CHAPTER NINE

Electronic Commerce Software

Learning Objectives

In this chapter, you will learn:

- How to find and evaluate Web-hosting services
- What functions are performed by electronic commerce software
- How electronic commerce software works with database and ERP software
- What enterprise application integration and Web services are and how they can be used with electronic commerce software

Learning Objectives (cont'd.)

- Which types of electronic commerce software are used by small, medium, and large businesses
- How electronic commerce software works with customer relationships management, knowledge management, and supply chain management software

Introduction

- Case study: **Harry Barker**
  - Sells pet products online
  - Prepared in advance for an expected increase in online orders from a *Good Morning America* segment
    - Added an additional Web server
    - Hired additional temporary staff
    - Created a customer Web page
  - Company followed up to measure how well it met new customer expectations

Web Hosting Alternatives

- **Self-hosting** is doing online business using their own servers and server software
  - Most often used by large companies
- Third-party **Web-hosting** service providers offer Web services, electronic commerce functions
  - Often used by midsize, smaller companies
- **Commerce service providers (CSPs)** provide Internet access and Web-hosting services
  - Offer Web server management and rent application software
  - Also called Managed Service Providers (MSPs) or Application Service Providers (ASPs)

Web Hosting Alternatives (cont'd.)

- Web-hosting service **options**
  - **Shared hosting** means client's Web site on a server hosting other Web sites simultaneously
  - **Dedicated hosting** means the client Web server NOT shared with other clients
  - In **both** cases, service provider owns and maintains server hardware, leases it to client, and provides Internet
  - With **co-location** (collocation or colocation) service, the provider rents physical space to client with a reliable power supply, Internet connection
    - Clients install/maintain server hardware and software

Web Hosting Alternatives (cont'd.)

- When making Web server-hosting decisions, a company should check
  - Hardware platform and software combination
    - Should be upgradable when site's Web traffic increases
- Many hosting services provide scalable hardware and software combinations
    - Adaptable to meet changing requirements

Basic Functions of Electronic Commerce Software

- All electronic commerce solutions MUST provide
  - Catalog display
  - Shopping cart capabilities
  - Transaction processing
- Larger complex sites may include software with added features and capabilities

Catalog Display Software

- **Catalog** organizes goods and services being sold
  - May organize by logical **departments**
    - Web store **advantage** is a single product may appear in multiple categories
- **Catalog** is a listing of goods and services
  - **Static catalog** is a simple list written in HTML
    - Must edit HTML to add or delete items
  - **Dynamic catalog** stores information in a database with photos, detailed descriptions and a search tool for locating item and determining availability
  - **Both located** in third tier of Web site architecture

Shopping Cart Software

- **Early** electronic commerce used forms-based shopping
  - Shoppers selected items by filling out online forms which was awkward if ordering more than one or two items and error prone
- **Electronic shopping carts** are now standard
  - Keep track of items customer selected and allows them to view cart contents, add and remove items
  - Ordering requires a simple click which executes the purchase transaction
    - Screen asks for billing and shipping information

Shopping Cart Software (cont'd.)

- Web is a **stateless system** that does not retain information from one transmission to another
  - Shopping cart software must store information
    - Cookies allows information to be stored and retrieved
    - If browser does not allow cookie storage software automatically assigns temporary number
- **Dynamic pricing management** software adjusts prices in real time based on variables seller chooses
- **Promotion management software** allows sellers to create special offers on specific products

Shopping Cart Software (cont'd.)

- **Fulfillment integration software** connects seller's shopping cart to fulfillment provider's computer
  - Shipping automatically triggered at completed sale
- **Product review management software** allows customers to post reviews of products
- **Product recommendation triggers** are tools that respond to customer's product selection
  - Provides suggestions for related products, refills
- **Abandoned cart management software** enables shopping cart to be retained for later when customer session is terminated

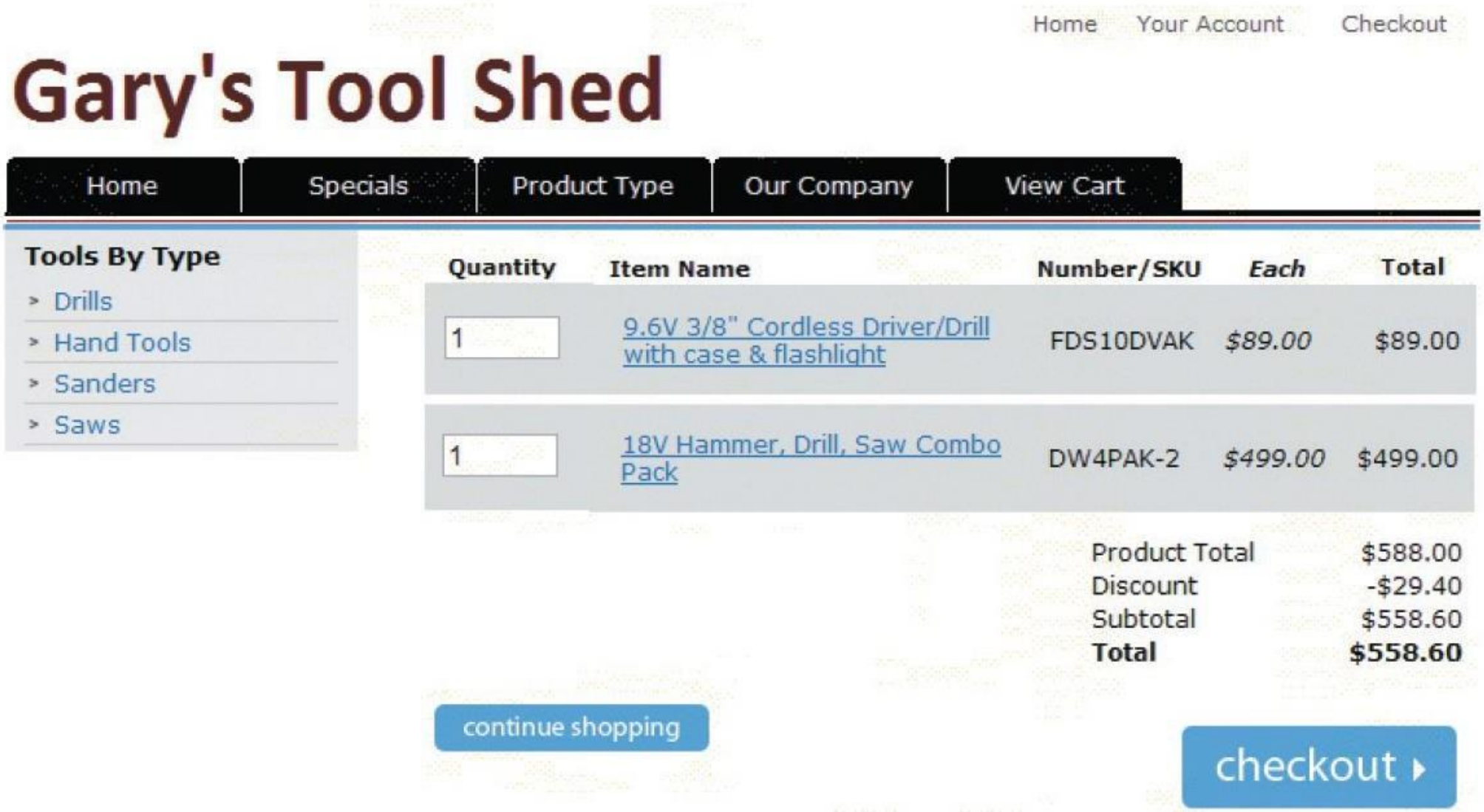

FIGURE 9-1 Typical shopping cart page

Transaction Processing

- Occurs when shopper proceeds to virtual checkout counter by clicking the **checkout** button
  - Electronic commerce software performs calculations
- Web browser software and seller's Web server software switch into secure communication state
  - Electronic commerce software communicates with accounting software sales and inventory modules
  - FedEx and UPS shipping rate software integrates with electronic commerce software
- Other calculations include coupons, promotions, time-sensitive offers

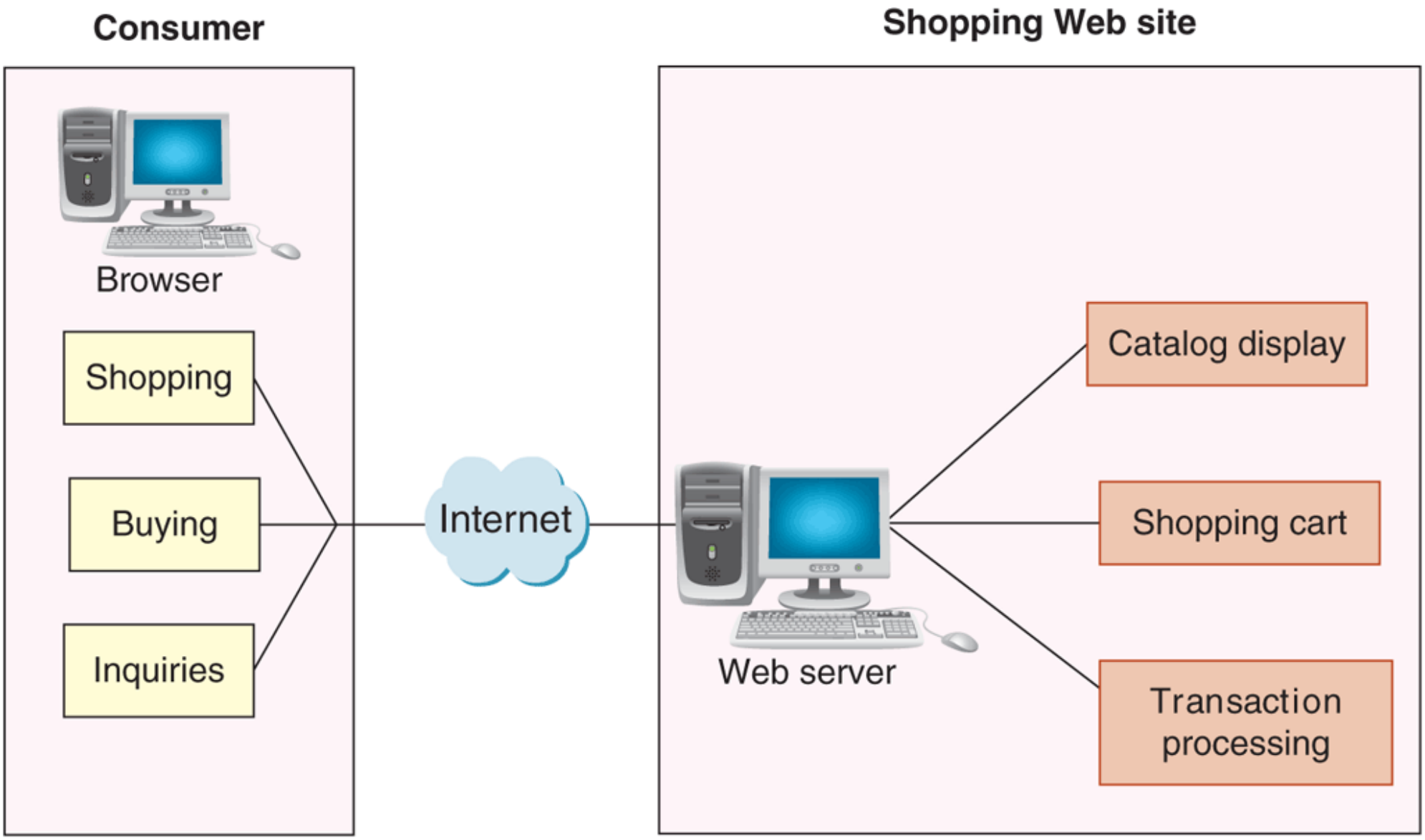

FIGURE 9-2 Basic electronic commerce site architecture

How Electronic Commerce Software Works with Other Software

- Most large companies with electronic commerce operations also have substantial business activity unrelated to electronic commerce
  - Important to integrate electronic commerce activities into the company's other operations
- Basic information system element is a collection of **databases**

Databases

- Highly structured information stored on a computer
- Business rules are how the company does business
- Database management software allows users to enter, edit, update, retrieve database information
- Distributed information systems are large systems storing data in many different physical locations
  - Distributed database systems are databases within distributed information systems
- MySQL database is open-source software owned by Oracle and maintained by group of programmers

Middleware

- **Middleware** takes sales and inventory shipments information from electronic commerce software and transmits to accounting and inventory management software
  - Companies can write their own or purchase customized middleware
- Interoperability is making information systems work together (goal of installing middleware)
- Middleware cost range is $30,000 to several millions
  - Depending on complexity and existing systems

Enterprise Application Integration

- **Application software** (application) is a program that performs specific function like creating invoices
- Application server (computer) takes request messages received by Web server
  - Runs application program performing action based on request message's contents
  - Actions determined by **business logic rules** such as verifying customer password upon log in
- **Enterprise application integration** is a creation of links among scattered applications so business logic can be interconnected

Enterprise Application Integration (cont'd.)

- As information is transferred from one application to another program data formats differ
  - Must edit and reformat (often using XML data feeds)
- **Page-based** application systems return pages generated by scripts containing rules
  - Present data on Web page with the business logic
  - Hard to revise and update (combined presentation and business logic)
- **Component-based** application systems separate presentation logic from business logic
  - Logic components created and maintained separately
    - Updating and changing system elements much easier

Integration with ERP Systems

- **Enterprise resource planning (ERP)** software are business systems integrating all facets of a business
  - Accounting, logistics, manufacturing, marketing, planning, project management, and treasury functions
- Two major ERP vendors: Oracle and SAP
  - ERP software installation costs between $1 million and $10 million for a midsize company
- Smaller online businesses can purchase products like NetSuite that offer ERP system subscriptions
  - Called software as a service (**SaaS**)

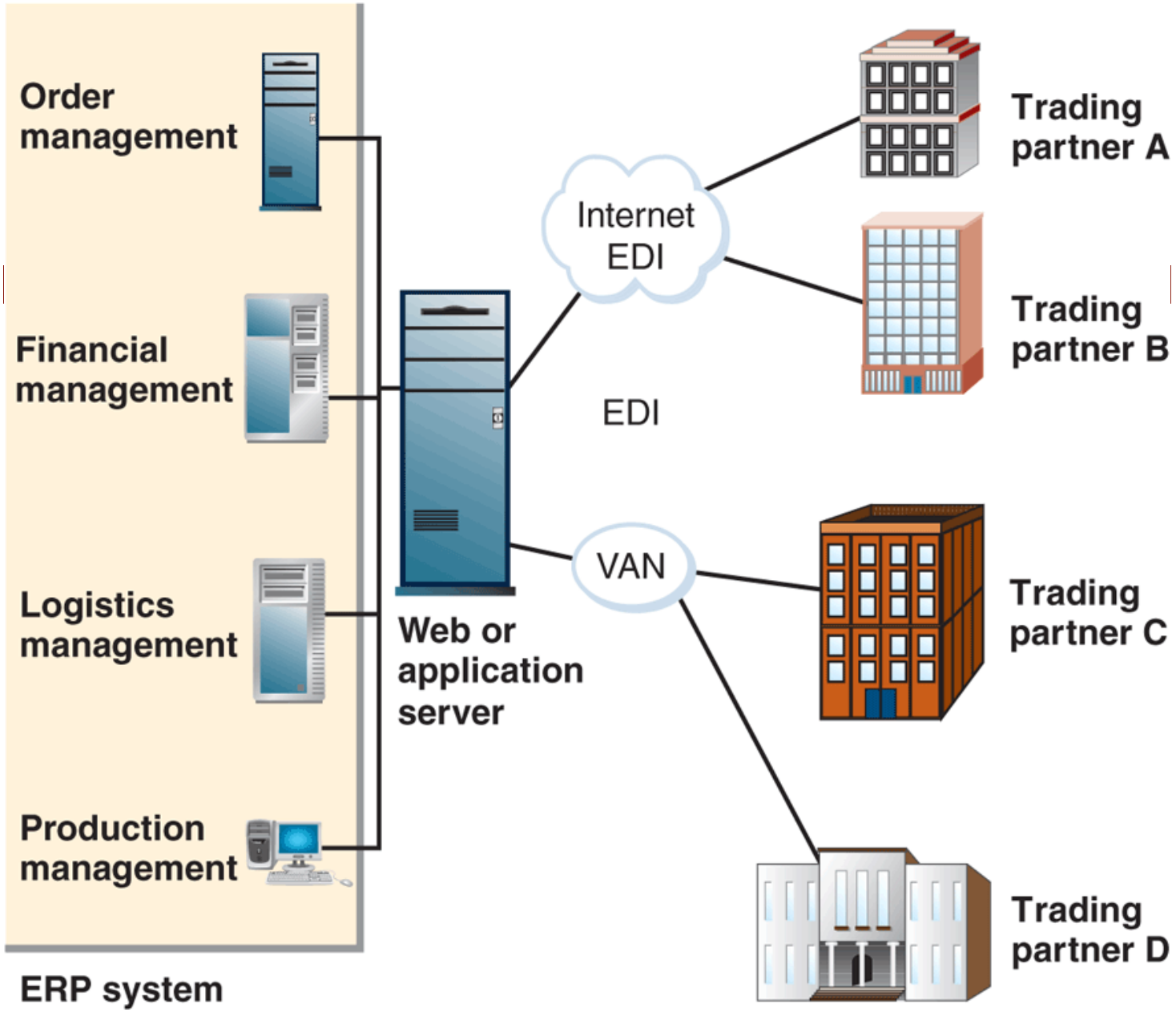

FIGURE 9-3 ERP system integration with EDI

Web Services

- **Web Services:** software systems supporting interoperable machine-to-machine interaction over a network
  - Set of software and technologies allowing computers to use the Web to interact with each other directly
  - Does not require human operators directing the specific interactions
- Application program interface (API) is a general name for the ways programs interconnect with each other
  - Web APIs: interaction over the Web

What Web Services Can Do and How Web Services Work

- Offer improved customer service, reduced costs
- Transmit XML-tagged data from one enterprise integrated application to another
- Provide data feeds between two different companies
- Programmers write software that access units of business application logic without knowing details
  - Allows communication between programs written in different languages on different platforms
    - Example task: transaction processing
  - Can be combined with other Web services for complex tasks

How Web Services Work (cont'd.)

- Machine-to-machine communication was originally accomplished with HTML but now most are XML
- The first Web services were just sources of information that programmers could incorporated into software applications
- More advanced example is purchasing software used to obtain vendor price information
  - Purchasing agent authorizes transaction and Web services submits order and tracks until delivered
- As Web servers become more sophisticated, they can often make decisions themselves

Web Services Specifications

- **Simple Object Access Protocol (SOAP)** is a message-passing protocol
  - Defines how to send marked up data from one software application to another across a network
  - The first widely used approach to Web services
- Utilizes **three rule sets (or protocols)**
  - Communication rules included in SOAP specification
  - Web Services Description Language (WSDL) describes logic unit characteristics of each Web service
  - Universal Description, Discovery, and Integration Specification (UDDI) woks as address book to identify Web services locations and associated descriptions

REST and RESTful Design

- **Representational State Transfer (REST)**
  - Principle describing how the Web uses networking architecture to identify and locate Web pages and elements making up those Web pages
- **RESTful design** (RESTful applications) are Web services built on the REST model
  - Transfers structured information from one Web location to another
  - Services accessible at a specific address
  - More than half of all Web services today are RESTful applications (instead of SOAP)

Electronic Commerce for Small and Midsize Businesses: Basic CSPs

- Use of service provider's shared or dedicated hosting services (instead of in-house service or co-location service)
  - Shifts staffing burden from company to Web host
  - Spread costs over all hosted businesses
  - Host provider keeps server working through storms and power outages
- CSPs offer free or low-cost e-commerce software
  - Less than $20 per month with software built into site
- CSP examples
  - Gate.com, ProHosting.com, 1&1 Internet, Yahoo!

Mall-Style CSPs

- Provide small businesses with basic Web site, online store design tools, templates and easy-to-use interfaces
  - Low monthly fee, one-time setup fees and percentage (or fixed) amount for each transaction
  - Provide shopping cart software and payment processing
- Two-main mall-style CSPs are **Amazon** services for business and **eBay** stores for businesses
  - No long-term commitment and few up-front costs

Estimating Operating Expenses for a Small Web Business

- Cost to become operational between $400 and $8200
  - Assumes less than 100 items for sale and business already has computer and Internet access
  - Figure 9-4 shows the range of estimates for first-year expenses for a small business owners
- Self-hosting include one time basic server and router costs of $2000 to $10,000 plus annual costs
  - Basic Internet connection: $480 to $1,800
  - Secure server room: $5000
  - Required technicians: $50,000 to $100,000
  - Annual total costs: $60,000 to $100,000

Operating Costs	Cost Estimates	
	Low	High
Initial site setup fee	$ 0	$ 200
Annual CSP maintenance fee (12 x $20 to $300)	240	3600
Domain name registrations	0	300
Scanner for photo conversion or digital camera	60	2000
Photo editing software	0	800
Occasional HTML and site design help	100	1100
Merchant credit card setup fees	0	200
Total first-year costs	$400	$8200

FIGURE 9-4 Approximate costs to put a small store online

Electronic Commerce Software for Midsize Businesses: Web Site Development Tools

- Possible to use Web page creation and site management tools from Chapter 2
- After Web site creation add purchased software elements and create the middleware

Midrange Electronic Commerce Software

- Costs $5000 to $200,000
- Operating costs range $1000 to $30,000 annually
- Offers connectivity to database or ERP systems that store inventory information
- **Intershop** offers midrange software packages for B2B & B2C
  - Include search and catalog capabilities, electronic shopping carts, credit card processing and connection to back-end businesses and databases
  - Setup wizards, catalog tools, data management functions and built-in storefront templates are included
  - Manage storefronts with Web browser interface

Midrange Electronic Commerce Software (cont'd.)

- IBM **WebSphere Commerce Professional** is a family of software components
  - Includes catalog templates, setup wizards, advanced catalog tools for both B2B and B2C
  - Provides link with existing corporate systems
    - Inventory databases, procurement systems
  - Customization requires programmers with JavaScript, Java or C++ expertise
  - Costs between $50,000 and $300,000 depending on number of servers and options

Electronic Commerce Software for Large Businesses

- Larger business requirement many of the same advanced capabilities as midsize firms
  - Need ability to handle higher transaction loads and dedicated software applications to handle specific online business elements
- Enterprise-class commerce software is used in large online business operations
  - Encompasses all areas of the business or enterprise
  - Provides tools for B2B and B2C commerce
  - Interacts with wide variety of existing systems
  - Costs: $200,000 to $10 million

Enterprise-Class Electronic Commerce Software

- **Requires** several dedicated computers, Web server system and any necessary firewalls
  - IBM WebSphere Commerce Enterprise, Oracle E-Business Suite and Broadvision
- Provides tools for linking to and supporting supply and purchasing activities (no human assistance needed)
  - Secure transaction processing and fulfillment
  - Interaction with firm's inventory system to issue purchase orders
  - Generate accounting entries
- Download electronic goods directly from site

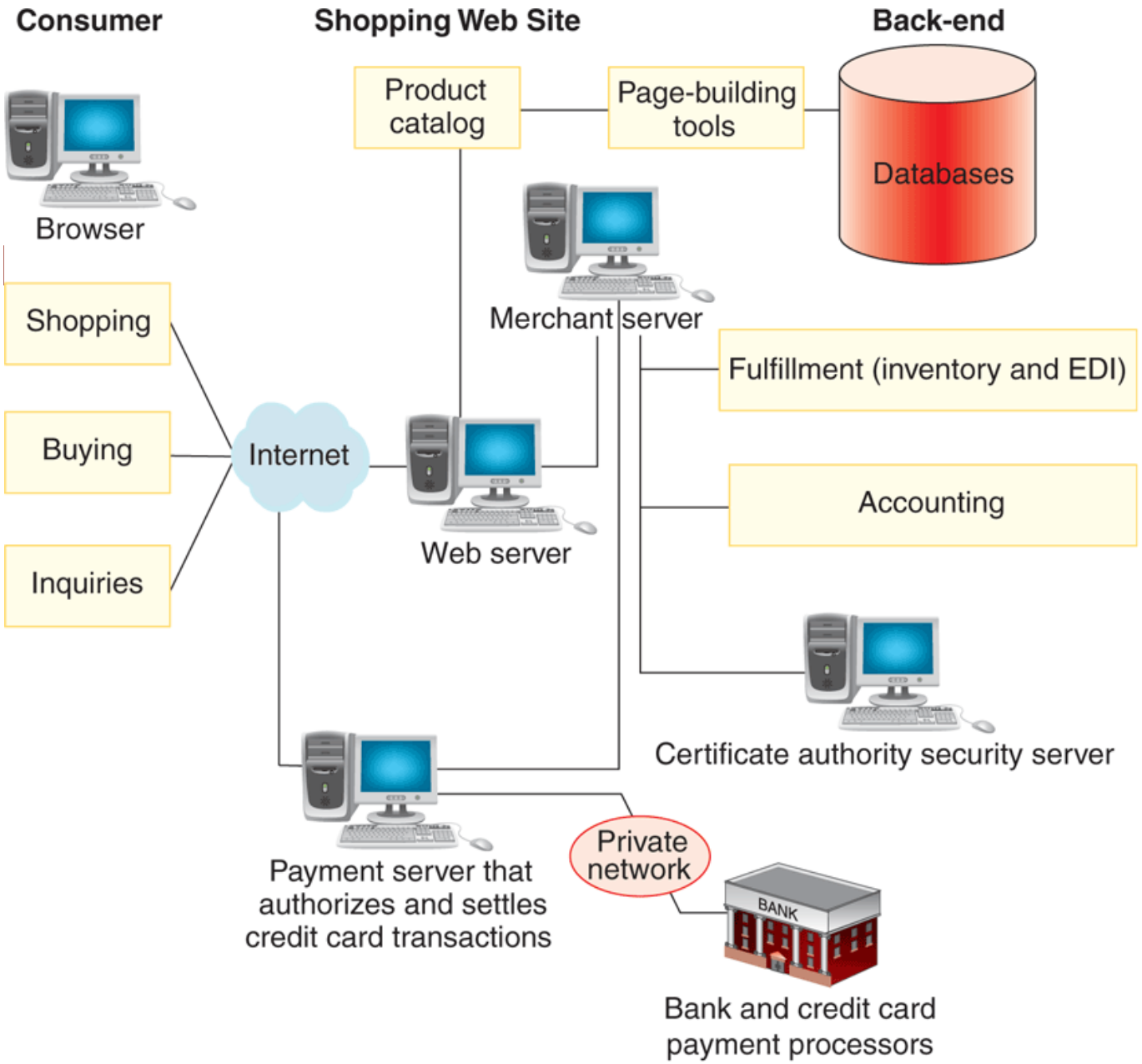

FIGURE 9-5 Typical enterprise-class electronic commerce architecture

Content Management Software

- Helps control large amounts of text, graphics, media files that have become crucial to doing business
  - Increased use of social media and networking as part of online business operations have made this more important
- Software should be tested before commitment
  - Straightforward procedures for regular maintenance
  - Facilitates typical content creation tasks (e.g., adding sale-item specials)
- Leading providers include IBM and Oracle
  - Costs between $50,000 and $500,000
  - Can cost 3 to 4 times that amount to customize, configure and implement

Knowledge Management Software

- Systems that manage knowledge itself rather than the documentary representations of that knowledge
  - Collect organize and share knowledge
  - Enhance user collaboration and
  - preserve knowledge gained through information use to benefit future users
- Tools to read documents and conduct searches
  - Use proprietary semantic, statistical algorithms
- Collects knowledge elements by extracting them from normal interactions users have with information
- Implementation costs $10,000 to $1 million or more

Supply Chain Management Software

- Helps coordinate planning and operations with supply chain partners, perform two main operations:
  - **SCM planning software** develops coordinated demand forecasts
  - **SCM execution software** helps with warehouse and transportation management
- SCM software components include those that manage demand planning, supply planning and demand fulfillment
- Cost of SCM software implementations varies tremendously based on number of locations
  - Range from under $300,000 to $5 million

Customer Relationship Management Software

- **Goal** is to understand customer's specific needs and customize product or service to meet those needs
  - **Idea** is if customer needs are met exactly they will pay more for goods or services
- Software must obtain data from operations software and gather data about customer activities
  - Use data to conduct analytical activities
- Basic form of CRM uses customer information to sell more goods or services
- Advanced form of CRM delivers attractive, positive customer experiences

Customer Relationship Management Software (cont'd.)

- Important in maintaining customer loyalty when purchase process is long and complex
- From 1996 to 2000 companies spent millions to buy systems and restructure customer strategies
  - Bad experiences led to a change in thinking
- Now used to solve smaller, more specific problems
  - Popular target is call center operations
- Some companies create their own but most buy a software package
  - Prices start around $2000 and large implementations can cost millions

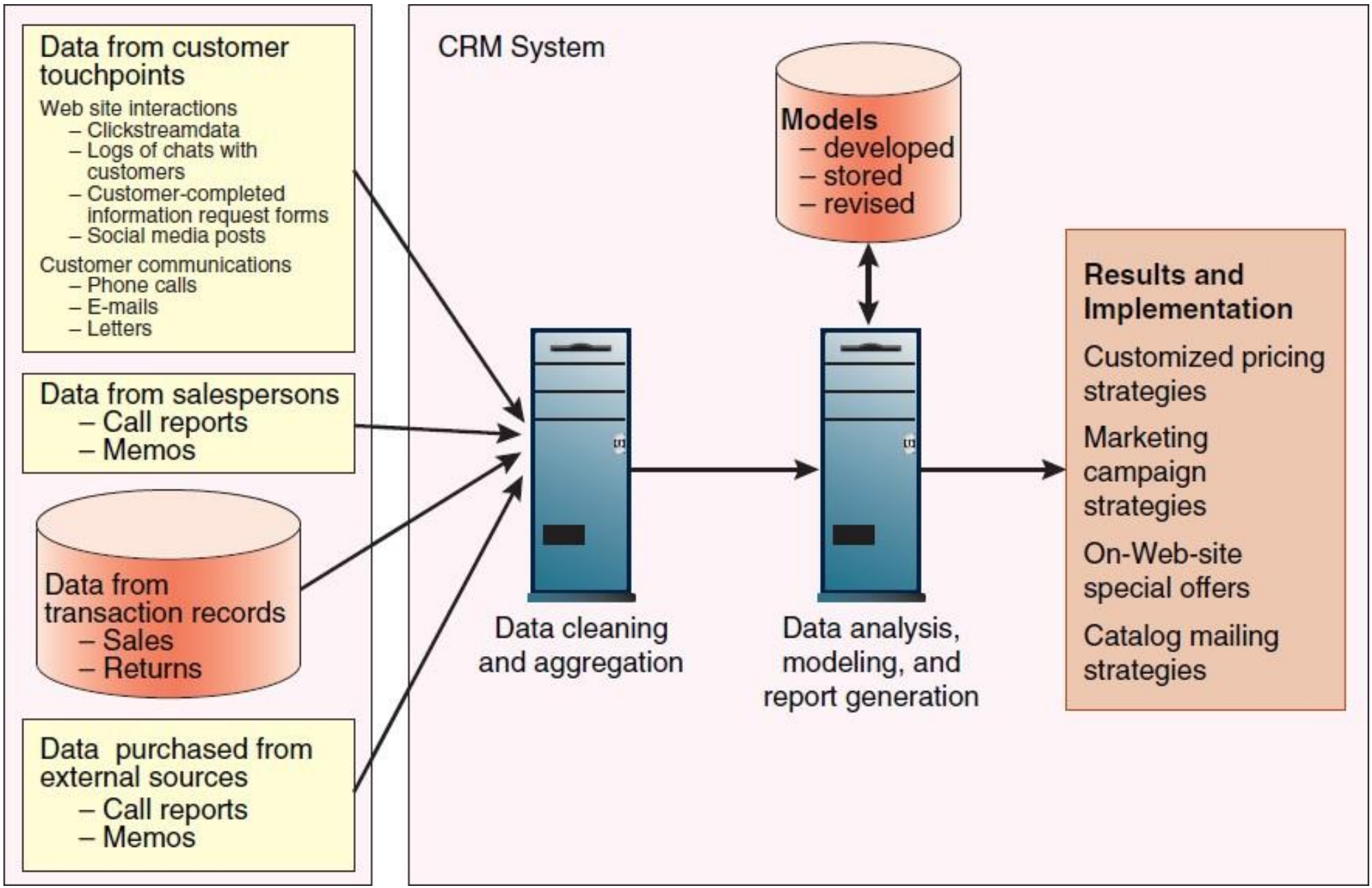

FIGURE 9-6 Elements of a CRM system