Electronic Commerce

Definition

Electronic commerce is an emerging model of new selling and merchandising tools in which buyers are able to participate in all phases of a purchase decision, while stepping through those processes electronically rather than in a physical store or by phone (with a physical catalog). The processes in electronic commerce include enabling a customer to access product information, select items to purchase, purchase items securely, and have the purchase settled financially.

Overview

The objective of this tutorial is to provide an overview of how electronic commerce works, the challenges of hosting complex electronic commerce environments, and the importance of electronic commerce capabilities that enhance the services and core competencies of the service provider.

Topics

1. Basic Function of Electronic-Commerce Systems
2. Hosted Electronic-Commerce Services: A Service Provider's Perspective
3. Electronic-Commerce Requirements
4. Task Categories
5. Components of Hosted Electronic-Commerce Systems
6. Implementation Scenarios

   Self-Test

   Correct Answers

1. Basic Function of Electronic-Commerce Systems

Electronic commerce is coming of age. Retail on-line buying will be in the billions of dollars in 1998. Electronic sales in a recent quarter are double those of the entire previous year. In some instances, companies create electronic-commerce capabilities out of a fear of falling behind competitors or as a result of the general momentum to expand the use of an existing Internet presence. But the primary value proposition is the prospect of increased revenue from new markets and creation of new, lower-cost, electronic-distribution channels.

Internet service providers (ISPs) are beginning to launch, or are at least evaluating, electronic-commerce hosting services. These services position the service provider as the outsourcer of the customers' electronic-commerce capabilities, managing the networking and server aspects of the initiative. This allows the ISP's customers to concentrate on their core businesses and expands the relationship of the customer and the ISP. An ISP's ability to offer a rich electronic-commerce environment, on its own or in partnership with an electronic-business provider, will be important in differentiating high-value ISPs from lower-value, access-only ISPs.

Customer's Perspective

From a customer's perspective, the purpose of an electronic-commerce system is to enable that customer to locate and purchase a desired good or service over the Internet when the customer is interested in making the purchase. Its function is no more or less than providing a virtual store.

Merchant's Perspective

From a merchant's perspective, the key function of an electronic-commerce system is to generate higher revenues than the merchant would achieve without the system. In order for this to happen, the electronic-commerce system must recreate or utilize existing data and business processes. All of the same processes that the merchant must have in place to support an in-store or catalog purchase must also be in place for an electronic purchase: product information, inventory systems, customer service, and transaction capabilities (including credit authorization, tax computation, financial settlement, and shipping).

Additional functions of an electronic-commerce system, related to revenue generation, are to help redefine and enhance an enterprise's brand strength, customer-service capability, and supply-chain effectiveness. An electronic-commerce system is one of the areas of an enterprise's infrastructure that is open

to customers via the Web, but it should be linked with other information technology (IT) systems that affect customer service (i.e., inventory and billing).

Basic Components

Provision of this basic system requires Internet access and an access device at the location of the home shopper, a Web-application server and electronic-commerce software (enabling catalog creation and transaction processing), security gateways to limit external access to internal data systems, and integration software to pull data from the appropriate support systems into the commerce environment (see *Figure 1*).

Figure 1. Electronic-Commerce Model
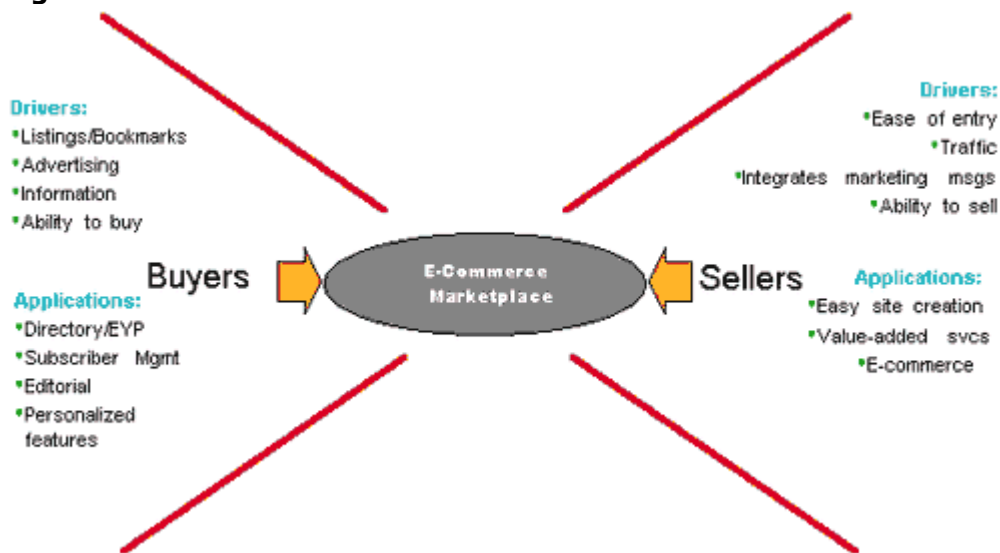
2. Hosted Electronic-Commerce Services: A Service Provider's Perspective

The benefits to the service provider of hosting electronic-commerce services include the following:

- hosting revenue for providing connectivity to electronic-commerce services

- enablement revenue for helping clients develop electronic-commerce offerings (Web sites, catalogs, storefronts) for the customer's hosted offering

- advertising revenue for aggregating traffic within hosted offerings

- transaction revenue for enabling on-line commerce

The value to a merchant (the service provider's customer) of an electronic commerce–hosting service is that it enables the merchant to focus on its core business processes, leaving the service provider to manage the Internet access, network management, network security, quality of service, and server management. In this scenario, the home shopper still needs Internet access and an access device, but the service provider could provide any or all of the remaining components on behalf of the merchant.

It is important that the service provider provide a hosting infrastructure that can scale and maintain quality of service as the customers' requirements grow. The electronic-commerce platform chosen by the service provider must support a variety of tasks:
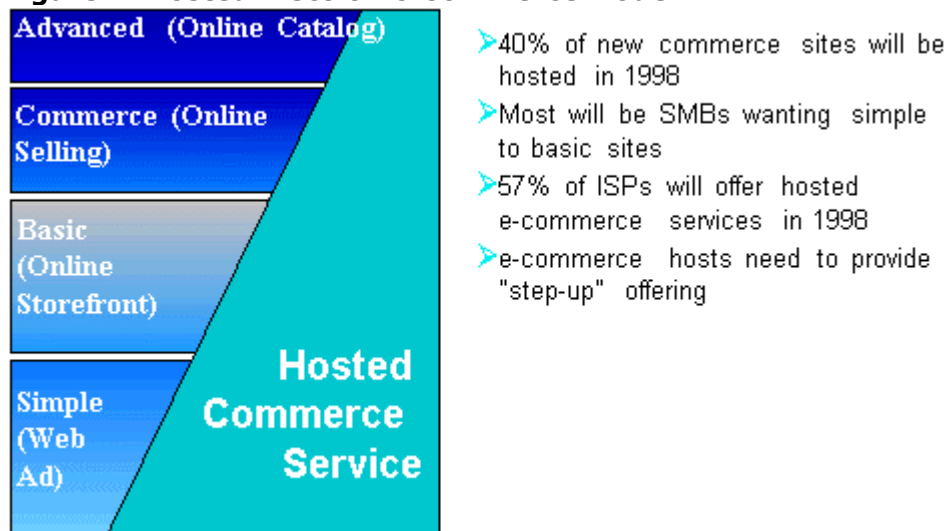
- the creation of a standard environment for storefronts and advertising sites

- the provision of a secure transaction environment

- the extraction and communication of orders

- the authorization of credit and clear payments

- the provision of site activity reports

- the provision of billing systems based on customer activity and advertising

In addition, the service provider's customers will look to it for a variety of enablement services: the creation of tools to build storefronts and advertisements; the documentation of the setup and site-building process; and the staging of the environment preliminary to production of the on-line hosting environment.
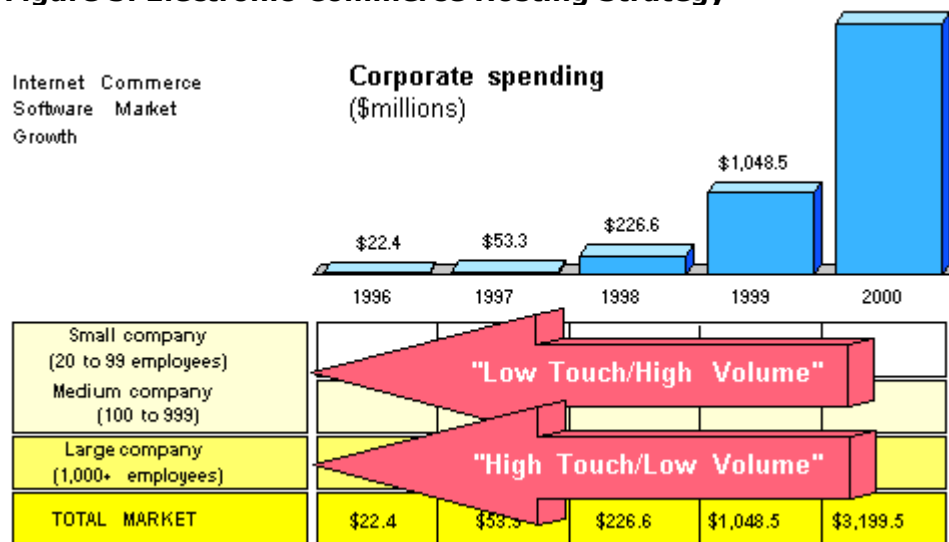
The customer, the service provider, or a third party could be responsible for the creation and hosting of the customer's Web site, the creation and hosting of the catalog information, and the provision of systems-integration requirements for various information systems.

The service provider must also consider how it will expand its hosting capabilities to enable its customers to obtain the full value possible from an electronic-commerce environment, including links to customer service, inventory, and billing systems (see *Figures 2* and *3*).

Figure 2. Hosted Electronic-Commerce Model

- 40% of new commerce sites will be hosted in 1998
- Most will be SMBs wanting simple to basic sites
- 57% of ISPs will offer hosted e-commerce services in 1998
- e-commerce hosts need to provide "step-up" offering

Figure 3. Electronic-Commerce Hosting Strategy

3. Electronic-Commerce Requirements

Enterprises, large or small, tend to develop their Web presence in stages. Once a Web presence is created, then the enterprise wants to use that site to enhance customer service and to produce revenue. It is at the latter stage that electronic commerce comes into play.

A service provider's hosting customers will go through the same evolution described in the preceding module. It is not enough just to pick off the high-end client who represents the highest per-client revenue; there simply are not enough of them. Furthermore, the future opportunity is to provide a platform that can

move a client along the range from low- to high-function as client sophistication and needs evolve.

Many small- and medium-sized businesses are struggling with the high cost of entry to electronic commerce. Creating a complete on-line selling environment can require considerable time, money, and technical expertise. Many businesses are stalled at the first or second of the three steps to building an effective electronic-commerce Internet presence. The three steps include the following.

Step One

Develop a content site (i.e., as opposed to a database-driven catalog) and handle transactions off-line.

- **advantages**—Simple Web sites can be developed easily and quickly at low cost.

- **disadvantages**—This limits Internet function to promotion; no revenue opportunity is involved.

Step Two

Develop an on-line catalog and handle transactions off-line.

- **advantages**—No need for sophisticated technology is involved; the catalog can manage large product assortment.

- **disadvantages**—Catalog building adds expense, without the possibility of reducing expense through on-line transactions.

Step Three

Develop an on-line catalog and handle transactions on-line.

- **advantages**—This can manage large product assortment and complete sales at lower cost.

- **disadvantages**—Catalog building is expensive, and on-line transaction management requires sophisticated technology.

The Transaction Server

Service providers must provide a solution for businesses that do not have the budget or technical expertise to progress to step three themselves. The
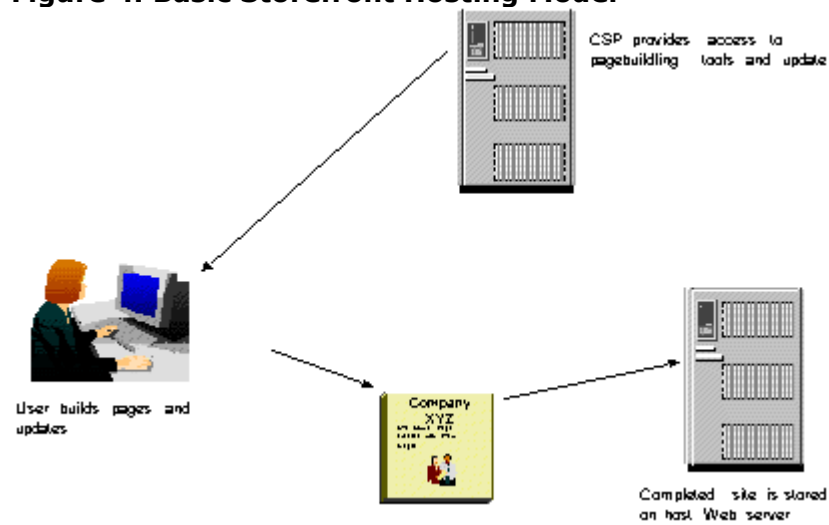
transaction-server aspect of the electronic system enables electronic-directory publishers and ISPs to become full electronic-commerce providers, offering complete outsourcing of electronic transactions and security technology. It can include software for easy site creation, using templates and simple point-click-and-drag method, as well as commerce capability to complete sales for a large set of changing prices and items.

With an electronic commerce–transaction server, service providers can process transactions for multiple sellers from distributed content. Easy-to-use Web site–construction tools help nontechnical businesses create Web sites and catalog pages.
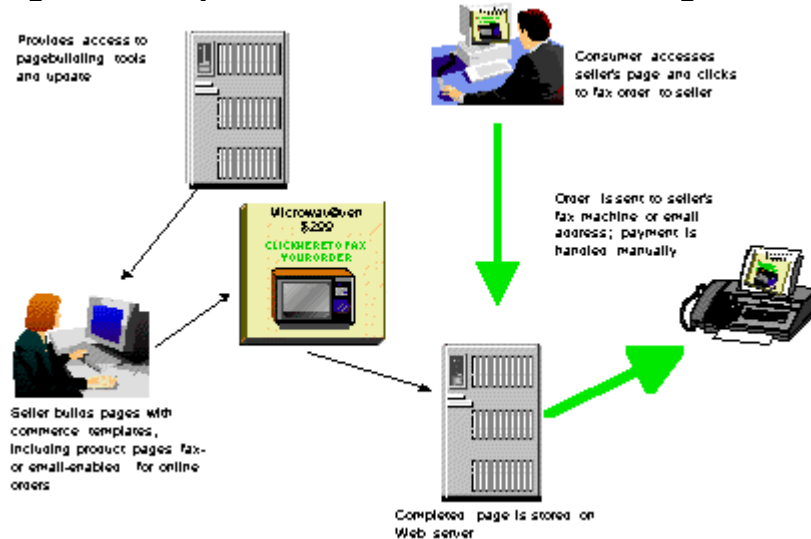
Service providers are likely to configure their offerings in any combination of the following models for their hosted clients on an electronic-commerce platform:

- **single Web site**—The client owns a Web site on a shared Web server and could have a unique uniform resource locator (URL). There are no on-line transactions, but there is e-mail capability.

- **single storefront**—The client owns a single store on a single merchant server at the host. The storefront has unique URL, database, and checkout process.

- **mall**—The customer offers (or client contracts for) multiple storefronts in a mall environment on the same URL and database, with shared registration, shopping cart, checkout, etc.

- **multihome**—Multiple single storefronts reside on one server, but each has its own URL, database, shopping and order forms, etc.

- **on-site content and transaction server**—Nondatabase storefronts are hosted in a multihome configuration with back-end transactions handled by a host merchant server. These selling Web sites are created with a buy button feature to enable product and transaction information to be sent to the separate (but same environment) host merchant server.

- **off-site content and on-site transaction server**—Nondatabase storefronts are hosted outside the service provider–hosting environment. Back-end transactions are handled by the remote host-merchant server on the service-provider premises. These selling sites are created with a buy button feature to enable product and transaction information to be sent to the remote host merchant server. *Figures 4* through *7* illustrate various hosting models.

Figure 4. Basic Storefront Hosting Model

CSP provides access to pagebuildling tools and update

User builds pages and updates

Company XYZ

Completed site is stored on host Web server

Figure 5. Simple Electronic-Commerce Hosting Model

Provides access to pagebuilding tools and update

Consumer accesses seller's page and clicks to fax order to seller

MicrowaveOven $299
CLICK HERE TO FAX YOUR ORDER

Order is sent to seller's fax machine or email address; payment is handled manually

Seller builds pages with commerce templates, including product pages fax- or email-enabled for online orders

Completed page is stored on Web server

Figure 6. Commerce Hosting Model

Seller builds site with commerce-enabled product pages

Consumer accesses seller's site. When 'Buy' button is selected, secure session established with transaction server

Transaction server sends order to seller via secure fax or email

MicrowaveOven $299
1.CLICKHERETO BUY

Transaction Server

Completed Web pages are stored on Web server.

Link

Web Server
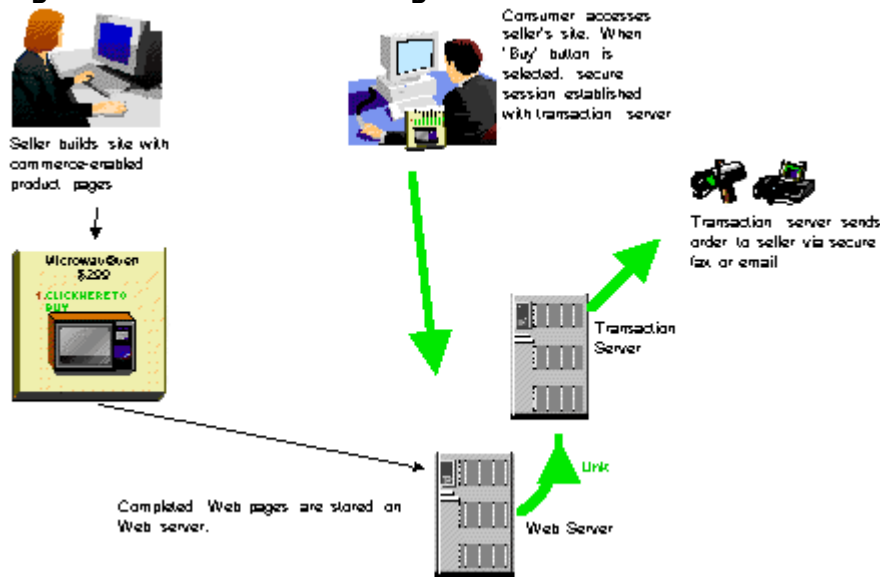
Figure 7. Advanced Electronic-Commerce Hosting Model

Sellers build catalog with catalog-building tools, generating flat HTML pages and data to populate e-catalog database.

Consumer accesses seller's site via browser. Static pages are displayed directly by commerce server. Dynamic pages are generated from database.

Catalog data for multiple seller sites is stored in database. Individual catalog data is updated by seller or service provider

Commerce server with catalog database

Commerce server sends order to seller via encrypted email or EDI

4. Task Categories

For each of the hosted-commerce scenarios described in the previous module, there are certain tasks that accompany the creation and implementation of an electronic presence for a merchant. Some of these tasks could be performed by the merchant, some by the service provider, and some by a third party on behalf of the merchant or service provider.

- **site setup and configuration**—planning, system architecture (single-server and distributed), installation, and configuration

- **client enablement and support**—store setup, catalog maintenance, store maintenance, order management, shopper management, and reporting

- **site administration and operation**—systems management, site maintenance, billing, reporting, and customer service and support

- **back-end tasks**—payment processing, tax calculation, and order routing

5. Components of Hosted Electronic-Commerce Systems

Web Site–Construction Tools

Business customers building a transaction server–supported commerce site need a Web site–construction tool that is provided (or a wide variety of popular content-creation tools) to create Internet pages that incorporate the special buy button created by the transaction server–client tools.

Web-Site Hosting and Publishing

Once the Internet storefront is completed, the site can be published to any server the business customer prefers and the commerce-service provider allows. The commerce-service provider is ready to provide the seller with the on-line transaction functions.

Transaction Server

The transaction server handles credit- and debit-card transactions (using secure electronic standards technology) on behalf of the merchant and the end customer. It must contain a common payment application programming interface (API) that is used for all payment types and functions: receive, approve, deposit, and refund. The transaction server handles the necessary authorization requests and recording of the transaction and settlement of the transaction information with the merchant, the credit-card company, and the customer. The transaction server manages the payment process, from communicating with the consumer to drafts with the merchant's financial institution. Records of transactions must be maintained to facilitate reconciliation and reporting later. The transaction server should also contain a component to process digital

certificates from an organization using certificate-authority software or follow-on security technologies. Multiple merchants can operate on a single transaction server.

Security Products and Services

SET, jointly developed by Visa and MasterCard, is the industry standard for secure electronic transactions. An open multiparty standard protocol for conducting secure bank-card and debit-card payments over the Internet, SET provides message integrity, authentication of all financial data, and encryption of sensitive information.

Registration systems reduce the risk in electronic commerce by establishing trust through authentication and nonrepudiation using SET standards, which in turn drives cost efficiencies and opens new avenues for commerce.

Payment Systems

Payment systems require components placed at the end customer's location (home PC, etc.), the merchant's transaction-system location (whether on merchant premises or service provider environment), and the financial institution's location.

Consumers must know that their financial information is confidential; this is accomplished with electronic wallets or credit-card software at the consumer's end point. The consumer's credit information is sent to a transaction server that can accept a variety of electronic payments, just as a physical store can accept credit- or debit-card information. The transaction server also must manage the payment process, from communicating with the consumer to drafts with the financial institution. Records of transactions must be maintained to facilitate reconciliation and reporting later. The transaction server also contains a component to process digital certificates from an organization using certificate-authority software. Financial institutions use gateways to decrypt sensitive information received from the merchant's transaction server about the consumer and manage transaction settlement for the merchant. The transaction server maintains detailed transaction payment information, enabling companies to handle disputes, chargebacks, or adjustments easily.

Figure 8. Distributed Architecture for Electronic Commerce
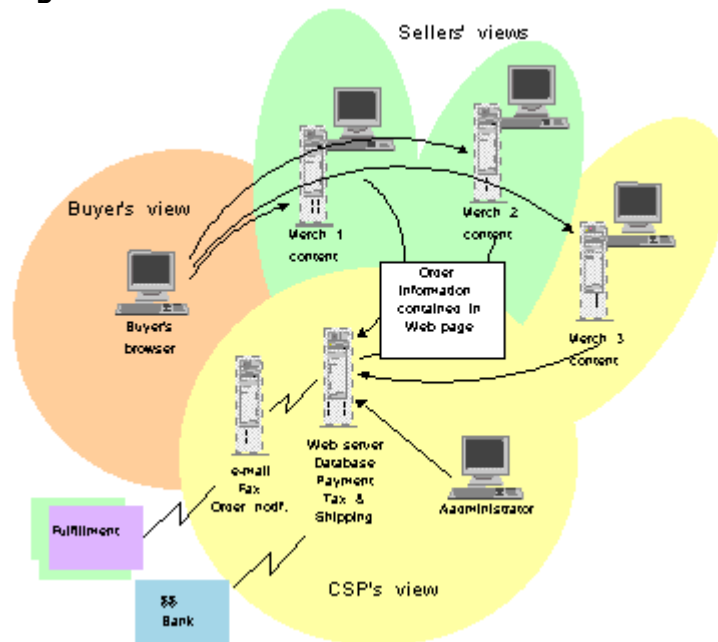
6. Implementation Scenarios

No Common Denominator

There is no single prevailing implementation model in the electronic-commerce marketplace. The electronic-commerce technologies described in this tutorial will typically be implemented in a variety of ways, based on the commerce host's target market, resources, and business strategy.

The market for hosted electronic-commerce services today is a showcase for a wide variety of these implementation models. It is difficult to point to any one single popular model that is winning broad support. At the same time, the newness of the industry—electronic commerce is still at the earliest stages of existence—promotes broad experimentation. Add to that the fact that this nascent technology has barely begun to show a profit for its practitioners, and it is clear that in the short term we will continue to see a variety of implementation models being tested and tweaked.

While the electronic-commerce–hosting market is notable for its variety of implementation models, a number of distinct factors are beginning to emerge across the marketplace. Increasingly, these factors are becoming the critical issues for commerce hosts around which to build their strategy. As these factors gain more and more adherents, they begin to resemble the key points around which an electronic-commerce strategy can be built.

Emerging Strategic Factors

Critical strategy issues that are increasingly being considered in decision-making for electronic-commerce hosting are the following:

- **market segment**—SMB versus large enterprise

- **business model**—transaction processor or commerce service provider

Some Definitions

Market Segment

Who is the business customer who will be hosted by the commerce host? A number of factors weigh in the decision of which segment to target, including the following:

- **host's existing business relationship with segment**—Will this be a totally new offering to unfamiliar clients? Or, will this be a new offering to a captured base of clients?

- **business-to-business, business-to-consumer, or both**—Will the business clients be selling to other businesses or consumers?

- **host's resources and competencies**—Large enterprise clients typically require more care and feeding from the commerce host than SMB customers. At the same time, SMB clients typically cannot afford extensive custom services from the host. The host must also weigh which skills will be required in managing these customer relationships and whether they currently exist—or whether they must be developed from the ground up.

- **customer requirements**—Large enterprises may demand more extensive features and functions than SMB, thus requiring greater expense on the part of the commerce host.

- **market dynamics**—Which segments will demand commerce services now and in the future?

Business Model

What are the primary business drivers that are directing the host into the electronic-commerce hosting business? What business does the host want to be

in? There are some general points about business models that apply regardless of the host's service model, including the following:

- **host's long-term electronic commerce strategy and position on future growth of its customer base**—Where do I want to be two, five, even ten years from now?

- **host's existing business relationship with segment**—Will this be a totally new offering to unfamiliar customers? Or, will this be a new offering to a captured base of customers?

- **business-to-business, business-to-consumer, or both**—Will the business customers be selling to other businesses or consumers?

However, the host faces a key decision point in setting up a hosting environment for electronic commerce around a critical distinction in the marketplace. The critical business model issue that fuels the host's implementation plan is the distinction between a transaction processor (or commerce enabler) and a commerce service provider.

Commerce Enabler

- provides Internet cash register function (remote transaction processing) for business clients whose selling content is created separately

- provides Internet cash register for selling content that may be hosted separately

- provides an outsourced solution for security, thereby saving client expense of implementing firewalls, secure servers, etc.

- leverages backend payment infrastructure to process high volumes of transactions for clients and provide payment services

Commerce Service Provider

- provides end-to-end commerce services for business clients, including content creation, hosting, payment processing, and integration with client back-end systems (inventory, billing, shipping, etc.)

- provides integrated commerce service environment that combines hosting electronic product catalogs with a transaction process

- provides a robust, scalable, secure environment for hosting clients' catalogs with high bandwidth and service levels

- supplies customization and integration services to meet specific needs of clients

These two key issues—market segment and business model—will drive the implementation plans for commerce hosts. *Table 1* explores the possible implementation scenarios that might be driven by these issues.

Table 1. Implementation

	SMB	**Large Enterprise**
Transaction Processor	• low touch/high volume strategy (high volume of clients with little or no hands-on enablement or customization) • distributed transactions • varied content that is created and managed by client • multiplicity of content creation tools used	• client in-sourced or hosted-content models (i.e., the client owns the content and chooses where it is hosted) • commerce-service provider supplies transaction services, connectivity, integration—some at the client's site and some at the host's location
Commerce-Service Provider	• service bureau model (hosted catalog environment to allow clients to self-enable, build catalogs) • integrated environment (catalogs exist at host site) • host's proprietary content creation tools	• service bureau model • high value-add from host (end-to-end commerce services, including hosting, promoting, catalog, credit authorization, billing, and shipping services) • high touch/low volume strategy (low volume of clients who desire high level of customization, enablement)

Self–Test

1. What are two of the benefits of hosting an electronic-commerce system for a service provider?

   a. increased sales and duplicate databases

   b. improved brand presence and elimination of the need for customer support

   c. increased advertising and transaction revenue

d. increased sales and improved ability of customers to compare vendors' prices

2. What is the benefit to the merchant of a hosted electronic-commerce service?

    a. the merchant can focus on its core business

    b. a transaction processor is not needed within the system

    c. catalog information can only be updated weekly

    d. the service provider assumes the merchant's bad debt risks

3. What components of an electronic-commerce system always reside with the end customer?

    a. gateway server to financial institutions

    b. electronic credit- and debit-card capability

    c. transaction server

    d. electronic catalog

4. What are the potential benefits of integrating an electronic-commerce system with other business processes?

    a. Web developers can create Web pages quickly and easily

    b. service providers can leverage Web-hosting and electronic-directory services to enhance electronic-commerce services

    c. efficiencies and effectiveness can be gained in areas of customer service, inventory management, and billing

    d. efficiencies can be obtained in the area of human resource policies and benefits

    e. both a and b

    f. both c and d

5. What two tasks are related to client enablement and support?

    a. store setup and catalog maintenance

    b. PC installation and router configuration

c. site administration and operation

d. advertisement creation and transaction pricing

6. Which of the following is a benefit of hosted electronic-commerce services for a service provider?

a. reduced costs of distributing its goods and services

b. hosting and enablement revenue

c. volume discounts on server technology

d. proprietary network environment

e. all of the above

7. Which of the following does not play a part in an electronic-commerce system?

a. end consumer–electronic credit capability

b. transaction server to handle payments

c. gateway server to communicate with financial institutions

d. personal productivity application suites

8. By the close of 1998, retail on-line buying will be in the millions of dollars.

a. true

b. false

9. Although merchant and customers will benefit greatly from electronic commerce, service providers have very little to gain.

a. true

b. false

10. Electronic-commerce confidentiality is maintained on the merchant's end with electronic wallets or credit-card software.

a. true

b. false

Correct Answers

1. What are two of the benefits of hosting an electronic-commerce system for a service provider?

    a. increased sales and duplicate databases

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    c. increased advertising and transaction revenue

    d. increased sales and improved ability of customers to compare vendors' prices

    See Topic 2.

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   d. efficiencies can be obtained in the area of human resource policies and benefits

   e. both a and b

   f. both c and d

   See Topic 1.

5. What two tasks are related to client enablement and support?

   a. store setup and catalog maintenance

   b. PC installation and router configuration

   c. site administration and operation

   d. advertisement creation and transaction pricing

   See Topic 4.

6. Which of the following is a benefit of hosted electronic-commerce services for a service provider?

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   b. hosting and enablement revenue

   c. volume discounts on server technology

   d. proprietary network environment

   e. all of the above

   See Topic 2.

7. Which of the following does not play a part in an electronic-commerce system?

   a. end consumer–electronic credit capability

   b. transaction server to handle payments

c. gateway server to communicate with financial institutions

d. personal productivity application suites

See Topic 5.

8. By the close of 1998, retail on-line buying will be in the millions of dollars.

    a. true

    b. false

    See Topic 1.

9. Although merchant and customers will benefit greatly from electronic commerce, service providers have very little to gain.

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    See Topic 5.

Acronym Guide

API
application programming interface

ISP
Internet service provider

IT
information technology

URL
uniform resource locator