decided to bypass the public phone network altogether. It laid its own fiber line to the distribution center and put 100 VoIP phones on Wincanton’s site. Now, Heinz managers pay nothing to talk with their logistics at Wincanton. Both companies save money.

Heinz even gave Wincanton a new main phone number and its own local data network. Therefore, Heinz linked the two companies not only in voice communications, but also in exchanging purchase orders, voice mail, and video messages.

Heinz has 37 sites across Europe. It is in the process of replacing its existing contracts with numerous communications companies with as few as one master contract with a single ISP. The economics are very persuasive.


QUESTIONS

1. How does VoIP affect traditional telephone companies?
2. What concerns would you have about communicating over the Internet?
5.3 Blogs Mean Business

Blogs can be good news for businesses, or bad news. But they can no longer be ignored. Consider the case of Kryptonite (www.kryptonite.com), a manufacturer of bicycle locks. On September 12, 2004, a blogger posted something unusual that he or she had noticed in a group discussion site for bicycle enthusiasts. According to the blogger, the ubiquitous, U-shaped Kryptonite lock could be easily picked with a Bic ballpoint pen. Two days later a number of blogs, including the consumer electronics site Engadget, posted videos demonstrating the trick. On September 16, Kryptonite issued a bland statement saying the locks remained a “deterrent to theft” and promising that a new line would be “tougher.” That was not enough. “Trivial empty answer,” wrote another blogger. Every day new bloggers began writing about the issue and talking about their experiences, and hundreds of thousands of people were reading about it. Prompted by the blogs, on September 17 the New York Times and the Associated Press published stories about the problem—articles that set off a new chain of blogging. Two days later, Technorati (www.technorati.com), a site that keeps track of the world of Weblogs, estimated that some 1.8 million people saw postings about Kryptonite.

Finally, on September 22, Kryptonite announced that it would exchange any affected lock free. The company sent out more than 100,000 new locks, at a cost of $10 million. That is $10 million in 10 days—a victory for the blogosphere.


QUESTIONS

1. Was blogging good news or bad news for Kryptonite? Defend your answer.
2. In general, how does blogging affect the relationship between businesses and their customers?
**Wikis**  A Wiki is a Web site on which anyone can post material and make changes quickly, without using difficult commands. Volunteers have posted more than 280,000 English-language articles since 2001 to the online encyclopedia Wikipedia (www.wikipedia.org). Wikis have an “edit” link on each page that allows anyone to add, change, or delete material, fostering easy collaboration. For example, Kodak’s Ofoto uses wikis to help teams develop prototypes of new technologies, work with contractors, and coordinate other tasks. Voice Communications, a public-relations firm, uses wikis to keep clients informed about campaigns and schedules faster and more reliably than it could with e-mail exchanges.

**Collaboration**

The third major category of network applications is collaboration. An important feature of modern organizations is that people collaborate to perform work. Collaboration refers to efforts by two or more entities (individuals, teams, groups, or organizations) who work together to accomplish certain tasks. The term work group refers specifically to two or more individuals who act together to perform some task. If group members are in different locations, they constitute a virtual group (team). Virtual groups conduct virtual meetings; that is, they “meet” electronically. Virtual collaboration (or e-collaboration) refers to the use of digital technologies that enable organizations or individuals to collaboratively plan, design, develop, manage, and research products, services, and innovative applications.

As one example of virtual collaboration, organizations interact with customers, suppliers, and other business partners to improve productivity and competitiveness. IT’s About Business 5.4 shows how Dannon collaborates with its customers.

As we discussed earlier, a variety of tools are available to support collaboration. In this section we consider two of them: workflow technologies and groupware tools.

**Workflow Technologies**  Workflow is the movement of information as it flows through the sequence of steps that make up an organization’s work procedures. Workflow management makes it possible to pass documents, information, and tasks from one participant to another in a way that is governed by the organization’s rules or procedures. Workflow systems are tools for automating business processes. One key benefit of these tools is that they place system controls in the hands of user departments. The following example illustrates a workflow system.

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**Workflow Software Helps Document Management at Brazos.** The Brazos Higher Education Services Corporation provides financing and loan-management services for higher education in the United States. The Brazos Group is the nation’s fifth largest holder of student loans, with total assets in excess of $5 billion. Brazos implemented a networked workflow solution to eliminate the distribution of paper documents while ensuring that the electronic documents can be viewed, searched, tracked, secured, archived, and readily available for verification. Brazos personnel (regardless of their location) have the capability to perform a global search to determine where applicable documents reside on the company’s network. Paper documents received via the mailroom are prepared by qualified personnel. They are then electronically scanned, indexed, processed, and managed by the workflow system for their respective local repositories or remote scanning to other Brazos locations via the company’s network. Once documents are successfully scanned into the system, paper documents are prepared for on/off-site storage or distribution. (Sources: Compiled from http://www.workflowsystems.com, accessed February 17, 2005; and www.bhesc.org, accessed February 19, 2005.)
IT's About Business

5.4 Speak, Customer!

Should companies let amateurs design their products? The answer is not clear. Nevertheless, many companies are letting customers have input into cars, insurance products, fast food, toys, and appliances. These companies have concluded that instant feedback is one way to cope with the high failure rate—about 80 percent—of new products.

Dannon U.S.A. (www.dannon.com) was experiencing such a problem. Its reduced-fat Light 'n' Fit yogurts were being squeezed by rivals. The company turned to consumers for help. The company was looking specifically for diet-conscious yogurt eaters who were responsible for grocery shopping in their households. Dannon's director of market research needed a quick read on what features customers felt were essential. She called in Affinnova (www.affinnova.com), a marketing research company. Affinnova e-mailed 40,000 men and women and asked them to visit a Web site to help create a new product. All respondents would be eligible to win $10,000. The e-mailing resulted in 705 people qualifying for the test.

Affinnova presented the respondents a series of yogurt containers so that they could evaluate different combinations of name, package design, nutritional labeling, and size. There were 11,268 possible combinations, but each "player" in this game was asked to choose among only a few. The test changed as more people took it, and a statistics program highlighted frequently selected features.

In just six days of Web activity, Affinnova had reached the following conclusions:

- The new yogurt should be called Carb Control.
- It should come in a red container.
- It should be sold in a four-pack of 4-ounce cups.
- It should highlight its nutritional information for dieters: "80% less sugar" and "3 grams of carbs."

Dannon had the new product on store shelves six months after the test. The results? In 2004, sales hit $70.5 million, a marked increase.


Questions

1. What are the benefits of collaborating with customers on products?
2. What might be disadvantages of collaborating with customers on products?

Groupware

Groupware refers to software products that support groups of people who share a common task or goal and who collaborate to accomplish it. Groupware uses networks to connect people, even if the people are in the same room. In this section we will describe some of the most common groupware products.

Groupware technologies are often integrated with other computer-based technologies to create groupware suites. (A software suite is created when several products are integrated into one system.) Lotus Notes/Domino is one of the most popular groupware suites.

The Lotus Notes/Domino suite (www.ibm.com) provides online collaboration capabilities, workgroup e-mail, distributed databases, bulletin whiteboards, text editing, (electronic) document management, workflow capabilities, instant virtual meetings, application sharing, instant messaging, consensus building, voting, ranking, and various application development tools. All these capabilities are integrated into one environment with a graphic, menu-based user interface.

Two types of groupware technologies include electronic teleconferencing and real-time collaboration tools. A discussion of each type follows.
Electronic Teleconferencing  Teleconferencing is the use of electronic communication that allows two or more people at different locations to hold a simultaneous conference. There are several types of teleconferencing. The oldest and simplest is a telephone conference call, where several people talk to each other from multiple locations. The biggest disadvantage of conference calls is that they do not allow for face-to-face communication. Also, participants in one location cannot see graphs, charts, and pictures at other locations. One solution is video teleconferencing, in which participants can see one another as well as the documents.

In a videoconference, participants in one location can see participants at other locations. With videoconferencing, participants can share data, voice, pictures, graphics, and animation by electronic means. They can also transmit data along with voice and video, making it possible to work on documents together and to exchange computer files. This technology allows geographically dispersed groups to work on the same project and to communicate simultaneously by video. When videoconferencing is conducted over the Internet, it is called Web conferencing.

Real-Time Collaboration Tools  The Internet, intranets, and extranets offer tremendous potential for real-time and synchronous interaction of people working in groups. Real-time collaboration (RTC) tools help companies bridge time and space to make decisions and to collaborate on projects. RTC tools support synchronous communication of graphical and text-based information. These tools are being used in distance training, product demonstrations, customer support, and sales applications.

For example, computer-based whiteboards enable all participants to join in. During meetings, each user can view and draw on a single document “pasted” onto the electronic whiteboard on a computer screen. Computer-based whiteboards can be used by participants in the same room or across the world. Digital whiteboarding sessions can also be saved for later reference or other use.

Web Services

The fourth major category of network applications is Web Services. Web Services are applications, delivered over the Internet, that users can select and combine through almost any device (from personal computers to mobile phones). By using a set of shared protocols and standards, these applications permit different systems to “talk” with one another—that is, to share data and services—without requiring human beings to translate the conversations.

Specifically, a Web Service fits the following three criteria: (1) It is able to announce and describe itself to other applications, allowing those applications to understand what the service does. (2) It can be located by other applications via an online directory, if it has been registered. (3) It can be invoked by the originating application by using standard protocols.

Web Services have great potential because they can be used in a variety of environments: over the Internet, on an intranet inside a corporate firewall, or on an extranet set up by business partners. In addition, they can be written using a wide variety of development tools. Web Services perform a wide variety of tasks, from automating business processes to integrating components of an enterprise-wide system to streamlining online buying and selling. It's About Business 5.5 shows how Citigroup used Microsoft's .NET to provide a Web Services application for its employees.

Web Services are based on four key standards, or protocols: XML, SOAP, WSDL, and UDDI. We discuss each one below.

* XML. Extensible Markup Language makes it easier to exchange data among a variety of applications and to validate and interpret such data. An XML document describes a Web
5.5 Citigroup Creates a Global, Web-Based Information Delivery System

Citigroup is the largest financial services group in the world. Its 120 million clients are served by 280,000 employees in 103 countries. More than 90 percent of Citigroup employees are local to the territory that they serve. This arrangement makes delivering and distributing information a particularly difficult, yet vital task for the company.

In order to serve their clients, Citigroup employees must have globally accessible, real-time information that is integrated from many sources in a readily understandable format. This information must also be delivered with collaboration tools, so that employees anywhere can interact with one another. Employees should share a common set of information. At the same time, however, they must be able to personalize the information for their needs. As one Citigroup executive put it, "We have the information available in a variety of sources and formats around the world; we just need a 'master key' to unlock it all."

To meet these requirements, Citigroup used Microsoft's .NET Web Services technology to build a corporate portal, which came to be called Citigroup CitiVision. The portal integrates 270 information sources, including internal and external sources, and makes this information available to Citigroup's global user base in real time. Users now have access to a wide range of information with a single-password logon. This information includes market data, internal company data, live streaming video, and customer profiles. With the CitiVision portal, Citigroup employees can now make better, faster decisions.


QUESTIONS

1. Why is it important to have a "common core" of information that is available to all employees?
2. Why is it important for employees to be able to customize some of that information?

Before you go on . . .

1. Describe the four major network applications and the tools and technologies that support each one.
2. Describe the protocols underlying Web Services.
5.5 E-Learning and Distance Learning

E-learning and distance learning are not the same thing, but they do overlap each other. E-learning refers to learning supported by the Web. It can take place inside classrooms as a support to conventional teaching, such as when students work on the Web during class. It also can take place in virtual classrooms, in which all coursework is done online and classes do not meet face-to-face. In these cases, e-learning is a part of distance learning. Distance learning (DL) refers to any learning situation in which teachers and students do not meet face-to-face.

Today, the Web provides a multimedia interactive environment for self-study. Web-enabled systems make knowledge accessible to those who need it, when they need it, anytime, anywhere. For this reason, E-learning and DL can be useful both for formal education and for corporate training.

The Benefits of E-Learning

There are many benefits to e-learning. For example, online materials can deliver very current content that is of high quality (created by content experts) and consistent (presented the same way every time). It also gives students the flexibility to learn from any place, at any time, and at their own pace. In corporate training centers that use e-learning, learning time generally is shorter, which means that more people can be trained within a given time frame. This system reduces training costs as well as the expense of renting facility space.

Despite these benefits, e-learning has some drawbacks. To begin with, students must be computer literate. Also, they may miss the face-to-face interaction with instructors. Finally, assessing students’ work can be problematic because instructors really do not know who completed the assignments.

E-learning does not usually replace the classroom setting. Rather, it enhances it by taking advantage of new content and delivery technologies. Advanced e-learning support environments, such as Blackboard (www.blackboard.com) and WebCT (www.webct.com), add value to traditional learning in higher education.

Virtual Universities

Virtual universities are online universities from which students take classes from home or at an off-site location, via the Internet. A large number of existing universities offer online education of some form. Some universities, such as the University of Phoenix (www.phoenix.edu), California Virtual Campus (www.cvc.edu), and the University of Maryland (www.umuc.edu/distance), offer thousands of courses and dozens of degrees to students worldwide, all online. Other universities offer limited online courses and degrees but use innovative teaching methods and multimedia support in the traditional classroom.

Before you go on...

1. Differentiate between e-learning and distance learning.
2. Describe virtual universities.