


Introduction to BlackBerry
Smartphone Web
Development—Widgets

Trainer name
Date


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BlackBerry widgets

BlackBerry widgets are stand-alone BlackBerry applications that consist of standard web components, including HTML, XHTML, style sheets, JavaScript, SVG, image files, and other resources. BlackBerry widgets are based on the W3C® widget specification.


HTML Hypertext Markup Language
XHTML Extensible Hypertext Markup Language
SVG scalable vector graphics
W3C World Wide Web Consortium



BlackBerry widgets

Benefits

- Leverage BlackBerry API's in a secure and manageable container
- Use the same distribution/management model as native applications and are distributed through BlackBerry® App World



BlackBerry widgets

Benefits (cont)

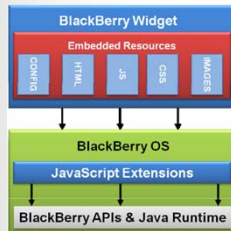
- Author the user interface entirely in HTML/CSS
- Write application logic in JavaScript
- Access the SD Card, PIM, and native applications
- Push and pull data

CSS cascading style sheet
SD Secure Digital
PIM personal information management



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Widget development model



JS JavaScript
OS operating system



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Tools and resources

- BlackBerry Widget SDK and the BlackBerry Widget SDK documentation
- Both the BlackBerry® Web Plug-in for Eclipse and the BlackBerry® Web Plug-in for Microsoft® Visual Studio® include the BlackBerry widget SDK as part of their installation process.



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The BlackBerry Widget SDK

- includes the BlackBerry Widget Packager, code samples, BlackBerry Smartphone Simulator, BlackBerry MDS Connection Service simulator, and documentation
- enables you to create native BlackBerry applications using standard web resources such as HTML, style sheets, and JavaScript, and extend them using BlackBerry widget APIs

SDK software development Kit



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BlackBerry widget APIs

The BlackBerry widget APIs are JavaScript APIs that expose BlackBerry smartphone capabilities that you can use to enhance the capabilities and usefulness of your BlackBerry widget. Some BlackBerry widget APIs also enable you to automatically push application data to the BlackBerry widget running on a BlackBerry smartphone.



BlackBerry widgets

BlackBerry widget development process

The BlackBerry widget development process is tool independent. You can create BlackBerry widgets using familiar tools, and then package them using the BlackBerry Widget Packager.



BlackBerry widgets

BlackBerry Widget Packager

The BlackBerry Widget Packager is a command line tool that compiles your web code to create the BlackBerry widget that you can distribute to BlackBerry smartphones as you would with any other native BlackBerry application. The BlackBerry Widget Packager creates the output files you need, including COD, JAD, and ALX, for your distribution strategy.

COD Code
JAD Java Application Descriptor
ALX application loader XML



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Communicating with the server: push and pull data

- BlackBerry widgets support push and pull communication.
- With pull communication, you can use XMLHttpRequest objects as you would with AJAX development. This enables you to use either synchronous or asynchronous pull communication.

AJAX Asynchronous JavaScript and XML



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Communicating with the server: push and pull data (cont)

- BlackBerry widgets support push data, that is, the ability for the backend server to push application data to the BlackBerry widget running on a BlackBerry smartphone. They use the BlackBerry widget API methods `blackberry.push` and `blackberry.push.Data` to enable BlackBerry widgets to use the same BlackBerry® Enterprise Server and public data push that other native BlackBerry applications use.



BlackBerry widgets

Example of a BlackBerry widget

- Widgets for mobile devices are generally single-purpose applications that permit users to view reformatted and specialized web content. With widgets, users do not need to type a web address or configure settings: the widget delivers the services and content available on the Internet to the mobile device.



BlackBerry widgets

Example of a BlackBerry widget (cont)

- One example of a widget for a BlackBerry smartphone is BlackBerry® Push Weather Clients. This widget permits BlackBerry users to get weather information every day; users can choose to receive either AccuWeather or The Weather Network. The software lets users choose how to receive weather updates: they can receive a text message, or have a browser channel appear on their home page.



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Security model

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Security model

There are two main approaches to preventing malicious programs such as viruses, trojans, worms, and spyware (collectively referred to as malware):

- Detection
- Containment

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Security model

Detection

Detection is the process of determining whether a program is malicious (malware). Effectively detecting malware is very difficult. It requires a large, frequently updated, local database or a constant connection to an online database. While computers can satisfy these requirements, mobile devices cannot. Mobile devices do not have enough storage space to hold a malware database and a constant connection to the Internet can not be guaranteed.



Security model

Containment

Containment is the process of preventing a malicious program from causing damage after it has appeared. Containment is relatively easy. It simply requires controlling access to the device software and other applications on the device. The BlackBerry solution focuses on containing malicious programs. The BlackBerry software and core applications are digitally signed to ensure authenticity and to control access to the APIs. Thus, the core BlackBerry functionality cannot be directly accessed by other applications.



Security model

BlackBerry widgets follow the same security rules, configuration, and deployment model as any other native BlackBerry application. BlackBerry widgets must be signed with a RIM® code signing key, and the same access control policies apply to widgets that apply to native applications.

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Security model

Access to external content

By default, BlackBerry widgets cannot access data from external resources. For example, a widget cannot retrieve an HTML page or make an AJAX request to a web service, unless you configure the widget to be able to do so.



Security model

To enable access to external resources and APIs, you must define the resources and APIs you require in the widget configuration document. Essentially, you define the list of domains permitted access and the BlackBerry widget APIs permitted for each domain. This list is called an allowed list. Web resources outside of the widget can be pulled in from external sources as long as those sources match the allowed list provided with your widget.



Security model

Whenever you retrieve content from outside your widget, do the following to make the BlackBerry widget as secure as possible:

- Provide JavaScript access to sensitive APIs for trusted and secure web sites only.
- Protect your communication channel using HTTPS when you are exposing sensitive APIs to the domain.
- Use the same precautions you normally use for a hosted web site, to guard against cross-site scripting attacks.

HTTPS Hypertext Transfer Protocol over Secure Sockets Layer



Security model

Authentication

- You can use device authentication, application authentication, and server-side authentication to ensure the security of your widget.
- Use a device password to access data and applications.
- Use a login screen to access the widget application.
- Use HTTP Basic authentication, or use certificates.



Security model

Application control

The BlackBerry Enterprise Server application control policy rules are designed to allow or prevent the installation of specific applications on the BlackBerry smartphone and to limit the permissions of applications on the BlackBerry smartphone.

For example, administrators can use the application control policy to make sure that a game application on the BlackBerry smartphone cannot access the phone application.



Security model

Data encryption

The BlackBerry Enterprise Server encrypts data using AES or TripleDES encryption at all points in the connection between the BlackBerry smartphone and the BlackBerry Enterprise Server behind the organization's firewall.

Use the HTTPS protocol and use SSL/TLS encryption to further encrypt data between the BlackBerry Enterprise Server and the destination server.

Data traffic is not encrypted by the BlackBerry® Internet Service or the Internet gateway of the wireless service provider.



Security model

Administrators can set an IT policy to make sure that all BlackBerry smartphone user data stored in the BlackBerry smartphone applications is encrypted locally in flash memory.

When a BlackBerry widget accesses a file on the microSD memory card, file decryption occurs and the file moves to main memory for an application to read.



Security model

The BlackBerry smartphone uses a master key stored on the microSD media card to encrypt BlackBerry smartphone media files.

You can apply the IT policy Encrypt data written to the microSD media card to any new or modified files that you store on the microSD media card. Only the files that you store on the microSD media card after an administrator sets the IT policy are encrypted.



Security model


Access to memory

The BlackBerry widget is designed to avoid causing problems accidentally or maliciously in another application:

- it can write only to the BlackBerry smartphone memory that the BlackBerry® Java® Virtual Machine uses
- it cannot access the virtual memory or the persistent storage of other applications (unless granted access to do so)
- it can access persistent storage or user data, or communicate with other applications, only through specific BlackBerry widget APIs




Widgets and web applications

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Widgets and web applications

On mobile devices, where screen space is limited, it can be difficult for users to run and view multiple applications, and to switch between applications. You can address these limitations through the creation of widgets, which reformat and deliver specific web content.

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Widgets and web applications

Widget development for BlackBerry smartphones uses the same standard technologies as web application development: HTML, CSS, JavaScript, and AJAX. Widgets, however, can provide a more personalized experience, and provide greater ease-of-use than web applications.

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BlackBerry widgets

Flexible development using standard technologies

- Widgets are a method of deploying an application to a mobile device without learning the languages that are supported by the mobile device. For example, you can create widgets for the BlackBerry smartphone without first learning Java® for BlackBerry. This approach provides you with the ability to use highly familiar technologies to build the same types of applications normally created in Java. You can use Java to extend your BlackBerry widgets as well; the BlackBerry widget development model means that you can choose the technology that best suits your needs.



BlackBerry widgets

Flexible development using standard technologies

- In addition to leveraging standard web technologies, you can also leverage both client-side and server-side resources.
 - Server-side resources
 - Client-side resources



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Server-side resources

- When you develop a widget, you can leverage the server-side assets that you have already created and extend them to the BlackBerry smartphone. You can write a BlackBerry widget that pulls in all your resources from your web server. In the BlackBerry widget, you can specify your own custom header that is passed down on every web request so that you know the request for the content is coming from your widget. You can then have your server-based web content react to this header and add functionality to the markup specific to the BlackBerry smartphone.



BlackBerry widgets

Server-side resources (cont)

- For example, instead of writing a search in your client application that returns XML, and then provides the user with a results interface that is based on the XML, you can instead pass the search to the server, and have the server return the rendered HTML back to the widget user interface with specific JavaScript markup. The markup can provide interaction with local resources, such as PIM.

XML Extensible markup language



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Client-side resources

- Widgets for mobile devices provide an enhanced experience for the end user. These single-purpose applications provide Internet content and services in a format suitable for mobile devices, where screen size is an important consideration. In addition, widgets can deliver web content that is specific to a user, and personalized to meet the user's requirements.



BlackBerry widgets

Client-side resources (cont)

- You can also leverage client-side resources. For example, your application can reside locally on the BlackBerry smartphone, but link to your CSS from remote sites. This approach means that you can still change your UI dynamically from a server, while maintaining the application logic on the device.

CSS cascading style sheet
UI user interface



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Enhanced user experience

- For example, the location of a mobile device is important information that you can use to enhance the experience of the user. You can use this information to create widgets that offer location-based services, such as local maps, local offers, currency converters, and weather information. Users can combine a variety of widgets to meet their needs.



JavaScript APIs and widgets



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JavaScript APIs and widgets

You can extend the capabilities of BlackBerry widgets using BlackBerry widget APIs, which add specific functionality to your BlackBerry widget.

BlackBerry widget APIs are JavaScript extensions that enable you to automatically push application data to the BlackBerry widget running on a BlackBerry smartphone.



JavaScript APIs and widgets

These BlackBerry widget APIs expose BlackBerry smartphone capabilities that you can use to enhance the capabilities and usefulness of your BlackBerry widget. You can use the BlackBerry APIs to create a custom application with specific features for a BlackBerry smartphone. These features include GPS and location-based services, multimedia, calendar and email message access, a customizable UI, and interaction with a trackwheel, trackball, or touch screen.

GPS - Global Positioning System



JavaScript APIs and widgets

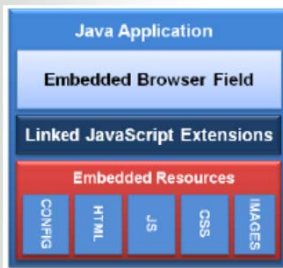
Accessible device APIs include the following:

- BlackBerry GPS
- BlackBerry Maps
- BlackBerry Address Book
- BlackBerry Calendar
- BlackBerry Email

A complete list of APIs is available on the BlackBerry Developer Zone website.



JavaScript APIs and widgets



JavaScript APIs and widgets

Note: JavaScript extensions are not accessible in the BlackBerry® Browser; they are available only in widgets.



BlackBerry widgets

Code sample: using a JavaScript extension

- The following example shows the JavaScript code for creating an appointment.



BlackBerry widgets

Code sample: using a JavaScript extension

```
<script type="text/javascript">  
// Create our Appointment  
var newAppt = new blackberry.pim.Appointment();  
newAppt.location = "Your office";  
newAppt.summary = "Talk about new project";  
newAppt.freeBusy = blackberry.pim.Appointment.FREE;  
// Create our hour time slot  
var start = new Date();  
newAppt.start = start;  
var end = start.setHours(start.getHours() + 1);  
newAppt.end = end;
```



BlackBerry widgets

Code sample: using a JavaScript extension (cont)

```
// Create Attendee
var attendees = new Array();
var onlyAttendee = new blackberry.pim.Attendee();
onlyAttendee.address = "john@foo.com";
onlyAttendee.type = blackberry.pim.Attendee.INVITED;
attendees.push(onlyAttendee);
// Save Appointment
newAppt.attendees = attendees;
newAppt.save();

</script>
```



Creating a BlackBerry widget



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Creating a BlackBerry widget

The BlackBerry widget development process is tool independent. You can create BlackBerry widgets using the tool of your choice, and then package them using the BlackBerry Widget Packager. The BlackBerry Widget Packager creates the output files you need, including COD, JAD, and ALX, for your distribution strategy.



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Creating a BlackBerry widget

When you develop BlackBerry widgets, you perform the following actions:

- Install the BlackBerry Widget Packager
- Create the configuration file
- Create an archive of widget code and resources
- Compile using BlackBerry Widget Packager
- Test the widget on the BlackBerry Smartphone Simulator
- Distribute to users



Summary



Summary

- BlackBerry widgets are stand-alone BlackBerry applications that consist of standard web components, including HTML, XHTML, style sheets, JavaScript, SVG, image files, and other resources.



Summary

- The security model for widgets consists of detection (the process of determining whether a program is malicious [malware]) and containment (the process of preventing a malicious program from causing damage after it has appeared). BlackBerry widgets must be signed with a RIM code signing key, and the same access control policies apply to widgets that apply to native applications.



Summary

- Widgets can provide a more personalized experience and provide greater ease-of-use than web applications. These single-purpose applications provide Internet content and services in a format suitable for mobile devices, where screen size is an important consideration. In addition, widgets can deliver web content that is specific to a user, and personalized to meet a user's requirements.



Summary

- You can extend the capabilities of BlackBerry widgets using BlackBerry widget APIs, which add specific functionality to your BlackBerry widget. JavaScript extensions are not accessible in the BlackBerry Browser; they are available only in widgets.
- To create a BlackBerry widget, develop the HTML, style sheet, and JavaScript code for your web application.

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- BlackBerry® Device Software
- BlackBerry® Enterprise Server
- BlackBerry® Enterprise Solution
- BlackBerry® Infrastructure
- BlackBerry® Internet Service
- BlackBerry® Java® Virtual Machine
- BlackBerry® Mobile Data Service
- BlackBerry® Push Weather Clients
- BlackBerry® Smartphone Simulator
- BlackBerry® Widget Packager
- BlackBerry® Widget SDK
- BlackBerry® Web Plug-in for Eclipse®
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