E-commerce
Software

A variety of software and hardware is used to deploy e-commerce applications. This lecture covers the main tools/functionalities of an e-commerce solution.

Two weeks ago

- E-commerce Web sites
- Web server architectures
- Software for Web servers
- Web Site and Internet Utility Programs
- Web server hardware
- Web hosting

E-Commerce Web Sites

To plan appropriately for an e-commerce server one must determine
- what they want to accomplish from a business perspective
- identify the types of content that will be delivered
- estimate how many visitors will be connecting to the Web site
- select an appropriate hardware and software platform
- select an appropriate service provider

E-Commerce Web Sites—Purpose of e-commerce sites

Companies create Web sites for very different reasons:
- simple proof-of-concept sites
- Intranets (internal information)
- information-only sites for customers
- business-to-business portals and extranets
- on-line stores (e-shops)
- content-delivery sites

Server Architectures—Three-Tier and N-Tier Client/Server Architectures

Software for Web servers—Popular server programs
Web Server Hardware

- Web server computers
  - More memory, larger hard disk drives, and faster processors
- Blade servers
  - Placing small server computers on a single computer board, then installing boards into a rack-mounted frame
- Virtual server (virtual host)
  - Maintains more than one server on one machine

Web Server Hardware - Performance Evaluation

- Benchmarking is a form of testing used to compare the performance of hardware and software
- Hardware and operating systems are key areas for benchmarking
- The speed of its connection can affect a Web server's performance
- Throughput and response time can be used to measure a server's Web page delivery capability

Web Server Hardware - Architectures

- Large sites deliver millions of pages every day
- They process thousands of customer and vendor transactions each day
- The large collection of servers that these sites have are called server farms
- One approach: centralised architecture: a few very large and very fast (and very expensive) computers
- Alternative approach: distributed/decentralised architecture: a large number of relatively inexpensive servers
- Large decentralised sites must use load-balancing systems (divide the workload among them)

Web Server Hardware - Load-Balancing1

- A load-balancing switch is a piece of network hardware that monitors the workloads of the servers attached to it and assigns incoming Web traffic to the server that has the most available capacity
- In a simple load-balancing system, the traffic that enters the site from the Internet, encounters the load-balancing switch, which then directs the traffic to the Web server best able to handle the traffic

Web Server Hardware - Load-Balancing2

- Diagram showing load-balancing system with Internet, router, load-balancing switch, and web servers

Web Server Hardware - Complex Load-Balancing

- Diagram showing complex load-balancing system with multiple web servers and load-balancing switch
Web hosting

- When making Web server hosting decisions, a company should ask whether the hardware, or platform and software combination, can be upgraded when the traffic on its site increases.
- Using a service provider’s shared or dedicated hosting services instead of building an in-house server or using a co-location service means that the staffing burden shifts from the company to the Web host.

Learning Outcomes (this week)

- Basic functions of electronic commerce software
- Advanced functions of electronic commerce software
- Electronic commerce software for small and mid-sized businesses
- Electronic commerce software for medium-sized to large businesses
- Electronic commerce software for large businesses that have an existing information technology infrastructure

Basic Functions

An e-commerce solution must at least provide:

- A product catalogue
- Shopping cart capabilities
- Transaction processing

Catalogue

- A static catalog is a simple list written in HTML that appears on a Web page or series of Web pages
- A dynamic catalog stores the information about items in a database
- Sites should also provide a search engine that allows customers to enter descriptions to quickly find an item
- Rule: Never stand in the way of a customer who wants to buy something!

Example catalogues

- [Example catalogue image]

Shopping Cart

- The web has no memory!
- Simple static HTML forms can be used for online shopping
- A more advanced way to shop online is by using a shopping cart
- Shopping cart software is now standard with most e-commerce solutions
Forms

Problems with forms-based shopping
• Shoppers had to write down product information before going to order form
• Customers sometimes forget whether they had clicked the submit button
• Confusing and error prone

Shopping Cart

Why do we need a Shopping basket?
• The Web is a stateless system unable to remember anything from one transmission or session to another
• The e-shop must distinguish one shopper from another
• Three ways to add persistence: More often to uniquely identify users and to store information about their choices e-shops create and store (in the customer

Transaction Processing

Transaction occurs when shopper proceeds to virtual checkout counter by clicking a checkout button
• Calculations: compute taxes and shipping costs
• Provisions for coupons, special promotions, and time-sensitive offers

MORE ADVANCED FUNCTIONS
• The e-shop software should also connect to accounting and inventory systems so that Web sales can be entered automatically
• Connections between electronic commerce software and the enterprise resource planning software are handled by a separate type of software called middleware
• Major middleware vendors include BEA Systems, Broadvision, Digital River, and IBM Tivoli Systems

Application Integration

Interoperability
Making a company’s information systems work together

Enterprise application integration
Attempt to tie all of company’s existing systems to each other and to company’s Web site
Application Integration—Application Servers

- A program that performs a specific function, such as creating invoices, is called an **application program**, application software, or an application.
- An **application server** is software that takes the request messages received by the Web server and performs some kind of action based on the contents of these messages.
- The actions that the application server software perform are determined by the rules used in the business.
- These rules are called **business logic**.

Application Servers

- Application server software may be grouped into two types: page-based and component-based.
- **Page-based technologies** deal with pages generated by scripts that include the rules for presenting data on the Web page following the business logic.
- **Common page-based** systems include Macromedia’s ColdFusion, Java Server Pages, Microsoft Active Server Pages, and PHP.

Application Servers

- **Component-based** technologies separate presentation logic from business logic.
- Each component of logic is created in its own module.
- Common component-based systems include Enterprise JavaBeans, Microsoft Component Object Model, and the Common Object Request Broker Architecture.

Database Servers

- Application servers usually obtain the business logic information that they use to build Web pages from databases.
- A **database manager** is software that stores information in a highly structured way.
- Large information systems that store the same data in many different locations are called distributed information systems.

Web Services

- Web services are a self-contained, modular unit of application logic that provides some businesses functionality to other applications through an Internet connection.
- They use a specific set of standards known by their acronyms:
  - SOAP—Simple Object Access Protocol
  - WSDL—Web Services Description Language
Software for SMEs

- One alternative to ISP hosting services are **ASP**: provide a connection to the Internet just as ISPs do but they also provide application server software, database management software, and electronic commerce expertise.
- **Shopcreator** is an example of an e-commerce ASP.

Basic Electronic Commerce Software Packages

- Basic packages are free or low-cost electronic commerce software supplied by the Web host for building electronic commerce sites that will be kept on the host’s server.
- Services in this category usually cost less than a few hundred pounds per month, and the software is available on the host site, allowing companies to immediately begin building and storing a storefront on the host’s server.

Mall-Style Hosting

- Shared hosting sites provide online stores with good services, good Web creation tools, and little or no banner advertising clutter.
- Web hosts in this group charge a monthly fee, a setup fee, and may also charge a percentage of or fixed amount for each customer transaction.
- Mall-style hosts provide shopping cart software or the ability to use another vendor’s shopping cart software.

Shared Mall-Style Hosting

- Mall-style hosting also offers transaction-processing through one of a few merchant services.
- These merchant services allow customers to choose to purchase their goods and services with a credit card, electronic cash, or other form of payment.
- Quality Web hosts in this category include Bigstep, Yahoo! Store, FedEx eCommerce Builder, and eBay Stores.

Shared Mall-Style Hosting

- Electronic commerce stores get a variety of services for a low monthly fee.
- Web hosting customers have their own domain name and IP address.
- Advantages of a shared Web host over dedicated hosting or self-hosting:
  - Low setup fee
  - No staff and capital costs
  - Free technical support.
Shopcreator Apex Store

- Shopcreator Apex Store is a good value among full-service shared hosting sites.
- Merchants can create, change, and maintain their Shopcreator storefronts through a Web browser.
- On its own site, Shopcreator holds all the stores’ pages in a proprietary format.
- Shopcreator’s management page contains many management, reporting, and global site setting tools.

Bigstep.com

- Bigstep.com provides a well-designed storefront package without charging hosting fees.
- Bigstep.com enables merchants to create, change, and maintain a storefront through a Web browser.
- Bigstep.com’s reports provide data mining capabilities.
- Data mining can help business find customers with common interests.

Bigstep.com

- Bigstep.com’s reports can answer the following questions:
  - How many visitors are coming to the site?
  - What is the average length of stay for each visitor on each page?
  - Which pages lead to purchases?
  - What advertisements or links have brought qualified visitors to the page or site?
  - What is the average number of pages that each visitor views?
  - Are repeat customers attracted to this site?

Estimated Operating Expenses for an SME

- The first-year operating costs can vary depending on the Web host selected (~£2,000).
- A reasonable guideline for processing fees is to multiply your expected annual gross sales by 3%.
- Self-hosting: Setup and Web site maintenance costs include equipment, communications, physical location, and staff.

Software for Large Businesses

- Medium-sized packages allow the merchant to have explicit control over merchandising choices, site layout, internal architecture, and remote and local management options.
- Midrange software has connectivity with database systems and the store’s catalog information.
- Intershop Enfinity, WebSphere, and MS-Commerce Server 2000 are examples of this type of software.

Intershop Enfinity

- Intershop Enfinity is produced by Intershop Communications Inc.
- This software provides:
  - search and catalog capabilities
  - electronic shopping carts
  - online credit card transaction processing
  - connection to existing business systems and databases, such as DB2 and Oracle
- It has setup wizards and catalog and data management tools.
IBM WebSphere Commerce
- IBM produces the WebSphere Commerce Suite
- It comes complete with catalog templates, setup wizards, and advanced catalog tools
- It can be used both for B2B and B2C applications
- This system runs on AIX, Linux, OS/400, Solaris, Windows 2000, and Windows NT operating systems.

MS Commerce Server 2002
- Commerce Server 2002 provides tools for:
  - User profiling and management
  - Transaction processing
  - Product and service management
  - Target audience marketing

Systems for Corporations
- Enterprise-level commerce software is called e-business software
- E-business software interacts with a wide variety of existing back office systems, including database, accounting, and Enterprise Resource Planning systems
- Examples of enterprise-class products that can be used to run a large online business
  - IBM WebSphere Commerce Business Edition
  - Oracle E-Business Suite
  - Broadvision One-To-One Commerce
- Enterprise-class software
  - Typically provides good tools for linking to and supporting supply and purchasing activities

Enterprise Solutions
- An enterprise-scale solution may integrate:
  - Domain Name System (DNS)
  - SMTP servers to handle e-mail
  - Web server
  - Application servers
  - Database server
  - Security mechanisms

Typical e-Business Architecture

Customer Relationship Management Software
- The goal of CRM is to understand each customer’s specific needs and then customize a product or service so that it meets those needs
- CRM software must obtain data from operations software that conducts activities, such as sales automation, customer service center operations, and marketing campaigns
- Siebel Systems’ E-Business 7 is one of the leading comprehensive CRM packages
- Oracle Global CRM, PeopleSoft CRM, and MySAP CRM are other CRM products
Supply Chain Management Software

- SCM software helps companies to coordinate planning and operations with their partner in the industry supply chains of which they are members.
- The 2 major firms that offer SCM software are:
  - i2 Technologies: includes components that manage demand planning, supply planning, and demand fulfillment
  - Manugistics: includes a constraint-based master planning module that controls the other elements of the system.

Content Management Software

- Content management software helps companies control the large amounts of text, graphics, and media files that have become a key part of doing business.
- The 3 leading companies that provide these tools are:
  - Documentum
  - Vignette
  - webMethods

Knowledge Management Software

- KM software helps manage knowledge, rather than the documentary representations of that knowledge.
- It helps companies do 4 main things:
  - Collect and organize information
  - Share the information among users
  - Enhance the ability of users to collaborate
  - Preserve the knowledge gained through the use of information so that future users benefit

Summary

- E-commerce software for Small, Medium-sized and Large businesses;
- Key elements of e-commerce software: catalog, shopping basket, transaction processing;
- Web services: commerce service provider, self-hosting, large customisable solutions (CRM, CM, KM etc).

Next time

- Next week: Reading week
- Nov 19: Payment systems (RJ)/Security (GM)