

33.21.3: Reading- Computer Networks and Cloud Computing

Computer Networks and Cloud Computing

Once it's grown beyond just a handful of employees, an organization needs a way of sharing information. Imagine a flower shop with twenty employees. The person who takes phone orders needs access to the store's customer list, as do the delivery person and the bookkeeper. Now, the store may have one computer and everyone could share it. It's more likely, however, that there are a number of computers (several for salespeople, one for delivery, and one for bookkeeping). In this case, everyone needs to be sure that customer records have been updated on all computers every time that a change is required.

Networks

Likewise, many companies want their personal computers to run their own software and process data independently. But they also want people to share databases, files, and printers, and they want them to share applications software that performs particular tasks, including word processing, creating and managing spreadsheets, designing graphical presentations, and producing high-quality printed documents (*desktop publishing*).

The solution in both cases is *networking*—linking computers to one another. The two major types of networks are distinguished according to geographical coverage:

- A local area network (LAN) links computers that are in close proximity—in the same building or office complex. They can be connected by cables or by wireless technology. Your university might have a LAN system that gives you access to resources, such as registration information, software packages, and printers. Figure 1, “Local Area Network (LAN),” below, illustrates a LAN that's connected to another network by means of a *gateway*—a processor that allows dissimilar networks to communicate with one another
- Because a wide area network (WAN) covers a relatively large geographical area, its computers are connected by telephone lines, wireless technology, or even satellite.

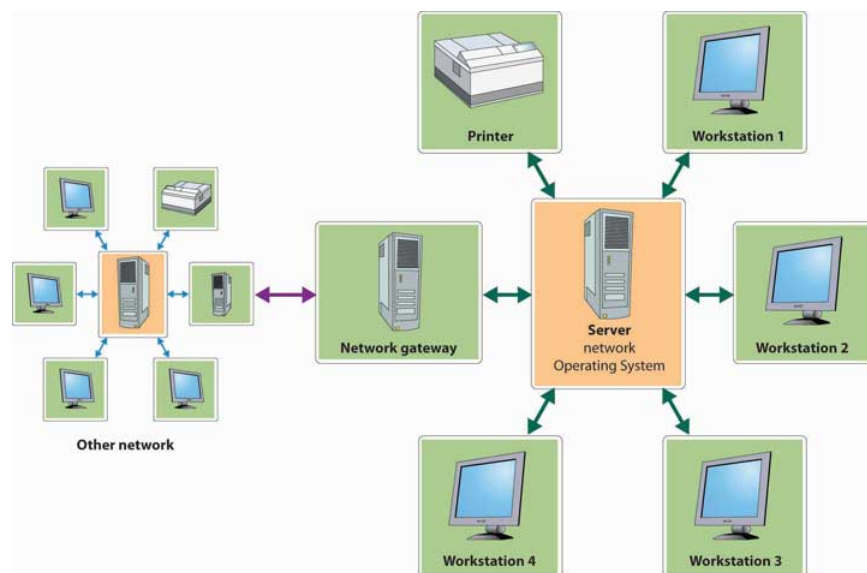


Figure 33.21.3.1: Local area network

Like the one above in Figure 1, “Local Area Network (LAN),” some networks are client-server systems, which include a number of client machines (the ones used by employees for data input and retrieval) and a server (which stores the database and the programs used to process the data). Such a setup saves time and money and circulates more-accurate information.

Cloud Computing

What is cloud computing? Watch the following video, which describes some of the uses and benefits of cloud computing.



A cloud is a “visible mass of condensed water vapor floating in the atmosphere, typically high above the ground.” The term “cloud computing” means performing computer tasks using services provided over the Internet. So how do you connect the two definitions? When IT professionals diagrammed computer systems, they used a cloud symbol to represent the Internet. So when you hear or read that an individual or company is using the “cloud” or technology firms, such as IBM, Hewlett-Packard, and Salesforce.com, are offering cloud services, just substitute the word “Internet” for “cloud” and things will make sense.

You might be surprised to learn that you’re already using the cloud—that is if you use Facebook (which is very likely—in fact, just mentioning Facebook here might prompt you to stop studying and check out your friends’ pages). How do you know that Facebook is a cloud application? Remember the trick: just substitute the word “Internet” for “cloud.” The Facebook computer application lets you store information about yourself and share it with others using the Internet.

Business Applications

Think about the functional areas of business you’ve explored in this text: accounting, finance, human resources, management, marketing, operations, and product design. Now imagine you’re Katrina Lane, senior vice president and chief technology officer for Caesars Entertainment, who is responsible for the information technology needed to handle multiple tasks in all these functional areas. You’re sitting at your desk when Gary Loveman, chief executive officer of Caesars, walks in and gives you the news. Caesars just purchased the Planet Hollywood Casino and Resort in Las Vegas and will open up two new casinos in Ohio in 2012. This is good news for the company, but it means a lot of work for you and your staff.

You wonder whether this might be the time to outsource some of your computing tasks to a technology firm specializing in cloud computing. You remember an example that really makes sense. Right now, whenever Microsoft comes out with a new version of Word, Caesars has to pay \$350 per PC for the latest version. Wouldn’t it make more sense to rent the use of the Microsoft Word program from a cloud vendor for say \$5 a month (or \$60 a year)? Given that the average time between new releases of Word is two years, your total cost per PC would be \$120 ($2 \times \60)—a savings of about \$230 per PC ($\$350 - \120). Your employees wouldn’t mind; instead of working offline, they would just login to the Internet and work with their online version using the files that were saved for them. And the members of your IT staff would be pleased that they wouldn’t need to install the new version of Word on all your PCs.

The As-A-Service Group

Companies can contract for various cloud computing services. The Microsoft Word example discussed previously is classified as software as a service (SaaS). This type of service gives companies access to a large assortment of software packages without having to invest in hardware or install and maintain software on its own computers. The available software, which includes e-mail and collaboration systems and customer relationship management programs, can be customized and used by an individual client or shared among several clients. A second type of service is called infrastructure as a service (IaaS). Instead of providing users with software, a technology firm offering infrastructure as a service provides hardware, including servers, central processing units,

network equipment, and disk space. The most successful IaaS provider is Amazon Web Services. The company rents computer power and storage to users who access their data via the Internet. The last as-a-service model is called platform as a service (PaaS). Those offering platform as a service provide services that enable users to develop customized web applications. Because they don't have to start from scratch but rather build on existing platforms made available by the service provider, the web applications can be developed quickly.

Advantages and Disadvantages of Cloud Computing

In making your final decision (as the pretend chief technology officer for Caesars) you should consider these advantages and disadvantages of cloud computing:

Advantages

Shifting some of Caesars's IT functions to the cloud would produce a number of advantages:

1. *Cost Savings*—By “renting” software rather than buying it, Caesars can reduce its costs. The monthly fee to “use” the software is generally less than the combined cost of buying, installing, and maintaining the software internally. On the hardware site, housing Caesars's data in a service provider's facilities, rather than in-house, reduces the large outlay of cash needed to build and maintain data centers.
2. *Speed of Delivery*—Purchasing and installing software and data processing equipment can be time consuming. A cloud computing service provider could get Caesars's applications up and running in only a few weeks.
3. *Scalable*—Caesars is constantly expanding both in the number of casinos it owns and geographically. In this ever-changing environment, it's difficult to gauge the level of our technology needs. If we overestimate our requirements, we end up paying for technology we don't need. If we underestimate, efficiency goes down, and the experience for our customers diminishes. By using cloud computing we are able to have exactly what we need at our disposal at any point in time.
4. *Employees Can Be Mobile*—The use of cloud computing will free workers from their desks and allow them to work wherever they are. As applications move to the cloud, all that is needed for our employees to connect to their “offices” is the Internet. This mobility benefit also makes it easier for employees to collaborate on projects and connect with others in the company.
5. *Information Technology Staff*—Although our current staff is extremely qualified and dedicated, finding experienced and knowledgeable staff is a continuing problem particularly in the casino industry which suffers from historically high turnover. By using cloud computing, we reduce our human resource needs by shifting some of our work to outside vendors who are able to hire and keep well qualified individuals (in part because IT professionals enjoy working for technology companies).

Disadvantages

Although the advantages of moving to a cloud environment outnumber the disadvantages, the following disadvantages are cause for concern:

1. *Disruption in Internet Service*—If Caesars moves some of its applications to the cloud, its employees can work on these applications on any device and in any location as long as they have an Internet connection. But what if the Internet is unavailable because of a disruption? Depending on the length of the disruption, this could create serious problems for Caesars.
2. *Security*—Many companies are reluctant to trust cloud service providers with their data because they're afraid it might become available to unauthorized individuals or criminals. This is a particular problem for Caesars, which collects and stores sensitive client information and has to constantly be on the lookout for fraudulent activity of staff and customers.
3. *Service Provider System Crash*—Organizations considering moving to the cloud are justifiably concerned about the possibility of a computer service crash at their service providers' facilities. It looks like this concern was warranted. In April of 2011, Amazon Web Service (a leading cloud services provider) experienced an outage in one of its large web-connected data centers. The outage crashed its system and brought down the Web sites of a number of companies, including the location-based social network, Foursquare. It took more than thirty-six hours to get all seventy or so of the crashed sites up and running.

Go or No Go?

So, pretend chief technology officer for Caesars, what's your decision: will you get on the cloud or stay on the ground? If you are curious about what the real chief technology officer did, she took the high road and transferred a number of applications to [Salesforce.com](https://www.salesforce.com)'s Web-based Force.com's cloud applications service.

KEY TAKEAWAYS

- Once an organization has grown to more than a few employees, it needs to network individual computers to allow them to share information and technologies.
- A **client-server system** links a number of client machines (for data input and retrieval) with a server (for storing the database and the programs that process data).
- Many companies want personal computers to run their own software and process data independently.
- But they also want individuals to share databases, files, printers, and **applications software** that perform particular types of work (word processing, creating and managing spreadsheets, and so forth).
- There are two systems that can satisfy both needs.
 1. A **local area network (LAN)** links computers in close proximity, connecting them by cables or by wireless technology.
 2. A **wide area network (WAN)** covers a relatively large geographical area and connects computers by telephone lines, wireless technology, or satellite.
- The term “**cloud computing**” means performing computer tasks using services provided over the Internet.
- The **software as a service (SaaS)** category of cloud computing gives companies access to a large assortment of software packages without having to invest in hardware or install and maintain software on its own computers.
- A technology firm offering **infrastructure as a service** provides users with hardware, including servers, central processing units, network equipment, and disk space.
- Those offering the **platform as a service** category of cloud computing provide services that enable users to develop customized web applications.
- Shifting IT functions to the cloud produces a number of advantages, including cost savings, speedy delivery of software, scalability (you pay for only what you need), employee mobility, and a reduction in information technology staff.
- The following disadvantages of cloud computing are cause for concern: disruption in internet service, security issues, and unreliability of service provider systems.

Check Your Understanding

Answer the question(s) below to see how well you understand the topics covered in this section. This short quiz does **not** count toward your grade in the class, and you can retake it an unlimited number of times.

Use this quiz to check your understanding and decide whether to (1) study the previous section further or (2) move on to the next section.

<https://assessments.lumenlearning.com/assessments/246>

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