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Objectives

- Define web development for mobile devices such as the BlackBerry® smartphone
- List the advantages and disadvantages of web development for mobile devices

This chapter introduces the topic of web development for mobile devices and outlines the advantages and disadvantages of developing web applications for this platform. This chapter also discusses tools and basic design principles, and provides an overview of the modules that make up this course.
Web development for mobile devices

This course provides information about developing browser-based services—such as web sites and BlackBerry widgets—that users can access from a mobile device, such as a BlackBerry smartphone.

When you develop web content for a mobile device, you must be aware of the standards that the device supports and determine how to develop web content that functions within those supported standards. In addition, you must be aware of the physical components of the wireless browsing environment and how they contribute, positively and negatively, to the user's wireless browsing experience.

The wireless device browsing environment

The BlackBerry® Browser is designed to enable users to access and navigate web pages over a wireless connection just as they would using a desktop browser. For content developers, however, wireless browsing poses a number of additional challenges that are not present when designing content for a traditional desktop environment. Some notable differences include the following characteristics:

- Display size—The BlackBerry smartphone display, while not as small as typical wireless devices, is still much smaller than a desktop browser. The following example shows how the same web page displays on a desktop display and on a BlackBerry smartphone.
Figure 3.1 The BlackBerry Developers’ web site shown on a desktop browser
Chapter 1

Figure 3.2 The BlackBerry Developers’ web site shown on a BlackBerry smartphone

- Memory—The BlackBerry smartphone has more stringent memory restrictions than desktop computers, which impacts the amount of data it can store.

- Network—Wireless networks have considerably slower data transfer rates than standard LAN or Wi-Fi networks. Most wireless browsers access the Internet through a WAP gateway, which can have size and content limitations. RIM has designed two gateways—the BlackBerry® Mobile Data Service and the BlackBerry® Internet Service—to mitigate the impact of the wireless network by supporting a wider range of content than WAP gateways, and optimizing the content to reduce sizes and decrease transmission and rendering times.

- Latency—Latency, or lag, is measured either one-way (the time from the source sending a packet to the destination receiving it), or round-trip (the one-way latency from source to desti-
nation plus the one-way latency from the destination back to the source. A well designed wireless web site will reduce the impact of latency by minimizing the number of round trips a browser needs to fetch a page.

Developing content with the wireless environment in mind can help you to work around some of the limitations inherent in wireless browsing. With a knowledge of the BlackBerry Browser, you can make the content development decisions necessary to provide the functionality that users require, while also providing a positive wireless browsing experience.

**Design considerations: disadvantages**

When you design your BlackBerry smartphone application, consider that BlackBerry smartphones differ from computers in many ways, and have the following inherent limitations:

- have a smaller screen size
- display a limited number of characters
- display one screen at a time
- have slower processor speeds
- have less available memory
- have shorter battery life
- use wireless networks that have a longer latency period than standard LANs

Applications designed for BlackBerry smartphones need to provide a balance between the best possible user experience and a long battery life.

Mobile device users use applications on their mobile device differently than they would use applications on a computer. On mobile devices, users expect to find information quickly. For example, a CRM system can provide a massive amount of information, but users only require a small amount of that information at one time. The BlackBerry smartphone UI is designed so users can perform tasks easily and access information quickly.

**Design considerations: advantages**

The BlackBerry smartphone offers additional functionality for mobile web browsing, which is not typically available in desktop browsers. This additional functionality includes the ability to do the following:

- send web signals—Web signals are near-real time content updates that push data directly to a user’s BlackBerry smartphone, allowing third-party content providers to add timely and relevant updates to their application portfolio. Web signals have a seamless distribution process after a simple customer opt-in process.
- push content—True server-side push communication is supported by every BlackBerry smartphone, allowing you to send information to the browser in a variety of ways, regardless of back-end server technology (Apache, IIS, and WebSphere).
queue forms offline—Automatically queue pages for submittal when users re-enter coverage.

- include web feeds using the built-in RSS function

- access GPS functionality through an API

- access the BlackBerry architecture—Application data can leverage the same wireless connection, compression, encryption, and infrastructure as BlackBerry smartphone email messages, so you do not need to build additional networking functions.

- create BlackBerry widgets—Widgets offer all the benefits of web development, while also permitting access to all of the APIs and content stored on the device. As a developer, you can decide which content you want to deploy on the server and update dynamically, and which content remains static on the device.

BlackBerry smartphone web applications offer the further advantage of allowing you to use standard web authoring tools. For example, you can develop web applications and widgets using the following standard tools:

- HTML and XHTML
- CSS
- JavaScript®
- SVG

Eclipse™—The BlackBerry® Web Plug-in for Eclipse® allows you to debug web applications and content for the BlackBerry solution. Working through a familiar platform like Eclipse allows you to simplify code profiling and increases overall efficiencies.

Microsoft® Visual Studio®—The BlackBerry® Web Plug-in for Microsoft® Visual Studio® v1.2 gives developers accustomed to creating web applications for desktop browsers the ability to write and deploy BlackBerry smartphone web applications. The plug-in enables such features as integrated device simulators and ASP.NET mobile controls.

Finally, because web applications are traditional client/server deployments, there is nothing to deploy. You can therefore reuse your existing web applications, as well as existing web content.
1. List three major reasons why designing web content for a mobile device is different than designing web content for a desktop browser.

2. Name three types of network gateways that the BlackBerry smartphone can use to access the Internet.

3. List two ways that the RIM gateways differ from a typical WAP gateway.

4. What is the purpose of optimizing content?
Answers

1. Display size
   Memory
   Wireless network

2. WAP
   BlackBerry MDS
   BlackBerry Internet Service

3. Wider range of content
   Optimization of content

4. To decrease transmission and rendering times
Introduction to web development for mobile devices

Course overview

In this course, you will learn about the following topics:

- web development tools for mobile devices
- the BlackBerry Infrastructure
- optimizing web content for mobile device browsers
- introduction to browser push communications
- BlackBerry® widgets

Web development tools

Several tools are available for developers, including the following topics:

- The BlackBerry Web Plug-in for Eclipse
- The BlackBerry Web Plug-in for Microsoft Visual Studio
- The BlackBerry Widget SDK

You will learn about these tools, as well as the development considerations associated with each development platform, such as application portability, infrastructure, the complexity of the application, vendor support, and the costs, benefits, and flexibility for future options.

The BlackBerry Infrastructure

You will learn about the components of the BlackBerry Infrastructure, including the following:

- BlackBerry® Enterprise Solution and BlackBerry® Enterprise Server—Allows administrators to manage large numbers of BlackBerry smartphone users using centralized tools and policies.
- BlackBerry Internet Browser—The BlackBerry Internet Browser was developed to use the BlackBerry Internet Service as a gateway to the Internet. This component is hosted by the BlackBerry Infrastructure and is a service offered by certain carriers.
- BlackBerry MDS—The BlackBerry MDS is an optimized framework for creating, deploying, and managing applications for the BlackBerry Enterprise Solution. The BlackBerry MDS provides essential components that enable applications beyond email messages to be deployed to mobile users, including developer tools, administrative services, and BlackBerry® Device Software. The BlackBerry MDS is the proxy for all web communications to and from the BlackBerry smartphone. To reduce costs and to increase data transmission speeds, the BlackBerry MDS compresses data that is sent to and received from BlackBerry smartphone users wirelessly. The BlackBerry MDS encrypts data before it passes through public networks.
Optimizing web content

Many factors influence how content is rendered on the BlackBerry smartphone. These factors include the network gateway, the browser configuration, and amount of memory in the wireless device, and the color depth of images. In addition, wireless devices have smaller screens and slower processors than desktop computers, which affect how web content is rendered.

You will learn the principles for designing efficient web content for a BlackBerry smartphone, including how to optimize source code using profiler tools, and how to use offline form queueing for greater efficiency. You will also learn how the BlackBerry MDS Connection Service and the BlackBerry Internet Service Browsing network gateways use optimization techniques unique to the BlackBerry Infrastructure.

Browser push communications

Browser push is designed to push information from a web application to a BlackBerry smartphone as the information becomes available. For example, you can use Browser push to receive updates for weather reports, the stock market, or breaking news. When your smartphone receives an update, a new Browser push message appears in a message list or on the Home screen of your BlackBerry smartphone.

You will learn about the advantages and disadvantages of push applications, as well as how to write a push application.

BlackBerry widgets

BlackBerry widgets are applications that you can create using standard web development tools, such as HTML, CSS, and JavaScript. BlackBerry widgets have full access to the device APIs and can leverage both server-side and client-side resources, which allows you to develop applications that create a custom user experience.

You will learn how BlackBerry widgets work on the BlackBerry smartphone platform, the security model used, and the benefits of developing a BlackBerry widget compared to developing web applications. You will also learn about the JavaScript APIs that are available to BlackBerry widgets, and how to create a BlackBerry widget for a BlackBerry smartphone.
When you develop web content for mobile devices such as the BlackBerry smartphone, you must be aware of the web standards that the BlackBerry Browser supports and determine how to develop web content that functions within those supported standards. However, to create an effective browsing experience on the BlackBerry Browser, you must understand more than just what the BlackBerry Browser supports. You must also be aware of the physical components of the wireless browsing environment in which the BlackBerry Browser exists, and how they contribute, positively and negatively, to the user's wireless browsing experience.

The limitations of mobile browsers include the following characteristics:

- a smaller screen size
- slower processor speeds
- less available memory
- shorter battery life
- longer latency period associated with wireless networks

BlackBerry smartphones offer enhanced functions that are not typically available on desktop browsers, including the following capabilities:

- web signals
- push communication
- GPS data
- built-in RSS feeds
- offline form queuing

You can develop web applications for the BlackBerry smartphone using standard tools and processes. In this course, you will learn about designing web applications and delivering content in a way that takes into account the experience of the user, the limitations of the wireless mobile platform, and the unique functions it offers.
Review Questions

1. List and describe the BlackBerry plug-ins that are available for web application development.

2. What are the functions of the BlackBerry Mobile Data System. Choose all that apply.
   A. deploying applications
   B. managing applications
   C. encrypting data
   D. providing developer tools

3. List and describe three factors that influence how content is rendered on a BlackBerry smartphone.