

1) Explain each of the three important concepts behind the Federal Networking Council's definition of the term *Internet*. Explain how each of these technologies contributes to the functioning of the Internet today.

Answer: The three important concepts in the Federal Networking Council's definition of the Internet are packet switching, the TCP/IP communications protocol, and client/server computing.

Packet switching is a method of slicing digital messages up into parcels that are sent along different communications paths as they become available. The packets travel from router computer to router computer and are then reassembled at their destination point. These routers are special purpose computers that interconnect the thousands of computer networks that make up the Internet. Since this method does not require a dedicated circuit, it makes use of any available spare capacity on any one of several hundred circuits enabling nearly full use of available communication lines and capacity.

Transmission Control Protocol/Internet Protocol (TCP/IP) is the universally agreed upon method for breaking the messages up, routing them to their destination, and reassembling them. The TCP protocol, or set of rules, specifies how messages should be formatted, ordered, compressed, and error-checked. It also stipulates which method devices the network will use to indicate that they have stopped sending and/or receiving messages and sometimes specifies the transmission speed as well. The IP protocol provides the addressing scheme for the Internet. Each computer connected to the Internet must be assigned an Internet Protocol address so that it can send and receive TCP packets. At present, each time home users sign on to the Internet they are temporarily assigned one of these 32-bit numbers by their ISP.

Client/server computing involves very powerful personal computers that are connected together in a network along with one or more server computers. These client computers can display rich graphics, store large files, and process graphic and sound files. The server computers are specifically allocated to common functions that all of the client computers need such as storing files and supplying software applications, and utility programs.

2) Identify and describe the types of ISP service, along with the Internet connection methods, in use today.

Answer: There are two types of ISP service: narrowband and broadband. Narrowband service is the traditional telephone modem connection now operating at 56.6 Kbps (although the actual throughput hovers around 30 Kbps due to line noise that causes extensive resending of packets). This used to be the most common form of connection worldwide but has been replaced by broadband connections in most of the United States, Europe, and Asia.

Broadband service is based on DSL, cable modem, telephone (T1 and T3 lines), and satellite technologies. Broadband—in the context of Internet service—refers to any communication technology that permits clients to play streaming audio and video files at acceptable speeds—generally anything above 100 Kbps.

Digital Subscriber Line (DSL) service is a telephone technology for delivering high-speed access to the Internet through ordinary telephone lines found in a home or business. Cable modem refers

to a cable television technology that piggybacks digital access to the Internet using the same analog or digital video cable providing television signals to a home. T1 and T3 are international telephone standards for digital communication. These are leased, dedicated, guaranteed lines suitable for corporations, government agencies, and businesses such as ISPs requiring high-speed guaranteed service levels. Additionally, some satellite companies offer broadband high-speed digital downloading of Internet content to homes and offices that deploy 18" satellite antennas.

3) What is augmented reality? Describe how augmented reality technologies could be used in e-commerce.

Answer: Augmented reality refers to content (text, video, and sound) that is superimposed over live images in order to enrich the user's experience. For example, Google Glass is an augmented reality implemented via wrap-around glasses that stream information to an area in the glass lenses above the eye. Businesses could use augmented reality for advertising location-based products and services in much the same way that mobile e-commerce currently does. For example, if you are walking down a street, your augmented reality glasses can let you know what deals are being offered at coffee shops or if a book you are looking for is discounted in the store you are passing. A content-provider service that you subscribe to might tell you the history of the church you are looking at.

4) Briefly describe the development of the World Wide Web including the key players.

Answer: The Web was invented between 1989 and 1991 when Dr. Tim Berners-Lee and his associates at CERN Laboratories built on the ideas of several earlier researchers and developed the initial versions of HTML, HTTP, a Web server, and a Web browser, the four essential components of the Web. Information being shared on the Web remained text-based until Marc Andreessen and others at NCSA (National Center for Supercomputing Applications) created a Web browser with a graphical user interface. This made it possible to view documents on the Web that included colored backgrounds, images, and primitive animations. In 1994 Andreessen and Jim Clark founded Netscape, which created the first commercial browser. In 1995 Microsoft released the first version of Internet Explorer and the Web began to take off.

Difficulty: Moderate

AACSB: Analytical thinking; Information technology; Written and oral communication

5) You are browsing the Web on your tablet computer. Describe the path that the Web page data takes to get from its storage point on a distant computer to your tablet.

Answer: The Web page information starts from where it is hosted on a Web server and travels through the host company's network to the Internet. On the Internet, the data will pass through the ISP's network to regional and national backbones, and finally to the network of the ISP that is serving my personal network, and through an access point or hot spot to be delivered wirelessly to my tablet.

6) Explain how the Internet and the Web make e-commerce possible. Briefly discuss at least six features or services that support e-commerce.

Answer: The Internet and the Web have made commerce possible because they brought about an extraordinary expansion of digital services to millions of amateur computer users. The Web

makes nearly all of the elements of rich human expression including color, text, images, photos, animations, sound, and video available, creating a unique environment in which to establish a commercial marketplace. Many of the Web's services and features support e-commerce, including e-mail, search engines, instant messaging (IM), chat, streaming media, and cookies.

E-mail, for example, can be used as a very effective marketing tool. E-commerce sites can buy e-mail lists from various sources and collate them with lists of their current customers to create a targeted advertising message that can be quickly and economically delivered and will produce a creditable response.

Search engines have also become a crucial tool on e-commerce sites, providing a method for customers to quickly locate the product category or a specific product they are looking for.

Instant messaging has been added to some e-commerce Web sites as a method of accessing customer support personnel.

Chat is a common feature of many Web sites, particularly those that focus on building a community of like-minded users. Chat enables a group of Web site visitors to bond and network and keeps visitors coming back to a site.

Although the low bandwidth available during the early days of e-commerce limited the use of audio and video files, today streaming media is now common on Web sites. Streaming media enables live Web video, music, video, and other large-bandwidth files to be sent to users in a variety of ways that enable the user to play back the files. Web advertisers increasingly use video to attract viewers. Streaming audio and video segments used in Web ads and news stories are perhaps the most frequently used streaming services.

Finally, cookies are a very important tool used by marketers to collect and store information about a user. These small text files are sent to the user's computer so that information from the site will load more quickly the next time they visit. More importantly from the e-tailer's perspective, cookies can retain information about the customer such as the number of pages visited, products examined, and other detailed information about a customer's behavior. Cookies enable sites to recognize returning visitors and target specific customers with special offers and marketing messages.