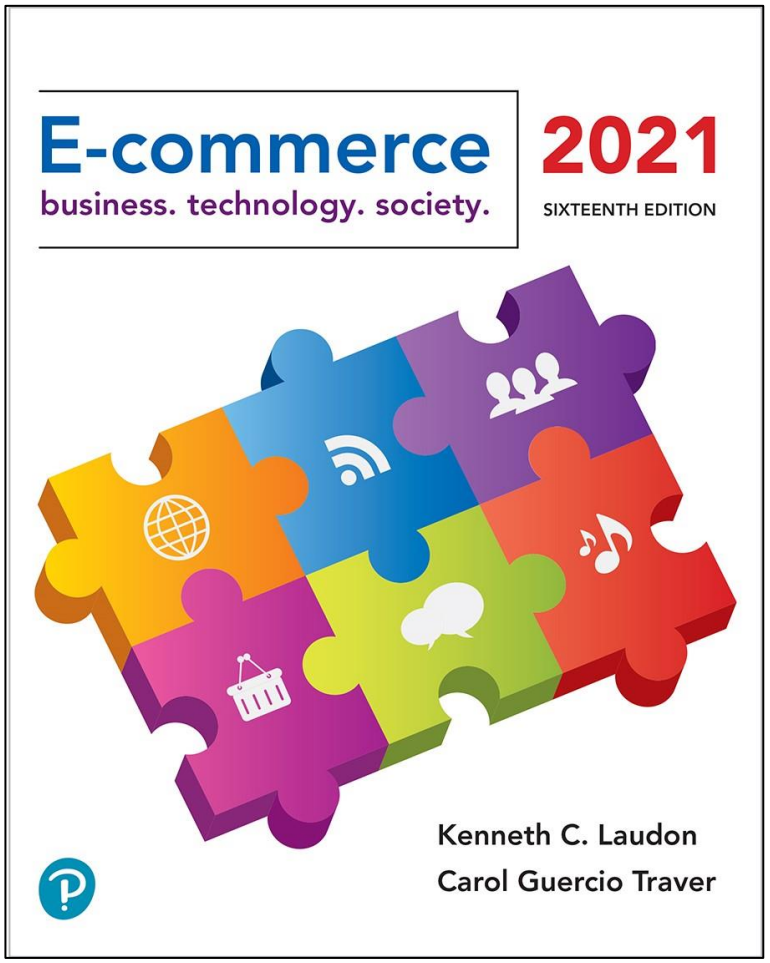
E-commerce 2021: Business. Technology. Society.

Sixteenth Edition



Chapter 4

Building an E-commerce Presence: Websites, Mobile Sites, and Apps

Learning Objectives

4.1 Understand the questions you must ask and answer, and the steps you should take, in developing an e-commerce presence.

4.2 Explain the process that should be followed in building an e-commerce presence.

4.3 Identify and understand the major considerations involved in choosing web server and e-commerce merchant server software.

4.4 Understand the issues involved in choosing the most appropriate hardware for an e-commerce site.

4.5 Identify additional tools that can improve website performance.

4.6 Understand the important considerations involved in developing a mobile website and building mobile applications.

Walmart Website Redesign: Going Upscale in Its Fight to Compete With Amazon

- Class Discussion
  - Why is Walmart considered an underdog in the e-commerce arena?
  - What was Walmart's objective in redesigning its website?
  - How does Walmart's website differ from Amazon's website?
  - How has the Covid-19 pandemic impacted Walmart?

Imagine Your E-commerce Presence (1 of 3)

- What's the idea? The vision includes:
  - Mission statement
  - Target audience
  - Intended market space
  - Strategic analysis
  - Marketing matrix
  - Development timeline
  - Preliminary budget

Imagine Your E-commerce Presence (2 of 3)

- Where's the money?
  - Business model(s)
  - Revenue model(s)
- Who and where is the target audience?
  - Demographics, lifestyle, consumption patterns, etc.
- What is the ballpark? Characterize the marketplace
  - Size, growth, demographics, structure

Imagine Your E-commerce Presence (3 of 3)

- Where's the content coming from?
- Know yourself-SWOT analysis
- Develop an e-commerce presence map
- Develop a timeline: Milestones
- How much will this cost?
  - Simple website: up to $5000
  - Small startup: $25,000 to $50,000
  - Large corporate website: $100,000+ to millions

Figure 4.1 SWOT Analysis

STRENGTHS

Current sites do not address market needs • Unique approach • Easy navigation • Better personalization • Customer base growing • High-value market segment • Superior social strategy

WEAKNESSES

Limited financial resources • No prior online experience • No existing user base • No media attention • No Web design expertise • No computer background

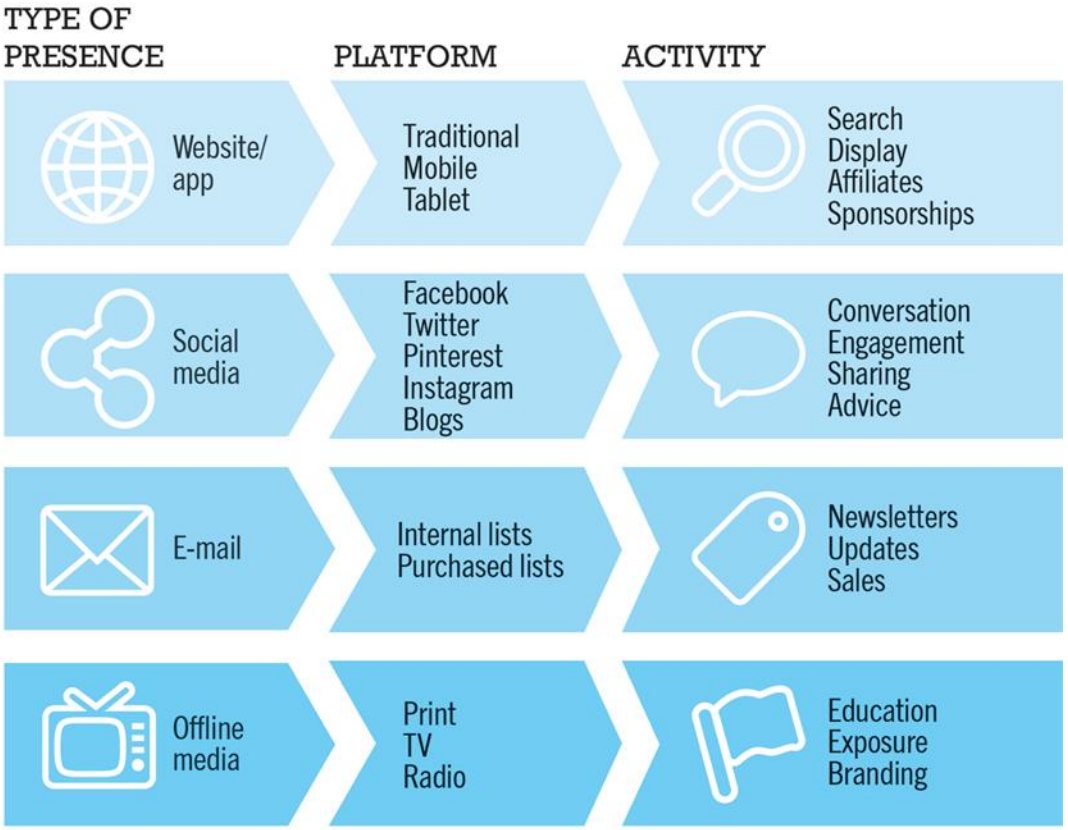
OPPORTUNITIES

Ability to address large market with unmet needs • Potential to capture significant share of this market • Potential to develop related sites

THREATS

Approach could be copied by competitors • Advertisers may not want to try a new site • Rapid pace of technological development • Low market entry costs

Figure 4.2 E-commerce Presence Map



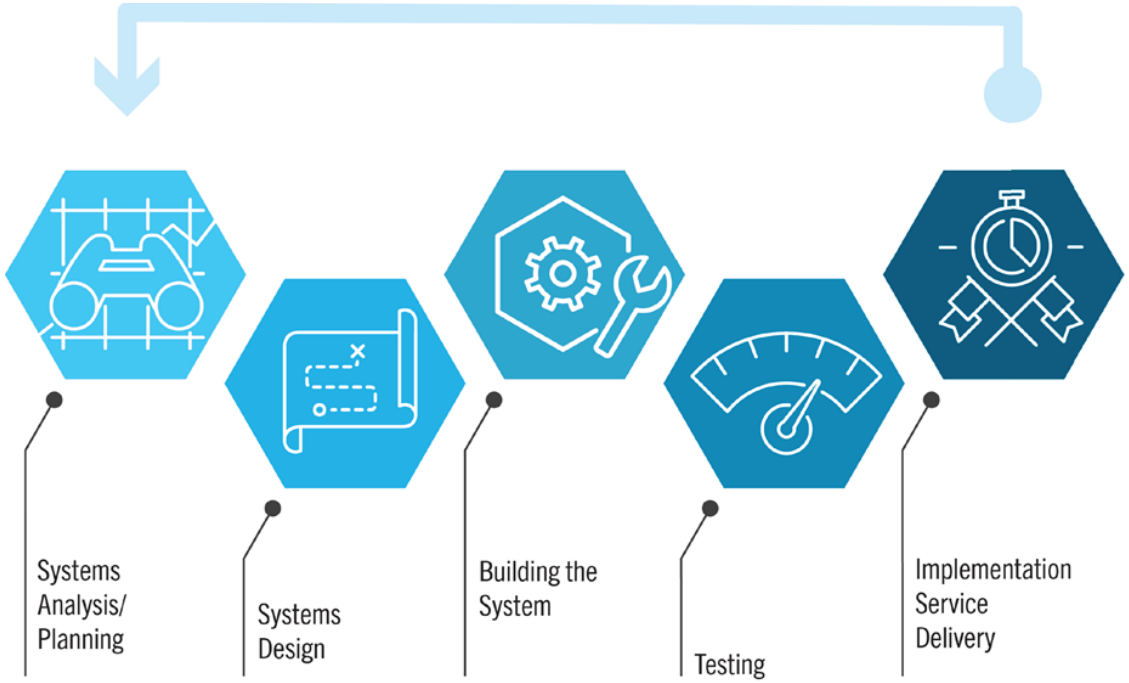
Building an E-commerce Site: A Systematic Approach

- Most important management challenges:
  1. Developing a clear understanding of business objectives
  2. Knowing how to choose the right technology to achieve those objectives
- Main factors to consider
  - Management
  - Hardware architecture
  - Software
  - Design
  - Telecommunications
  - Human resources

Planning: The Systems Development Life Cycle

- Methodology for understanding business objectives of a system and designing an appropriate solution
- Five major steps:
  - Systems analysis/planning
  - Systems design
  - Building the system
  - Testing
  - Implementation

Figure 4.5 Systems Development Life Cycle



System Analysis/Planning

- Business objectives:
  - List of capabilities you want your site to have
- System functionalities:
  - List of information system capabilities needed to achieve business objectives
- Information requirements:
  - Information elements that system must produce in order to achieve business objectives

Table 4.2 System Analysis, Business Objectives, System Functionalities, and Information Requirements for a Typical E-commerce Site (1 of 2)

Business Objective	System Functionality	Information Requirements
Display goods	Digital Catalog	Dynamic text and graphics catalog
Provide product information	Product database	Product description, stocking numbers, inventory levels
Personalize/customize product	Customer on-site tracking	Site log for every customer visit; data mining capability to identify common customer paths and appropriate responses
Engage customers in conversations	On-site blog; user forums	Software with blogging and community forum functionality
Execute a transaction	Shopping cart/payment system	Secure credit card clearing; multiple payment options
Accumulate customer information	Customer database	Name, address, phone, and e-mail for all customers; online customer registration

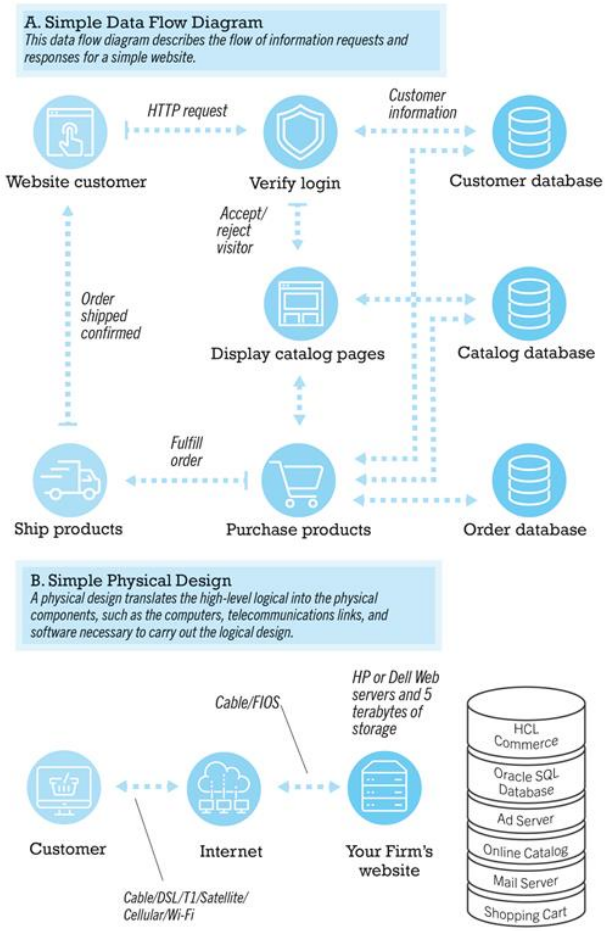
Table 4.2 System Analysis, Business Objectives, System Functionalities, and Information Requirements for a Typical E-commerce Site (2 of 2)

Business Objective	System Functionality	Information Requirements
Provide after-sale customer support	Sales database	Customer ID, product, date, payment, shipment date
Coordinate marketing/advertising	Ad server, e-mail server, e-mail, campaign manager, ad banner manager	Site behavior log of prospects and customers linked to e-mail and banner ad campaigns
Understand marketing effectiveness	Site tracking and reporting system	Number of unique visitors, pages visited, products purchased, identified by marketing campaign
Provide production and supplier links	Inventory management system	Product and inventory levels, supplier ID and contact, order quantity data by product

Systems Design: Hardware and Software Platforms

- System design specification:
  - Description of main components of a system and their relationship to one another
- Two components of system design:
  - Logical design
    - Data flow diagrams, processing functions, databases
  - Physical design
    - Specifies actual physical, software components, models, and so on

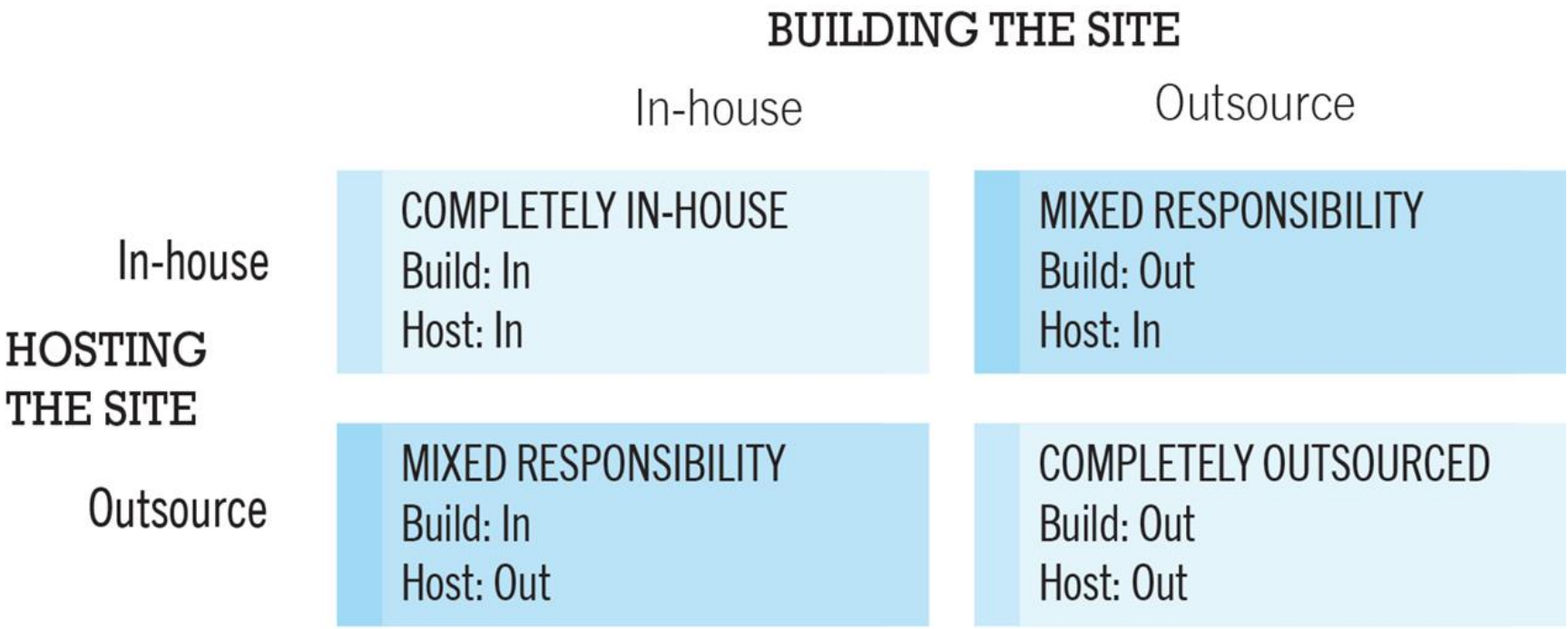
Figure 4.6 A Logical and Physical Design for a Simple Website



Building the System: In-House Versus Outsourcing

- Outsourcing: Hiring vendors to provide services involved in building site
- Build own vs outsourcing:
  - Build your own requires team with diverse skill set; choice of software tools; both risks and possible benefits
- Host own vs outsourcing
  - Hosting: Hosting company responsible for ensuring site is accessible 24/7, for monthly fee
  - Co-location: Firm purchases or leases web server (with control over its operation), but server is located at vendor's facility

Figure 4.7 Choices in Building and Hosting



Insight on Business: Weebly Makes Creating Websites Easy

- Class Discussion
  - What value does Weebly offer to small businesses?
  - Are there any drawbacks to using Weebly to create an e-commerce presence?
  - How are service providers like Weebly changing the nature of e-commerce?

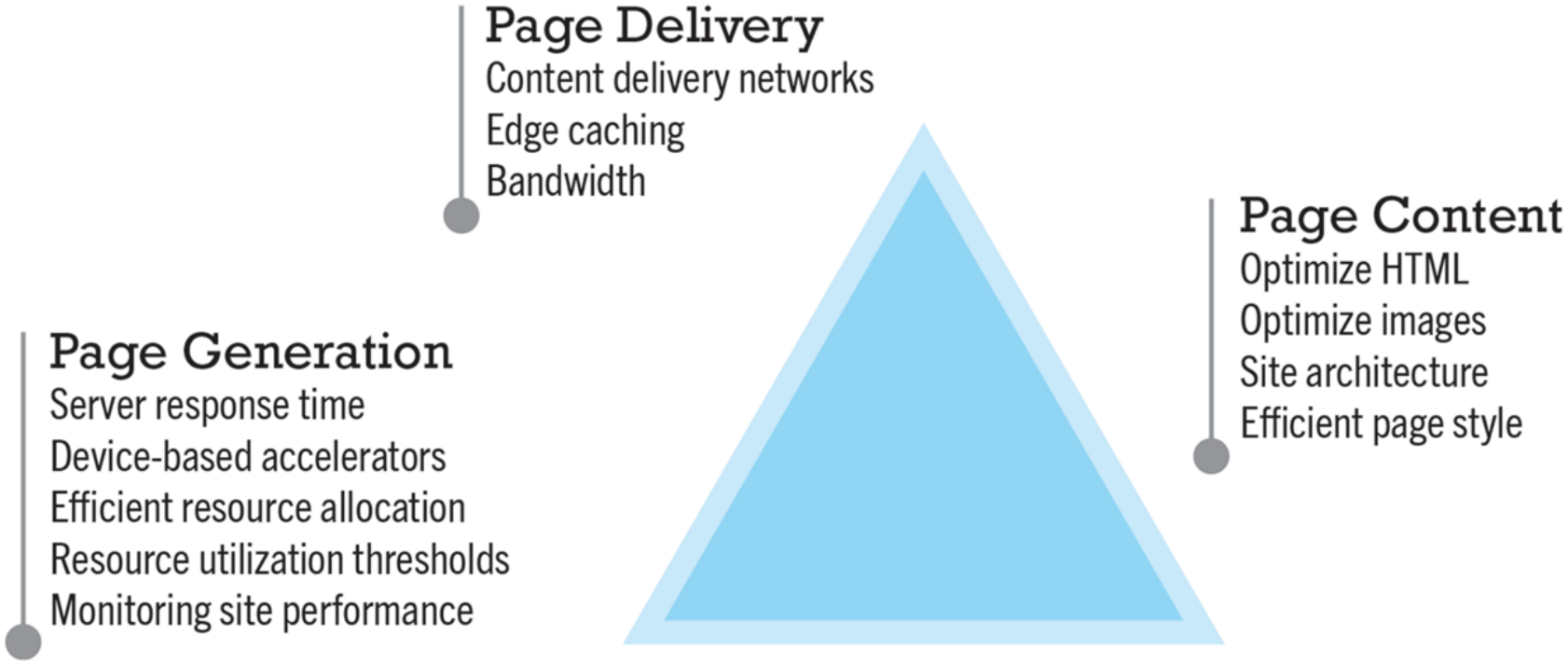
Testing the System

- Testing
  - Unit testing
  - System testing
  - Acceptance testing
  - A/B testing (split testing)
  - Multivariate testing

Implementation, Maintenance, and Optimization

- Systems break down unpredictably
- Maintenance is ongoing
- Maintenance costs: Similar to development costs
  - A $40K e-commerce site may require $40K annually to upkeep
- Benchmarking

Figure 4.10 Factors in Website Optimization



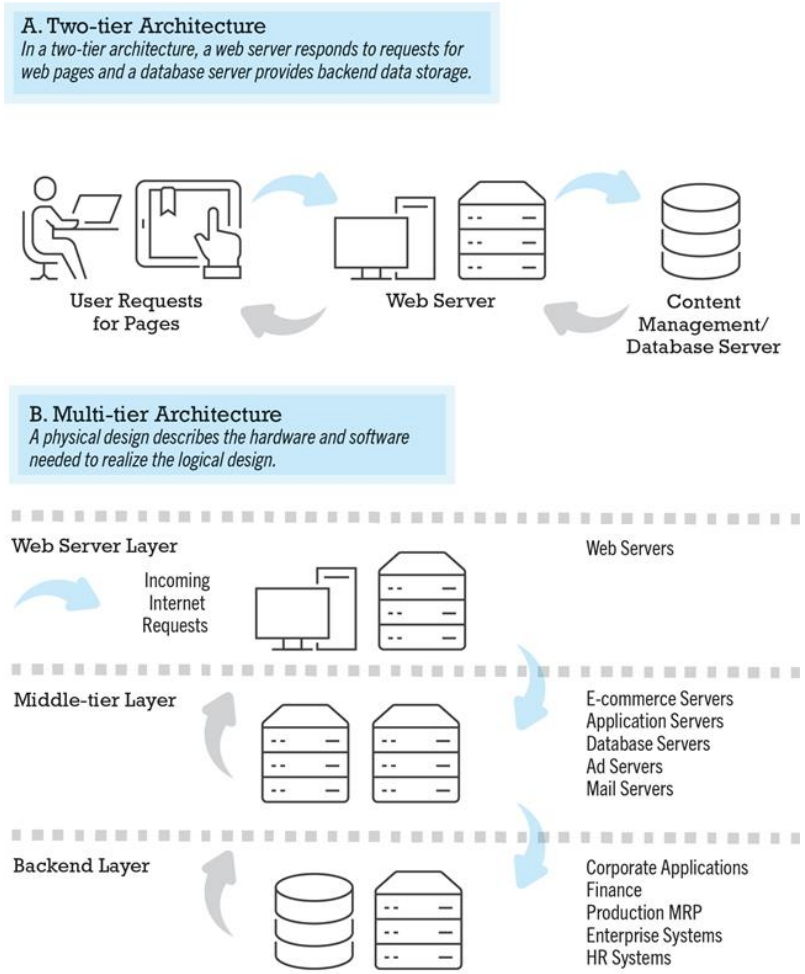
Alternative Web Development Methodologies

- Prototyping
- Agile development
- DevOps
- Component-based development
- Web services
  - Service-oriented architecture (SOA)
  - Microservices

Simple vs Multi-Tiered Website Architecture

- System architecture
  - Arrangement of software, machinery, and tasks in an information system needed to achieve a specific functionality
- Two-tier
  - Web server and database server
- Multi-tier
  - Web application servers
  - Backend, legacy databases

Figure 4.11 Two-Tier and Multi-tier E-commerce Site Architectures



Web Server Software

- Apache
  - Leading web server software
  - Works with UNIX, Linux operating systems
  - Reliable, stable, part of open software community
- Microsoft's Internet Information Server (IIS)
  - Second major web server software
  - Windows-based
  - Integrated, easy-to-use

Table 4.4 Basic Functionality Provided by Web Servers

Functionality	Description
Processing of HTTP requests	Receive and respond to client requests for HTML pages
Security services (Secure Sockets Layer)/Transport Layer Security	Verify username and password; process certificates and private/public key information required for credit card processing and other secure information
File Transfer Protocol	Permits transfer of very large files from server to server
Search engine	Indexing of site content; keyword search capability
Data capture	Log file of all visits, time, duration, and referral source
E-mail	Ability to send, receive, and store e-mail messages
Site management tools	Calculate and display key site statistics, such as unique visitors, page requests, and origin of requests; check links on pages

Site Management Tools

- Basic tools included in all web servers
  - Verify that links on pages are still valid
  - Identify orphan files
- Third-party software for advanced management
  - Monitor customer purchases
  - Marketing campaign effectiveness
  - Keep track of hit counts and other statistics
  - Example: Webtrends Analytics 10

Dynamic Page Generation Tools

- Dynamic HTML (DHTML): used to change a way a web page looks but does not generate a unique web page
- Dynamic page generation:
  - Contents stored in database and fetched when needed to create a unique web page
- Advantages
  - Lowers menu costs
  - Permits easy online market segmentation
  - Enables cost-free price discrimination
  - Enables content management system (CMS)

Application Servers

- Web application servers:
  - Provide specific business functionality required for a website
  - Type of middleware
    - Isolate business applications from Web servers and databases
  - Single-function applications being replaced by integrated software tools that combine all functionality needed for e-commerce site

E-commerce Merchant Server Software

- Provides basic functionality for sales
  - Online catalog
    - List of products available on website
  - Shopping cart
    - Allows shoppers to set aside, review, edit selections, and then make purchase
  - Credit card processing
    - Typically works in conjunction with shopping cart
    - Verifies card and puts through credit to company's account at checkout

Merchant Server Software Packages (1 of 3)

- Integrated environment that includes most of functionality needed
  - Shopping cart
  - Merchandise display
  - Order management

Merchant Server Software Packages (2 of 3)

- Different options for different-sized businesses
  - Small and medium-sized businesses: Shopify; Bigcommerce, Vendio, open-source solutions
  - Mid-range: HCL Commerce; Sitecore Experience Commerce
  - High-end: SAP Hybris Commerce, Oracle ATG Web Commerce, Magento
- Many now also available as cloud-based SaaS solutions.

Merchant Server Software Packages (3 of 3)

- Key factors in selecting a package
  - Functionality
  - Support for different business models, including m-commerce
  - Business process modeling tools
  - Visual site management and reporting
  - Performance and scalability
  - Connectivity to existing business systems
  - Compliance with standards
  - Global and multicultural capability
  - Local sales tax and shipping rules

Choosing Hardware

- Hardware platform:
  - Underlying computing equipment needed for e-commerce functionality
- Objective:
  - Enough platform capacity to meet peak demand without wasting money
- Important to understand the factors that affect speed, capacity, and scalability of a site

Right-Sizing Your Hardware Platform: The Demand Side

- Customer demand:
  - Most important factor affecting speed of site
- Factors in overall demand:
  - Number of simultaneous users in peak periods
  - Nature of customer requests (user profile)
  - Type of content (dynamic vs static Web pages)
  - Required security
  - Number of items in inventory
  - Number of page requests
  - Speed of legacy applications

Right-Sizing Your Hardware Platform: The Supply Side

- Scalability:
  - Ability of site to increase in size as demand warrants
- Ways to scale hardware:
  - Vertically
    - Increase processing power of individual components
  - Horizontally
    - Employ multiple computers to share workload
  - Improve processing architecture
  - Outsource hosting, use content delivery network

Table 4.8 Vertical and Horizontal Scaling Techniques

Technique	Application
Use a faster computer	Deploy edge servers, presentation servers, data servers, etc.
Create a cluster of computers	Use computers in parallel to balance loads.
Use appliance servers	Use special-purpose computers optimized for their task.
Segment workload	Segment incoming work to specialized computers.
Batch requests	Combine related requests for data into groups, process as group.
Manage connections	Reduce connections between processes and computers to a minimum.
Aggregate user data	Aggregate user data from legacy applications in single data pools.
Cache	Store frequently used data in cache rather than on the disk.

Table 4.9 Improving the Processing Architecture of Your Site

Architecture Improvement	Description
Separate static content from dynamic content	Use specialized servers for each type of workload.
Cache static content	Increase RAM to the gigabyte range and store static content in RAM.
Cache database lookup tables	Use cache tables used to look up database records.
Consolidate business logic on dedicated servers	Put shopping cart, credit card processing, and other CPU-intensive activity on dedicated servers.
Optimize ASP code	Examine your code to ensure it is operating efficiently.
Optimize the database schema	Examine your database search times and take steps to reduce access times.

Other E-commerce Site Tools

- Website design: Basic business considerations
  - Enabling customers to find and buy what they need
- Tools for search engine optimization
  - Search engine placement
    - Metatags, titles, content
    - Identify market niches
    - Offer expertise
    - Links
    - Buy ads
    - Local e-commerce

E-commerce Website Features That Annoy Customers (1 of 2)

- Requiring user to view ad or intro page before going to website content
- Pop-up and pop-under ads and windows
- Too many clicks to get to the content
- Links that don’t work
- Confusing navigation; no search function
- Requirement to register and log in before viewing content or ordering
- Slow loading pages
- Content that is out of date

E-commerce Website Features That Annoy Customers (2 of 2)

- Inability to use browser's Back button
- No contact information available (web form only)
- Unnecessary splash/flash screens, animation, etc.
- Music or other audio that plays automatically
- Unprofessional design elements
- Text not easily legible due to size, color, format
- Typographical errors
- No or unclear returns policy

Table 4.11 The Eight Most Important Factors in Successful E-commerce Site Design

Factor	Description
Functionality	Pages that work, load quickly, and point the customer toward your product offerings
Informational	Links that customers can easily find to discover more about you and your products
Ease of use	Simple foolproof navigation
Redundant navigation	Alternative navigation to the same content
Ease of purchase	One or two clicks to purchase
Multi-browser functionality	Site works with the most popular browsers
Simple graphics	Avoids distracting, obnoxious graphics and sounds that the user cannot control
Legible text	Avoids backgrounds that distort text or make it illegible

Tools for Interactivity and Active Content

- Java, JSP, and JavaScript (including Node.js)
  - JavaScript-based tools: React, Vue, Angular JS, D3, jQuery and Ajax)
  - Typescript
- ASP (Active Server Pages)/ASP.NET
- ColdFusion
- PHP, Ruby on Rails, Django
- Other design elements:
  - Widgets, mashups

Personalization Tools

- Personalization: ability to treat people based on personal qualities and prior history with site
  - Website personalization alters site based on who is viewing it
- Customization: ability to change the product to better fit the needs of the customer
  - E-commerce customization focuses on generating personalized product recommendations
- Cookies a basic method to achieve personalization
- Other more sophisticated tools available

The Information Policy Set

- Privacy policy
  - Set of public statements declaring how site will treat customers' personal information that is gathered by site
- Accessibility rules
  - Set of design objectives that ensure users with disabilities can effectively access site

Insight on Society: Designing for Accessibility

- Class discussion:
  - Why might some merchants be reluctant to make their websites accessible to users with disabilities?
  - How can websites be made more accessible?
  - Should all websites be required by law to provide “equivalent alternatives” for visual and sound content?
  - What additional accessibility problems do mobile devices pose?

Developing a Mobile Website and Building Mobile Applications

- Types of m-commerce software
  - Mobile website
    - Responsive Web design
  - Mobile Web app
  - Native app
  - Hybrid app
    - Runs inside native container
    - App distribution
    - Based on HTML5, CSS, JavaScript

Planning and Building a Mobile Presence

- Identify business objectives, system functionality, and information requirements
- Choice:
  - Mobile website or mobile Web app
    - Less expensive
  - Native app
    - Can use device hardware, available offline

Table 4.13 Unique Features That Must Be Taken Into Account When Designing a Mobile Presence

Feature	Implications For Mobile Platform
Hardware	Mobile hardware is smaller, and there are more resource constraints in data storage and processing power.
Connectivity	The mobile platform is constrained by slower connection speeds than desktop websites.
Displays	Mobile displays are much smaller and require simplification. Some screens are not good in sunlight.
Interface	Touch-screen technology introduces new interaction routines different from the traditional mouse and keyboard. The mobile platform is not a good data entry tool but can be a good navigational tool.

Mobile Presence Design Considerations

- Platform constraints
  - Graphics, file sizes
- Mobile first design
  - Desktop website design after mobile design
- Responsive web design (RWD)
  - CSS site adjusts layout of site according to device screen resolutions
- Adaptive web design (AWD)
  - Server delivers different templates or versions of site optimized for device

Cross-Platform Mobile App Development Tools

- Objective C, Java
- Low cost, open-source alternatives
  - Flutter
  - React Native
  - Appery.io
  - Codiqa
  - Swiftic
  - PhoneGap
  - Axway Appcelerator

Mobile Presence: Performance and Cost Considerations

- Mobile first design
  - Most efficient
- Mobile website
  - Resizing existing website for mobile access is least expensive
- Mobile web app
  - Can utilize browser API
- Native app
  - Most expensive; requires more programming

Insight on Technology: Duolingo's Mobile App Powers Language Learning

- Class Discussion
  - Why do you think Duolingo's mobile app has been such a major factor in its success?
  - What business model does Duolingo use?
  - Why is A/B testing an important part of Duolingo's process?

Careers in E-commerce

- Position: UX Designer
- Qualification/Skills
- Preparing for the Interview
- Possible Interview Questions

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