

Part III:

E-commerce Website Infrastructure: Software

1. E-commerce Website Architecture

- System architecture
 - System architecture refers to the arrangement of software, machinery, and tasks in an information system needed to achieve a specific functionality (much like a home's architecture refers to the arrangement of building materials to achieve a particular functionality).

系統架構指的是實現特定功能所需的信息系統中的軟件、機械和任務的布置（非常類似於房屋架構，房屋架構指的是實現特定功能的建築材料的布置）。

- Single-tier architecture 單層式架構
- Two-tier architecture 兩層式構架
- Multi-tier architecture 多層式構架

1. E-commerce Website Architecture

- **Single architecture 單層式構架**

- Prior to the development of e-commerce, websites simply delivered web pages to users who were making requests through their browsers for HTML pages with content of various sorts. Website software was appropriately quite simple—it consisted of a server computer running basic web server software. We might call this arrangement a single-tier system architecture.

在電子商務蓬勃發展之前，網站的功能非常簡單，只是響應用戶通過瀏覽器發出的HTML頁面請求，再把網頁傳回至用戶端即可。網站軟件相當簡單，它由一臺運行基本web服務器軟件的服務器計算機組成，可將這種安排稱為單層式架構。

- **Two-tier architecture 兩層式構架**

- Two-tier architecture e-commerce system architecture in which a web server responds to requests for web pages and a database server provides backend data storage.

Web服務器響應來自客戶端的網頁請求，數據庫服務器提供後臺數據存儲功能。

- **Multi-tier architecture 多層式構架**

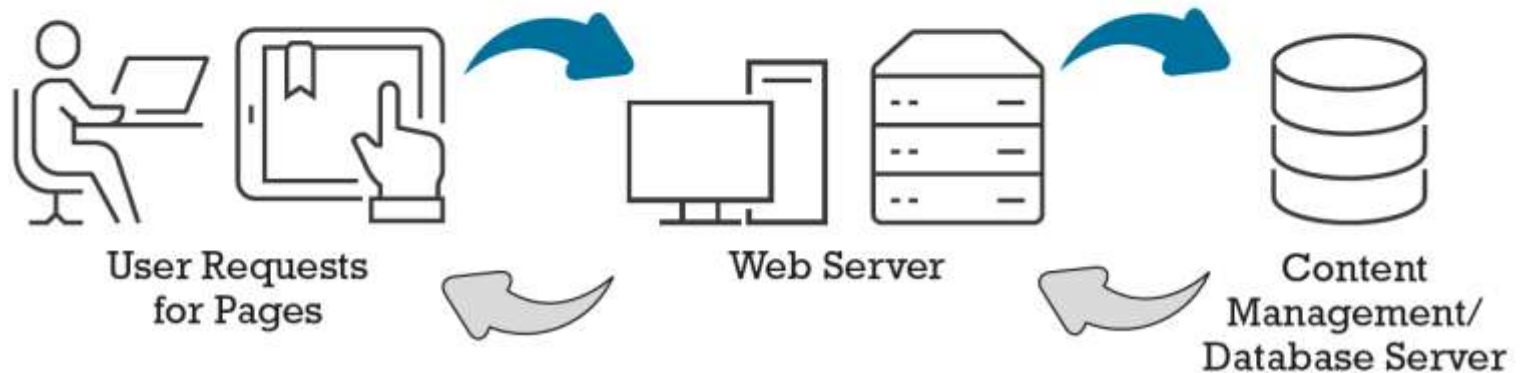
- Two-tier architecture e-commerce system architecture in which the web server is linked to a middle-tier layer that typically includes a series of application servers that perform specific tasks, as well as to a backend layer of existing corporate systems containing product, customer, and pricing information. A multi-tiered site typically employs several computers, each running some of the software applications and sharing the workload across many computers.

Web服務器與實現特定功能的一系列應用服務器構成的中間層，以及存放產品、客戶和價格等信息的現有企業系統構成的後端層相連。多層式網站通常配備多臺計算機，每臺機器都運行一些軟件程序，各臺計算機之間還要實現數據共享。

1. E-commerce Website Architecture

A. Two-tier Architecture

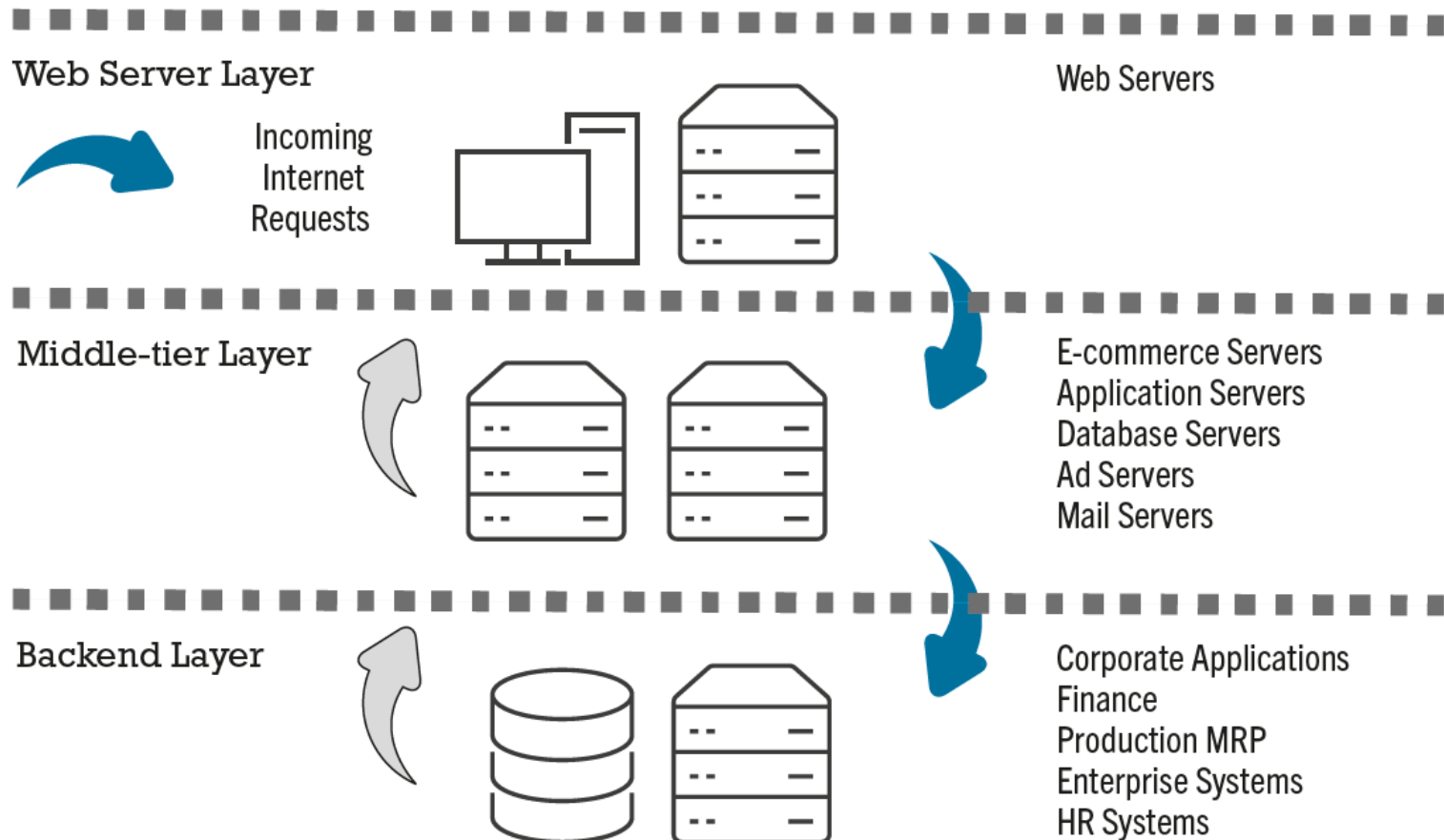
In a two-tier architecture, a web server responds to requests for web pages and a database server provides backend data storage.



1. E-commerce Website Architecture

B. Multi-tier Architecture

A physical design describes the hardware and software needed to realize the logical design.



2. Web Server Software

- E-commerce sites need to install basic web server software to answer requests from customers for HTML and XML pages.

電子商務網站需要安裝基本的web服務器軟件，以此來響應用戶發出的 HTML 和 XML 頁面請求。

Basic Functionality Provided by Web Server Software

| Functionality | Description |
|-----------------------------|--|
| Processing of HTTP requests | Receive and respond to client requests for HTML pages |
| Security services | 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 | Create 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 webpages |

2. Web Server Software

- Apache

- Leading web server software (Netcraft, 2022)

Web服務器軟件的領頭羊 (Netcraft, 2022)

- Works with UNIX, Linux operating systems

在Unix和Linux操作系統中運行

- Developed by a worldwide community of Internet innovators. Apache is free and can be downloaded from many sites on the Web.

由全世界的互聯網高手共同開發。Apache是免費的，可以從 Web 上的許多站點下載。

- There are thousands of utility software programs written for Apache that can provide all the functionality required for a contemporary e-commerce site.

有成千上萬的為 Apache 編寫的實用程序，可以提供現代電子商務網站所需的所有功能。

2. Web Server Software

- Microsoft's Internet Information Server (IIS)
 - Another popular type of web server software
 - IIS is based on the Windows operating system and is compatible with a wide selection of Microsoft utility and support programs.

IIS 基於 Windows 操作系統，兼容多種 Microsoft 實用程序和其他支持程序。

- Utility program is used to help analyze, configure, optimize or maintain a computer, such as Disk partition editors, Disk cleaners.

實用程序是用於幫助分析、配置、優化、維護計算機的系統程序，如磁盤分區程序、磁盤清理程序。

2. Web Server Software

- Basic tools included in all web servers

包含在所有web服務器中的基本工具

- Verify that links on pages are still valid

檢驗頁面中的超鏈接是否依然有效

- Identify orphan files

找出網站中的孤立文件

- Some third-party software has more advanced management functions

一些第三方軟件更有高級管理功能

- Third-party software for advanced management

- Monitor customer purchases 監測客戶購買行為

- Marketing campaign effectiveness 網站營銷活動效果

- Keep track of hit counts and other statistics 跟踪點擊總數和其他統計數據

2. Web Server Software

Site Management Tools

- Site management tools are an important functionality of web server software. Site management tools verify that links on pages are still valid and also identify orphan files, or files on the site that are not linked to any pages. By surveying the links on a website, a site management tool can quickly report on potential problems and errors that users may encounter. Links to URLs that have moved or been deleted are called dead links; these can cause error messages for users trying to access that link. Regularly checking that all links on a site are operational helps prevent irritation and frustration in users who may decide to take their business to a better-functioning site.

網站管理工具是 web 服務器軟件的一項重要功能。網站管理工具可以驗證頁面上的鏈接是否仍然有效，並標識孤立文件或網站上未鏈接到任何頁面的文件。通過調查網站上的鏈接，網站管理工具可以快速報告用戶可能遇到的潛在問題和錯誤。如果用戶在你的網站上遇到“404:頁面不存在”的消息，這將會給他們留下不好的印象。那些被移動或被刪除的超鏈接通常稱為死鏈接，對於嘗試訪問該鏈接的用戶，這些可能會導致錯誤消息。定期檢查所有的鏈接對網站的運營大有益處，可以有效地避免挑剔的用戶一怒之下將業務轉向其他網站的情況出現。

2. Web Server Software

Site Management Tools

- Even more importantly, site management tools can help you understand consumer behavior on your website. More sophisticated site management software and services, such as those provided by Webtrends, can be purchased in order to more effectively monitor customer purchases and marketing campaign effectiveness, as well as keep track of standard hit counts and page visit information. These services can track your e-commerce presence on the Web, mobile, and social network platforms.

更重要的是，網站管理工具可以幫助你瞭解網站上的消費者行為。可以購買網站管理軟件和服務，例如由 Webtrends 提供的網站管理軟件和服務，以便更有效地監管客戶購買和市場營銷活動效果，並跟踪頁面點擊總數和頁面訪問信息。這些服務能夠追踪你在互聯網、移動端和社交網絡三個平臺上的電子商務活動。

2. Web Server Software

Site Management Tools



Webtrends Analytics

Using a sophisticated web analytics solution such as Webtrends Analytics, managers can quickly understand the return on investment of their online marketing efforts and determine how to improve conversion by drilling down into abandonment paths, product preferences, and successful campaign elements for different types of customers.

2. Web Server Software

Dynamic Page Generation Tools 動態頁面生成工具

- One of the most important innovations in website operation has been the development of dynamic page generation tools. Prior to the development of e-commerce, websites primarily delivered unchanging, static content in the form of HTML pages.

動態頁面生成工具的開發是網站操作中最重要之創新之一。在電子商務發展之前，網站主要以 HTML 頁面的形式交付不變的靜態內容。

- The content of successful e-commerce sites is always changing, often day by day. These sites feature new products and promotions, changing prices, news events, and stories of successful users. E-commerce sites must intensively interact with users who not only request pages but also request product, price, availability, and inventory information. E-commerce sites are just like real markets— they are dynamic. News sites, where stories change constantly, also are dynamic..

成功的電子商務網站的內容總是在不斷變化，並且每天都在變化，有新產品和促銷、不斷變化的價格、新聞事件和成功用戶的故事。由於用戶不僅希望看到頁面，更希望得到產品、價格、實用性以及庫存數量等信息，因此電子商務網站必須隨時保持與用戶之間的密切交流。電子商務網站就像真實的市場一樣，是動態的。新聞網站的新聞不斷變化，新聞網站也是動態的。

2. Web Server Software

Dynamic Page Generation Tools 動態頁面生成工具

- The dynamic and complex nature of e-commerce sites requires a number of specialized software applications in addition to static HTML pages. **Dynamic HTML (DHTML)** is a term used to refer to a collection of technologies, including HTML, CSS, JavaScript, and the Document Object Model (DOM) (an application programming interface), that can be used together to create interactive websites. DHTML can be used to change the way a page looks but does not actually generate a unique page. Dynamic web page generation is more complex. With dynamic page generation, the contents of a web page are stored as objects in a database, rather than being hard-coded in HTML. When the user requests a web page, the contents for that page are then fetched from the database. The objects are retrieved from the database using Java Server Pages (JSP), Node.js, ASP.NET, or other server-side programs. This technique is much more efficient than working directly in HTML code. It is much easier to change the contents of a database than it is to change the coding of an HTML page.

電子商務網站的動態和複雜特性使之除了需要靜態HTML頁面外，還需要許多專業軟件工具的支持。**動態HTML**是一個術語，用於表示一組技術，包括 HTML、CSS、JavaScript 和文檔對象模型（一種 App 編程接口），可以一起使用它們來創建交互式網站。DHTML可用於更改頁面的外觀，但實際上不會生成唯一的頁面。動態頁面生成更加複雜。通過動態頁面生成，網頁的內容作為對象存儲在數據庫中，而不是用HTML硬編碼。當用戶發出網頁請求時，就會從數據庫中獲取該網頁的內容。可使用Java服務器頁面Node.js、ASP.NET或其他服務器端程序從數據庫中檢索對象。這種技術比直接在 HTML代碼中工作要有效得多。更改數據庫的內容比更改 HTML頁面的編碼要容易得多。

2. Web Server Software

Dynamic Page Generation Tools 動態頁面生成工具

- Dynamic page generation gives e-commerce several significant capabilities compared to traditional commerce. Dynamic page generation lowers menu costs (the costs incurred by merchants for changing product descriptions and prices). Dynamic page generation also permits easy online market segmentation—the ability to sell the same product to different markets. The same capability makes possible nearly cost-free price discrimination—the ability to sell the same product to different customers at different prices. Dynamic page generation also enables the use of a web content management system (WCMS). A web content management system (WCMS) is used to create and manage web content. It separates the design and presentation of content (such as HTML documents, images, video, and audio) from the content creation process. The content is maintained in a database and dynamically linked to the website. A CMS usually includes templates that can be automatically applied to new and existing content, WYSIWYG editing tools that make it easy to edit and describe (tag) content, and collaboration, workflow, and document management tools.

與傳統商業相比，動態頁面生成使電子商務網站獲得了成本及盈利優勢。動態頁面生成降低了菜單成本（商戶因更改產品描述和價格而產生的成本）。動態頁面生成還可以輕鬆實現在線市場細分---可以將同一產品銷售到不同的市場。這種能力也使得無成本的價格歧視--以不同的價格向不同的客戶出售相同的產品成為可能。動態頁面生成還可以使用CMS。如前所述，CMS用於創建和管理網站內容CMS將內容（例如HTML文檔、圖像、視頻和音頻）的設計和呈現與內容的創建過程分開。內容保存在數據庫中，並動態鏈接到網站。CMS通常包括：可自動應用於新內容和現有內容的模板、可輕鬆編輯和描述（標記）內容的WYSIWYG編輯工具，以及協作、工作流程和文檔管理工具。

2. Web Server Software

Dynamic Page Generation Tools 動態頁面生成工具

In summary:

- With dynamic page generation, the contents of a web page are stored as objects in a database, rather than being hard-coded in HTML. When the user requests a web page, the contents for that page are then fetched from the database.

在動態頁面開發中，網頁內容作為對象存儲在數據庫中，而不是直接使用HTML進行編碼。當用戶請求一個網頁時，該頁面的內容再從數據庫中調出。

- The objects are retrieved from the database using Common Gateway Interface (CGI), Active Server Pages (ASP), Java Server Pages (JSP), or other server-side programs.

使用公共網關接口、動態服務器網頁、Java服務器網頁或其他服務器端程序從數據庫中檢索對象。

2. Web Server Software

Dynamic Page Generation Tools 動態頁面生成工具

- **Advantages**

- This technology is much more efficient than working directly in HTML code, because it is much easier to change the contents of a database than it is to change the coding of an HTML page.

這種技術比直接使用HTML編碼更高效，因為更改數據庫的內容比更改HTML頁面的代碼更容易。

- Dynamic page generation lowers menu costs (the costs incurred by merchants for changing product descriptions and prices).

動態頁面生成降低了菜單成本（商家因更改產品描述和價格而產生的成本）

- This makes possible nearly cost-free price discrimination— the ability to sell the same product to different customers at different prices.

這使得無成本的差別定價成為可能——能夠以不同的價格向不同的客戶銷售相同的產品

- Dynamic page generation enables the use of a content management system (CMS).

動態頁面生成支持使用內容管理系統。

3. Application Servers

- Provide specific business functionality required for a website, such as catalog display, transaction processing (shopping cart), database, streaming media, advertising, and e-mail.

提供網站所需的特定商務功能的軟件程序，如目錄顯示、交易處理（購物車）、數據庫、流媒體、廣告和電子郵件

- Basic idea is to isolate the business applications from the details of displaying web pages to users on the front end and the details of connecting to databases on the backend.

基本思想是把商務應用程序與前臺顯示網頁、後臺連接數據庫的細節工作分離。

- Application servers are a kind of middleware software that provides the glue connecting traditional corporate systems to the customer as well as all the functionality needed to conduct e-commerce.

應用服務器是一種中介軟件，不但可以幫助企業將原有的系統與客戶保持繼續連接，還可以為企業提供經營電子商務所需的所有功能。

- Totally, application servers provides the glue connecting traditional corporate systems to the customer as well as all the functionality needed to conduct e-commerce.

總體上，應用服務器提供了將傳統企業系統連接到客戶、以及進行電子商務所需的所有功能。

APPLICATION SERVERS AND THEIR FUNCTION

| APPLICATION SERVER | FUNCTIONALITY |
|--|---|
| Catalog display | Provides a database for product descriptions and prices |
| Transaction processing (shopping cart) | Accepts orders and clears payments |
| List server | Creates and serves mailing lists and manages e-mail marketing campaigns |
| Proxy server | Monitors and controls access to main web server; implements firewall protection |
| Mail server | Manages Internet e-mail |
| Audio/video server | Stores and delivers streaming media content |
| Chat server | Creates an environment for online real-time text and audio interactions with customers |
| News server | Provides connectivity and displays Internet news feeds |
| Fax server | Provides fax reception and transmission using a web server |
| Groupware server | Creates workgroup environments for online collaboration |
| Database server | Stores customer, product, and price information |
| Ad server | Maintains web-enabled database of advertising banners that permits customized and personalized display of advertisements based on consumer behavior and characteristics |
| Auction server | Provides a transaction environment for conducting online auctions |
| B2B server | Implements buy, sell, and link marketplaces for commercial transactions |

4. E-Commerce Merchant Server Software

電子商務商業服務器軟件

- Rather than build your site from a collection of disparate software applications, it is easier, faster, and generally more cost-effective to purchase e-commerce merchant server software. E-commerce merchant server software (also called an e-commerce software platform) offers an integrated environment that promises to provide most or all of the functionality and capabilities you will need to develop a sophisticated, customer-centric site. Important elements of e-commerce merchant software packages are an online catalog and a built-in shopping cart that can manage orders and fund transaction processing .

與使用一系列不同的軟件應用程序來開發網站不同，購買電子商務商業服務器軟件開發網站更簡單、更快捷，而且通常更划算。電子商務商業服務器軟件（也稱為電子商務軟件套件）提供了一個集成環境，提供開發複雜的以客戶為中心的網站所需的大部分或全部功能。電子商務商業軟件包的重要組成部分是在綫目錄和內置購物車，可以管理訂單和資金交易處理。

4. E-Commerce Merchant Server Software

電子商務商業服務器軟件

- Basic functionality for sales includes
 - Online catalog 在線目錄
 - List of products available on website
網站上提供的產品列表
 - Shopping cart 購物車
 - Allows shoppers to set aside, review, edit selections, and then make purchase
允許購物者預留、查看、編輯選擇，然後進行購買
 - Fund transaction processing 資金交易處理
 - Alipay, Wechat Pay, PayPal, Bank card processing
支付寶、微信支付、PayPal、銀行卡處理

4. E-Commerce Merchant Server Software

電子商務商業服務器軟件

- While existing firms often have the financial capital to invest in commercial e-commerce merchant server software, many small firms and startups do not. Such firms can use the e-commerce merchant services provided by companies that make it easy to create an e-commerce website with customizable templates. Most templates today contain ready-to-go site designs with built-in e-commerce functionality like shopping carts, payment clearance, and site management tools.

雖然現有公司通常有足夠資金購買商業電子商務商業服務器軟件，但許多小公司和初創公司却沒有足夠的資金。這些公司可以使用其他公司提供的電子商務商業服務，這些服務使創建帶有自定義模板的電子商務網站變得容易。如今，大多數模板都包含內置電子商務功能的即用型網站設計，例如購物車、貨款結算和網站管理工具。

4. E-Commerce Merchant Server Software

電子商務商業服務器軟件

- Some firms and startups opt instead for [open-source merchant server software](#). Open-source software is software developed by a community of programmers and designers and is free to use and modify. The advantage of using open-source tools is that you can get exactly what you want: a truly customized, unique website. The disadvantage is that it may take several months to develop the site and get all the tools to work together seamlessly.

一些公司和初創公司選擇使用[開源商業服務器軟件](#)。開源軟件是由程序員和設計者社區開發的軟件，可以免費使用和修改。使用開源工具的優點是你可以得到自己想要的東西：一個真正定制的、獨特的網站。缺點是可能需要幾個月的時間來開發網站並讓所有工具有序運行。

4. E-Commerce Merchant Server Software

電子商務商業服務器軟件

| OPEN-SOURCE SOFTWARE OPTIONS | |
|------------------------------------|---|
| FUNCTIONALITY | OPEN-SOURCE SOFTWARE |
| Web server | Apache (the leading web server for small and medium-sized businesses) |
| Shopping cart, online catalog | Many providers: osCommerce, Zen Cart, AgoraCart, X-cart, AspDotNetStorefront |
| Bank card processing | Bank card acceptance is typically provided in shopping cart software, but you may need a merchant account from a bank as well. |
| Database | MySQL (the leading open-source SQL database for businesses) |
| Programming/ scripting language | PHP is a scripting language embedded in HTML documents but executed by the server, providing server-side execution with the simplicity of HTML editing. JavaScript programs are typically client-side programs that provide user interface components. Ruby on Rails (RoR, Rails) and Django are popular open-source web application frameworks. Python and Perl are two other open-source programming languages used in web development. |
| Analytics | 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 Matomo and Open Web Analytics. |

4. E-Commerce Merchant Server Software

電子商務商業服務器軟件

- Key factors in selecting an e-commerce software platform

選擇電子商務軟件套件考慮的關鍵因素

- Functionality
軟件功能
- Support for different business models, including m-commerce
軟件對不同業務模式的支持程度, 包括移動電子商務
- Business process modeling tools
是否具備業務流程建模工具
- Visual site management and reporting
是否具備可視化網站管理與報告工具
- Performance and scalability
軟件的性能與擴展性
- Connectivity to existing business systems
與企業現有系統的集成程度
- Compliance with standards
與各種行業標準的兼容程度
- Global and multicultural capability
是否能夠滿足全球化和多元化要求
- Local sales tax and shipping rules
是否支持不同地區的銷售稅金計算與購物規則

Part IV:

E-commerce Website Infrastructure: Hardware

Choosing Hardware

- Hardware platform refers to all the underlying computing equipment needed for e-commerce functionality

硬件平臺指系統實現電子商務功能所依賴的計算機設備

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

目標：足夠的平臺容量滿足高峰需求而不浪費資金

1. Right-Sizing Your Hardware Platform: The Demand Side

正確選擇你的硬件平臺: 按需配置

- The important factors affecting overall demand on a website system.:
影響網站系統整體需求的重要因素:
 - The number of simultaneous users in peak periods
高峰時段同時在線用戶
 - The nature of customer requests
客戶需求特徵
 - The type of content (dynamic vs. static web pages)
內容的種類 (動態頁面與靜態頁面)
 - The required security
安全需求
 - The number of page requests
頁面請求數量
 - The speed of legacy applications that may be needed to supply data to the web pages
可能需要向網頁提供數據的傳統應用程序

1. Right-Sizing Your Hardware Platform:

The Demand Side

正確選擇你的硬件平臺: 按需配置

- One important factor to consider is the number of simultaneous users who will likely visit your site. In general, the load created by an individual customer on a server is typically quite limited and short-lived. A web session initiated by the typical user is stateless, meaning that the server does not have to maintain an ongoing, dedicated interaction with the client. A web session typically begins with a page request, then a server replies, and finally the session is ended. The sessions may last from tenths of a second to a minute per user. Nevertheless, system performance does degrade as more and more simultaneous users request service. Fortunately, degradation (measured as “transactions per second” and “latency,” or delay in response) is fairly graceful over a wide range, up until a peak load is reached and service quality becomes unacceptable.

需要考慮的一個重要因素是同時登錄網站的用戶數量。總的來說，單個用戶給服務器帶來的負荷非常有限，並且不會持久。典型用戶產生的網絡進程是無狀態的，即服務器與用戶之間無須保持連續的專用交互連接。網絡進程通常從頁面請求開始，之後服務器響應請求，進程結束。每個用戶的進程可以持續1/10秒至1分鐘。無論如何，隨著同時請求服務的用戶越來越多，網站的性能將會顯著下降但令人感到欣慰的是，網站性能的下降（用“每秒完成的處理數量”，以及響應的“等待時間”或延遲來衡量）有一個循序漸進的過程，要到網站的負荷達到頂點時才會出現，此時網站的服務質量可能會變得令人無法接受。

1. Right-Sizing Your Hardware Platform: The Demand Side

正確選擇你的硬件平臺: 按需配置

- Serving up static web pages is I/O intensive, which means it requires input/output (I/O) operations rather than heavy-duty processing power. As a result, website performance is constrained primarily by the server's I/O limitations and the telecommunications connection, rather than the speed of the processor. Other factors to consider when estimating the demand on a website are the user profile and the nature of the content. If users request searches, registration forms, and order taking via shopping carts, then demands on processors will increase markedly.

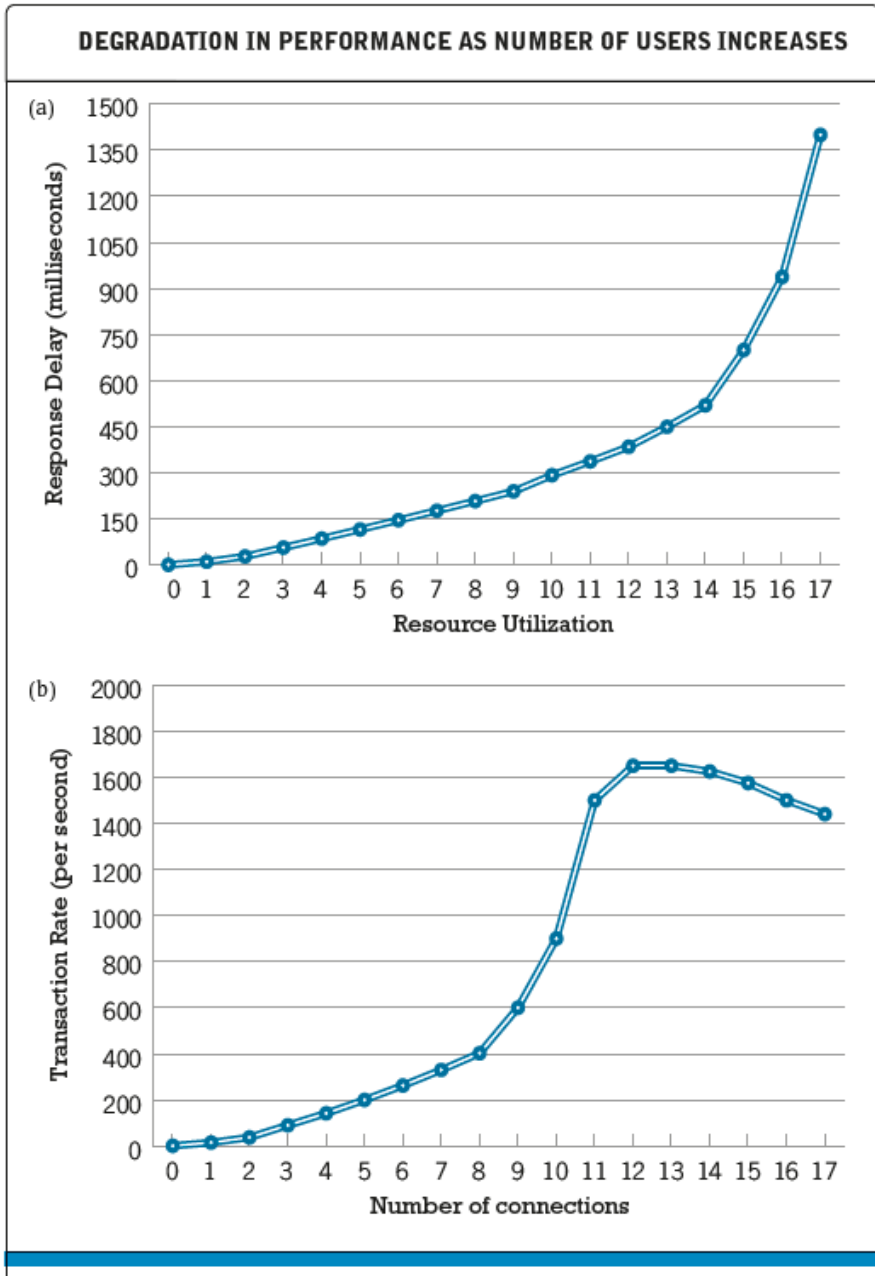
靜態頁面服務屬I/O密集型服務，只需要輸入/輸出處理，不需要強大的計算能力的支持。因此，網站的性能主要受服務器輸入/輸出的限制以及通信綫路帶寬的制約，與處理器的速度無關。當估計網站性能的時候，其他需要考慮的因素包括用戶配置文件、內容的性質。如果用戶請求搜索、注册表單和通過購物車下訂單，對處理器的要求將顯著提高。

THE MOST IMPORTANT FACTORS TO CONSIDER WHEN ESTIMATING THE DEMAND ON A SITE

| SITE TYPE | PUBLISH/ SUBSCRIBE | SHOPPING | CUSTOMER SELF- SERVICE | TRADING | WEB SERVICES/ B2B |
|-------------------------------------|---|---|---|---|---|
| Examples | WSJ.com | Amazon | Travelocity | E*Trade | Ariba e-procurement exchanges |
| Content | Dynamic Multiple authors High volume Not user-specific | Catalog Dynamic items User profiles with data mining | Data in legacy applications Multiple data sources | Time sensitive High volatility Multiple suppliers and consumers Complex transactions | Data in legacy applications Multiple data sources Complex transactions |
| Security | Low | Privacy Nonrepudiation Integrity Authentication Regulations | Privacy Nonrepudiation Integrity Authentication Regulations | Privacy Nonrepudiation Integrity Authentication Regulations | Privacy Nonrepudiation Integrity Authentication Regulations |
| Percent secure pages | Low | Medium | Medium | High | Medium |
| Cross-session information | No | High | High | High | High |
| Searches | Dynamic Low volume | Dynamic High volume | Nondynamic Low volume | Nondynamic Low volume | Nondynamic Moderate volume |
| Unique items (SKUs) | High | Medium to high | Medium | High | Medium to high |
| Transaction volume | Moderate | Moderate to high | Moderate | High to extremely high | Moderate |
| Legacy integration complexity | Low | Medium | High | High | High |
| Page views (hits) | High to very high | Moderate to high | Moderate to low | Moderate to high | Moderate |

1. Right-Sizing Your Hardware Platform: The Demand Side

正確選擇你的硬件平臺：按需配置



Degradation in web server performance occurs as the number of users (connections) increases and as the system's resources (processors, storage) become more utilized. In (a), user-experienced delay rises gracefully until an inflection point is reached, and then delay rises exponentially to an unacceptable level. In (b), the transaction rate rises gracefully until the number of users rapidly escalates the transaction rate, and at a certain inflection point, the transaction rate starts declining as the system slows down or crashes.

2. Right-Sizing Your Hardware Platform: The Supply Side 正確選擇你的硬件平臺: 持續擴展

- Once you estimate the likely demand on your site, you will need to consider how to scale up your site to meet demand.
一旦你估計了客戶對網站的需求, 就需要考慮如何擴展你的網站以滿足需求.
- Scalability refers to the ability of site to increase in size as demand warrants.
可擴展性指網站爲了保證需求得到滿足而不斷擴大規模的能力.
- Ways to scale hardware 擴展硬件的方法
 - **Vertical scaling** refers to increases processing power of individual components
垂直擴展指提高單位組件的計算能力
 - **Horizontal scaling** refers to employing multiple computers to share the workload and increase the “footprint” of the installation.
水平擴展指使用多臺計算機來分擔工作量並擴大安裝“內存”.
 - **Improving processing architecture** is a combination of vertical and horizontal scaling
改進處理構架是垂直擴展和水平擴展的結合

2. Right-Sizing Your Hardware Platform: The Supply Side 正確選擇你的硬件平臺: 持續擴展

Vertical scaling 垂直擴展

You can scale your site vertically by upgrading the servers from a single processor to multiple processors. You can keep adding processors to a computer, depending on the operating system, and upgrade to faster chip speeds as well. **Two drawbacks:** First, it can become expensive to purchase additional processors with every growth cycle, and second, your entire site becomes dependent on a small number of very powerful computers. If you have two such computers and one goes down, half of your site, or perhaps your entire site, may become unavailable.

你可以把服務器從單處理器升級為多處理器，以實現垂直擴展網站的目標。你可以根據操作系統的情況不斷向計算機添加處理器，並使芯片速度更快。 **兩個缺點：**首先，擴展持續的周期長導致購買額外的處理器會變得昂貴，其次，整個網站依賴於少數性能強大的計算機。如果有兩臺這樣的計算機，其中一臺出現故障，網站的一半或整個網站可能會變得不可用。

2. Right-Sizing Your Hardware Platform: The Supply Side 正確選擇你的硬件平臺: 持續擴展

Horizontal scaling 水平擴展

Horizontal scaling involves adding multiple servers to your site and balancing the load among the servers. You can then partition the load so that some servers handle only requests for static HTML pages, while others are dedicated to handling database applications. One will need special load-balancing software (provided by a variety of vendors such as Cisco, Microsoft, and IBM) to direct incoming requests to various servers.

水平擴展可以通過在網站中增加多臺單處理器服務器，並在各服務器之間平衡負載這種方式實現。當然，你也可以把網站的負載分類，讓一些服務器專門負責HTML頁面的請求，另一些服務器專門執行數據庫相關操作。此時，需要使用專用的負載平衡軟件（這類軟件的提供商有很多，如思科、微軟和IBM），將進入網站的請求引導至不同的服務器。

2. Right-Sizing Your Hardware Platform: The Supply Side 正確選擇你的硬件平臺: 持續擴展

Horizontal scaling 水平擴展

There are many advantages to horizontal scaling. It is inexpensive and often can be accomplished using older computers that otherwise might be disposed of. Horizontal scaling also introduces redundancy—if one computer fails, chances are that another computer can pick up the load dynamically. However, when your site grows from a single computer to perhaps 10 to 20 computers, the size of the physical facility required (the “footprint”) increases, and there is added management complexity.

水平擴展具有許多優點，不僅成本低，還可以充分利用企業準備淘汰的計算機資源。水平擴展同時也為系統引入了冗餘--如果一臺服務器出現故障，其他服務器會立即接管該服務器所有的負載。但是，當你的網站從一臺服務器擴展到10臺或20臺服務器後，網站物理設施（即“場地”）的需求量隨之激增，網站也會變得更加複雜而難以管理。

2. Right-Sizing Your Hardware Platform: The Supply Side 正確選擇你的硬件平臺: 持續擴展

Improving processing architecture 改進處理架構

There are many common steps you can take to improve performance of your site. Most of these steps involve splitting the workload into I/O-intensive activities (such as serving web pages) and CPU-intensive activities (such as taking orders). Once you have this work separated, you can fine-tune the servers for each type of load. One of the least expensive fine-tuning steps is to simply add RAM to a few servers and store all your HTML pages in RAM. This reduces load and increases speed dramatically. RAM is fast and inexpensive. The next most important step is to move your CPU-intensive activities, such as order taking, onto a high-end, multiple-processor server that is dedicated to handling orders and accessing the necessary databases.

有許多改進網站的處理架構時常用的方法。其中，大多數處理架構改進方法都包括把網站的負載分為I/O密集型服務（如網頁服務）和CPU密集型服務（如訂單處理）。這樣，你就可以對每種服務使用的服務器分別進行優化。由於內存的速度比硬盤的速度快上千倍且價格低廉，因此為部分服務器添加內存，將網站所有的HTML網頁存放在內存中，是一種成本較低的優化方案，可以有效減輕硬盤負擔並顯著加快網站的反應速度。而將網站中的CPU密集型服務如訂單處理，轉移至專門用於處理訂單和訪問數據庫的多處理器高端服務器，則是另一種行之有效的改進方案。

2. Right-Sizing Your Hardware Platform: The Supply Side 正確選擇你的硬件平臺: 持續擴展

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. |

2. Right-Sizing Your Hardware Platform: The Supply Side 正確選擇你的硬件平臺: 持續擴展

Improving the Processing Architecture

| Architecture Improvement | Description |
|---|--|
| Separate static content from dynamic content | Use specialized servers for each type of workload. |
| Cache static content | Increase the size of RAM 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, fund transaction processing, and other CPU-intensive activity on dedicated servers. |
| Optimize 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. |

Part V:

Other E-Commerce Website Tools

Background: Except considering the key factors affecting the speed, capacity, and scalability of your website, some other important requirements should be considered. You will need a coherent website design that makes business sense—not necessarily a site to wow visitors or excite them, but to sell them something. You will also need to know how to build active content and interactivity into your site—not just display static HTML pages. You must be able to track customers who come, leave, and return to your site in order to be able to greet return visitors. You will also want to track customers throughout your site so that you can personalize and customize their experience. You will definitely want the ability for customers to generate content and feedback on your site to increase their engagement with your brand. Finally, you will need to establish a set of information policies for your site—privacy, accessibility, and access to information policies. In order to achieve these business capabilities, you will need to be aware of some design guidelines and additional software tools that can cost-effectively achieve the required business functionality.

除了考慮影響網站速度、容量和可擴展性的關鍵因素外，對於網站，還有其他重要因素。你將需要一個具有商業意義的設計一致的網站--不是單純吸引訪問者或使他們興奮的網站，而是向他們實實在在出售東西的網站。你還需要知道如何在網站中創建動態內容和交互性，而不僅僅是顯示靜態HTML頁面。你必須能夠跟踪來訪、離開和返回你網站的顧客，以便能夠與回頭客打招呼。你也想跟踪整個網站中的客戶，以便給他們提供個性化或定制的客戶體驗。你還希望客戶能夠在你的網站上生成內容和提供反饋，以提高他們對你品牌的參與度。最後，你將需要為你的網站制定一套信息政策，包括隱私策略、易用規則、信息訪問策略等。

1. Website Design: Basic Business Considerations

網站設計：以基本商務考慮為本

- Objective: Enabling customers to find and buy what they need easily

目的：確保顧客能够在網站中輕鬆地找到自己所需的東西，然後購買



1. Website Design: Basic Business Considerations

網站設計：以基本商務考慮為本

E-Commerce Website Features That Annoy Customers

讓消費煩惱的電子商務網站特徵

Features

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

Pages that load slowly

Content that is out of date

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

1. Website Design: Basic Business Considerations

網站設計：以基本商務考慮為本

The Eight Most Important Factors in Successful E-Commerce Site Design

成功的電子商務網站設計中最重要的八個因素

| 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 |

2. Tools for Search Engine Optimization

搜索引擎優化工具

- A website is only as valuable from a business perspective as the number of people who visit. The first stop for most customers looking for a product or service is to start with a search engine, and follow the listings on the page, usually starting with the top three to five listings, then glancing to the sponsored ads to the right. The higher you are on the search engine pages, the more traffic you will receive.

從商業角度來看，網站只有訪問人數多才相對有價值。大多數顧客尋找產品或服務的第一步就是打開搜索引擎，然後瀏覽頁面上的前3-5頁目錄，然後瀏覽右側的贊助商廣告。網站在搜索引擎頁面上的位置越前，獲得的流量就越多。

2. Tools for Search Engine Optimization

搜索引擎優化工具

- **Ideas for improving rankings**
 - Metatags, keywords, titles, page contents
元標記、關鍵詞、標題、頁面內容
 - Offer expertise
提供專業知識
 - Get linked up
建立聯繫
 - Buy ads
購買廣告
 - Local e-commerce
本地電子商務

2. Tools for Search Engine Optimization

搜索引擎優化工具

Metatags, keywords, titles, page contents

元標記、關鍵詞、標題、網頁內容

- Search engines “crawl” your site and identify keywords as well as title pages and then index them for use in searches. Pepper your pages with keywords that accurately describe what you say you do in your metatag site “description” and “keywords” sections of your source code. The goal is to find a balance of the different types of keywords, including shorter head keywords that may be more generic (such as “car”), body keywords that may be slightly more specific (such as “British sports car”), and long-tail keywords that are much more detailed (such as “1968 red Jaguar XKE convertible”).

搜索引擎“抓取”你的網站並識別關鍵詞和頁面標題，將其編為搜索參數。在源代碼的元標記網站的描述和關鍵詞部分，要使用準確描述你所說內容的關鍵詞來修飾你的頁面。目標是找到不同類型的關鍵詞之間的平衡，包括可能更通用的較短的頭部關鍵詞，更具體的正文關鍵詞，以及更詳細的長尾關鍵詞。

2. Tools for Search Engine Optimization

搜索引擎優化工具

Offer expertise

提供專業知識

- White papers, industry analyses, FAQ pages, guides, and histories are excellent ways to build confidence on the part of users and to encourage them to see your website as the place to go for help and guidance.

白皮書、行業分析、問答頁面、網站使用指南和企業發展歷史是極好的建立用戶信心、鼓勵他們在你的網站尋求幫助和獲得指導的方法。

2. Tools for Search Engine Optimization

搜索引擎優化工具

Get linked up

建立聯繫

- Encourage other sites to link to your site; create a blog that attracts people and who will share your URL with others and post links in the process. Create a Facebook page for your company, and think about using Tiktok or Xiaohongshu to develop a following or fan base for your products.

鼓勵其他網站鏈接到你的網站; 開發一個吸引用戶的博客, 他們將與他人共享你的 URL 並在此過程中發布鏈接. 為你的公司開發一個臉書頁面, 並考慮使用 Tiktok 或小紅書為你的產品開發追隨者或建立粉絲群.

2. Tools for Search Engine Optimization

搜索引擎優化工具

Buy ads

購買廣告

- Complement your organic search optimization efforts with paid search engine keywords and ads. Choose your keywords, and purchase direct exposure on web pages. You can set your budget and put a ceiling on it to control costs. See what works, and observe the number of visits to your site produced by each keyword string.

通過向搜索引擎付費購買關鍵詞和做廣告來作為搜索引擎優化的補充方式。選擇你的關鍵詞，付費後將關鍵詞合理布局到每個頁面中。你可以制定預算和設定上限以防大額損失。觀察每一個關鍵詞為你帶來的訪問者數量。

2. Tools for Search Engine Optimization

搜索引擎優化工具

Local e-commerce

本地電子商務

- Developing a national market can take a long time. If your website is particularly attractive to local people, or if it involves products sold locally, use keywords that connote your location so that people can find you nearby. Town, city, and region names in your keywords—such as “Shanghai honey” or “Zhuhai blues music”—can be helpful.

建立一個全國型的網站可能會花費很長時間。如果你的網站對當地人很有吸引力，或者在本地出售產品，那麼使用包含地址的關鍵詞，這樣人們可以在附近找到你。關鍵詞中的鄉鎮、城市和地區名字會很有幫助，例如，“上海奶酪”或“珠海藍調音樂”。

3. Tools for Interactivity and Active Content

動態和交互內容的工具

Some commonly used software tools for achieving high levels of site interactivity:

常用的可以幫助網站實現高交互性目標的軟件工具：

- CGI (Common Gateway Interface) 公共網關接口
- Java, Java Server Pages (JSP), and JavaScript
- Active Server Pages (ASP) and ASP.NET 動態服務網頁和ASP.NET
- ColdFusion
- PHP, Ruby on Rails (RoR), and Django
- Other Design Elements

3. Tools for Interactivity and Active Content

動態和交互內容的工具

CGI (Common Gateway Interface) 公共網關接口

- In the early days of the Web, Common Gateway Interface (CGI) programs (scripts) were the primary method of creating interactivity.

在萬維網發展的早期，公共網關接口程序（脚本）是創建交互性的主要方法。

- Common Gateway Interface (CGI) is a set of standards for communication between a browser and a program running on a server that allows for interaction between the user and the server.

公共網關接口是在瀏覽器和服务器上運行的與用戶進行互動的程序在通信時所遵循的一系列標準。

- CGI permits an executable program to access all the information within incoming requests from clients. The program can then generate all the output required to make up the return page (the HTML, script code, text, etc.), and send it back to the client via the web server.

CGI使可执行程序可以訪問來自客戶機的傳入請求中的所有信息，然後，程序可以生成組成返回頁面所需的所有輸出（HTML、脚本代碼、文本等），並通過web服務器將其發送回客戶機。

3. Tools for Interactivity and Active Content

動態和交互內容的工具

CGI (Common Gateway Interface) 公共網關接口

- All the computing took place on the server side (this is why CGI programs and others like them are referred to as “server-side” programs).

所有計算都在服務器端進行（這就是CGI程序和其他類似程序被稱為服務器端程序的原因）。

- CGI programs can be written in nearly any programming language as long as they conform to CGI standards.

只要符合CGI標準，幾乎可以用任何編程語言編寫CGI程序。

- CGI scripts are best used for small to medium-sized applications that do not involve a high volume of user traffic. Today, CGI scripts have become obsolete, due to security and other concerns

CGI 脚本最適合用於不涉及大量用戶流量的中小型應用程序.如今，由於安全性和其他方面的考慮，CGI脚本已經過時了。

- CGI’s primary disadvantage is that it is not highly scalable because a new process must be created for each request, thereby limiting the number of concurrent requests that can be handled.

CGI的主要缺點是它的可擴展性不高，因為必須為每個請求創建一個新進程，從而限制了可以處理的並發請求數量。

3. Tools for Interactivity and Active Content

動態和交互內容的工具

CGI (Common Gateway Interface) 公共網關接口



3. Tools for Interactivity and Active Content

動態和交互內容的工具

```
public class Example {  
    public static void main(String[] args) {  
        System.out.println("Hello World!");  
    }  
}
```

Java, Java Server Pages (JSP), and JavaScript

- **Java** is a programming language that allows programmers to create interactivity and active content on the client computer, thereby saving considerable load on the server. Java was initially developed by Sun Microsystems as a platform-independent programming language for consumer electronics. By 1995, however, when Sun Microsystems released Java 1.0, the first public version of the language, it had become clear that Java was more applicable to the Web than to consumer electronics.

Java 是一種編程語言，允許程序員創建客戶機上的交互性和動態內容，可以大大減輕服務器的負擔。Java最初是由Sun Microsystems開發的，它原先是面向消費類電子產品的跨平臺編程語言。到1995年，當Sun Microsystems發布第一個公開版本Java 1.0時，人們才意識到Java更適用於互聯網環境，而不是用作消費類電子產品的跨平臺編程語言。

- The idea was to create a language whose programs (so-called Write Once Run Anywhere [WORA] programs) could operate on any computer regardless of operating system.

Java旨在創建一種能夠忽略操作系統，可在任何機器中運行的程序，即一次編寫，任意使用（Write Once Run Anywhere, WORA）的程序。



3. Tools for Interactivity and Active Content

動態和交互內容的工具

Java, Java Server Pages (JSP), and JavaScript

- **Java Server Pages (JSP)** is a web page-coding standard that allows developers to use a combination of HTML, JSP scripts, and Java to dynamically generate web pages in response to user requests. JSP uses Java “servlets,” small Java programs that are specified in the web page and run on the web server to modify the web page before it is sent to the user who requested it. JSP is supported by most of the popular application servers on the market today.

Java Server Pages是一種網頁編碼標準，它允許開發人員使用 HTML、JSP 腳本和Java的組合來動態生成網頁以響應用戶請求。JSP使用在web頁面中指定並在web服務器端運行的小型Java程序，以在將網頁發送給請求該網頁的用戶之前對其進行修改。目前，市場中的主流應用服務器軟件都可為JSP提供良好的支持。

3. Tools for Interactivity and Active Content

動態和交互內容的工具

Java, Java Server Pages (JSP), and JavaScript

- **JavaScript** is a programming language invented by Netscape that is used to control objects on an HTML page and handle interactions with the browser. It is most commonly used on the client side to handle verification and validation of user input, as well as to implement business logic. For instance, JavaScript can be used on customer registration forms to confirm that a valid phone number, zip code, or e-mail address has been given. Before a user finishes completing a form, the e-mail address given can be tested for validity.

JavaScript 是由網景公司開發的一種編程語言，用於控制 HTML 頁面上的對象並處理與瀏覽器的交互。它最常在客戶機上用於對用戶輸入進行驗證和確認，以及實現業務邏輯。例如，JavaScript 可用於客戶登記表，以確認客戶已提供有效的電話號碼郵政編碼或電子郵件地址。在用戶完成表格之前，可以測試給定的電子郵件地址的有效性。



3. Tools for Interactivity and Active Content

動態和交互內容的工具

Java, Java Server Pages (JSP), and JavaScript

- **JavaScript** appears to be much more acceptable to corporations and other environments in large part because it is more stable and is also restricted to the operation of requested HTML pages. JavaScript is also used as part of Node.js, a cross-platform environment for server-side applications (including mobile). Node.js is one of the most popular server-side developer frameworks, used by companies such as PayPal, Walmart, and LinkedIn, resulting in JavaScript remaining a vital language not just for web development but also for platform as a service (PaaS) applications.

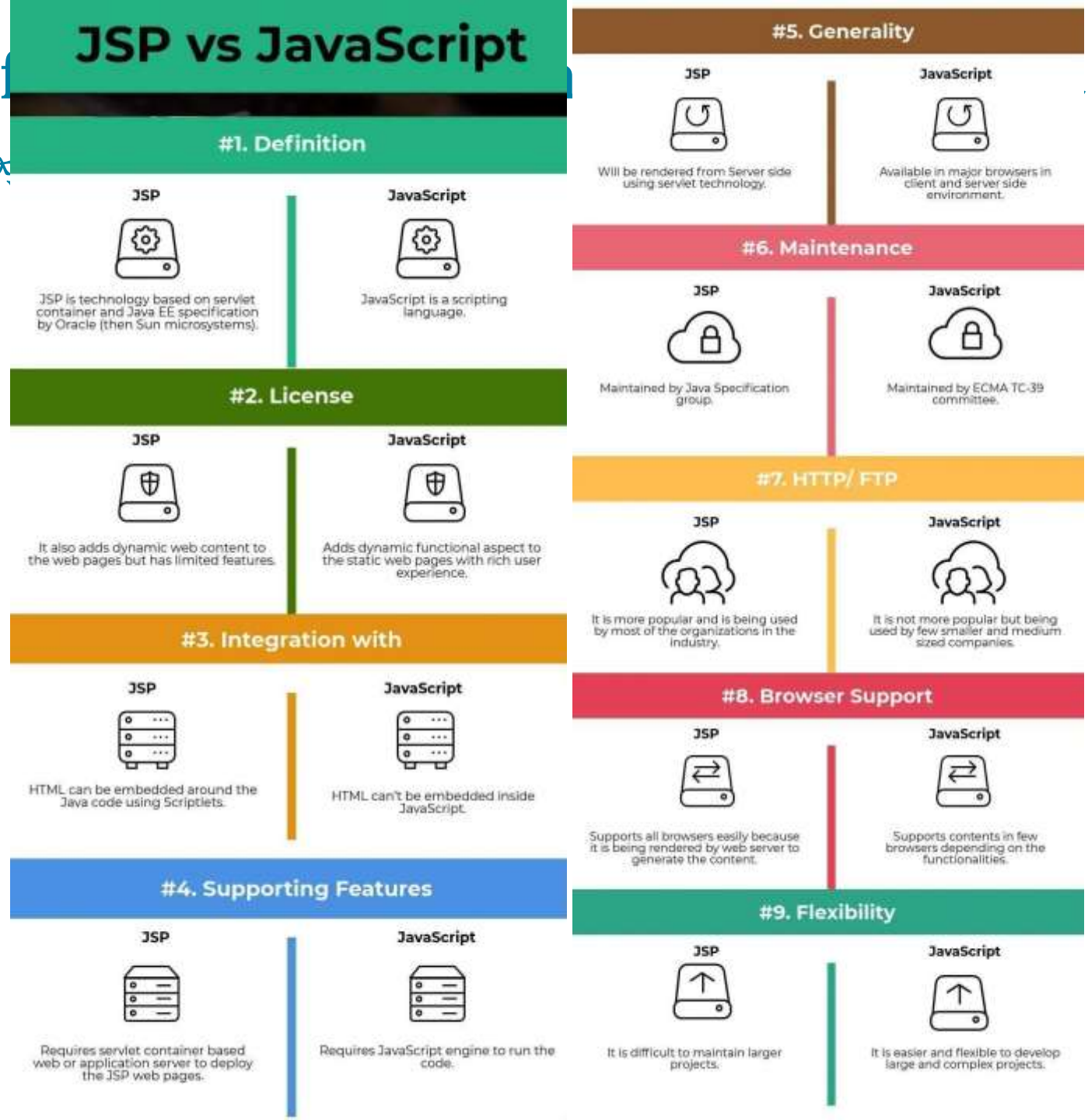
JavaScript更容易被公司和其他環境接受，這在很大程度上是因為它更穩定，而且它僅限於對用戶請求的 HTML 頁面進行操作。JavaScript 還用作 Node.js 的一部分，Node.js 是服務器端（包括移動端）應用程序的跨平臺環境。Node.js 是最流行的服務器端開發框架之一，已被 PayPal、沃爾瑪和領英等公司使用。因此，JavaScript 不僅對於 web 開發，而且對於平臺即服務應用程序來說仍然是一門重要的語言。



3. Tools

動態和交互內

Difference between JSP and JavaScript



3. Tools for Interactivity and Active Content

動態和交互內容的工具

Active Server Pages (ASP) and ASP.NET 動態服務網頁和ASP.NET

- **Active Server Pages (ASP)** was invented by Microsoft in late 1996 and grew rapidly to become the major technique for server-side web programming in the Windows environment. ASP enables developers to easily create and open records from a database and execute programs within an HTML page as well as handle all the various forms of interactivity found on e-commerce sites. ASP permits an interaction to take place between the browser and the server. However, ASP programs are restricted to use on Windows servers running Microsoft's IIS web server software.

動態服務網頁於1996年底由微軟發明，並迅速發展成為Windows環境中服務器端網絡編程的主要技術。ASP使開發人員能夠輕鬆地從數據庫中創建和打開記錄並在HTML頁面中執行程序，以及處理電子商務站點上的各種形式的交互。ASP允許在瀏覽器和服務器之間進行交互。但是，ASP程序僅限在運行 Microsoft IIS web服務器軟件的Windows 服務器上使用。

3. Tools for Interactivity and Active Content

動態和交互內容的工具

Active Server Pages (ASP) and ASP.NET 動態服務網頁和ASP.NET

- **ASP.NET**, first released in January 2002 and part of Microsoft's .NET framework, is the successor to ASP. The current version of ASP.NET features a modern, cross-platform web framework for cloud and regular application servers.

ASP.NET於2002年1月首次發布，是微軟的.NET框架的一部分，是ASP的繼承者。ASP.NET 的当前版本具有適用於云和常規应用程序服务器的现代跨平台 web 框架。

ASP.NET extends .NET

ASP.NET extends the .NET platform with tools and libraries specifically for building web apps.

These are some things that ASP.NET adds to the .NET platform:

- **Base framework for processing web requests in C# or F#**
- **Web-page templating syntax**, known as Razor, for building dynamic web pages using C#
- **Libraries for common web patterns**, such as Model View Controller (MVC)
- **Authentication system** that includes libraries, a database, and template pages for handling logins, including multi-factor authentication and external authentication with Google, X, and more.
- **Editor extensions** to provide syntax highlighting, code completion, and other functionality specifically for developing web pages

3. Tools for Interactivity and Active Content

動態和交互內容的工具

Active Server Pages (ASP) and ASP.NET 動態服務網頁和ASP.NET

What is ASP.NET?

ASP.NET is an open source web framework, created by Microsoft, for building modern web apps and services with .NET.

ASP.NET is cross platform and runs on Windows, Linux, macOS, and Docker.



The .NET platform

.NET is a developer platform made up of tools, programming languages, and libraries for building many different types of applications.

The base platform provides components that apply to all different types of apps. Additional frameworks, such as ASP.NET, extend .NET with components for building specific types of apps.

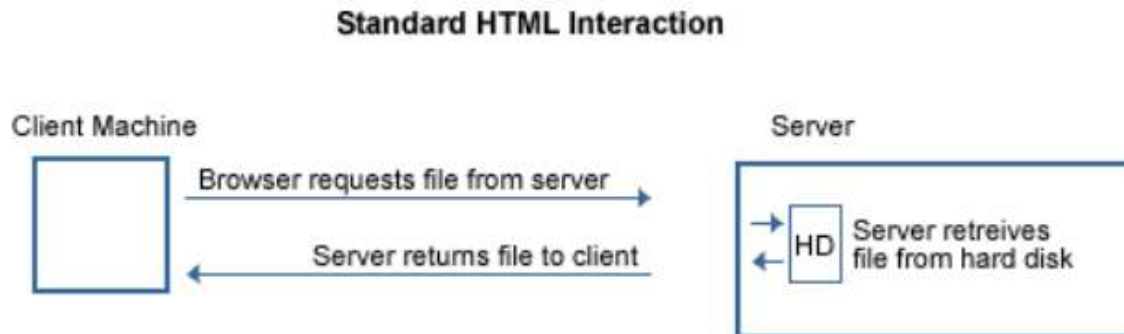
Here are some things included in the .NET platform:

- **The C#, F#, and Visual Basic programming languages**
- **Base libraries** for working with strings, dates, files/IO, and more
- **Editors and tools** for Windows, Linux, macOS, and Docker

3. Tools for Interactivity and Active Content

動態和交互內容的工具

Active Server Pages (ASP) and ASP.NET 動態服務網頁和ASP.NET



3. Tools for Interactivity and Active Content

動態和交互內容的工具

ColdFusion

<https://www.adobe.com/products/coldfusion-family.html>

- **ColdFusion** is an integrated server-side environment for developing interactive web and mobile applications. Originally developed by Macromedia and now offered by Adobe, ColdFusion combines an intuitive, tag-based scripting language and a tag-based server scripting language (CFML) that lowers the cost of creating interactive features. ColdFusion offers a powerful set of visual design, programming, debugging, and deployment tools, including the ability to create mobile apps, robust security features, and support for interoperability. The most recent version, Adobe ColdFusion 2021/2020, offers a new administrative user interface, improved object-oriented programming support, express and modular installation features, and enhanced cloud and security tools.

ColdFusion是用於開發網絡互動應用程序和移動應用的集成服務器端環境。ColdFusion最初由 Macromedia 公司開發，現在由Adobe提供，它結合了直觀的基於標籤的腳本語言和基於標籤的服務器腳本語言，從而降低了創建交互功能的成本。ColdFusion提供了一組強大的可視化設計、編程、調試和部署工具，包括創建移動應用的功能、強大的安全功能以及對互操作的支持。最新版本 Adobe ColdFusion 2021/2020 提供了新的管理用戶界面、改進的面向對象編程支持、快速和模塊化安裝功能以及增強雲和安全工具。

3. Tools for Interactivity and Active Content

動態和交互內容的工具

ColdFusion

- ColdFusion

Web App, in a Snap!

Adobe ColdFusion is built for developers who demand speed, security, and simplicity. As a **secure, nimble application platform**, it offers intuitive tools, streamlined workflows, and rapid deployment, empowering you to create high-performance, dynamic web applications—fast, reliable, and hassle-free, no matter the complexity.

3. Tools for Interactivity and Active Content

動態和交互內容的工具



PHP, Ruby on Rails (RoR), and Django

- **PHP** is an open-source, general-purpose scripting language that is most frequently used in server-side web applications to generate dynamic web page content, although it can also be used for client-side graphical user interface applications. PHP is also a part of many web application development frameworks, such as CakePHP, CodeIgniter, and others, and is also part of the LAMP (Linux, Apache, MySQL, PHP) open-source web development model for building dynamic websites and web applications (Perl and Python are sometimes substituted for PHP in some LAMP projects). According to W3Techs, PHP is, by far and away, the most commonly used server-side scripting language (used by more than 75% of the websites whose server-side programming language it was able to identify), with ASP.NET a distant second, used by around 8%; followed by Ruby on Rails at 6%; Java, with only about 4%; Scala (a general-purpose programming language that has the capability to interoperate with Java and JavaScript) at around 2.5%; JavaScript at about 2%; and Python at a little more than 1%. ColdFusion and Perl were both used by fewer than 1%. Hackers often try to exploit PHP code and use it for a variety of attacks, such as SQL injection, code injection, and phishing attacks.

3. Tools for Interactivity and Active Content

動態和交互內容的工具

PHP, Ruby on Rails (RoR), and Django

<https://rubyonrails.org/>

- **Ruby on Rails** (Ruby, RoR, or Rails) is an open-source web application framework based on the Ruby programming language. RoR is based on a philosophy known as convention over configuration, or coding by convention (CoC), which means that the framework provides a structured layout that minimizes the number of decisions that the programmer needs to make, thereby simplifying and speeding development. JavaScript and Ajax are highly integrated into RoR, which makes it easy to handle Ajax requests for page updates. Ruby was very popular in the early 2000s, but in the last several years, it has fallen out of favor somewhat. Some well-known websites based on RoR include Shopify, Groupon, Etsy, Kickstarter, Hulu, and Airbnb.

Ruby on Rails是基於Ruby編程語言的開源網絡應用程序框架。RoR是基於一種稱為慣例優於配置或按照慣例編碼的規則開發的，這意味著該框架提供了一種結構化布局，可最大限度地減少程序員需要做出的決策數量，從而簡化和加速開發。JavaScript和 Ajax高度集成到 RoR 中，可以方便地處理 Ajax 請求進行頁面更新。RoR在21世紀初期非常流行，但是最近幾年有些失寵。基於RoR的知名網站包括Shopify、Groupon、Kickstarter、Hulu和愛彼迎。

3. Tools for Interactivity and Active Content

動態和交互內容的工具

PHP, Ruby on Rails (RoR), and Django

- [Ruby on Rails](#)

[New Getting Started Tutorial] Build an e-commerce app with Rails 8.

[Source](#)

[Docs](#)

[Community](#)

[News](#)



[Events](#)

[Jobs](#)

[Merch](#)

[Foundation](#)

Compress the complexity of modern web apps.

Learn just what you need to get started, then keep leveling up as you go. **Ruby on Rails scales from HELLO WORLD to IPO.**

3. Tools for Interactivity and Active Content

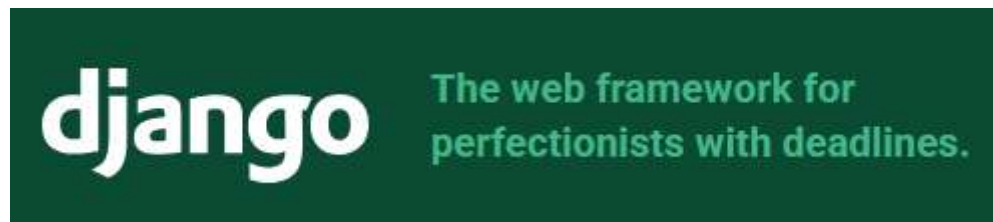
動態和交互內容的工具

PHP, Ruby on Rails (RoR), and Django

<https://www.djangoproject.com/>

- **Django** is also an open-source web application framework. It is based on the Python programming language. Django is optimized for the creation of complex, database-driven websites. It allows for fast development, focuses on automating as much as possible, emphasizes the reusability of various components, and follows the DRY (Don't Repeat Yourself) programming principle. Some well-known websites based on Django include Instagram, Spotify, Pinterest, Dropbox, NASA, and Quora.

Django也是一個開源的web應用程序框架. 它是基於Python 編程語言開發的. Django 針對創建複雜數據庫驅動的網站進行了優化. 它可以用於快速開發, 該語言的特點在於盡可能自動化, 並強調各種組件的可重用性, 同時遵循DRY(不要自我重複)編程原理. 基於Django的知名網站包括Instagram、Pinterest、NASA 和《華盛頓郵報》官網.



3. Tools for Interactivity and Active Content

動態和交互內容的工具

Other Design Elements

- One easy way to pump up the energy on a website is to include some appropriate **widgets** (sometimes called gadgets, plug-ins, or snippets). [Widgets are small chunks of code that execute automatically in your HTML web page.](#) They are prebuilt, and many are free. Social networks and blogs use widgets to present users with content drawn from around the Web (news headlines from specific news sources, announcements, press releases, and other routine content), calendars, clocks, weather, games, and other functionality. You can copy the code to an HTML web page. You can find widgets at Apple's Dashboard Widgets, Wolfram|Alpha Widgets, and SIMILE Widgets. There are also widgets for specific platforms such as WordPress, Amazon, and Pinterest.

一種能讓網站充滿活力的簡單辦法是使用一些適當的**小部件**（有時也叫作配件、插件或小代碼片段）。[小部件是在HTML網頁中自動執行的小塊代碼。](#)它們是預先構建好的，並且許多是免費的。社交網絡和博客都使用小部件向用戶呈現來自網絡（來自具體新聞資源的標題、聲明、新聞稿和其他常規內容）、日曆時鐘、天氣、電視直播、遊戲等的內容。你可以將這些代碼複製到HTML網頁中你也可以從蘋果公司的Dashboard Widgets、Wolfram|Alpha Widgets 和 SIMILE Widgets 中獲取小部件。還有為特定平臺製作的小部件，例如 WordPress、亞馬遜和Pinterest。

3. Tools for Interactivity and Active Content

動態和交互內容的工具

Other Design Elements

- Mashups are a little more complicated and involve pulling functionality and data from one program and including it in another. The most common mashup involves using Baidu Maps data and software and combining it with other data. For instance, if you have a local real estate website, you can download Baidu Maps and satellite image applications to your site so that visitors can get a sense of the neighborhood. There are thousands of Baidu Map mashups, from maps of political protests to maps, all with associated news stories and other content. Other mashups involve sports, shopping, and news.

糅合技術更為複雜，涉及從一個程序中獲取相應的功能和數據，並將其移植到另一個程序中。最常見的糅合技術包括使用百度地圖中的數據和軟件，並將其與其他數據相結合。例如，如果你有一個本地的房產網站，你可以將百度地圖和衛星圖像 APP 下載到你的網站，以便訪問者瞭解房產的鄰里情況。現在有數以千計的 APP 和百度地圖進行糅合，它們都有相應的新聞故事和其他內容。其他糅合涉及運動、照片、視頻、購物和新聞。

4. Personalization Tools 個性化工具

- Personalization 個性化
 - Ability to treat people based on personal qualities and prior history with a site
根據客戶的個人特質和他在你網站上的瀏覽歷史來對待客戶的能力
- Customization 定制化
 - Ability to change the product to better fit the needs of the customer
更改產品以更好地滿足客戶需求的能力
- Website personalization involves altering a website based on who is viewing it, by serving dynamic content, messages, and offers tailored to the individual. E-commerce customization focuses on generating personalized product recommendations, including both similar and complementary items
網站個性化包括通過提供動態內容、消息和為個人量身定制的產品，根據誰正在查看網站來更改網站內容。電子商務定制專注於生成個性化的產品推薦，包括相似和瓦補的商品。

4. Personalization Tools 個性化工具

- Cookies
 - There are a number of methods for achieving personalization and customization. One basic method involves the placement of cookie files on the user's client computer. A cookie is a small text file placed on the user's client computer that can contain any kind of information about the customer, such as customer ID, campaign ID, or prior purchases at the site. When the user returns to the site, or indeed goes further into the site, the customer's prior history can be accessed from a database. Information gathered on prior visits can then be used to personalize the visit and customize the product.

有許多方法可以實現個性化和定制。一種基本方法涉及將cookies文件放置在用戶的客戶機上。cookies是一種安裝在客戶機中的小型文本文件，可以存放有關客戶的任何類型的信息，例如顧客編號、交易編號或所購物品。當用戶返回網站或實際上進入網站時，可以從數據庫中訪問客戶的歷史記錄。然後，可以將先前訪問中收集的信息用於個性化訪問並自定義產品。

4. Personalization Tools 個性化工具

- There are also a number of other, more sophisticated tools available that offer intelligent customer segmentation, personalization, and individualized product recommendations. Examples include Kibo Montetate and Barilliance. Most e-commerce suites, such as Salesforce Commerce Cloud, include similar functionality. At the other end of the spectrum, Google Optimize is a free tool that can customize a website based on visitor location, browser device, and digital behavior.

還有許多更複雜的工具可以提供智能的客戶細分和個性化的產品推薦功能，例如 Montetate、Barilliance 和 Evergage 等。大多數電子商務套件，例如 Salesforce Commerce Cloud，都包含類似的功能。另外，Google Optimize 是一款免費工具，可以根據訪問者位置、瀏覽器設備和數字行為自定義網站。

5. The Information Policy 信息政策

- Privacy policy 隱私策略
 - Set of public statements declaring how site will treat customers' personal information that is gathered by site
向公眾聲明企業如何保護在網站中收集到的客戶的個人信息
- Accessibility rules 易用策略
 - Set of design objectives that ensure disabled users can effectively access site
確保殘障用戶能夠順利使用網站的一系列設計目標

Part VI:

Developing a Mobile Website and Building Mobile Applications

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

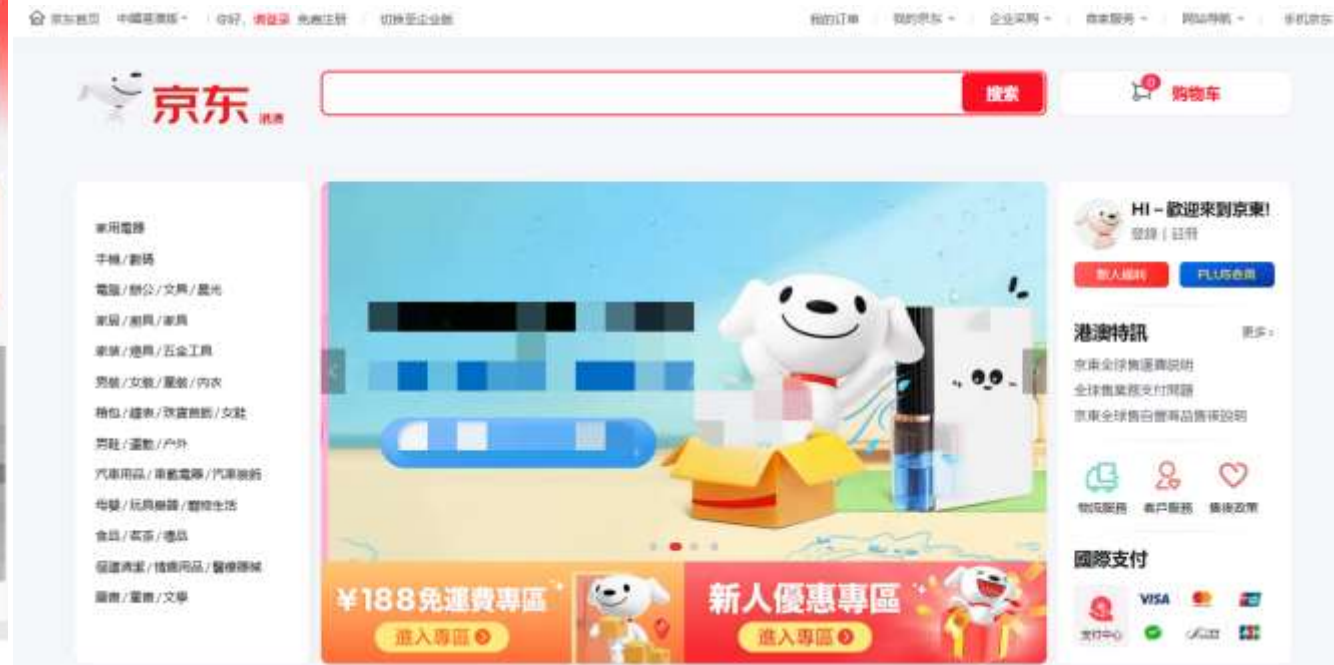
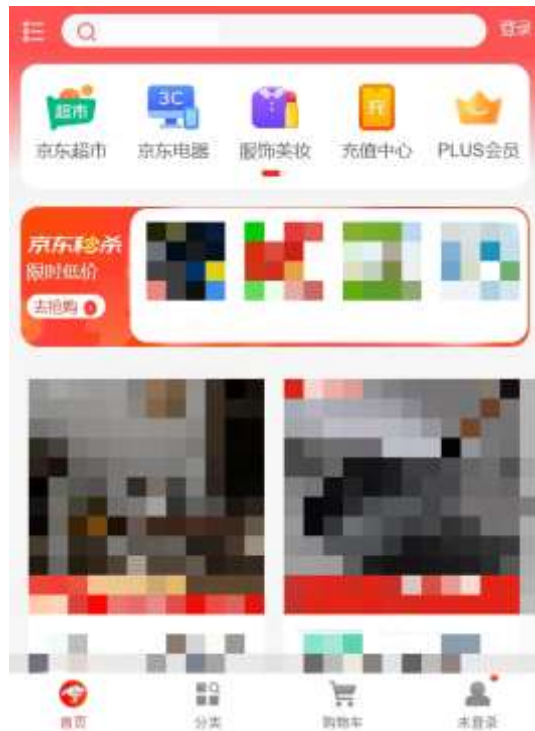
- A **mobile website** is a version of a regular website that is scaled down in content and navigation so that users can find what they want and move quickly to a decision or purchase. You can see the difference between a regular website and a mobile site by visiting the JD.com website from your desktop computer and then from a smartphone or tablet computer. JD.com's mobile site is a cleaner, more interactive site suitable for finger navigation and efficient consumer decision making. Like traditional websites, mobile websites run on a firm's servers and are built using standard web tools such as server-side HTML, Linux, PHP, and SQL. Like all websites, the user must be connected to the Web, and performance will depend on bandwidth.

移動網站是常規網站的另外一種版本，可以縮放內容和導航，以便用戶找到自己想要的內容並快速進行決策或購買。我們可以通過個人計算機訪問京東網站，然後通過智能手機或平板電腦查看常規網站和移動網站之間的區別。京東的移動網站更加簡潔且交互性更強，適合手指導航並方便消費者進行決策。像傳統網站一樣，移動網站在公司的服務器上運行，並使用標準的網絡工具（如服務器端HTML、Linux、PHP和SQL）構建。像傳統網站一樣，用戶必須連接到移動網站，而移動網站性能將取決於用戶的帶寬。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

JD.com's mobile site vs JD.com's regular site



Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

- A **mobile web app** is an application built to run on the mobile web browser built into a smartphone or tablet computer. In the case of Apple, the native browser is Safari. Generally, a mobile web app is built to mimic the qualities of a native app using HTML5, CSS, and JavaScript. Mobile web apps are specifically designed for the mobile platform in terms of screen size, finger navigation, and graphical simplicity. Mobile web apps can support complex interactions used in games and rich media; can perform real-time, on-the-fly calculations; and can be geo-sensitive using the smartphone's built-in global positioning system (GPS) function. Mobile web apps typically operate more quickly than mobile websites but not as quickly as native apps.

移動web應用程序是一種在移動網絡瀏覽器（該瀏覽器內置於智能手機或平板電腦中）上運行的應用程序。在蘋果公司的產品中，原生瀏覽器是 Safari。一般來說，移動web應用程序是爲了模仿使用HTML5、CSS和JavaScript的原生應用程序的效果而構建的。移動web應用程序是根據不同的屏幕尺寸、手指導航和圖形簡單性，針對移動平臺專門設計的。移動網絡應用程序可以支持在遊戲和富媒體中的複雜交互，執行即時計算，並且使用智能手機的內置全球定位系統進行地理定位。移動網絡應用程序的運行速度通常比移動網站快，但不如原生應用程序快。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

- A **native app** is an application designed specifically to operate using a mobile device's hardware and operating system. These stand-alone programs can connect to the Internet to download and upload data and can operate on this data even when not connected to the Internet. You can download a book to an app reader, disconnect from the Internet, and read your book. Because the various types of smartphones have different hardware and operating systems, apps are not “one size fits all” and therefore need to be developed for different mobile platforms. An Apple app that runs on an iPhone cannot operate on Android phones. Native apps are built using different programming languages depending on the device for which they are intended, which is then compiled into binary code, and which executes extremely quickly on mobile devices. For this reason, native apps are ideal for games, complex interactions, on-the-fly calculations, graphic manipulations, and rich media advertising.

原生应用程序是根据移动设备的硬件和操作系统专门设计的应用程序。这些独立程序可以连接互联网进行数据的下载和上传，即使移动设备没有连接互联网，也可以对这些数据进行操作。举例来说，将书下载到阅读器应用程序中之后，断开移动设备与互联网的连接，你仍然可以阅读。由於各种类型的智能手机具有不同的硬件和操作系统，因此需要为不同的移动平台开发不同的原生应用程序。在iPhone上运行的原生应用程序无法在安卓手机上运行。原生应用程序根据其所针对的设备使用不同的编程语言进行构建，然后将其编译为二进制代码，这样在移动设备上运行的速度会非常快。因此，原生应用程序是游戏、复杂交互、即时计算、图形操纵和富媒体广告的理想选择。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

- Increasingly, developers are combining elements of native apps and mobile web apps into hybrid apps. A **hybrid app** has many of the features of both a native app and a mobile web app. Like a native app, it runs inside a native container on the mobile device and has access to the device's APIs, enabling it to take advantage of many of the device's features, such as a gyroscope, that are normally not accessible by a mobile web app. It can also be packaged as an app for distribution from an app store. Like a mobile web app, it is based on HTML5, CSS3, and JavaScript but uses the device's browser engine to render the HTML5 and process the JavaScript locally.

開發人員越來越多地將原生應用程序和移動網絡應用程序的元素組合到混合應用程序中。**混合應用程序**具有原生應用程序和移動網絡應用程序的許多功能。像原生應用程序一樣，它在移動設備上運行，並且可以訪問設備的API，使其能夠使用移動網絡應用程序通常無法獲得的設備，例如陀螺儀。它也可以打包成應用程序，在應用商店發布。像移動網絡應用程序一樣，混合應用程序基於HTML5、CSS3 和JavaScript構建，但使用設備的瀏覽器引擎。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

- What is the “right” mobile presence for your firm? The answer depends on identifying the business objectives and from these, deriving the information requirements for your mobile presence.

什麼才是適合你公司的移動電子商務平臺?這取決於公司確立的商業目標, 以及據此確定的移動網站的信息需求.



Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence

計劃和建立移動平臺

- The first step is to identify the business objectives you are trying to achieve. Once you have a clear sense of business objectives, you will be able to describe the kind of system functionality that is needed and specify the information requirements for your mobile presence.

第一步是確定要嘗試實現的商業目標。一旦明確了商業目標，你將能夠描述所需的系統功能，並確定移動網站的信息需求。

- After you have identified the business objectives, system functionality, and information requirements, you can think about how to design and build the system.

在確定了商業目標、系統功能和信息需求之後，你可以考慮如何設計和構建系統。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence

計劃和建立移動平臺

| SYSTEMS ANALYSIS FOR BUILDING A MOBILE PRESENCE | | |
|---|---|---|
| BUSINESS OBJECTIVE | SYSTEM FUNCTIONALITY | INFORMATION REQUIREMENTS |
| Driving sales | Digital catalog; product database | Product descriptions, photos, SKUs, inventory |
| Branding | Showing how customers use your products | Videos and rich media; product and customer demonstrations |
| Building customer community | Interactive experiences; games with multiple players | Games, contests, forums, social sign-up |
| Advertising and promotion | Coupons and flash sales for slow-selling items | Product descriptions, coupon management, and inventory management |
| Gathering customer feedback | Ability to retrieve and store user inputs including text, photos, and video | Customer sign-in and identification; customer database |

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

- Consider which to develop: a mobile website, a mobile web app, or a native app. For instance, if your objective is branding or building community, a native app might be the best choice because it enables you to deliver a rich, interactive, and immersive experience that can strengthen the user's emotional connection with the brand. Because native apps are stored locally on the device, they can be accessed even when the user is offline, enabling the user to more deeply engage. In addition, native apps can take advantage of the mobile device's unique characteristics, such as using the gyroscope to deliver a 360-degree view. If your objective, on the other hand, is to create broad awareness, provide specific information on particular products, or drive sales, then a mobile website or mobile web app makes more sense because it is relatively easy and inexpensive to simply publish information to the mobile Web and consumers are still most comfortable completing transactions on the Web (although this is changing as more and more retailers add e-commerce functionality directly into apps). Increasingly, however, the choice will not be an either/or decision. Mobile apps and mobile websites each offer distinct benefits, and in most cases, the best strategy will be to plan to deliver compelling content across all devices.

現在是從移動網站、移動網絡應用程序或原生應用程序三者中進行選擇的時候了。例如，如果目標是推廣品牌或建立社區，原生應用程序可能是最佳選擇，因為它可以讓你提供豐富、交互性強和沉浸式的體驗，從而加強客戶與品牌的情感聯繫。由於原生應用程序存儲在本地移動設備上，即使用戶離線也可以訪問，這能夠提高用戶對原生應用程序的參與度。此外，原生應用程序可以利用移動設備的獨有特性，例如使用陀螺儀提供360度視圖功能。如果目標是獲得公眾的關注、提供特定產品的具體信息或推動銷售，那麼選擇移動網站或移動網絡應用程序更為合適，因為信息發布到移動網絡非常簡單而且成本不高，此外，消費者仍然願意在網絡上完成交易(儘管隨著越來越多的零售商將電子商務功能直接添加到應用程序中，這種情況正在發生變化)。然而，越來越多的選擇不再是非此即彼的決定。移動應用程序和移動網站各自都有獨特的優勢，在大多數情況下，最好的策略是在所有設備上提供具有吸引力的內容。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

- Mobile website
 - Resizing existing website for mobile access is least expensive
調整現有網站的大小以實現移動訪問成本最低
- Mobile web app
 - Can utilize browser API
可以使用瀏覽器應用程序接口
- Native app
 - More expensive; requires more programming
較昂貴; 需要更多的編程
 - Available offline
可離線訪問

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Mobile Presence: Design Considerations

移動平臺：設計考量

- Designing a mobile presence is somewhat different from traditional desktop website design because of different hardware, software, and consumer expectations.

移動平臺與傳統網站的設計有所不同，這是因為硬件、軟件和消費者的期望不同。

| UNIQUE FEATURES THAT MUST BE TAKEN INTO ACCOUNT IN 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 have. |
| Displays | Mobile displays are much smaller and require simplification. Some screens are not good in sunlight. |
| Interface | Touch-screen technology introduces new interaction routines that are different from the traditional mouse and keyboard. The mobile platform is not a good data entry tool but can be a good navigational tool. |

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

- Designers need to take mobile platform constraints into account when designing for the mobile platform. Mobile page load speed has been shown to be a significant factor in conversion rates. File sizes should be kept smaller and the number of files sent to the user reduced. Focus on a few, powerful graphics, and minimize the number of images sent to the user. Prioritize the loading of critical content first, and while the user is processing that content, start to load the next layer of content. Simplify choice boxes and lists so that the user can easily scroll and touch-select the options.

設計人員在進行移動平臺設計時需要考慮移動平臺的限制。移動頁面加載速度已成為影響轉換率的一個重要因素。文件應較小，並減少發送給用戶的文件數量。專注於少數強大的圖形，並儘量減少發送給用戶的圖像數量。優先加載關鍵內容，當用戶處理該內容時，開始加載下一層內容。簡化選擇框和列表，以便用戶可以輕鬆滾動和觸摸選項。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

- Mobile presence has become so important that it is fueling a growing trend to flip the traditional e-commerce development process and begin instead with development of a mobile presence rather than a desktop website (known as **mobile first design**). Mobile first design has several advantages. Instead of creating a full-featured design for a desktop website that then needs to be scaled back, mobile first design focuses on creating the best possible experience given mobile platform constraints and then adding in elements for the desktop platform, progressively enhancing the functionality of the site. Proponents of mobile first design argue that it forces designers to focus on what is most important, and this helps create a lean and efficient mobile design that functions much better than a design that begins with a traditional platform that must be stripped down to work on mobile devices.

移動平臺相當重要，當今的趨勢是扭轉傳統的電子商務開發過程，從移動平臺而不是從傳統網站開始開發（**稱為移動優先設計**），而移動平臺正在加速這一過程。移動優先設計有幾個優點。移動優先設計不是為一個桌面網站進行一個功能齊全的設計，而是需要簡化，其重點在於在移動平臺的限制下創造最佳的體驗，然後漸進地添加傳統平臺的元素，逐步增強移動平臺的功能。移動優先設計的支持者認為，移動優先設計迫使設計師將重點放在移動網站最重要的地方，有助於產生精益高效的移動設計，其功能遠遠優於從傳統平臺開始設計。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

Responsive web design and Adaptive web design

- The important trends in the development of mobile websites include **responsive web design** and **adaptive web design**.

移動網站開發的其他重要趨勢包括響應式網頁設計和自適應網頁設計。



Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

Responsive web design and Adaptive web design

- Responsive web design (RWD) tools and design techniques make it possible to design a website that automatically adjusts its layout and display according to the screen resolution of the device on which it is being viewed, whether a desktop, tablet, or smartphone. RWD tools include HTML5 and CSS3, and its three key design principles involve using flexible, grid-based layouts; flexible images and media; and media queries. RWD uses the same HTML code and design for each device but uses CSS (which determines the layout of the web page) to adjust the layout and display according to the screen's form factor. RWD typically works well for sites with relatively simple functionality (i.e., sites that primarily deliver content) and that users engage with in a similar manner no matter the device being used.

響應式網頁設計工具和設計原理使得網站被設計成能够根據其正在查看的設備(無論是面設備、平板電腦還是智能手機)的屏幕分辨率自動調整布局 and 顯示。RWD工具包括HTML5和CSS3，其三個關鍵設計原則包括使用靈活的基於網格的布局、可伸縮的圖像和媒體以及媒體查詢。RWD對每個設備都使用相同的HTML代碼和設計，但使用CSS(它決定了網頁的布局)來調整布局並顯示屏幕的外形因素。對於具有相對簡單的功能(比如主要傳遞內容)並且用戶不管使用何種設備都是以類似的方式運行的網站來說，RWD站點通常有很好的效果。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

Responsive web design and Adaptive web design

- Using RWD can be costly, often requiring a complete redesign of the website's interface. Another problem with RWD, particularly if not coupled with mobile first design, is that the responsive website still has the size and complexity of a traditional desktop site, sometimes making it slow to load and perform on a mobile device. Another technique, known as adaptive web design, has been developed to deal with this issue.

使用RWD的代價不菲，通常需要對網站的界面進行徹底的重新設計。RWD還有另一個問題，特別是在沒有與移動優先設計相結合時，響應式網站仍然具有傳統網站的大小和複雜度，有時在移動設備上加載和運行的速度非常慢。慶幸的是，如今已經開發了另一種稱為自適應網頁設計的技術來解決這個問題。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

Responsive web design and Adaptive web design

- With adaptive web design (AWD) (sometimes also referred to as adaptive delivery or responsive web design with server-side components [RESS]), the server hosting the website detects the attributes of the device making the request and, using predefined templates based on device screen size along with CSS and JavaScript, loads a version of the site that is optimized for the device. AWD has a number of advantages, including faster load times, the ability to enhance or remove functionality on the fly, and typically a better user experience, particularly for businesses where user intent differs depending on the platform being used. A variation on AWD uses a cloud-based platform to provide similar functionality.

使用自適應網頁設計（有時也稱為自適應交付或具有服務器端組件的響應式網頁設計），托管網站的服務器會檢測提出請求的設備的屬性，並使用基於設備屏幕尺寸的預定義模板以及CSS和JavaScript，加載為設備優化的網站版本。AWD具有許多優點，包括加載更快，能夠快速增加或刪除功能，並且通常具有更好的用戶體驗，特別是對於那些在不同平臺上用戶意圖有所不同的企業。AWD的變體是通過基於雲的平臺來提供類似的功能。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

Responsive web design and Adaptive web design

- The core feature of Responsive Design is that the webpage layout automatically adjusts based on screen width, ensuring a good browsing experience on desktops, tablets, and mobile devices. Open a website and try resizing the browser window to see if the content rearranges itself as the window size changes.

Responsive Design的核心特點是網頁佈局會根據螢幕寬度自動調整，無論是在桌面、平板還是手機上，都能提供良好的瀏覽體驗。打開一個網站，嘗試調整瀏覽器窗口大小，觀察網頁內容是否會隨著窗口大小變化而重新排列。

- Use the browser's developer tools to check if the webpage uses Media Queries in its CSS. Media Queries are a key technology in Responsive Design, allowing different styles to be applied based on the device's screen width..

使用瀏覽器的開發者工具，檢查網頁的HTML和CSS是否使用了Media Queries。Media Queries 是 Responsive Design 的核心技術，用於根據設備的螢幕寬度應用不同的樣式。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

Responsive web design and Adaptive web design

An example of responsive web design



A major difference is that AWD requires excessive knowledge of CSS and JavaScript programming languages, while RWD requires knowing only how to apply changes to existing codes.

一個主要區別是AWD需要更多的CSS和JavaScript編程語言知識，而RWD只需要知道如何對現有代碼應用更改。

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Responsive web design and Adaptive web design

An example of adaptive web design



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Developing a Mobile Website and Mobile Applications

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Responsive web design and Adaptive web design

Advantages of adaptive web design

- Better User Experience (UX) – with AWD, web developers can control each layout and ensure optimal UX for each screen size. Simply put, it allows the implementation of different content for different screen sizes.
更好的用戶體驗 – 借助 AWD，Web 開發人員可以控制每種布局並確保每種屏幕尺寸的最佳用戶體驗。簡單來說，它允許針對不同的屏幕尺寸實現不同的內容。
- Faster loading time – AWD approach allows developers to remove heavier content for smaller devices.
更快的加載時間 – AWD 方法允許開發人員為較小的設備刪除更冗餘的內容。
- Existing website re-usage – developers can make complex sites built with older code fit all devices without having to recode them from scratch.
重用現有網站——開發人員可以將舊代碼構建的複雜網站適用到所有設備，而無需從頭開始重新編碼。

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Responsive web design and Adaptive web design

Disadvantages of adaptive web design

- Labor-intensive – different layouts require different HTML codes.
更多的勞動——不同的布局需要不同的 HTML 代碼.
- High maintenance – with AWD , you can't update all website versions at once. Instead, you will have to update every version one by one.
高維護——使用 AWD，無法一次更新所有網站版本。相反，必須一一更新每個版本.
- Expensive – AWD usually requires a large team of developers, which will lead to more expenses.
昂貴——AWD通常需要大的開發團隊，這會導致更多的開支.

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

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Responsive web design and Adaptive web design

Advantages of responsive web design

- Consistent with all screen sizes – no matter what device your users use, they will always have the same browsing experience.
與所有屏幕尺寸一致 - 無論用戶使用什麼設備，他們都將始終擁有相同的瀏覽體驗。
- Search engine optimization friendly – RWD allows you to gather all social sharing links through one URL address. This makes it easier for Search Engine to handle the same HTML and content.
友好的搜索引擎優化 – RWD允許您通過一個URL地址收集所有社交共享鏈接。這使得搜索引擎可以更輕鬆地處理相同的HTML和內容。
- Cost-effective – RWD requires only two sets of design renderings and three different sets of CSS styles.
性價比高——RWD只需要兩套設計效果圖和三套不同的CSS樣式。
- Low maintenance – with RWD you won't have to maintain multiple websites designed for different devices. One change will update website content for all screen sizes.
維護成本低——使用RWD，您無需維護為不同設備設計的多個網站。一項更改將更新所有屏幕尺寸的網站內容。
- Easy analytics tracking – with one website for all devices, you will only have to perform analysis from one source of information.
輕鬆分析跟踪——通過一個適用於所有設備的網站，您只需從一種信息源執行分析。

Developing a Mobile Website and Mobile Applications

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Responsive web design and Adaptive web design

Disadvantages of responsive web design

- Slower loading speed – all devices load all data. Even if the mobile version requires only 60% of the desktop content, it will still upload the additional 40% and hide it with CSS.
加載速度較慢——所有設備都會加載所有數據。即使移動版本只需要桌面內容的 60%，它仍然會上傳額外的 40% 並用 CSS 隱藏。
- Problems with usability – RWD will not allow your mobile users to perform different tasks from those of your desktop users and vice versa.
可用性問題——RWD 不允許移動用戶執行與桌面用戶不同的任務，反之亦然。
- Difficulty with integrating Ads – it is challenging to make all ads display perfectly across all screen sizes.
集成廣告困難——讓所有廣告在所有屏幕尺寸上完美顯示是一項挑戰。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

Responsive web design and Adaptive web design

Responsive Web Design Adaptive Web Design

Whether you choose an adaptive or responsive web design will depend on what kind of features you prioritize for your website.

您選擇自適應還是響應式網頁設計將取決於您優先考慮網站的功能類型。

- If you aim for faster page loading times, consider using adaptive web design but be prepared for more complicated maintenance and update procedures.

如果目標是更快的頁面加載時間，則考慮使用自適應網頁設計，但要為更複雜的維護和更新過程做好準備。

- If you prioritize easy analytics tracking and having the same content for all devices, consider using responsive web design but be prepared to compromise on your page loading time.

如果優先考慮輕鬆的分析跟踪並為所有設備提供相同的內容，則考慮使用響應式網頁設計，但要做好犧牲頁面加載時間的準備。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Planning and Building a Mobile Presence 計劃和建立移動平臺

Responsive web design and Adaptive web design

Responsive Web Design Adaptive Web Design

RWD is good for small to medium-sized companies that require frequent website updates. It is also good for new businesses that are on the budget.

RWD 適合需要頻繁更新網站的中小型公司。這對於預算有限的新企業也有好處。

AWD is the best for businesses that want to have customized designs for all screen sizes, use different elements for different devices, and have a lot of content on their website.

對於想要針對所有屏幕尺寸進行定制設計、針對不同設備使用不同元素以及在網站上擁有大量內容的企業來說，AWD 是最佳選擇。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Cross-Platform Mobile App Development Tools 跨平臺移動應用程序開發工具

- In addition to creating native apps from scratch using a programming language such as Objective C or Java, there are hundreds of low-cost or opensource app development toolkits that make creating cross-platform mobile apps relatively easy and inexpensive, without having to use a device-specific programming language.

除了使用諸如 Objective-C或Java之類的編程語言從頭開始創建原生應用程序，還有數百種低成本或開源應用程序的開發工具包可以使跨平臺移動應用程序的創建變得相對容易、成本低，並且不必使用針對特定設備的編程語言。

- **Flutter** is an open-source toolkit developed by Google that can be used to create native apps for Android and iOS devices (as well as applications for Windows, Mac, and the Web). React Native is another open-source tool that uses React and JavaScript to build native iOS, Android, Windows, and Mac apps

Flutter 是一个由谷歌开发的开源工具包，可用於创建適用於安卓和iOS设备（以及適用於Windows、Mac和Web的应用程序）的原生应用程序。React Native是另一个使用 React 和JavaScript 构建原生iOS、安卓、Windows和Mac应用程序的开源工具。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Cross-Platform Mobile App Development Tools 跨平臺移動應用程序開發工具

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除了使用諸如 Objective-C或Java之類的編程語言從頭開始創建原生應用程序，還有數百種低成本或開源應用程序的開發工具包可以使跨平臺移動應用程序的創建變得相對容易、成本低，並且不必使用針對特定設備的編程語言。

- **Appery.io** is a cloud-based platform that enables you to use a drag-and-drop visual builder tool to create HTML5 apps using jQuery Mobile. Appery.io supports Android and iOS applications. **Codiqa** is a similar tool that is even easier to use. It also provides a drag-and-drop interface and builds an app with 100% HTML5 components, without the need to do any coding.

Appery.io是一個基於雲的平臺，能够使用拖放式可視化構建工具來使用jQuery Mobile 創建 HTML5 應用程序. Appery.io 支持安卓和iOS 應用程序. **Codiqa**是一個類似的工具，更易於使用. 它還提供了一個拖放界面，並只使用HTML5組件構建了一個應用程序，而無須進行任何編碼.

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Cross-Platform Mobile App Development Tools 跨平臺移動應用程序開發工具

- In addition to creating native apps from scratch using a programming language such as Objective C or Java, there are hundreds of low-cost or opensource app development toolkits that make creating cross-platform mobile apps relatively easy and inexpensive, without having to use a device-specific programming language.

除了使用諸如 Objective-C或Java之類的編程語言從頭開始創建原生應用程序，還有數百種低成本或開源應用程序的開發工具包可以使跨平臺移動應用程序的創建變得相對容易、成本低，並且不必使用針對特定設備的編程語言。

- **Swiftic** is a free mobile app builder that allows you to include a variety of functionality, including e-commerce, notifications, and a social feed. On the more technical side, **Iconic** is another open-source mobile development framework that enables building hybrid mobile applications using HTML, CSS, and JavaScript. **Axway Appcelerator** is a similar, less technical tool for creating and managing hybrid mobile apps..

Swiftic是一個免費的移動應用程序構建工具，包含各種功能，包括電子商務、通知和社交提要。在技術方面，**Iconic**是另一個移動開發框架，使用HTML、CSS和JavaScript構建混合移動應用程序。**Axway Appcelerator**是一種類似的、技術含量較低的工具，用於創建和管理混合移動應用程序。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Mobile Presence: Performance and Cost Considerations

移動平臺：性能和費用考量

- If you don't have an existing website, the most efficient process may be to use a mobile first design philosophy and [create a mobile site first](#). Alternatively, you may choose to build a traditional website using RWD or AWD techniques. If you already have a website that you don't want to totally redevelop, the least expensive path is to resize it to create a smartphone-friendly mobile site. Doing so typically will not require a complete redesign effort.

如果你沒有現成的網站，則最有效的辦法可能是基於移動優先設計理念先[設計移動網站](#)。或者，你可以選擇使用RWD或AWD技術構建傳統網站。如果你不想完全重建網站，那麼最省錢的途徑就是調整它的大小以創建一個適合智能手機的移動端。這樣做通常不需要完全重新設計。

1. Developing a Mobile Website and Mobile Applications 移動網站和移動應用程序開發

Mobile Presence: Performance and Cost Considerations 移動平臺：性能和費用考量

- Building a mobile web app that uses the mobile device's browser requires more effort and cost than developing a mobile website and suffers from the same limitations as any browser-based application. However, it does offer some advantages such as better graphics, more interactivity, and faster local calculations as, for instance, in mobile geo-location applications like Foursquare that require local calculations of position and then communication with the site's web server.

構建使用移動設備瀏覽器的移動網絡應用程序需要比開發移動網站投入更多的努力和費用，並將受到與基於瀏覽器開發的應用程序相同的限制。然而，它確實有一些優點，例如有更好的圖形、更强的交互性和速度更快的本地計算，如在Foursquare 的移動地理位置應用中需要本地位置計算，然後與站點的web服務器進行通信。

Developing a Mobile Website and Mobile Applications

移動網站和移動應用程序開發

Mobile Presence: Performance and Cost Considerations

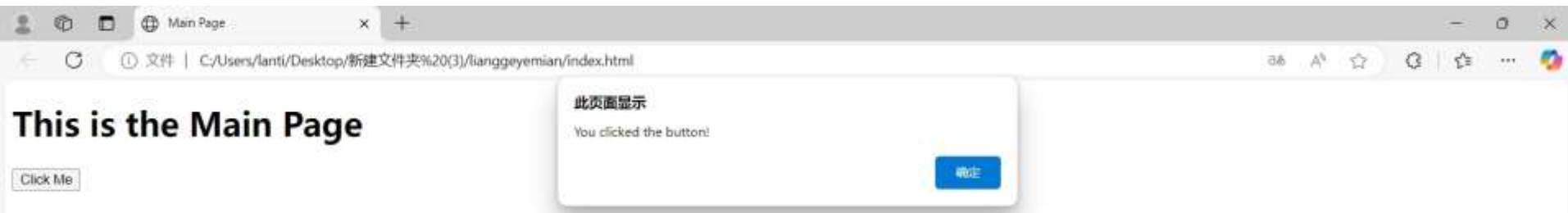
移動平臺：性能和費用考量

- The most expensive path to a mobile presence is to build a native app. Native apps can require more programming expertise, although there are many new development packages that can build mobile native apps with minimal programming expertise. In addition, virtually none of the elements used in your existing website can be reused, and you will need to redesign the entire logic of the interface and carefully think out the customer experience.

建立移動平臺的最昂貴的方法是構建原生應用程序。儘管有許多新的開發包可以以最少的編程技術構建原生應用程序，但在三種形式中，原生應用程序對編程技術的需求最高。此外，現有網站中幾乎沒有任何元素可以重複使用，你需要重新設計界面的整個邏輯，並仔細思考客戶體驗。

Example 1

- The following images show a simple website with JavaScript, write its HTML code.



Example 1

- The following images show a simple website with JavaScript, write its HTML code.

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width,
initial-scale=1.0">
  <title>Main Page</title>
</head>
<body>
  <h1>This is the Main Page</h1>
  <button id="myButton">Click Me</button>

  <script src="script.js"></script>
</body>
</html>
```

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width,
initial-scale=1.0">
  <title>Second Page</title>
</head>
<body>
  <h1>Welcome to the Second Page!</h1>
  <p>You have successfully been redirected here.</p>
</body>
</html>
```

| | |
|-----------------------------------|--|
| Main Page (index.html) | Second Page (page2.html) |
| | JavaScript File (script.js) |

```
// Get the button element
const button = document.getElementById('myButton');

// Add a click event listener
button.addEventListener('click', function() {
  // Show an alert message
  alert('You clicked the button!');

  // Redirect to the local second page
  window.location.href = 'page2.html'; // Redirect to page2.html
});
```

Example 2

- The following images show a simple website using JavaScript, when you click the button, and you will first see the prompt message. After that, the browser will redirect to the specified webpage. Write its HTML code.



Example 2

- The following images show a simple website using JavaScript, when you click the button, and you will first see the prompt message. After that, the browser will redirect to the specified webpage. Write its HTML code.

| |
|--|
| HTML File (index.html) |
| JavaScript File (script.js) |

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width,
initial-scale=1.0">
  <title>Redirect Page Example</title>
</head>
<body>
  <h1>Welcome to My Webpage</h1>
  <button id="myButton">Click Me</button>

  <script src="script.js"></script>
</body>
</html>
```

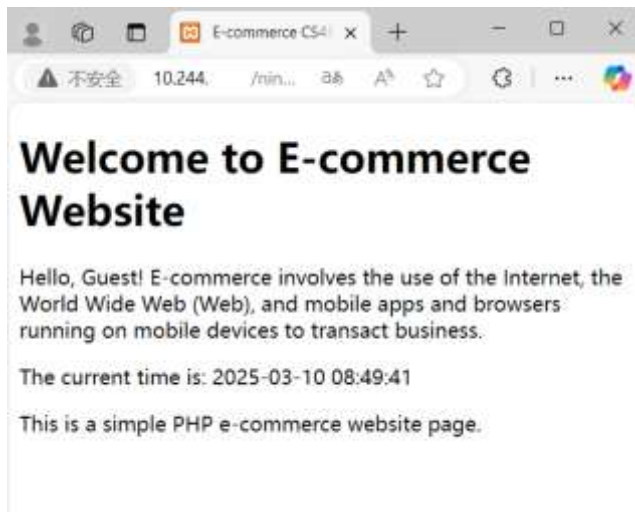
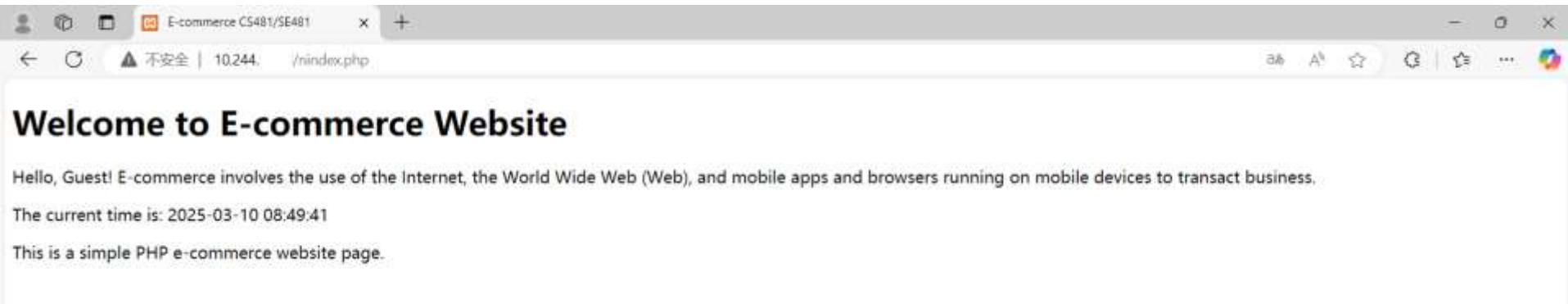
```
// Get the button element
const button = document.getElementById('myButton');

// Add a click event listener
button.addEventListener('click', function() {
  // Display a prompt message
  alert('You clicked the button!');

  // Redirect to a new page
  window.location.href = 'https://www.must.edu.mo'; //
Replace with the URL you want to redirect to
});
```

Example 3

- The following images show a simple website with PHP, write its HTML code.



```
C:\Users\lanti>ipconfig

Windows IP 配置

无线局域网适配器 区域连接* 1:

   媒体状态 . . . . . : 媒体已断开连接
   连接特定的 DNS 后缀 . . . . . :

无线局域网适配器 区域连接* 2:

   媒体状态 . . . . . : 媒体已断开连接
   连接特定的 DNS 后缀 . . . . . :

以太网适配器 VMware Network Adapter VMnet1:

   连接特定的 DNS 后缀 . . . . . :
   IPv4 地址 . . . . . : 192.168.
   子网掩码 . . . . . : 255.255.
   默认网关 . . . . . :

以太网适配器 VMware Network Adapter VMnet8:

   连接特定的 DNS 后缀 . . . . . :
   IPv4 地址 . . . . . : 192.168.
   子网掩码 . . . . . : 255.255.
   默认网关 . . . . . :

无线局域网适配器 WLAN:

   连接特定的 DNS 后缀 . . . . . : mast.edu.cn
   IPv4 地址 . . . . . : 10.244.
   子网掩码 . . . . . : 255.255.
   默认网关 . . . . . : 10.244.

以太网适配器 蓝牙网络连接 2:

   媒体状态 . . . . . : 媒体已断开连接
   连接特定的 DNS 后缀 . . . . . :
```

Example 3

- The following images show a simple website with PHP, write its HTML code.

**PHP File
(nindex.php)**

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-
scale=1.0">
    <title>E-commerce CS481/SE481</title>
</head>
<body>

    <h1>Welcome to E-commerce Website</h1>

    <?php
    // This is a simple PHP code block
    $name = "Guest";
    $currentTime = date("Y-m-d H:i:s");

    echo "<p>Hello, $name! E-commerce involves the use of the Internet,
the World Wide Web (Web), and mobile
apps and browsers running on mobile devices to transact business.</p>";
    echo "<p>The current time is: $currentTime</p>";
    ?>

    <p>This is a simple PHP e-commerce website page.</p>

</body>
</html>
```

Example 3

- The following images show a simple website with PHP, write its HTML code.

To run this simple PHP example locally, you need to set up a local development environment.

1. Install a Local Server Environment.

- Install XAMPP (XAMPP is a free and easy-to-use local server environment that includes Apache (web server), MySQL (database), and PHP) and start the Apache service.

2. Place the PHP File in the Server Directory

- Open your installed server environment: Locate the server's root directory: XAMPP: C:\xampp\htdocs\ (Windows)
- Create a new folder (e.g., project) in the root directory and place your index.php file inside it.

3. Run the PHP File

- Start your local server (e.g., Apache in XAMPP).
- Open your browser and enter the following URL:

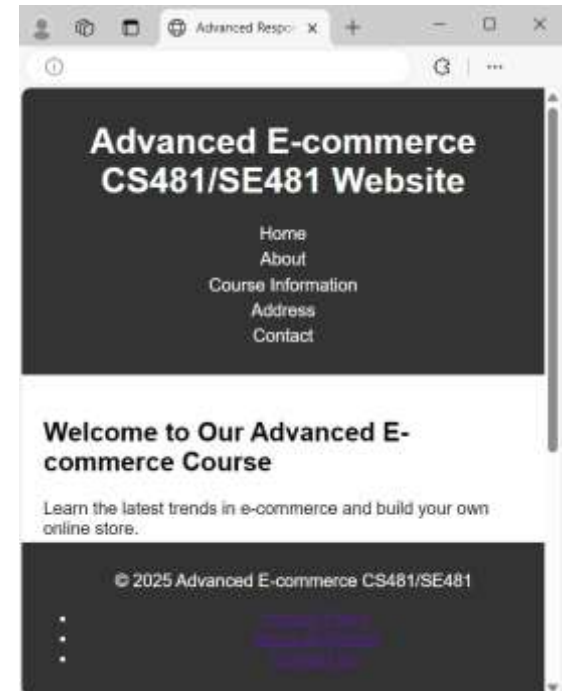
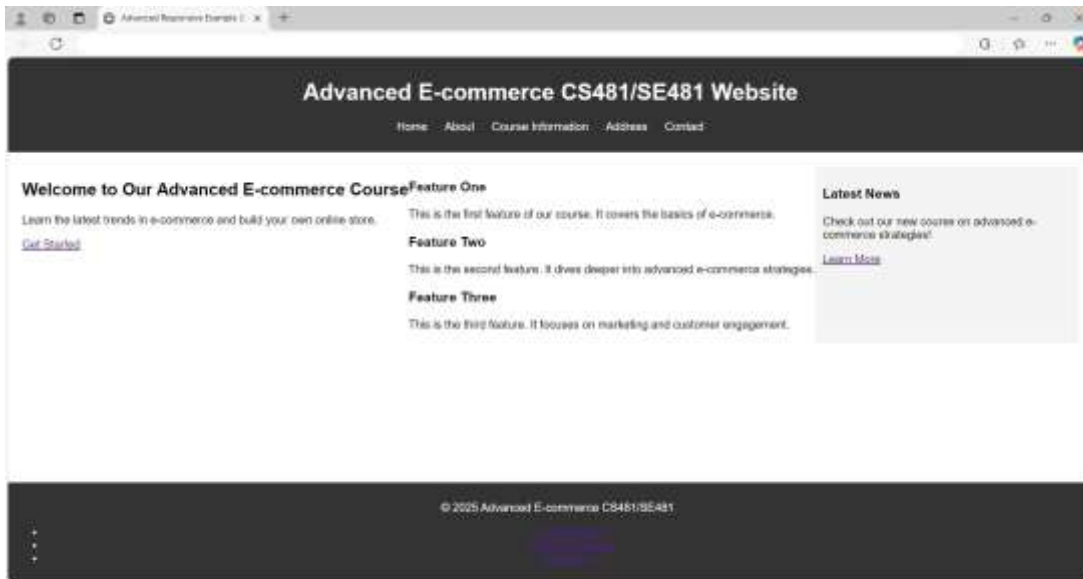
`http://10.244.***.***/nindex.php`

4. Stop the Server

- When you're done testing, remember to stop the local server (e.g., stop Apache in XAMPP) to free up system resources.

Example 4

- The following images show a simple responsive example website, write its HTML code.



Example 4

HTML File (index.html)

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Advanced Responsive Example (E-commerce CS481/SE481)</title>
  <link rel="stylesheet" href="styles.css">
</head>
<body>
  <header>
    <h1>Advanced E-commerce CS481/SE481 Website</h1>
    <nav>
      <ul>
        <li><a href="#">Home</a></li>
        <li><a href="#">About</a></li>
        <li><a href="#">Course Information</a></li>
        <li><a href="#">Address</a></li>
        <li><a href="#">Contact</a></li>
      </ul>
    </nav>
  </header>
  <main>
    <section class="hero">
      <h2>Welcome to Our Advanced E-commerce Course</h2>
      <p>Learn the latest trends in e-commerce and build your own online store.</p>
      <a href="#" class="btn">Get Started</a>
    </section>
    <section class="features">
      <div class="feature">
        <h3>Feature One</h3>
        <p>This is the first feature of our course. It covers the basics of e-commerce.</p>
      </div>
      <div class="feature">
        <h3>Feature Two</h3>
        <p>This is the second feature. It dives deeper into advanced e-commerce strategies.</p>
      </div>
      <div class="feature">
        <h3>Feature Three</h3>
        <p>This is the third feature. It focuses on marketing and customer engagement.</p>
      </div>
    </section>
    <aside class="sidebar">
      <h3>Latest News</h3>
      <p>Check out our new course on advanced e-commerce strategies!</p>
      <a href="#" class="btn">Learn More</a>
    </aside>
  </main>
  <footer>
    <p>© 2025 Advanced E-commerce CS481/SE481</p>
    <ul class="footer-links">
      <li><a href="#">Privacy Policy</a></li>
      <li><a href="#">Terms of Service</a></li>
      <li><a href="#">Contact Us</a></li>
    </ul>
  </footer>
</body>
</html>
```

Example 4

- The following images show a simple responsive example website, write its HTML

```
/* 基本樣式 */
body {
  font-family: Arial, sans-serif;
  margin: 0;
  padding: 0;
  box-sizing: border-box;
}

header {
  background: #333;
  color: #fff;
  padding: 10px 20px;
  text-align: center;
}

nav ul {
  list-style: none;
  padding: 0;
}

nav ul li {
  display: inline;
  margin: 0 10px;
}

nav ul li a {
  color: #fff;
  text-decoration: none;
}

main {
  display: flex;
  flex-wrap: wrap;
  padding: 20px;
}

.content {
  flex: 3;
  padding: 10px;
}

.sidebar {
  flex: 1;
  padding: 10px;
  background: #f4f4f4;
}
```

```
footer {
  background: #333;
  color: #fff;
  text-align: center;
  padding: 10px;
  position: fixed;
  bottom: 0;
  width: 100%;
}

/* Responsive 設計 */
@media (max-width: 768px) {
  nav ul li {
    display: block;
    text-align: center;
    margin: 5px 0;
  }

  main {
    flex-direction: column;
  }

  .content, .sidebar {
    flex: 1 100%;
  }
}

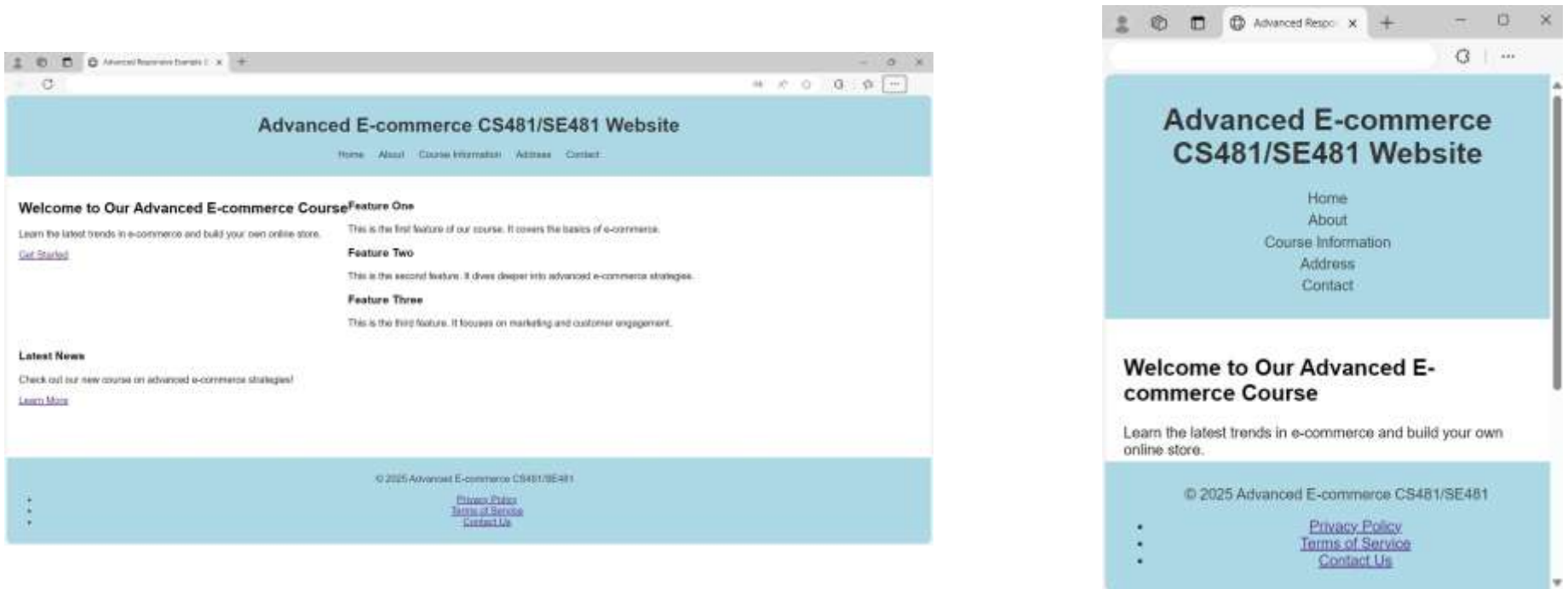
@media (max-width: 480px) {
  header h1 {
    font-size: 1.5em;
  }

  .sidebar {
    display: none; /* 在小螢幕上隱藏側邊欄 */
  }
}
```

CSS File
(styles.css)

Example 4

- The following images show a simple responsive example website, write its HTML code.



Example 4

HTML File (index.html)

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Advanced Responsive Example (E-commerce CS481/SE481)</title>
  <link rel="stylesheet" href="newstyles.css">
</head>
<body>
  <header>
    <h1>Advanced E-commerce CS481/SE481 Website</h1>
    <nav>
      <ul>
        <li><a href="#">Home</a></li>
        <li><a href="#">About</a></li>
        <li><a href="#">Course Information</a></li>
        <li><a href="#">Address</a></li>
        <li><a href="#">Contact</a></li>
      </ul>
    </nav>
  </header>
  <main>
    <section class="hero">
      <h2>Welcome to Our Advanced E-commerce Course</h2>
      <p>Learn the latest trends in e-commerce and build your own online store.</p>
      <a href="#" class="btn">Get Started</a>
    </section>
    <section class="features">
      <div class="feature">
        <h3>Feature One</h3>
        <p>This is the first feature of our course. It covers the basics of e-commerce.</p>
      </div>
      <div class="feature">
        <h3>Feature Two</h3>
        <p>This is the second feature. It dives deeper into advanced e-commerce strategies.</p>
      </div>
      <div class="feature">
        <h3>Feature Three</h3>
        <p>This is the third feature. It focuses on marketing and customer engagement.</p>
      </div>
    </section>
    <aside class="sidebar">
      <h3>Latest News</h3>
      <p>Check out our new course on advanced e-commerce strategies!</p>
      <a href="#" class="btn">Learn More</a>
    </aside>
  </main>
  <footer>
    <p>© 2025 Advanced E-commerce CS481/SE481</p>
    <ul class="footer-links">
      <li><a href="#">Privacy Policy</a></li>
      <li><a href="#">Terms of Service</a></li>
      <li><a href="#">Contact Us</a></li>
    </ul>
  </footer>
</body>
</html>
```

Example 4

- The following images show a simple responsive example website, write its HTML

```
/* 基本樣式 */
body {
  font-family: Arial, sans-serif;
  margin: 0;
  padding: 0;
  box-sizing: border-box;
}

header {
  background: lightblue; /* 新增：淺藍色背景 */
  color: #333; /* 修改文字顏色以確保可讀性 */
  padding: 10px 20px;
  text-align: center;
}

nav ul {
  list-style: none;
  padding: 0;
}

nav ul li {
  display: inline;
  margin: 0 10px;
}

nav ul li a {
  color: #333;
  text-decoration: none;
}

main {
  display: flex;
  flex-wrap: wrap;
  padding: 20px;
}

.content {
  flex: 3;
  padding: 10px;
}
```

```
footer {
  background: lightblue; /* 新增：淺藍色背景 */
  color: #333; /* 修改文字顏色以確保可讀性 */
  text-align: center;
  padding: 10px;
  position: fixed;
  bottom: 0;
  width: 100%;
}

/* Responsive 設計 */
@media (max-width: 768px) {
  nav ul li {
    display: block;
    text-align: center;
    margin: 5px 0;
  }

  main {
    flex-direction: column;
  }

  .content, .sidebar {
    flex: 1 100%;
  }
}

@media (max-width: 480px) {
  header h1 {
    font-size: 1.5em;
  }

  .sidebar {
    display: none; /* 在小螢幕上隱藏側邊欄 */
  }
}
```

CSS File
(newstyles.css)

Example 5

Adaptive Web Design: We need to use **server-side technology** to detect the user's device type and serve different HTML files based on the device.

```
const express = require('express');
const path = require('path');
const app = express();

// Middleware: Detect Device Type
app.use((req, res, next) => {
  const userAgent = req.headers['user-agent'];
  let deviceType = 'desktop'; // Default to desktop

  if (/mobile/i.test(userAgent)) {
    deviceType = 'mobile';
  } else if (/tablet|ipad/i.test(userAgent)) {
    deviceType = 'tablet';
  }

  req.deviceType = deviceType;
  next();
});

// Serve Different HTML Files Based on Device Type
app.get('/', (req, res) => {
  const deviceType = req.deviceType;
  res.sendFile(path.join(__dirname, 'public', deviceType, 'index.html'));
});

// Start the Server
const PORT = 3000;
app.listen(PORT, () => {
  console.log(`Server running at http://localhost:${PORT}`);
});
```

Exercise (Part II)

1) Which of the following technologies is used to separate the design and presentation of content from the content creation process?

- A) CGI
- B) proxy server
- C) shopping cart
- D) CMS (Content management system)

2) All of the following are basic functionality provided by e-commerce merchant server software *except*:

- A) a product catalog
- B) marketing analytics
- C) a shopping cart
- D) credit card processing

3) Which of the following types of sites typically needs a very high percentage of secure pages?

- A) web services
- B) customer self-service
- C) trading
- D) publishing/subscription

Exercise (Part II)

4) Which of the following is not a main factor in determining the overall demand on an e-commerce site?

- A) file sizes of web pages being served
- B) number of simultaneous users in peak periods
- C) speed of legacy applications that are needed to supply data to web pages
- D) whether content is dynamic or static

5) All of the following are important factors in search engine optimization *except*:

- A) selecting keywords and page titles
- B) identifying market niches for your services or products
- C) buying search engine ads
- D) adhering to privacy policies

6) The primary way a website personalizes the content presented to a visitor is through the use of_____.

Exercise (Part II)

7) Which of the following is *not* part of the LAMP open source web development model?

- A) Linux
- B) Apache
- C) Microsoft IIS
- D) PHP

8) Which of the following statements about responsive web design (RWD) is *not* true?

- A) RWD works best for sites that have complex functionality
- B) RWD tools include HTML5 and CSS3
- C) RWD makes it possible to design a website that automatically adjusts its layout and display according to the screen resolution of the device on which it is being viewed
- D) RWD can be costly

9) Building which of the following is the most expensive path to creating a mobile presence?

- A) native app
- B) mobile website
- C) mobile web app
- D) hybrid HTTP

Exercise (Part II)

10) Beginning the e-commerce development process with a mobile presence rather than a desktop website is referred to as which of the following?

- A) RWD (Responsive Web Design)
- B) AWD (Adaptive Web Design)
- C) mobile first design
- D) RESS (Responsive Design + Server Side Components)

11) Which of the following statements is true?

- A) A native app is one designed to specifically operate using a mobile device's hardware and operating system
- B) Storing HTML pages in RAM rather than on a server's hard drive is an expensive way to fine-tune the processing architecture of a website
- C) Upgrading a server from a single processor to multiple processors is an example of scaling a site horizontally
- D) Dynamic page generation increases menu costs

12) Which of the following statements is *not* true?

- A) Prior to the development of e-commerce, websites primarily delivered static HTML pages
- B) The web server software used has a significant impact on how a website's web pages look on a user's computer
- C) The eight most important factors in successful e-commerce site design include functionality; being informational; ease of use; providing redundant navigation; ease of purchase; multi-browser functionality ; simple graphics; and legible text
- D) A hybrid app has many of the features of both a native app and a mobile web app

Exercise (Part II)

13) Which of the following statements about mobile websites is not true?

- A) Mobile websites run on a firm's servers, just like a traditional website
- B) Mobile websites can be built using standard web tools such as server-side HTML, Linux, PHP and SQL
- C) Generally, mobile websites operate more quickly than traditional websites viewed on a desktop computer connected to a broadband office network
- D) Most large firms today have mobile websites

14) _____ is a server-side technique that detects the attributes of the device making the request, and using predefined templates, loads a version of a site that is optimized for the device.

15) All of the following are key design principles of responsive web design except:

- A) flexible grid-based layouts
- B) media queries
- C) coding by convention
- D) flexible images and media

Exercise (Part II)

16) _____ is a programming language invented by Netscape used to control the objects on an HTML page and handle interactions with the browser.

17) _____ provides a set of standards for communicating between a browser and a program running on a server that allows for interaction between the user and server.

18) All of the following are website design features that annoy customers *except*:

- A) slow-loading pages
- B) pop-under ads
- C) splash pages
- D) multi-browser functionality

Exercise (Part II)

19) Which of the following is one of the world's most commonly used server-side scripting language?

- A) Ruby on Rails
- B) Django
- C) PHP
- D) Perl

20) All of the following are methods of improving the processing architecture of a website except:

- A) separating static content from dynamic content
- B) optimizing ASP code
- C) optimizing the database schema
- D) adding web servers

21) All of the following are steps one can take to right-size a website's hardware platform and meet demands for service except:

- A) scaling hardware vertically
- B) scaling hardware horizontally
- C) replacing static pages with dynamically generated pages
- D) improving processing architecture

Exercise (Part II)

22) The term *stateless* refers to the fact that:

- A) no one government entity controls the Internet
- B) the server does not have to maintain an ongoing dedicated interaction with the client computer
- C) system performance degrades as more simultaneous users require service
- D) web servers may maintain multiple instances of server software to handle requests

23) Which of the following is a standard that makes it possible to access data from any application regardless of the database and operating system software being used?

- A) CGI
- B) ODBC
- C) MySQL
- D) HTTP

24) _____ is not an open source software tool.

- A) WebSphere
- B) Apache
- C) MySQL
- D) PHP

Exercise (Part II)

25) Which of the following types of application server monitors and controls access to a main web server and implements firewall protection?

- A) proxy server
- B) list server
- C) groupware server
- D) mail server

26) Which of the following *cannot* be used to retrieve objects from a database?

- A) CGI
- B) ASP
- C) JSP
- D) HTML

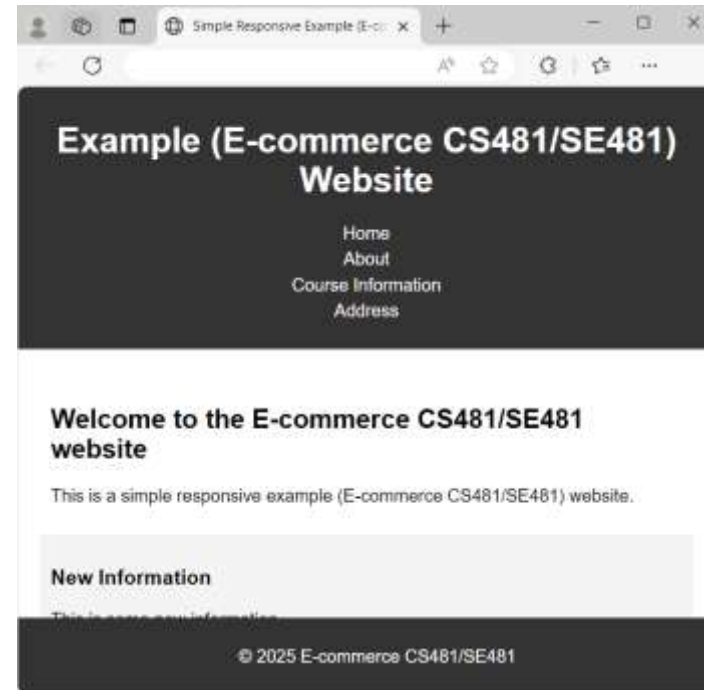
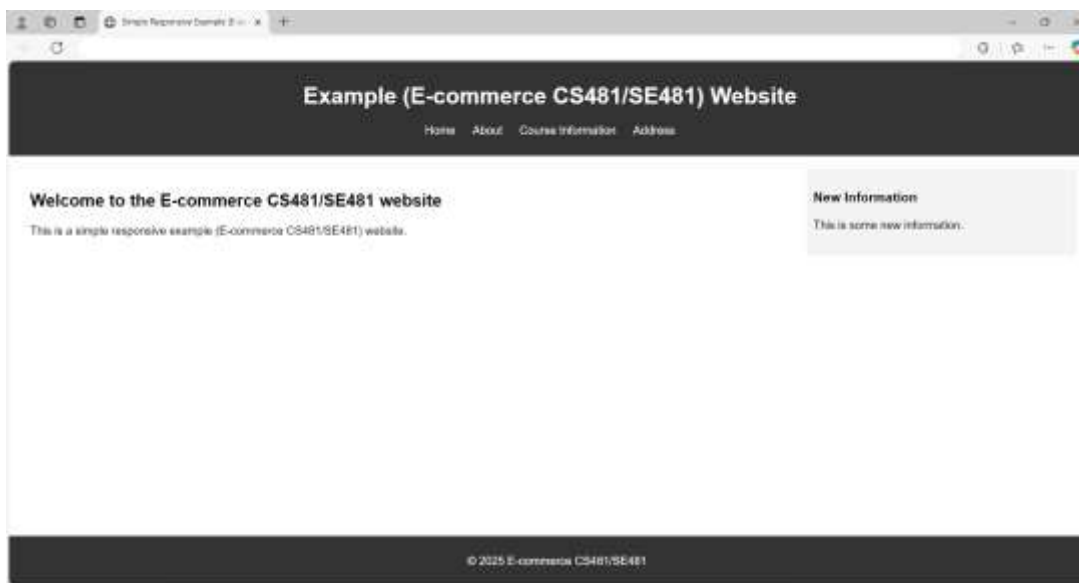
27) The process of comparing a website with that of its competitors in terms of response speed, quality of layout, and design is known as_____.

1. In the development of e-commerce, what is system architecture? Give a simple graph that can illustrates a simple two-tier and a more complex multi-tier e-commerce site architecture

2. What are the eight most important factors impacting website design, and how do they affect a site's operation?

3. What are responsive web design (RWD) and adaptive web design (AWD) and when should you use them?

4. The following images show a simple responsive example website, write the corresponding HTML code.



5. The following images show a simple website, write the corresponding HTML code.

Before click the button



After click the button

