4. Building an eCommerce Presence: Web Sites, Mobile Sites, and Apps

Alexander Nikov

Teaching Objectives

- Explain the process that should be followed in building an e-commerce Web site.
- Describe the major issues surrounding the decision to outsource site development and/or hosting.
- Identify and understand the major considerations in choosing Web server and e-commerce merchant server software.
- Explain the issues involved in choosing the most appropriate hardware for an e-commerce site.
- Identify additional tools that can improve Web site performance.
- Explain the important considerations involved in developing a mobile Web site and building mobile applications.

Outline

1. Imagine your eCommerce presence
2. Building eCommerce website: A systematic approach
3. Choosing software
4. Choosing hardware for eCommerce website
5. Other eCommerce site tools
6. Developing a mobile website and building mobile applications
7. Building eCommerce website: A customer-oriented approach

Video case study:
Nixon eCommerce Web Design
Imagine Your E-commerce Presence

• What’s the idea?
  – Vision
  – Mission statement
  – Target audience
  – Intended market space
  – Strategic analysis
  – Marketing matrix
  – Development timeline
  – Preliminary budget

Imagine Your E-commerce Presence (cont.)

• Where’s the money?
  – Business model(s):
    • Portal, e-tailer, content provider, transaction broker, market creator, service provider, community provider (social networks)
  – Revenue model(s):
    • Advertising, subscriptions, transaction fees, sales, and affiliate revenue

Imagine Your E-commerce Presence (cont.)

• Who and where is the target audience?
  – Describing your audience
    • Demographics
      – Age, gender, income, location
    • Behavior patterns (lifestyle)
    • Consumption patterns (purchasing habits)
    • Digital usage patterns
    • Content creation patterns (blogs, Facebook)
    • Buyer personas

Imagine Your E-commerce Presence (cont.)

• Characterize the marketplace
  – Demographics
  – Size, growth, changes
  – Structure
    • Competitors
    • Suppliers
    • Substitute products
  • Where is the content coming from?
    – Static or dynamic?
Imagine Your E-commerce Presence (cont.)

- Know yourself—SWOT analysis
- Develop an e-commerce presence map
- Develop a timeline: Milestones
- How much will this cost?
  - Simple Web sites: up to $5000
  - Small Web start-up: $25,000 to $50,000
  - Large corporate site: $100,000+ to millions
Building an eCommerce Site: A Systematic Approach

- Most important management challenges:
  - Developing a clear understanding of business objectives
  - Knowing how to choose the right technology to achieve those objectives

1.1. Pieces of the Site-Building Puzzle

- Main areas where you will need to make decisions:
  - Human resources and organizational capabilities
    - Creating team with skill set needed to build and manage a successful site
  - Hardware
  - Software
  - Telecommunications
  - Site design
1.2. The Systems Development Life Cycle

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

1.3. System Analysis

- 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
1.4. 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:
  1. Logical design
     - Data flow diagrams, processing functions, databases
  2. Physical design
     - Specifies actual physical, software components, models, etc.
1.5. Build/Host Your Own 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
1.6. Testing, Implementation, and Maintenance

- Testing
  - Unit testing
  - System testing
  - Acceptance testing

- Implementation and maintenance:
  - Maintenance is ongoing
  - Maintenance costs: parallel to development costs
  - Benchmarking

1.7. Factors in Optimizing Web Site Performance

- Page Delivery
  - Content delivery networks
  - Edge caching
  - Bandwidth

- Page Generation
  - Server response time
  - Device-based accelerators
  - Efficient resource allocation
  - Resource utilization thresholds
  - Monitoring site performance

Figure 4.7, Page 214

1.8. Web Site Budgets

- From $5,000 to millions of dollars/year

- Components of budget:
  - System maintenance
  - System development
  - Content design & development
  - Hardware
  - Telecommunications
  - Software

Figure 4.8, Components of a Web Site Budget

- Content design and development: 15%
- Hardware: 10%
- Software: 8%
- Telecommunications: 10%
- System maintenance: 35%
- System development: 22%
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2.1. Simple versus Multi-tiered Web Site 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

Two-Tier eCommerce Architecture

(a) Two-tier Architecture
In a two-tier architecture, a Web server responds to requests for Web pages and a database server provides backend data storage.

Multi-tier eCommerce Architecture

(b) Multi-tier Architecture
In a multi-tier architecture, a Web server is linked to a middle-tier layer that typically includes a series of application servers that perform specific tasks, as well as a backend layer of existing corporate systems.
2.2. Web Server Software

- Apache
  - Leading Web server software (51% of market)
  - Works with UNIX, Linux operating systems
- Microsoft’s Internet Information Server (IIS)
  - Second major Web server software (12% of market)
  - Windows-based

Site Management Tools

- Basic tools
  - Included in all Web servers
  - Verify that links on pages are still valid
  - Identify orphan files
- Third-party software and services for advanced site management
  - Monitor customer purchases, marketing campaign effectiveness, etc.
  - E.g. WebTrends Analytics 10, Google Analytics

Dynamic Page Generation Tools

- Dynamic page generation:
  - Contents of Web page stored as objects in database and fetched when needed
- Common tools: CGI, ASP, JSP, ODBC, JDBC
- Advantages
  - Lowers menu costs
  - Permits easy online market segmentation
  - Enables cost-free price discrimination
  - Enables content management system (CMS)
2.3. Application Servers

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

2.4. eCommerce Merchant Server Software

- Provides basic functionality for online sales
  - Online catalog
    - List of products available on Web site
  - 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

2.5. Merchant Server Software Packages

- Integrated environment with most or all of functionality needed
- Key factors in selecting a package
  - Functionality
  - Support for different business models
  - 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
2.6. Web Services and Open-Source Options

- Options for small firms
  - Hosted eCommerce sites, e.g., Yahoo's Merchant Solutions
    - Site building tools
    - E-commerce templates
  - Open-source merchant server software
    - Enables you to build truly custom site
    - Requires programmer with expertise, time

<table>
<thead>
<tr>
<th>FUNCTIONALITY</th>
<th>OPEN SOURCE SOFTWARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web server</td>
<td>Apache (the leading Web server for small and medium businesses)</td>
</tr>
<tr>
<td>Shopping cart, online catalog</td>
<td>Many providers: osCommerce, Zen Cart, AgoraCart, X-cart, AspDotNetStorefront</td>
</tr>
<tr>
<td>Credit card processing</td>
<td>Credit card acceptance is typically provided in shopping cart software but you may need a merchant account from a bank as well.</td>
</tr>
<tr>
<td>Database</td>
<td>MySQL (the leading open source SQL database for businesses)</td>
</tr>
<tr>
<td>Programming/scripting language</td>
<td>PHP is a scripting language embedded in HTML documents but executed by the server, providing server-side execution with the simplicity of HTML editing. Perl is an alternative language. JavaScript programs are client-side programs that provide user interface components. Ruby on Rails (ROR, Rails) and Django are other popular open source Web application frameworks.</td>
</tr>
<tr>
<td>Analytics</td>
<td>Analytics keep track of your site’s customer activities and the success of your Web advertising campaign. You can also use Google Analytics if you advertise on Google, which provides good tracking tools; most hosting services will provide these services as well. Other open source analytic tools include Flurry, ClickTracks, and Open Web Analytics.</td>
</tr>
</tbody>
</table>

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Choosing Hardware

- Hardware platform:
  - Underlying computing equipment that system uses to achieve eCommerce functionality

- Objective:
  - Enough platform capacity to meet peak demand without wasting money

- Important to understand the different factors that affect speed, capacity, and scalability of a site
3.1. 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 versus static Web pages)
  - Required security
  - Number of items in inventory
  - Number of page requests
  - Speed of legacy applications

<table>
<thead>
<tr>
<th>Table 4.7</th>
<th>FACTORS IN RIGHT-SIZING AN E-COMMERCE PLATFORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE TYPE</td>
<td>PUBLISH/SHOPPING</td>
</tr>
<tr>
<td>Examples</td>
<td>W3.com</td>
</tr>
<tr>
<td>Content</td>
<td>Dynamic</td>
</tr>
<tr>
<td></td>
<td>Multiple authors</td>
</tr>
<tr>
<td></td>
<td>High volume</td>
</tr>
<tr>
<td></td>
<td>Not user specific</td>
</tr>
<tr>
<td>Security</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent secure pages</td>
<td>Low</td>
</tr>
<tr>
<td>Cross session information</td>
<td>No</td>
</tr>
<tr>
<td>Searches</td>
<td>Dynamic</td>
</tr>
<tr>
<td></td>
<td>Low volume</td>
</tr>
<tr>
<td>Unique items (ODU)</td>
<td>High</td>
</tr>
<tr>
<td>Transaction volume</td>
<td>Moderate</td>
</tr>
<tr>
<td>Legacy integration complexity</td>
<td>Low</td>
</tr>
<tr>
<td>Page views (β/τ)</td>
<td>High to very high</td>
</tr>
</tbody>
</table>

Degradation in Performance as Number of Users Increases—Resource Utilization

Degradation in Performance as Number of Users Increases—Number of Connections
3.2. 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

### Table 4.8: Vertical and Horizontal Scaling Techniques

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

### Figure 4.14: Vertically Scaling a System

```
HP ProLiant Server DL140 G3
Intel Xeon Dual Core 1.6 GHz 1 GB RAM

HP ProLiant Server DL140 G3
Intel Xeon Dual Core 3 GHz 2 GB RAM

HP ProLiant Server DL585 G3
AMD Opteron Dual Core 2.8GHz 8 GB RAM

HP ProLiant Server DL585 G3
AMD Opteron Quad Core 2.8 GHz 16 GB RAM
```

### Figure 4.15: Horizontally Scaling a System

```
Web Server 1
- ISAPI Commerce Server 1
- LDAP Server 1

Web Server 2
- ISAPI Commerce Server 2
- LDAP Server 2

SQL Server
- Membership Root
```

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4-53
4-54
4-55
4-56
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### 4.1. Other eCommerce Site Tools

- Web site design: Basic business considerations
  - Enabling customers to find and buy what they need
- Tools for Web site optimization
  - Search engine placement
    - Metatags, page titles, content
    - Identify market niches, localize site
    - Expertise
    - Links
    - Search engine ads
    - Local eCommerce

### TABLE 4.9

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

Table 4.9, Page 222

### TABLE 4.10

| E-COMMERCE WEB SITE FEATURES THAT ANNOY CUSTOMERS |
|-------------------------------------------------|----------------------------------------------|
| Requiring user to view ad or Flash introduction before going to Web site content | Inability to use browser’s Back button |
| Pop-up and pop-under ads and windows            | No contact information available (Web form only) |
| Links that don’t work                           | Unnecessary splash/flash screens, animation, etc. |
| Confusing navigation; no search function        | Music or other audio that plays automatically |
| Requirement to register and log in before viewing content or ordering | Text not easily legible due to size, color, format |
| Slow loading pages                              | Typographical errors                      |
| Content that is out of date                     |                                              |

Table 4.10, Page 223
### 4.3. Tools for Interactivity and Active Content

- CGI (Common Gateway Interface)
- ASP (Active Server Pages)/ASP.NET
- Java, JSP, and JavaScript
- ActiveX and VBScript
- ColdFusion
- PHP, Ruby on Rails, Django
- Web 2.0 design elements:
  - Widgets, mashups

### 4.4. Personalization Tools

- **Personalization**
  - Ability to treat people based on personal qualities and prior history with site
- **Customization**
  - Ability to change the product to better fit the needs of the customer
- **Cookies**
  - Primary method to achieve personalization

### 4.5. 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 disabled users can affectively access site

---

**Table 4.11**

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

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### Developing a Mobile Web Site and Building Mobile Applications

- Three types of mobile e-commerce software
  - Mobile Web site
    - 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 Web site or mobile Web app
    - Less expensive
  - Native app
    - Can use device hardware, available offline

### System Analysis for Building a Mobile Presence

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive sales</td>
<td>Digital catalog; product database</td>
</tr>
<tr>
<td>Branding</td>
<td>Showing how customers use your products</td>
</tr>
<tr>
<td>Building customer community</td>
<td>Interactive experiences, games with multiple players</td>
</tr>
<tr>
<td>Advertising and promotion</td>
<td>Coupons and flash sales for slow-selling items</td>
</tr>
<tr>
<td>Gathering customer feedback</td>
<td>Ability to retrieve and store user inputs including text, photos, and video</td>
</tr>
<tr>
<td></td>
<td>Product descriptions, photos, SKUs, Inventory</td>
</tr>
<tr>
<td></td>
<td>Videos and rich media; product and customer demonstrations</td>
</tr>
<tr>
<td></td>
<td>Games, contests, forums, social sign-up to Facebook</td>
</tr>
<tr>
<td></td>
<td>Product descriptions, coupon management, and inventory management</td>
</tr>
<tr>
<td></td>
<td>Customer sign-in and identification; customer database</td>
</tr>
</tbody>
</table>
Mobile Presence: Design Considerations

- Platform constraints
  - Graphics, file sizes
- Mobile first design
  - Desktop Web site 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
  - Appery.io
  - Codiqua
  - PhoneGap
  - MoSynch
  - Appcelerator

Performance and Cost Considerations

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

<table>
<thead>
<tr>
<th>TABLE 4.13</th>
<th>UNIQUE FEATURES THAT MUST BE TAKEN INTO ACCOUNT WHEN DESIGNING A MOBILE WEB PRESENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEATURE</td>
<td>IMPLICATIONS FOR MOBILE PLATFORM</td>
</tr>
<tr>
<td>Hardware</td>
<td>Mobile hardware is smaller, and there are more resource constraints in data storage and processing power.</td>
</tr>
<tr>
<td>Connectivity</td>
<td>The mobile platform is constrained by slower connection speeds than desktop Web sites.</td>
</tr>
<tr>
<td>Displays</td>
<td>Mobile displays are much smaller and require simplification. Some screens are not good in sunlight.</td>
</tr>
<tr>
<td>Interface</td>
<td>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.</td>
</tr>
</tbody>
</table>

Table 4.13, Page 246
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What Does a Web Site Do?

- Web site is a virtual storefront
- The customers are cyber-customers
- Emphasis is on
  - Need
  - Efficiency
  - Good response time
  - Availability of procedures that expedite a sale

- A Web site is basically a series of pages with links to other pages or other sites

Key Components of a Web Site

- Homepage is the first page of a site that appears when one visits a URL address
- Web page is a carrier of information reached by clicking a button on a homepage
- Link is a connector that makes it possible to go to another Web page on the site or on the Internet, or go back to the homepage
- Banner is a graphic display on a Web page, usually used for advertising

Web Site Benefits

- Reach millions of customers quickly and reliably
- Establish a presence in cyberspace
- Leverage advertising costs
- Reduce the cost of serving customers
- Promote public relations
- Reach international markets and customers
- Test-market new product or services
5.1. Site Building Life Cycle

Objectives of a Customized Web Site

- Speed up the interactive process
- Reduce human intervention to a minimum
- Save time
- Make buying and selling through the site cost-effective

Planning Stage

- Provide for quick application development and deployment
- Define site’s goals
  - Determine who will be involved in defining the goals
  - Determine if there is time or a need for formal definition
- Decide on the site’s mission
- Who is the intended audience?
- Why will people want to visit the stage?

Define the Audience and the Competition

- Determining your audience, their goals and objectives
- Generate a list of intended audiences
- Identify what prospective customers want
- Goal is to enhance site visitors’ experience
  - Escorting them quickly to the merchandise
  - Speed and responsiveness are crucial
  - The seven-second rule
- See how well the site matches users’ needs
- Competitive analysis
Build Site Content

- What the site will contain
- Content inventory is a list of the company activities (contents) that make up the Web site
- Determine the order of priority of each function or department
- The designer needs to determine the feasibility of each function
- Content and functional requirements

Define the Site Structure

- Site structure is an organized layout of a merchant’s departments or functions that becomes the basis for the Web site
  - Easy site navigation
  - Well-laid-out pages and templates
  - The structure that holds the entire site together

Architectural Blueprints of Site Contents

<table>
<thead>
<tr>
<th>Brand</th>
<th>Banner Ad</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTENT</td>
<td></td>
</tr>
<tr>
<td>Footer</td>
<td></td>
</tr>
</tbody>
</table>

Develop the Visual Design

- Find main goal, attracting and retaining visitors
- Use a layout grid to show how well the elements fit together
- Branding company’s logo on each page
- Content is the critical part of a page
- Establish look and feel of the site via page mock-ups
- Personalization
  - Tracking the user’s behavior
  - Cookies are bits of code that sit in a user’s browser memory and identify the visitor to the Web site
Design Languages

- Hypertext Markup Language (HTML)
  - Text-based
  - Standards
- Java is another popular language for designing
- Multimedia-enriched content
  - Macromedia Flash and Shockwave
  - Extensible Markup Language (XML)
  - Vector Markup Language (VML)

5.2. Constructing Your Web Site

- Storefront Building Service
- Web-Hosting Service
  - Web host representative meets with you and explains the aspects of Web design
  - The web host begins to collect content from you to build a custom Web site
  - Once the website passes the test, the firm begins to write the keywords and metatags and submits the Web site to leading search engines, Web directories, and industry sites
  - A reputable web host also supports maintenance and future enhancements in a yearly contract or a long term agreement
- Do It Yourself

5.3. Web Navigation Design

- Creating user profiles
  - Customer profile is a brief study of the type of person who might visit your Web site
- Using scenarios
  - Scenario is a situation that helps you view the navigation process and the site as a point of entry
- What about cultural differences?
- Design a user-friendly site
- Design guidelines

5.4. Design Criteria

- Appearance and quality design
  - Quality assurance (QA) is a process used to check the readiness of a site before it is loaded on the Web
  - Style guide is a template designed to measure the materials used to build the Web site
- Public exposure
- Viewability and Resolution
- Consistency
- Scalability
- Security
- Performance
- Navigation and interactivity
Why Web Site Projects Fail?

- Unrealistic deadlines
- Incompetent or inadequate staffing
- Poor quality design
- Changing requirements of the client
- Filling Web positions