

# BlackBerry Web Services for Enterprise Administration

For Java developers  
Version: 5.0.4



Getting Started Guide



# Contents

1	Overview: BlackBerry Web Services .....	4
2	System requirements: BlackBerry Web Services .....	5
3	Configuring a BlackBerry Enterprise Server for development .....	6
	Add the BlackBerry Enterprise Server as a trusted authority .....	7
	Creating administrator accounts that your applications can use .....	7
	Create a BlackBerry Administration Service administrator account .....	8
	Administrative roles for the BlackBerry Enterprise Server .....	9
	Create a role .....	14
	Create a role by copying an existing role .....	15
	Change the roles that are assigned to an administrator account .....	16
4	Creating a keystore for your applications .....	17
	Download the self-signed SSL certificate of the BlackBerry Administration Service .....	17
	Generate a keystore and import the BlackBerry Administration Service certificate into the keystore .....	18
	Configure the proxy generator to access the keystore .....	19
5	Generating the client proxy files .....	20
	Generate the proxy files for the BWS and BWSUtil web services .....	20
6	Configuring your development environment .....	22
	Create a project .....	22
	Configure the VM arguments in your project .....	22
	Import Apache CXF libraries to your Eclipse project .....	23
	Import the BlackBerry Web Services proxy files to your project .....	24
7	Using the BlackBerry Web Services API reference .....	25
8	Sample application .....	26
	Authenticating with the BlackBerry Administration Service and initializing the web services .....	26
	Code sample: Authentication and initializing the web services .....	27
	Creating a user account .....	31
	Code sample: Creating a user account .....	32
9	Revision history .....	36
10	Related resources .....	37
11	Glossary .....	38
12	Legal notice .....	39

# Overview: BlackBerry Web Services

1

The BlackBerry Web Services for Enterprise Administration are a collection of document-style web services that you can use to create applications to manage your organization's BlackBerry Enterprise Server. You can use the BlackBerry Web Services to automate many of the tasks that administrators typically perform using the BlackBerry Administration Service. For example, you can create an application that automates the process of adding and activating user accounts on the BlackBerry Enterprise Server.

The BlackBerry Web Services are installed automatically when you install the BlackBerry Enterprise Server.

The BlackBerry Web Services use abstracted data objects, which allow your applications to be compatible with different versions of the BlackBerry Enterprise Server. The BlackBerry Web Services emphasize compatibility, ease-of-use, and flexibility, giving you the option to build your applications using various development languages and web service frameworks.

To use the BlackBerry Web Services, you should be proficient in one of the supported programming languages and in the use of common web services concepts such as XML, SOAP, and WSDL. You should be familiar with the configuration and administration of the BlackBerry Enterprise Server, including the management of user accounts, groups, IT policies, software configurations, and security settings.

The BlackBerry Web Services offer a subset of the functionality that is available in the BlackBerry Administration API. Going forward, the BlackBerry Web Services are the primary web services solution for the BlackBerry Enterprise Server. While the BlackBerry Administration API is still supported, you should consider using the BlackBerry Web Services when creating new applications, or consider modifying your existing applications to use the BlackBerry Web Services. Before you create or modify your applications, check the BlackBerry Web Services API reference to verify that the BlackBerry Web Services support the functionality that your application requires.

For more information about the BlackBerry Enterprise Server, visit [www.blackberry.com/go/serverdocs](http://www.blackberry.com/go/serverdocs) to read the *BlackBerry Enterprise Server Feature and Technical Overview* and the *BlackBerry Enterprise Server Administration Guide*.

# System requirements: BlackBerry Web Services

2

Verify that the following software is installed on the computer that you want to use to develop applications for the BlackBerry Web Services.

Item	Requirement
Operating system	<ul style="list-style-type: none"><li>Windows XP or later</li></ul>
Software development kit (SDK)	<ul style="list-style-type: none"><li>Java SE Development Kit 6 Update 31</li></ul> <p>The Java SE Development Kit includes the Java Platform, Standard Edition (Java SE), the Java Runtime Environment (JRE), and the Java keytool (keytool.exe), which you use to create the required keystore.</p> <p>Visit <a href="http://www.oracle.com">www.oracle.com</a> to download the Java SE Development Kit. Verify that your computer satisfies the installation prerequisites or system requirements.</p>
Integrated development environment (IDE)	<ul style="list-style-type: none"><li>Latest version of the Eclipse IDE for Java Developers</li></ul> <p>Visit <a href="http://www.eclipse.org/downloads/">www.eclipse.org/downloads/</a> to download the Eclipse IDE for Java Developers. Verify that your computer satisfies the installation prerequisites or system requirements.</p>
Web service framework	<p>Use the following web service framework to bind web service requests and to generate the required client proxy files:</p> <ul style="list-style-type: none"><li>Apache CXF 2.6.1 (binary distribution)</li></ul> <p>Visit <a href="http://cxf.apache.org/">http://cxf.apache.org/</a> to download Apache CXF. Verify that your computer satisfies the installation prerequisites or system requirements.</p> <p>The BlackBerry Web Services might support other web services frameworks, but additional configuration or resource libraries might be required.</p>

# Configuring a BlackBerry Enterprise Server for development

3

Before you develop applications to work with the BlackBerry Web Services, you must perform the following tasks for each BlackBerry Enterprise Server that you want to manage:

- Verify that your development computer has network access to the computers that host the BlackBerry Enterprise Server components and the BlackBerry Administration Service.
- Add the BlackBerry Administration Service certificate to the Trusted Root Certification Authorities certificate store so that your applications can authenticate with the BlackBerry Administration Service.
- Create the BlackBerry Administration Service administrator accounts that your applications can use to manage the BlackBerry Enterprise Server (or determine the existing accounts that your applications can use).
- Assign the appropriate roles to the administrator accounts. Certain tasks can only be performed if the administrator account has a role with the required permissions (for example, an administrator can create a user account only if the administrator has a role with the Create a user permission).

It is recommended that you install one or more instances of the BlackBerry Enterprise Server to use specifically for testing and debugging your applications. Using a test environment can prevent accidental changes to your organization's production environment. The version of the test BlackBerry Enterprise Server and BlackBerry Administration Service should match the version used in your production environment, to ensure that the features and functionality of the BlackBerry Web Services remain the same.

When you are ready to implement your applications in your organization's production environment, consider using a trusted certificate that is signed by a certification authority.

For more information about installing and configuring the BlackBerry Enterprise Server, visit [www.blackberry.com/go/serverdocs](http://www.blackberry.com/go/serverdocs) to read the *BlackBerry Enterprise Server Installation and Configuration Guide* and the *BlackBerry Enterprise Server Administration Guide*.

# Add the BlackBerry Enterprise Server as a trusted authority

You must add the self-signed SSL certificate of the BlackBerry Administration Service to the Trusted Root Certification Authorities certificate store so that your applications can authenticate with the BlackBerry Administration Service.

**Before you begin:** Use Windows Internet Explorer 6.0 or later to perform this task. For information about adding certificates using other browsers or versions, see the help or documentation for the browser.

1. In Windows Internet Explorer, browse to the login page for the BlackBerry Administration Service. The web address is **https://<server\_name>/webconsole/app**, where <server\_name> is the name of the computer that hosts the BlackBerry Administration Service.
2. Click **File > Properties**.
3. In the **Properties** window, click **Certificates**.
4. Click **Install Certificate**.
5. Click **Next**.
6. Select **Place all certificates in the following store**. Click **Browse**.
7. Click **Trusted Root Certification Authorities**. Click **OK**.
8. Click **Next**.
9. Click **Finish**.

# Creating administrator accounts that your applications can use

When your application makes calls to the BlackBerry Web Services APIs, the application must use the login information of a BlackBerry Administration Service administrator account to authenticate with the BlackBerry Administration Service and authorize its use of the API. You can create a new administrator account that is reserved specifically for your custom applications, or you can use an existing administrator account.

When you have determined the administrative tasks that you want your application to perform, you must identify the BlackBerry Administration Service permissions that are required to perform the task, and you must assign a role with the required permissions to the administrator account. An API request can only be completed if the application uses an

administrator account with the required permissions. For example, an administrator can create a user account only if the administrator has a role with the Create a user permission.

You can assign one of the predefined roles that are available in the BlackBerry Administration Service, or you can create and assign a custom role. For more information about the permissions that are associated with predefined roles, see [Administrative roles for the BlackBerry Enterprise Server](#).

## Create a BlackBerry Administration Service administrator account

Follow these steps if you want to create a new administrator account that your application can use to complete management tasks on the BlackBerry Enterprise Server.

**Before you begin:** Ask your organization's BlackBerry Administration Service administrator to perform this task, or ask for access to an administrator account that you can use to perform this task.

1. Log in to the BlackBerry Administration Service using an administrator account that has a role with the Create an administrator user permission (for example, the Security Administrator role).
2. On the **BlackBerry solution management** menu, expand **Administrator user**.
3. Click **Create an administrator user**.
4. In the **Display name** field, type a display name for the administrator account.
5. In the **Authentication type** drop-down list, select the type of authentication that you want the administrator account to use.
6. Specify the login information for the administrator account. If you selected Active Directory authentication, specify a user name and domain. If you selected BlackBerry Administration Service authentication, specify a user name and password, and confirm the password.
7. In the **Administrator password** field, type the password of the administrator account that you used to log in to the BlackBerry Administration Service.
8. In the **Role** drop-down list, click the role that you want to assign to the administrator account. For more information about the permissions that are associated with predefined roles, see [Administrative roles for the BlackBerry Enterprise Server](#).
9. Click **Create an administrator user**.

**After you finish:** If necessary, create a custom role and assign the custom role to the administrator account.

## Administrative roles for the BlackBerry Enterprise Server

The BlackBerry Enterprise Server includes preconfigured administrative roles that you can assign to administrator accounts. Each role is designed for a different type of administrator, and grants different permissions to manage and make changes to the BlackBerry Enterprise Server, user accounts, and BlackBerry devices. The table below details the permissions that are associated with each role.

To meet the needs of your organization's environment, you can change the permissions that are associated with the preconfigured roles, or you can create custom roles. For more information about how to change or create roles, visit [www.blackberry.com/go/serverdocs](http://www.blackberry.com/go/serverdocs) to read the *BlackBerry Enterprise Server Administration Guide*.

Permission name	Security role	Enterprise role	Senior Helpdesk role	Junior Helpdesk role	Server only role	User only role
<b>User and device group</b>						
Create a group	X	X	X			X
Delete a group	X	X				X
View a group	X	X	X	X		X
Edit a group	X	X	X	X		X
Create a user	X	X	X			X
Delete a user	X	X	X			X
View a user	X	X	X	X		X
Edit a user	X	X	X	X		X
View a device	X	X	X	X		X
Edit a device	X	X	X	X		X
View device activation settings	X	X				X
Edit device activation settings	X	X				X
Create an IT policy	X	X				X

Permission name	Security role	Enterprise role	Senior Helpdesk role	Junior Helpdesk role	Server only role	User only role
Delete an IT policy	X	X				X
View an IT policy	X	X	X	X		X
Edit an IT policy	X	X				X
Import an IT policy	X	X				X
Export an IT policy	X	X				X
Create a user-defined IT policy template	X	X				X
Delete a user-defined IT policy template	X	X				X
Resend data to devices	X	X	X			X
Edit a user-defined IT policy template	X	X				X
Import an IT policy template	X	X				X
Create a software configuration	X	X				X
View a software configuration	X	X	X	X		X
Edit a software configuration	X	X				X
Delete a software configuration	X	X				X
Create an application	X	X				X
View an application	X	X	X	X		X
Edit an application	X	X				X
Delete an application	X	X				X

Permission name	Security role	Enterprise role	Senior Helpdesk role	Junior Helpdesk role	Server only role	User only role
Create an administrator user	X					
Add or remove to user configuration	X	X	X			X
Export asset summary data	X	X				X
Import or export users	X	X	X			X
Export statistics	X	X				X
Import user updates	X	X				X
Assign the current device to a user	X	X	X	X		X
Delete all device data and remove device	X	X	X	X		X
Delete only the organization data and remove device	X	X	X	X		X
Specify an activation password	X	X	X	X		X
Turn off and on external services	X	X	X			X
Generate an activation email	X	X	X	X		X
Clear synchronization backup data	X	X	X			X
Clear user statistics	X	X	X			X
Reset user field mapping	X	X	X			X
Turn on redirection	X	X	X			X

Permission name	Security role	Enterprise role	Senior Helpdesk role	Junior Helpdesk role	Server only role	User only role
Turn off redirection	X	X	X			X
Add user from company directory	X	X	X			X
Import new users	X	X				X
Refresh available user list from company directory	X	X			X	
Edit GroupWise subscription for a user	X	X	X	X		X
Import or export email message filters for a user	X	X				X
<b>Topology group</b>						
View a server	X	X			X	
Edit a server	X	X			X	
View a component	X	X			X	
Edit a component	X	X			X	
View an instance	X	X			X	
Edit an instance	X	X			X	
Change the status of an instance	X	X			X	
Edit an instance relationship	X	X			X	
View a job	X	X				X
Edit a job	X	X				X
View default distribution settings for a job	X	X				X

Permission name	Security role	Enterprise role	Senior Helpdesk role	Junior Helpdesk role	Server only role	User only role
Edit default distribution settings for a job	X	X				X
Update peer-to-peer encryption key	X	X			X	
Manage deployment job tasks	X	X	X			X
Change the status of a job task	X	X				X
Delete an instance	X	X			X	
Edit license keys	X	X			X	
View license keys	X	X			X	
Clear instance statistics	X	X			X	
Synchronize instance system address book						
Clear and synchronize instance system address book						
Import or export email filters	X	X			X	
Clear statistics for a BlackBerry MDS Connection Service instance	X	X			X	
View rules for the BlackBerry MDS Connection Service	X	X	X	X	X	X
<b>BlackBerry Administration Service setup group</b>						
Send message	X	X	X	X		X
Create a role	X					

Permission name	Security role	Enterprise role	Senior Helpdesk role	Junior Helpdesk role	Server only role	User only role
Delete a role	X					
View a role	X	X				X
Edit a role	X					
Add or remove role	X					
View BlackBerry Administration Service software management	X	X			X	
Edit BlackBerry Administration Service software management	X	X				
Import or export groups within roles	X					
View reporting data		X				
View BlackBerry Monitoring Service information	X					
Edit BlackBerry Monitoring Service settings	X					

## Create a role

If the predefined administrative roles do not meet your requirements, you can create a new role that you can assign to BlackBerry Administration Service administrator accounts. When you create a new role, by default, all of the permissions are turned off.

**Before you begin:** Ask your organization's BlackBerry Administration Service administrator to perform this task, or ask for access to an administrator account that you can use to perform this task.

1. Log in to the BlackBerry Administration Service using an administrator account that has the required permissions to create and change roles (for example, the Security Administrator role).
2. On the **BlackBerry solution management** menu, expand **Role**.

3. Click **Create a role**.
4. Type a name and description for the role.
5. Click **Save**.
6. In the **Role information** section, click the name of the role.
7. Click **Edit role**.
8. On the appropriate tabs, configure the permissions that you want to assign to the role.
9. Click **Save all**.

**After you finish:** Assign the role to an administrator account.

## Create a role by copying an existing role

If the predefined administrative roles do not meet your requirements, you can copy an existing role and modify it as required. You can then assign the new role to BlackBerry Administration Service administrator accounts.

**Before you begin:** Ask your organization's BlackBerry Administration Service administrator to perform this task, or ask for access to an administrator account that you can use to perform this task.

1. Log in to the BlackBerry Administration Service using an administrator account that has the required permissions to create and change roles (for example, the Security Administrator role).
2. On the **BlackBerry solution management** menu, expand **Role**.
3. Click **Manage roles**.
4. Click the role that you want to copy.
5. Click **Copy role**.
6. Type a name and description for the role.
7. Click **Copy role**.
8. In the **Role information** section, click the name of the role.
9. Click **Edit role**.
10. On the appropriate tabs, configure the permissions that you want to assign to the role.
11. Click **Save all**.

**After you finish:** Assign the role to an administrator account.

## Change the roles that are assigned to an administrator account

**Before you begin:** Ask your organization's BlackBerry Administration Service administrator to perform this task, or ask for access to an administrator account that you can use to perform this task.

1. Log in to the BlackBerry Administration Service using an administrator account that has the required permissions to assign and remove roles (for example, the Security Administrator role).
2. On the **BlackBerry solution management** menu, expand **Administrator user**.
3. Click **Manage users**.
4. Search for the administrator account and click the display name.
5. Click **Edit user**.
6. On the **Roles** tab, in the **Available roles** list, click the roles that you want to assign to the administrator account.
7. Click **Add**.
8. In the **Current roles** list, click the roles that you want to remove.
9. Click **Remove**.
10. Click **Save all**.

# Creating a keystore for your applications

## 4

To generate the client proxy files that your applications require to use the BlackBerry Web Services, and to enable your applications to make SSL connections to the BlackBerry Administration Service, you must complete the following tasks:

- Download the self-signed SSL certificate of the BlackBerry Administration Service.
- Generate a keystore for your applications and import the BlackBerry Administration Service certificate into the keystore.
- Configure the proxy generator (wsdl2java.bat) to access the keystore.

## Download the self-signed SSL certificate of the BlackBerry Administration Service

**Before you begin:** Use Windows Internet Explorer 6.0 or later to perform this task. For information about adding certificates using other browsers or versions, see the help or documentation for the browser.

1. Create a folder to temporarily store the self-signed SSL certificate on your computer (for example, C:\Temp\BWS\).
2. In Windows Internet Explorer, browse to the login page for the BlackBerry Administration Service. The web address is **https://<server\_name>/webconsole/app**, where <server\_name> is the name of the computer that hosts the BlackBerry Administration Service.
3. Click **File > Properties**.
4. In the **Properties** window, click **Certificates**.
5. On the **Details** tab, click **Copy to File**.
6. Click **Next**.
7. Select the **DER encoded binary X.509 (.CER)** radio button.
8. Click **Next**.
9. Click **Browse** and navigate to the folder that you created in step 1. In the **File name** field, type a name for the certificate (for example, bascert.cer).

10. Click **Save**.
11. Click **Next**.
12. Click **Finish**.

**After you finish:** Generate a keystore and import the BlackBerry Administration Service certificate into the keystore.

## Generate a keystore and import the BlackBerry Administration Service certificate into the keystore

You can use the keytool utility to generate a keystore for your applications, and to import the self-signed SSL certificate of the BlackBerry Administration Service into the keystore. Your applications use the BlackBerry Administration Service certificate to make SSL connections to the BlackBerry Administration Service.

**Before you begin:** Download the self-signed SSL certificate of the BlackBerry Administration Service.

1. Record the bin folder of the active JRE by performing the following actions:
  - a. In the Control Panel, double-click **Java**.
  - b. On the **Java** tab, in the **Java Runtime Environment Settings** section, click **View**.
  - c. On the **User** tab, the first value in the **Path** column contains the file path of the bin folder. For example, if the first path is C:\Program Files\Java\jre6\bin\javaw.exe, the path of the bin folder is C:\Program Files\Java\jre6\bin\.
2. On the taskbar, click **Start > Run**.
3. Type **cmd**. Click **OK**.
4. To navigate to the bin folder of the active JRE, type **cd <file\_path>**, where <file\_path> is the path of the bin folder. For example:

```
cd C:\Program Files\Java\jre6\bin
```

5. Press ENTER.
6. Type **keytool -import -trustcacerts -file <cert\_file\_path> -keystore <keystore\_name> -storepass <password> -alias <cert\_alias>**, where <cert\_file\_path> is the full path where you stored the BlackBerry Administration Service

certificate, *<keystore\_name>* is the name you want to specify for the keystore, *<password>* is the password you want to specify for the keystore, and *<cert\_alias>* is an alias name you want to specify for the certificate. For example:

```
keytool -import -trustcacerts -file C:\Temp\BWS\bascert.cer -keystore
bas.keystore -storepass password -alias bas
```

7. Press ENTER. Confirm that you want to add the certificate to the keystore.

**After you finish:** Configure the proxy generator to access the keystore.

## Configure the proxy generator to access the keystore

To generate the proxy files that your applications require to use the BlackBerry Web Services, you must configure the proxy generator (`wsdl2java.bat`) to access the keystore that you created.

**Before you begin:** Generate a keystore and import the BlackBerry Administration Service certificate into the keystore.

1. Navigate to the bin folder of the Apache CXF installation (for example, `C:\Program Files\Apache CXF\apache-cxf-2.6.1\bin`).
2. In a text editor, open **`wsdl2java.bat`**.
3. After `"%JAVA_HOME%\bin\java"`, type the following: **`-Djavax.net.ssl.trustStorePassword=<password> -Djavax.net.ssl.trustStore=<keystore_path>`**, where *<password>* is the keystore password that you specified, and *<keystore\_path>* is the full path of the keystore that you created. For example:

```
"%JAVA_HOME%\bin\java" -Djavax.net.ssl.trustStorePassword=password
-Djavax.net.ssl.trustStore="C:\Program Files\Java\jre7\bin\bas.keystore" -
Xmx128M
-Djava.endorsed.dirs="%CXF_HOME%\lib\endorsed" -cp "%CXF_JAR%;%TOOLS_JAR%;
%CLASSPATH%"
-Djava.util.logging.config.file="%CXF_HOME%\etc\logging.properties"
org.apache.cxf.tools.wsdlto.WSDLToJava %*
```

4. Save and close the file.

**After you finish:** Generate the client proxy files for the BWS and BWSUtil web services.

# Generating the client proxy files

5

The BlackBerry Web Services use WSDL files to describe the classes that they expose. To integrate your applications with the BlackBerry Web Services, you must use a proxy generator to generate the client proxy files for the BWS and BWSUtil web services.

The BWS and BWSUtil proxy files are typically stored in one folder.

Each release of the BlackBerry Web Services introduces new features and functionality, improvements to existing features, and bug fixes. It is a best practice to generate and use a new set of proxy files whenever your organization implements a new version of the BlackBerry Enterprise Server, so that your application can leverage the most recent improvements and fixes for the BlackBerry Web Services.

## Generate the proxy files for the BWS and BWSUtil web services

To avoid duplication type compiler errors, you can store all of the generated proxy files for the BWS and BWSUtil web services in one folder.

**Before you begin:** Create a folder to store the proxy files (for example, C:\Temp\BWS\proxy).

1. On the taskbar, click **Start > Run**.
2. Type **cmd**. Click **OK**.
3. Type **cd <file\_path>**, where <file\_path> is the path of the bin folder for your Apache CXF installation. For example:

```
cd C:\Program Files\Apache CXF\apache-cxf-2.6.1\bin
```

4. Press ENTER.
5. To generate the proxy files for the BWS web service, type **wSDL2java.bat -wv 1.1 -d <proxy\_path> https://<server\_name>/enterprise/admin/ws?wsdl**, where <proxy\_path> is the path of the folder you created to store the proxy files, and <server\_name> is the name of the computer that hosts the BlackBerry Administration Service. For example:

```
wSDL2java.bat -wv 1.1 -d C:\Temp\BWS\proxy https://server1.test.rim.net/enterprise/admin/ws?wsdl
```

6. Press ENTER.
7. Type **cd <file\_path>**, where <file\_path> is the path of the bin folder of your Apache CXF installation. For example:

```
cd C:\Program Files\Apache CXF\apache-cxf-2.6.1\bin
```

8. To generate the proxy files for the BWSUtil web service, type **wsd12java.bat -wv 1.1 -d <proxy\_path> https://<server\_name>/enterprise/admin/util/ws?wsdl**, where <proxy\_path> is the path of the folder you created to store the proxy files, and <server\_name> is the name of the computer that hosts the BlackBerry Administration Service. For example:

```
wsd12java.bat -wv 1.1 -d C:\Temp\BWS\proxy https://server1.test.rim.net/  
enterprise/admin/util/ws?wsdl
```

# Configuring your development environment

6

This section describes how to configure your development environment so that you can integrate your applications with the BlackBerry Web Services.

## Create a project

1. Open a workspace in Eclipse.
2. On the **File** menu, click **New > Java Project**.
3. Type a name for the project. Click **Finish**.
4. In the **Package Explorer** pane, expand your project folder.
5. Right-click the **src** folder. Click **New > Class**.
6. Type a package name for the code sample (for example, **com.rim.enterprise.admin.HelloWorld**).
7. Type a class name for the code sample (for example, **HelloWorld**).
8. Click **Finish**.

## Configure the VM arguments in your project

To save data about your development environment, including information about the BlackBerry Administration Service and the administrator accounts that you want your applications to use, you can configure environment variables as VM arguments. VM arguments allow your application to access these variables by using `System.getProperty(<property name>)` method calls. For example, if you want to set a variable called `baseUrl`, make the following method call:  
`baseUrl=System.getProperty("baseUrl")`.

1. On the **Run** menu, click **Run Configurations**.
2. In the left pane, select the class that you created (for example, `HelloWorld`).

- On the **Arguments** tab, in the **VM arguments** field, type the following argument for the FQDN of the BlackBerry Administration Service: **-Dbasurl=" <server\_name>**". For example:

```
-Dbasurl="server1.test.rim.net"
```

- On the next line, type the following argument for the user name of the BlackBerry Administration Service administrator account: **-Dusername=" <user\_name>**". For example:

```
-Dusername="admin"
```

- On the next line, type the following argument for the password of the BlackBerry Administration Service administrator account: **-Dpassword=" <password>**". For example:

```
-Dpassword="password"
```

- On the next line, type the following argument for the location and password of the keystore that you created: **-Djavax.net.ssl.trustStore=" <keystore\_path>" -Djavax.net.ssl.trustStorePassword=" <keystore\_password>**". For example:

```
-Djavax.net.ssl.trustStore="C:\Program Files\Java\jre6\bin\bas.keystore"  
-Djavax.net.ssl.trustStorePassword="password"
```

- Click **Apply**.
- Click **Close**.

## Import Apache CXF libraries to your Eclipse project

Import the Apache CXF libraries to make them available for use in your applications.

- In Eclipse, in the **Package Explorer** pane, right-click your project.
- Click **Properties**.
- In the left pane, click **Java Build Path**.
- On the **Libraries** tab, click **Add External JARs**.
- Navigate to the **lib** folder of your Apache CXF installation (for example, C:\Program Files\Apache CXF\apache-cxf-2.6.1\lib).
- Select all of the .jar files.

7. Click **Open**.
8. Click **OK**.

## Import the BlackBerry Web Services proxy files to your project

Import the proxy files for the BWS and BWSUtil web services to make them available for use in your applications.

1. In Eclipse, in the **Package Explorer** pane, right-click your project.
2. Click **Properties**.
3. In the left pane, click **Java Build Path**.
4. On the **Source** tab, click **Add Folder**.
5. Click **Create New Folder**.
6. Type a name for the new source folder (for example, proxy).
7. Click **Finish**.
8. Click **OK**. Click **OK** again.
9. In Windows Explorer, navigate to the folder that contains the client proxy files (for example, C:\Temp\BWS\proxy\).
10. Drag the **com** folder into the new source folder you created in Eclipse.

# Using the BlackBerry Web Services API reference

7

The API reference for the BlackBerry Web Services is available at [docs.blackberry.com/BWS](https://docs.blackberry.com/BWS).

The API reference describes the interfaces, classes, methods, and data types of the BlackBerry Web Services. The API reference includes UML diagrams that illustrate the inheritance model used by all elements of the APIs, as well as code samples that demonstrate how to use each API.

# Sample application

8

To assist you in developing your applications and integrating them with the BlackBerry Web Services, you can visit <https://github.com/blackberry/BWS-Samples> to access a code sample for an application that performs the following tasks:

- Initializes the BWS and BWSUtil web services
- Authenticates the application with the BlackBerry Administration Service
- Collects and displays system information for the BlackBerry Enterprise Server
- Creates a specified user account
- Displays the details for a specified user account

This section of the guide examines the sample application and explains the purpose and structure of key sections of the code sample. The code sample was tested and verified with BlackBerry Enterprise Server 5.0.3 MR5.

## Authenticating with the BlackBerry Administration Service and initializing the web services

Before an application can make calls to the BlackBerry Web Services, the application must initialize the BWS and BWSUtil web services. First, the application must use the login information of an administrator account to authenticate with the BlackBerry Administration Service and authorize its use of the web services. When authentication completes, the initialization process starts.

When the BWS and BWSUtil web services are initialized, they accept subsequent API calls from the application. If authentication or initialization is not successful, the application throws an exception. The exception contains a simple text message property that your application can access for more information.

## Code sample: Authentication and initializing the web services

Visit <https://github.com/blackberry/BWS-Samples> to copy the full code sample to your development tool. This topic highlights and explains key sections of the code that are used to authenticate the application with the BlackBerry Administration Service and initialize the BWS and BWSUtil web services. This topic refers to lines 1 to 327 and the main method of the code sample.

Before you run the code sample, verify that you have completed the configuration tasks described earlier in this guide.

### Define metadata

The following code defines the metadata that describes the application's requests to the BlackBerry Web Services. This includes the client version of the BlackBerry Web Services, locale information, the computer that hosts the BlackBerry Administration Service, and the login information for the administrator account that the application uses. You must specify the host name, user name, and password values in the main method (the last section of the code sample). The variables are defined as global variables.

The code also defines a RequestMetadata object to use for initialization. This object is defined as a global variable.

```
// The request Metadata information.
// This is the version of the WSDL used to generate the proxy, not the version of
the server.
private final static String CLIENT_VERSION = "<client_version>";

/*
 * To use a different locale, call getLocales() in the BWSUtilService web service
 * to see which locales are supported.
 */
private final static String LOCALE = "en_US";
private final static String ORG_UID = "0";
private final static RequestMetadata REQUEST_METADATA = new RequestMetadata();

// Authentication type name.
private final static String AUTHENTICATOR_NAME = "BlackBerry Administration
Service";

// Hostname to use when connecting to web service.
private static String BWS_HOST_NAME = null; // e.g. BWS_HOST_NAME =
"server01.yourcompany.net".
private static String USERNAME = null; // e.g. USERNAME = "admin".
private static String PASSWORD = null; // e.g. PASSWORD = "password".
```

From the main method:

```
// Hostname to use when connecting to web service.
BWS_HOST_NAME = "<BWSHostName>"; // e.g. BWS_HOST_NAME = "server01.yourcompany.net".
```

```

USERNAME = "<username>"; // e.g. USERNAME = "admin".
PASSWORD = "<password>"; // e.g. PASSWORD = "password".

```

## Assign values to the Metadata global object

The following code assigns the values of the metadata global variables to the Metadata global object.

```

REQUEST_METADATA.setClientVersion(CLIENT_VERSION);
REQUEST_METADATA.setLocale(LOCALE);
REQUEST_METADATA.setOrganizationUid(ORG_UID);

```

## Initialize and set the URL properties of the web services

The following code initializes and sets the values for the URL properties of the web services so that the application can connect to the BlackBerry Web Services.

```

URL bwsServiceUrl = null;
URL bwsUtilServiceUrl = null;

try
{
    // These are the URLs that point to the web services used for all calls.
    bwsServiceUrl = new URL("https://" + BWS_HOST_NAME + "/enterprise/admin/ws");
    bwsUtilServiceUrl = new URL("https://" + BWS_HOST_NAME + "/enterprise/admin/
util/ws");
}
catch (MalformedURLException e)
{
    logMessage("Cannot initialize web service URLs");
    logMessage("Exiting %s with value \"%s\"", METHOD_NAME, returnValue);
    return returnValue;
}

// Initialize the BWS web service stubs that will be used for all calls.
logMessage("Initializing BWS web service stub");
QName serviceBWS = new QName("http://ws.rim.com/enterprise/admin", "BWSService");
QName portBWS = new QName("http://ws.rim.com/enterprise/admin", "BWS");
_bwsService = new BWSService(null, serviceBWS);
_bwsService.addPort(portBWS, "http://schemas.xmlsoap.org/soap/",
bwsServiceUrl.toString());
_bws = _bwsService.getPort(portBWS, BWS.class);
logMessage("BWS web service stub initialized");

logMessage("Initializing BWSUtil web service stub");
QName serviceUtil = new QName("http://ws.rim.com/enterprise/admin",
"BWSUtilService");
QName portUtil = new QName("http://ws.rim.com/enterprise/admin", "BWSUtil");
_bwsUtilService = new BWSUtilService(null, serviceUtil);
_bwsUtilService.addPort(portUtil, "http://schemas.xmlsoap.org/soap/",
bwsUtilServiceUrl.toString());
_bwsUtil = _bwsUtilService.getPort(portUtil, BWSUtil.class);
logMessage("BWSUtil web service stub initialized");

```

## Configure timeout properties

The following code configures a 60 second connection timeout for the BlackBerry Web Services.

```
// Set the connection timeout to 60 seconds.
HTTPClientPolicy httpClientPolicy = new HTTPClientPolicy();
httpClientPolicy.setConnectionTimeout(60000);

httpClientPolicy.setAllowChunking(false);
httpClientPolicy.setReceiveTimeout(60000);

Client client = ClientProxy.getClient(_bws);
HTTPConduit http = (HTTPConduit) client.getConduit();
http.setClient(httpClientPolicy);

client = ClientProxy.getClient(_bwsUtil);
http = (HTTPConduit) client.getConduit();
http.setClient(httpClientPolicy);
```

## Define the authenticator object

The following code defines the Authenticator object that the application requires for the overall authentication and initialization process. In the two sections following this code, the application uses the authenticator object to collect the login information and the encoded user name that the application uses to authenticate with the BlackBerry Web Services.

```
Authenticator authenticator = getAuthenticator(AUTHENTICATOR_NAME);
if (authenticator != null)
{
    String encodedUsername = getEncodedUserName(USERNAME, authenticator);
    if (encodedUsername != null && !encodedUsername.isEmpty())
    {
        /*
         * Set the HTTP basic authentication on the BWS service.
         * BWSUtilService is a utility web service that does not require
         * authentication.
         */
        BindingProvider bp = (BindingProvider) _bws;
        bp.getRequestContext().put(BindingProvider.USERNAME_PROPERTY,
encodedUsername);
        bp.getRequestContext().put(BindingProvider.PASSWORD_PROPERTY, PASSWORD);

        returnValue = true;
    }
    else
    {
        logMessage("'encodedUsername' is null or empty");
    }
}
else
{
    logMessage("'authenticator' is null");
}
```

## Authenticate with the BlackBerry Web Services

The following code retrieves the encoded login information for the BlackBerry Administration Service administrator account that the application uses, and authenticates the application with the BlackBerry Web Services.

```
public static String getEncodedUserName(String username, Authenticator
authenticator)
{
    final String METHOD_NAME = "getEncodedUserName()";
    final String BWS_API_NAME = " bwsUtil.getEncodedUsername()";
    logMessage("Entering %s", METHOD_NAME);
    String returnValue = null;

    GetEncodedUsernameRequest request = new GetEncodedUsernameRequest();
    request.setMetadata(REQUEST_METADATA);
    request.setUsername(username);
    request.setOrgUid(REQUEST_METADATA.getOrganizationUid());
    request.setAuthenticator(authenticator);

    CredentialType credentialType = new CredentialType();
    credentialType.setPassword(true);
    credentialType.setValue("PASSWORD");
    request.setCredentialType(credentialType);

    GetEncodedUsernameResponse response=null;
    try
    {
        logRequest(BWS_API_NAME);
        response = _bwsUtil.getEncodedUsername(request);
        logResponse(BWS_API_NAME, response.getReturnStatus().getCode(),
response.getMetadata());
    }
    catch (WebServiceException e)
    {
        // Log and re-throw exception.
        logMessage("Exiting %s with exception \"%s\"", METHOD_NAME, e.getMessage());
        throw e;
    }

    if (response.getReturnStatus().getCode().equals("SUCCESS"))
    {
        returnValue = response.getEncodedUsername();
    }
    else
    {
        logMessage("Error Message: \"%s\"",
response.getReturnStatus().getMessage());
    }

    logMessage("Exiting %s with value \"%s\"", METHOD_NAME, returnValue == null ?
"null" : returnValue);
    return returnValue;
}
```

After the authentication and initialization process completes, the BlackBerry Web Services are ready to accept API calls from the application.

## Creating a user account

When the application successfully completes the authentication and initialization process, it can send API calls to the BlackBerry Web Services. The sample application includes API calls to retrieve and display system data for the BlackBerry Enterprise Server, to retrieve and display details for a user account, and to create a new user account using an email address.

These topics highlight the section of the code sample that is used to create a new user account. The following table describes the types of user accounts that you can create (the sample application creates a BlackBerry-enabled user account). For more details about creating user accounts, visit [docs.blackberry.com/BWS](https://docs.blackberry.com/BWS) to review the BlackBerry Web Services API reference and the BWS.createUsers API.

User type	Description
Administrator account - BlackBerry-enabled	<p>A user account that is assigned login information and an administrative role so that the user can log in to the BlackBerry Administration Service and perform managements tasks. The user can be assigned a device.</p> <p>To create this administrator account with the BlackBerry Web Services:</p> <ul style="list-style-type: none"> <li>• The AccountAttributes object is not null</li> <li>• The UserAttributes object is not null</li> <li>• The roleUID property is specified</li> </ul>
Administrator account - Not BlackBerry-enabled	<p>A user account that is assigned login information and an administrative role so that the user can log in to the BlackBerry Administration Service and perform managements tasks. The user cannot be assigned a device.</p> <p>To create this administrator account with the BlackBerry Web Services:</p> <ul style="list-style-type: none"> <li>• The AccountAttributes object is null</li> <li>• The UserAttributes object is not null</li> <li>• The roleUID property is specified</li> </ul>
User account - BlackBerry-enabled	<p>A standard user account that does not require login information for the BlackBerry Administration Service or an administrative role. An administrator can assign a device to the user account.</p>

User type	Description
	<p>To create this user account with the BlackBerry Web Services:</p> <ul style="list-style-type: none"> <li>• The AccountAttributes object is not null</li> <li>• The UserAttributes object is null</li> </ul>
User account - Not BlackBerry-enabled	<p>A user account that does not require login information for the BlackBerry Administration Service or an administrative role. An administrator cannot assign a device to the user account.</p> <p>Create this type of user account only if you want an administrator to give the user administrative privileges by assigning the user to a group with an administrative role.</p> <p>To create this user account with the BlackBerry Web Services:</p> <ul style="list-style-type: none"> <li>• The AccountAttributes object is null</li> <li>• The UserAttributes object is not null</li> <li>• The roleUID property is not specified</li> </ul>

## Code sample: Creating a user account

Visit <https://github.com/blackberry/BWS-Samples> to copy the full code sample to your development tool. This topic highlights and explains key sections of the code that are used to create a new BlackBerry-enabled user account. This topic refers to lines 584 to 670 and the main method of the code sample.

Before you run the code sample, verify that you have completed the configuration tasks described earlier in this guide.

### Specify the email address for the new user

The following code from the main method defines the CREATE\_NEW\_USER\_EMAIL variable that is used to create the new user account. Specify the email address of the user account that you want the application to create.

```
// Email address used to create a new user with the createUsers() API call.
CREATE_NEW_USER_EMAIL = "\"user01@example.net\"";
```

## Create the CreateUsersRequest object

The following code creates the CreateUsersRequest object that is used to send the API call to the BlackBerry Web Services, and assigns the value of the Metadata global variable (see [Code sample: Authentication and initializing the web services](#)) to the metadata property of the CreateUsersRequest object.

```
// Create the request object.
CreateUsersRequest createUsersRequest = new CreateUsersRequest();
createUsersRequest.setMetadata(REQUEST_METADATA);
```

## Create the NewUser object

The following code creates a NewUser object to hold the values of the account attributes for the user account.

```
NewUser newUser = new NewUser();
```

## Create the AccountAttributes object

The following code creates an AccountAttributes object, which is used to set the value of the email address for the user account. The global variable CREATE\_NEW\_USER\_EMAIL contains the email address value.

```
// To create an administrator user, create and set the "UserAttributes".
AccountAttributes accountAttributes = new AccountAttributes();

/*
 * Check if value of the variable "CREATE_NEW_USER_EMAIL" is enclosed in double-
 * quotes, otherwise the string
 * would infer a substring match search.
 */
if (!CREATE_NEW_USER_EMAIL.startsWith("\"") || !
    CREATE_NEW_USER_EMAIL.endsWith("\""))
{
    logMessage("Warning: Email Address \"%s\" is not enclosed in double-quotes",
        CREATE_NEW_USER_EMAIL);
}
// Value of the variable "CREATE_NEW_USER_EMAIL" is used to create a BlackBerry-
// enabled user.
logMessage("Creating a user with email address \"%s\"", CREATE_NEW_USER_EMAIL);
accountAttributes.setEmailAddress(CREATE_NEW_USER_EMAIL);
```

## Set the attributes of the user account

The following code uses the NewUser object (called newUser) with the AccountAttribute object (called accountAttributes) to set the attributes of the user account. In this code sample, a null value is assigned to the newUser.server property to randomly select the BlackBerry Enterprise Server to create the user on.

```
newUser.setAccountAttributes(accountAttributes);
// Randomly select a BlackBerry Enterprise Server on which to create the user.
newUser.setServer(null);
```

## Prepare the API call

The following code uses the `createUsersRequest.getNewUsers().add(newUser)` method to add the `newUser` object to the `createUsersRequest` object. The `createUsersRequest` object is ready to make a call to the `createUsers` API.

```
createUsersRequest.getNewUsers().add(newUser);
```

## Send the API call and verify that the API call was successful

The following code calls the `createUsers` API using `_bws.createUsers(createUsersRequest)` and stores the response from the API call in a `CreateUsersResponse` object called `response`. The code checks the return status message stored in the `CreateUsersResponse` object to verify that the call to the API was successful. If the call was successful, the code iterates through the individual responses and displays the results. Otherwise, it displays any errors that were found in the individual responses.

```
CreateUsersResponse response=null;
try
{
    logRequest(BWS_API_NAME);
    response = _bws.createUsers(createUsersRequest);
    logResponse(BWS_API_NAME, response.getReturnStatus().getCode(),
response.getMetadata());
}
catch (WebServiceException e)
{
    // Log and re-throw exception.
    logMessage("Exiting %s with exception \"%s\"", METHOD_NAME, e.getMessage());
    throw e;
}

if (response.getReturnStatus().getCode().equals("SUCCESS"))
{
    if (response.getIndividualResponses() != null)
    {
        for (IndividualResponse individualResponse :
response.getIndividualResponses())
        {
            displayResult(    "User created with UID \"%s\" using Email Address \"%s
\"", individualResponse.getUId(), accountAttributes.getEmailAddress());
        }

        returnValue = true;
    }
}
else
{
    logMessage( "Error Message: \"%s\"", response.getReturnStatus().getMessage());
    if (response.getIndividualResponses() != null)
    {
        for (IndividualResponse individualResponse :
response.getIndividualResponses())
        {
            logMessage( "Individual Response - Code: \"%s\", Message: \"%s\"",
```

```
        individualResponse.getReturnStatus().getCode(),  
        individualResponse.getReturnStatus().getMessage());  
    }  
}
```

# Revision history

9

Date	Description
Nov 2012	<p>The code sample at <a href="https://github.com/blackberry/BWS-Samples">https://github.com/blackberry/BWS-Samples</a> was updated to improve logging and to add timestamp information. Updated the following topics to capture the changes to the sample application:</p> <ul style="list-style-type: none"><li data-bbox="515 578 1168 602">• <a href="#">Code sample: Authentication and initializing the web services</a></li><li data-bbox="515 619 933 644">• <a href="#">Code sample: Creating a user account</a></li></ul>

# Related resources

10

To view the API reference for the latest version of the BlackBerry Web Services, and to read the BlackBerry Web Services documentation, visit <http://docs.blackberry.com/BWS>.

To read the documentation for the BlackBerry Enterprise Server, visit [blackberry.com/go/serverdocs](http://blackberry.com/go/serverdocs).

Resource	Information
<i>BlackBerry Web Services for Enterprise Administration - API Reference</i>	<ul style="list-style-type: none"> <li>• Details for all available web services</li> <li>• Code samples</li> </ul>
<i>BlackBerry Web Services for Enterprise Administration - Feature and Technical Overview</i>	<ul style="list-style-type: none"> <li>• Architecture</li> <li>• BlackBerry Web Services features</li> </ul>
<i>BlackBerry Web Services for Enterprise Administration - Release Notes</i>	<ul style="list-style-type: none"> <li>• Description of new and changed APIs and classes</li> <li>• Fixed issues</li> <li>• Known issues</li> </ul>
<i>BlackBerry Enterprise Server Feature and Technical Overview</i>	<ul style="list-style-type: none"> <li>• BlackBerry Enterprise Server features</li> <li>• System architecture</li> <li>• Data and process flows</li> </ul>
<i>BlackBerry Enterprise Server Installation and Configuration Guide</i>	<ul style="list-style-type: none"> <li>• System requirements</li> <li>• Installation instructions</li> </ul>
<i>BlackBerry Enterprise Server Administration Guide</i>	<ul style="list-style-type: none"> <li>• System configuration and management</li> </ul>

# Glossary

11

<b>API</b>	application programming interface
<b>FQDN</b>	fully qualified domain name
<b>IP</b>	Internet Protocol
<b>JRE</b>	Java Runtime Environment
<b>SOAP</b>	Simple Object Access Protocol
<b>SSL</b>	Secure Sockets Layer
<b>TLS</b>	Transport Layer Security
<b>WSDL</b>	Web Services Description Language
<b>XML</b>	Extensible Markup Language

# Legal notice

12

©2012 Research In Motion Limited. All rights reserved. BlackBerry®, RIM®, Research In Motion®, and related trademarks, names, and logos are the property of Research In Motion Limited and are registered and/or used in the U.S. and countries around the world.

Apache CXF is a trademark of The Apache Software Foundation. Eclipse is a trademark of Eclipse Foundation, Inc. Java and JRE are trademarks of Oracle and/or its affiliates. Microsoft, Windows, and Windows Internet Explorer are trademarks of Microsoft Corporation. All other trademarks are the property of their respective owners.

This documentation including all documentation incorporated by reference herein such as documentation provided or made available at [www.blackberry.com/go/docs](http://www.blackberry.com/go/docs) is provided or made accessible "AS IS" and "AS AVAILABLE" and without condition, endorsement, guarantee, representation, or warranty of any kind by Research In Motion Limited and its affiliated companies ("RIM") and RIM assumes no responsibility for any typographical, technical, or other inaccuracies, errors, or omissions in this documentation. In order to protect RIM proprietary and confidential information and/or trade secrets, this documentation may describe some aspects of RIM technology in generalized terms. RIM reserves the right to periodically change information that is contained in this documentation; however, RIM makes no commitment to provide any such changes, updates, enhancements, or other additions to this documentation to you in a timely manner or at all.

This documentation might contain references to third-party sources of information, hardware or software, products or services including components and content such as content protected by copyright and/or third-party web sites (collectively the "Third Party Products and Services"). RIM does not control, and is not responsible for, any Third Party Products and Services including, without limitation the content, accuracy, copyright compliance, compatibility, performance, trustworthiness, legality, decency, links, or any other aspect of Third Party Products and Services. The inclusion of a reference to Third Party Products and Services in this documentation does not imply endorsement by RIM of the Third Party Products and Services or the third party in any way.

EXCEPT TO THE EXTENT SPECIFICALLY PROHIBITED BY APPLICABLE LAW IN YOUR JURISDICTION, ALL CONDITIONS, ENDORSEMENTS, GUARANTEES, REPRESENTATIONS, OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY CONDITIONS, ENDORSEMENTS, GUARANTEES, REPRESENTATIONS OR WARRANTIES OF DURABILITY, FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, MERCHANTABLE QUALITY, NON-INFRINGEMENT, SATISFACTORY QUALITY, OR TITLE, OR ARISING FROM A STATUTE OR CUSTOM OR A COURSE OF DEALING OR USAGE OF TRADE, OR RELATED TO THE DOCUMENTATION OR ITS USE, OR PERFORMANCE OR NON-PERFORMANCE OF ANY SOFTWARE, HARDWARE, SERVICE, OR ANY THIRD PARTY PRODUCTS AND SERVICES REFERENCED HEREIN, ARE HEREBY EXCLUDED. YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY BY STATE OR PROVINCE. SOME JURISDICTIONS MAY NOT ALLOW THE EXCLUSION OR LIMITATION OF IMPLIED WARRANTIES AND CONDITIONS. TO THE EXTENT PERMITTED BY LAW, ANY IMPLIED WARRANTIES OR CONDITIONS RELATING TO THE DOCUMENTATION TO THE EXTENT THEY CANNOT BE EXCLUDED AS SET OUT ABOVE, BUT CAN BE LIMITED, ARE HEREBY LIMITED TO NINETY (90) DAYS FROM THE DATE YOU FIRST ACQUIRED THE DOCUMENTATION OR THE ITEM THAT IS THE SUBJECT OF THE CLAIM.

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW IN YOUR JURISDICTION, IN NO EVENT SHALL RIM BE LIABLE FOR ANY TYPE OF DAMAGES RELATED TO THIS DOCUMENTATION OR ITS USE, OR PERFORMANCE OR NON-

PERFORMANCE OF ANY SOFTWARE, HARDWARE, SERVICE, OR ANY THIRD PARTY PRODUCTS AND SERVICES REFERENCED HEREIN INCLUDING WITHOUT LIMITATION ANY OF THE FOLLOWING DAMAGES: DIRECT, CONSEQUENTIAL, EXEMPLARY, INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR AGGRAVATED DAMAGES, DAMAGES FOR LOSS OF PROFITS OR REVENUES, FAILURE TO REALIZE ANY EXPECTED SAVINGS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, LOSS OF BUSINESS OPPORTUNITY, OR CORRUPTION OR LOSS OF DATA, FAILURES TO TRANSMIT OR RECEIVE ANY DATA, PROBLEMS ASSOCIATED WITH ANY APPLICATIONS USED IN CONJUNCTION WITH RIM PRODUCTS OR SERVICES, DOWNTIME COSTS, LOSS OF THE USE OF RIM PRODUCTS OR SERVICES OR ANY PORTION THEREOF OR OF ANY AIRTIME SERVICES, COST OF SUBSTITUTE GOODS, COSTS OF COVER, FACILITIES OR SERVICES, COST OF CAPITAL, OR OTHER SIMILAR PECUNIARY LOSSES, WHETHER OR NOT SUCH DAMAGES WERE FORESEEN OR UNFORESEEN, AND EVEN IF RIM HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW IN YOUR JURISDICTION, RIM SHALL HAVE NO OTHER OBLIGATION, DUTY, OR LIABILITY WHATSOEVER IN CONTRACT, TORT, OR OTHERWISE TO YOU INCLUDING ANY LIABILITY FOR NEGLIGENCE OR STRICT LIABILITY.

THE LIMITATIONS, EXCLUSIONS, AND DISCLAIMERS HEREIN SHALL APPLY: (A) IRRESPECTIVE OF THE NATURE OF THE CAUSE OF ACTION, DEMAND, OR ACTION BY YOU INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR ANY OTHER LEGAL THEORY AND SHALL SURVIVE A FUNDAMENTAL BREACH OR BREACHES OR THE FAILURE OF THE ESSENTIAL PURPOSE OF THIS AGREEMENT OR OF ANY REMEDY CONTAINED HEREIN; AND (B) TO RIM AND ITS AFFILIATED COMPANIES, THEIR SUCCESSORS, ASSIGNS, AGENTS, SUPPLIERS (INCLUDING AIRTIME SERVICE PROVIDERS), AUTHORIZED RIM DISTRIBUTORS (ALSO INCLUDING AIRTIME SERVICE PROVIDERS) AND THEIR RESPECTIVE DIRECTORS, EMPLOYEES, AND INDEPENDENT CONTRACTORS.

IN ADDITION TO THE LIMITATIONS AND EXCLUSIONS SET OUT ABOVE, IN NO EVENT SHALL ANY DIRECTOR, EMPLOYEE, AGENT, DISTRIBUTOR, SUPPLIER, INDEPENDENT CONTRACTOR OF RIM OR ANY AFFILIATES OF RIM HAVE ANY LIABILITY ARISING FROM OR RELATED TO THE DOCUMENTATION.

Prior to subscribing for, installing, or using any Third Party Products and Services, it is your responsibility to ensure that your airtime service provider has agreed to support all of their features. Some airtime service providers might not offer Internet browsing functionality with a subscription to the BlackBerry® Internet Service. Check with your service provider for availability, roaming arrangements, service plans and features. Installation or use of Third Party Products and Services with RIM's products and services may require one or more patent, trademark, copyright, or other licenses in order to avoid infringement or violation of third party rights. You are solely responsible for determining whether to use Third Party Products and Services and if any third party licenses are required to do so. If required you are responsible for acquiring them. You should not install or use Third Party Products and Services until all necessary licenses have been acquired. Any Third Party Products and Services that are provided with RIM's products and services are provided as a convenience to you and are provided "AS IS" with no express or implied conditions, endorsements, guarantees, representations, or warranties of any kind by RIM and RIM assumes no liability whatsoever, in relation thereto. Your use of Third Party Products and Services shall be governed by and subject to you agreeing to the terms of separate licenses and other agreements applicable thereto with third parties, except to the extent expressly covered by a license or other agreement with RIM.

Certain features outlined in this documentation require a minimum version of BlackBerry® Enterprise Server, BlackBerry® Desktop Software, and/or BlackBerry® Device Software.

The terms of use of any RIM product or service are set out in a separate license or other agreement with RIM applicable thereto. NOTHING IN THIS DOCUMENTATION IS INTENDED TO SUPERSEDE ANY EXPRESS WRITTEN AGREEMENTS OR

WARRANTIES PROVIDED BY RIM FOR PORTIONS OF ANY RIM PRODUCT OR SERVICE OTHER THAN THIS DOCUMENTATION.

Research In Motion Limited  
295 Phillip Street  
Waterloo, ON N2L 3W8  
Canada

Research In Motion UK Limited  
200 Bath Road  
Slough, Berkshire SL1 3XE  
United Kingdom

Published in Canada