

1) Describe the major issues surrounding the decisions to build and/or host your own e-commerce Web site or to outsource some aspects of site development. Include the advantages and disadvantages of each decision.

Answer: If you decide to build an e-commerce Web site in-house, you will need a multiskilled staff including programmers, graphic artists, Web designers, and project managers. You will also have to select and purchase software and hardware. Building a site from scratch involves a great deal of risk, and the costs can be high because many of the required elements of an e-commerce site such as shopping carts, credit card authentication and processing, inventory management, and order processing are quite complex. Specialized firms have already perfected these tools and your staff will often have to learn to build all of these features themselves. The advantage is that you and your staff may be able to build a site that exactly suits the specific needs of your company. Another advantage is that you will be developing a skilled staff and consequently acquiring an invaluable supply of in-house knowledge that will enable your firm to change the site if necessary due to the rapidly changing business environment.

If on the other hand, you decide to purchase an expensive site-building package, you will have to evaluate different packages to decide which one will be best suited to your firm's needs. This can be a lengthy process and some packages may have to be modified. Additional vendors may have to be hired to execute the modifications, and this can cause the costs to mount rapidly.

You can also purchase less expensive, prebuilt templates, but you will be limited to the functionality already built into the template. You can choose templates from merchant-solution vendors such as Amazon Stores, or use the templates from a site-building tool such as WordPress. Brick-and-mortar retailers can generally design a site themselves because they have a skilled staff in place and have made large investments in information technology, such as databases and telecommunications. They will usually use outside vendors to build the e-commerce applications for the site. Medium-size startups will often purchase a prepackaged site-building tool and make modifications as necessary. Small startups that only require a simple virtual storefront will usually use a template.

The hosting decision is independent from the building decision, but the two are usually considered at the same time. Most businesses choose to outsource hosting because it is generally less expensive than it would be for them to purchase all of the hardware and the physical space, lease the communications lines, and hire the staff. Large hosting firms can build the telecommunication links and emergency power supplies and achieve economies of scale by establishing huge "server farms" in strategic locations around the country. If you host your own site you must also build the security and backup capabilities yourself.

Another option is co-location in which a firm purchases or leases a Web server and has total control over its operation, but the server is located in the vendor's physical facility. In a co-location agreement, the vendor maintains the facility, the machinery, and the communication lines. Small ISPs may not be able to provide service that is as reliable as the large providers. The disadvantage of outsourcing hosting is that as your business grows, you may need more power or services than the hosting company can provide. This is the main reason that firms will decide to host their own sites, but the costs will almost always be higher than if they had chosen an outsourcing firm.

2) Explain the main functionalities included in e-commerce server software and the decision-making process for a manager choosing from among the various e-commerce merchant server software suites.

Answer: The main functionalities included in e-commerce server software are online catalog, order taking capabilities using an online shopping cart, and online credit card processing. Merchant server software typically includes a database and the capability to post lists, product descriptions, product photographs, and in larger sites even sound, animations, videos, or interactivities with product demonstrations and customer service representatives. Online shopping carts enable customers to set aside items they wish to purchase while they continue to shop at the site. Online shopping cart capabilities must also include the ability for consumers to review the items they have set aside and delete or edit items as necessary. Finally, the customer must be able to click a button to begin the order processing system. Credit card processing must work in conjunction with the shopping cart so that the customer's credit card can be verified, the charge can be debited to the card, and a credit to the firm's account can be made. Merchant server software/e-commerce suites offer an integrated environment that promises to provide most or all of the functionality and capabilities you will need to develop a sophisticated, customer-centric site. E-commerce suites come in three general ranges of price and functionality: basic, mid-range, and high-end.

Key factors to consider when selecting a package include functionality, support for different business models, business process modeling tools, visual site management tools and reporting, performance and scalability, connectivity to existing business systems, compliance with standards, global and multicultural capability, and local sales tax and shipping rules.

For instance, although e-commerce suites promise to do everything, your business may require special functionality. You will need a list of business functionality requirements. Your business may involve several different business models. Be sure the package can support all of your business models. You may wish to change your business processes, such as order taking and order fulfillment. Does the suite contain tools for modeling business process and work flows? Understanding how your site works will require visual reporting tools that make its operation transparent to many different people in your business. A poorly designed software package will drop off significantly in performance as visitors and transactions expand into the thousands per hour, or minute. Check for performance and scalability by stress testing a pilot edition or obtaining data from the vendor about performance under load. You will have to connect the e-commerce suite to your traditional business systems. How will this connection to existing systems be made, and is your staff skilled in making the connection? Because of the changing

technical environment—in particular, changes in mobile commerce platforms—it is important to document exactly what standards the suite supports now, and what the migration path will be toward the future. Finally, your e-commerce site may have to work both globally and locally. You may need a foreign language edition using foreign currency denominations. And you will have to collect sales taxes across many local, regional, and national tax systems. Does the e-commerce suite support this level of globalization and localization?

3) Explain both the demand-side and the supply-side considerations when choosing the hardware platform for an e-commerce site. Include a discussion of I/O-intensive vs. CPU-intensive operations and scalability.

Answer: The hardware platform refers to the underlying computing equipment that a system will need in order to perform all of the necessary e-commerce functions. You must have enough platform capacity to meet peak demand, without overinvesting in unnecessary and expensive equipment. The question is: How much computing and telecommunications capacity will be enough to meet that peak demand?

On the demand side, the first factor to consider is the maximum number of simultaneous users your site experiences. System performance will degrade as more simultaneous users request service. Processing HTTP requests for static pages is an I/O or input/output intensive operation, meaning that it does not require heavy-duty processing power. However, as customers request more advanced services such as searching the site, registering with the site, filling a shopping cart and checking out, and particularly downloading large multimedia files, much more processing power is required and site performance can deteriorate rapidly. The user profile on your site will help to determine the necessary hardware platform. What types of requests will users on your site make, for how many pages, and for what kind of service? Another factor to consider is the nature of the content on your site. If your site uses dynamic page generation and business logic, as does the shopping cart, the load on the processor increases rapidly. These types of requests are CPU-intensive operations, meaning that they require a great deal of processing power. Any user interactions that require interfacing with a database, such as filling out forms, adding items to the shopping cart, making purchases, or filling out customer questionnaires, require lots of processing power. The final factor to consider on the demand side is the telecommunication link your site has to the Web. The number of hits your site can handle per second depends on the bandwidth connections between your server and the Web. The larger the available bandwidth, the more simultaneous users your site can handle. The connection to the client is also a consideration. As consumers embrace broadband connections, they will be able to make far more frequent requests and will demand richer content from your site. This increased demand will mean that additional capacity requirements may be needed.

After you have estimated the present and future demands you expect your site to have, you will have to look at the supply side considerations. First and foremost is scalability. How will your site be able to increase in size as demand warrants? You can scale your site vertically by upgrading the servers from single processor to multiple processors. The drawbacks are that this can become expensive with each growth cycle and that the site becomes overly dependent on just a small number of powerful machines. You can scale your site horizontally by adding multiple single processor servers and balancing the load among many servers. This can be less expensive as you can use older PCs that would otherwise be discarded, but you will have to purchase special load-balancing software. The main drawbacks are that the size of the physical facility will have to increase and that there is added management complexity. Perhaps the best method for meeting the demands for service on your site is to improve the processing architecture of your site by splitting the workload up into I/O-intensive and CPU-intensive operations. Then you can fine-tune the servers to handle each type of workload. You can add RAM to servers that will store the HTML pages, reducing the load on the hard drives, and move the CPU-intensive activities to high-end multiple processor servers that are dedicated to handling a particular task such as order processing and accessing the necessary databases. These steps will enable you to reduce the number of servers required to handle your peak demand.

4) What tools or technologies are available for providing interactivity and active content on a Web site and what functionality do they add? Describe at least five.

Answer: Among the tools that are available for providing interactivity on a Web site are widgets, mashups, CGI scripts, Java, Java Server Pages, JavaScript, Active Server Pages, ActiveX, VBScript, and Cold Fusion.

Widgets are small chunks of code that execute automatically in your HTML Web page. They typically present users with dynamic content such as news headlines, calendars, clocks, weather, live TV, games, and other functionality.

Mashups pull functionality from one Web site and include it in another, such as a real-estate agent incorporating Google Maps data in his or her own Web site.

CGI or Common Gateway Interface is a set of standards for communications between a browser and a program running on a server that allows for interaction between the user and the server. CGI allows an executable program to access all of the information within incoming requests from clients. The program then generates the required output for a Web page and sends it back to the client through the Web server. For example, CGI scripts are behind the display of the contents of a shopping cart to a user. The CGI script retrieves the contents from a database and returns it to the server, which sends it as an HTML page to the user's client computer. All of the computing takes place on the server side, thus this is referred to as server-side computing.

Active Server Pages (ASP) and its successor, ASP.NET, are Microsoft's versions of server-side programming. ASP and ASP.NET enable Web developers to easily create and open records from a database and execute programs within an HTML page. They also handle all of the various forms of interactivity found on e-commerce sites.

Java is a programming language that allows programmers to create interactivity on the user's

client computer. The leading browsers today have a Java Virtual Machine (VM) that enables Java applets to be downloaded to the client over the Web. Although Java can display interesting graphics and create small interactive programs such as calculators and calendars that are executed entirely on the user's computer, thus saving considerable load on the server, it is not used extensively on corporate e-commerce sites for several reasons. First, the different vendors produce different versions of Java, resulting in applets built using proprietary versions that would only work well in the vendor's own browser or that would crash or malfunction in some browsers. Second, many firms will not allow Java applets through their firewalls for security reasons.

Java Server Pages (JSP), like CGI and ASP, is a Web page coding standard. Developers use a combination of HTML, JSP scripts, and Java to dynamically generate Web pages. Java servlets (small programs) are specified in the Web page and run on the Web server to modify pages before they are sent to the user. JSP is supported by most of the popular application servers on the market today.

JavaScript is a programming language invented by Netscape that is used to control objects on HTML pages as well as the interactions with the browser. It is much more acceptable to corporations because it is more stable than Java and it is restricted to the operation of requested Web pages. It is used for many common, yet crucial functions such as verifying and validating customer input. For example, it is used to verify that a valid phone number or e-mail address has been entered.

ActiveX is Microsoft's programming language that competes with Java, while VBScript is the competitor for JavaScript. ActiveX controls are the equivalent of Java applets; however, when the browser receives a Web page containing an ActiveX control, the browser simply runs the program on the page rather than downloading it to the client's computer. ActiveX also has full access to the client's resources (printers, networks, and hard drives), unlike Java. However, neither ActiveX nor VBScript work in any browser other than Internet Explorer. Due to the proprietary nature of Java, ActiveX, and VBScript, they are generally avoided by e-commerce site developers. CGI scripts, JSP, and JavaScript are the leading tools for providing interactive content.

ColdFusion is an integrated server-side environment for developing interactive Web applications. It combines an intuitive tag-based scripting language and a tag-based server scripting language (CFML) that lowers the cost of creating interactive features. It provides visual design, debugging, and deployment tools that make it a complete Web application development platform.

5) Discuss some of the unique features that must be taken into account when designing a mobile Web presence.

Answer: Designing a mobile Web presence is somewhat different from designing a Web site that will be accessed via a traditional desktop computer. For instance, mobile hardware is smaller, and there are more resource constraints on data storage and processing power. The mobile platform is also constrained by slower connection speeds than provided by traditional

desktop computers. As a result, file sizes should be kept smaller, and the number of files sent to the user reduced. Mobile displays are much smaller and require simplification, and some screens are not as easily visible in sunlight. Touch screen technology also introduces new interaction routines that are different from the traditional mouse and keyboard. The mobile platform is not as easy to use as a data entry tool, and therefore choice boxes and lists should be used more frequently so that the user can easily scroll and touch-select options, rather than type them in. You will also want to determine whether to create a mobile-friendly version of your e-commerce site or implement responsive Web design, or create an entirely new mobile app. You can either choose to build a mobile Web app or a native app. Building a mobile Web app that uses the mobile device's browser requires more effort and cost than developing a mobile Web site, suffers from the same limitations as any browser-based application, but does offer some advantages such as better graphics, more interactivity, and faster local calculations. Building a native app, which is programmed for specific mobile operating systems, requires much more programming; however, it will allow you much greater creative rein in making a unique customer experience.

6) Your e-commerce design company has received an RFP to help create an e-commerce presence for Tucci's, a renowned gourmet and specialty butcher that now wishes to sell goods over the Internet. Describe the elements you will include in your proposal to Tucci's.

Answer: Student answers will vary, but should include the following:

Elements that will be in the proposal include the (1) business goals, or vision, or mission statement, (2) identification of the target audience, (3) description of the marketplace, (4) a strategic analysis or SWOT analysis, (5) the content to be included, (6) a development timeline, and (7) a budget. Other recommendations that the student should mention include using social, local, or mobile marketing.