Push Service SDK

Version: 1.1.0.16

Feature and Technical Overview

BlackBerry

Contents

Overview

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You can use the Push Service SDK to develop a push solution that uses the push technology of the BlackBerry® Application Platform. The push solution includes a Push Initiator and a push-enabled application on a BlackBerry device. With push technology, the Push Initiator does not need to wait for a request from the push-enabled application to deliver content. The Push Initiator can deliver up to 8 KB of content (images, text, or audio) to many devices at once through the BlackBerry® Infrastructure (to the general public), through the BlackBerry® Enterprise Server (to enterprise users), or through both simultaneously. The content is available immediately to all users on their devices without waiting for downloads.

If you plan to develop a push solution that delivers content through the BlackBerry Infrastructure, the Push Service SDK provides two service options:

- BlackBerry Push Essentials: offers all the basic functionality that you need to develop push solutions, and to send content to users quickly and efficiently.
- BlackBerry Push Plus: offers additional functionality so that you can check the status and receive notifications about delivered push messages. You can also change the expiry time of push messages.

BlackBerry Push Essentials is a free service while BlackBerry Push Plus has a free tier and paid tiers.

You can evaluate the Push Service and the two service options by registering with Research In Motion. If you plan to develop a push solution that delivers content through the BlackBerry Enterprise Server only, you do not need to register. For more information about registering and to download the Push Service SDK, visit www.blackberry.com/developers/pushservice.

Benefits of push technology

When you develop push solutions using the Push Service SDK, your solutions take advantage of the benefits that the push technology of the BlackBerry® Application Platform provides.

Benefit	Description
Immediate information	Your push solutions can securely and reliably deliver up to 8 KB of content (images, text, or audio) to BlackBerry devices through the BlackBerry® Infrastructure, through the BlackBerry® Enterprise Server, or through both simultaneously. The content is available immediately to all users on their devices without waiting for downloads.
Increased efficiency	You can choose where to send content. You can send content to individual users (point-to-point), many users (multicast), or all of your users (broadcast). Your push solution sends the content when it is actually available so that data traffic is generated only when it is needed. Additionally, with the BlackBerry Push Plus service option, your push solution can store push requests. If your push solution receives a result notification, it can then perform status queries locally.

Benefit	Description
End-to-end visibility	With the BlackBerry Push Plus service option, you can receive two status reports for your push request: a server acknowledgement and application-level acknowledgements. Real-time status also allows you to query the status of a push request down to a specific BlackBerry device.
Longer battery life	The Push Service SDK minimizes the impact on device batteries because the push-enabled application listens in the background for the server to push content to it. Once the application receives the content, it processes it. The application does not need to poll the server to see if new content is available, and this helps to preserve the life of the battery.

Architecture: Push Service SDK solution

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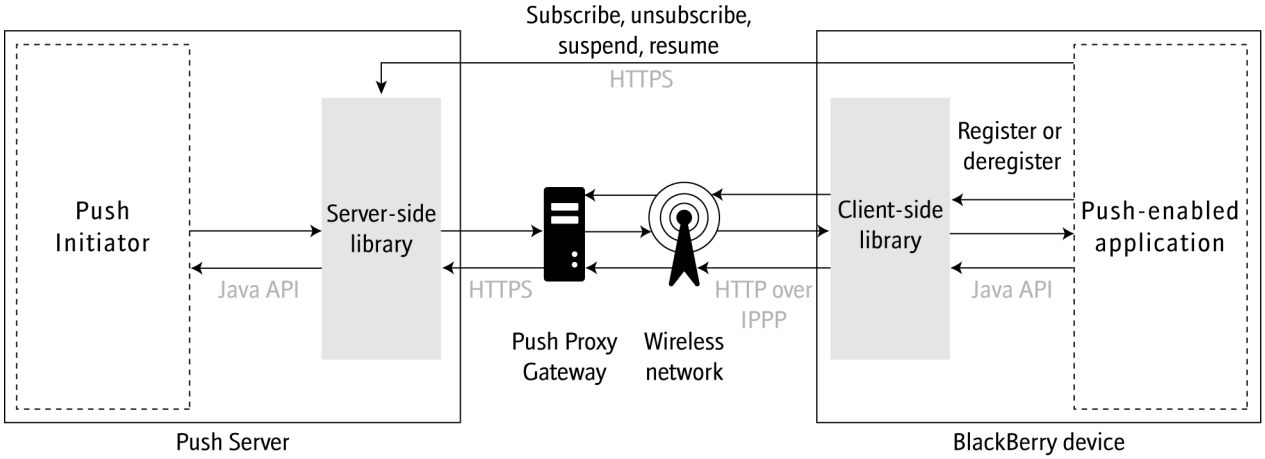
The architecture diagram shows a client/server solution that is developed using the Push Service SDK. The server-side library and the client-side library interact with other components to enable the delivery of server-initiated content to BlackBerry devices using push technology.



Component	Description
Push Initiator	The Push Initiator is the application that creates request messages (push request, cancel request, status-query request) and response messages (result-notification response) using the server-side library and submits them to the Push Proxy Gateway (PPG). Using the server-side library, the Push Initiator also processes subscription-related requests (subscribe, unsubscribe, suspend, resume) that it receives from the push-enabled application on the BlackBerry device.
Server-side library	The Push Service SDK contains the server-side library. The server-side library provides the APIs that the Push Initiator uses to facilitate all interactions with the PPG. The Push Initiator uses the server-side library to create push messages, status-query messages, and result-notification response messages in PAP XML format for delivery to the PPG. The Push Initiator uses the server-side library to process result-notification messages and status-query response messages that it receives from the PPG. The Push Initiator also uses the server-side library to process subscription-related requests, such as subscribe, unsubscribe, suspend, and resume requests, that it receives from the push-enabled application on the BlackBerry device.
Push Proxy Gateway (PPG)	The Push Proxy Gateway processes push request messages and status-query messages that it receives from the Push Initiator. Upon processing a push request message, the PPG sends a response message which communicates the overall outcome of the push message. The response message contains a result code or a PAP error code. The PPG can be the BlackBerry® Infrastructure or the BlackBerry® Enterprise Server.

Component	Description
Client-side library	The BlackBerry® Java® Development Environment 5.0 and later contains the client-side library. The client-side library provides the APIs that the push-enabled application uses to register or deregister with the PPG. The client-side library listens in the background for content received from the PPG. When content arrives from the PPG, the client-side library starts the push-enabled application if the application is not running.
Push-enabled application	The push-enabled application on the BlackBerry device sends subscription-related requests, such as subscribe, unsubscribe, suspend, and resume requests, to the Push Initiator. The push-enabled application uses the client-side library to register with the PPG and to listen for content, received from the PPG, in the background.

Features

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Two-tiered development model

At its core, a push solution communicates with the PPG using PAP messages. Around this basic functionality are the constructs of the rest of the push solution: user subscription and user management, push message validation, the management of result notifications, and so on.

The Push Service SDK provides a two-tiered development model that includes low-level APIs and high-level APIs. Depending on the design of the push solution, you might only choose to use the APIs to create PAP messages, and develop the rest of the solution on your own. Conversely, you might want to use the Push Service SDK APIs to handle some of the more complex operations of your solution as well.

The Push Service SDK APIs can be categorized in the following tiers:

Tier	Description	Components
Low-level APIs	The low-level APIs focus on the creation and parsing of PAP messages, as well as the communication with the PPG. These APIs provide a simple Java® API layer over the PAP XML, removing the need for developers to write and parse PAP control entities and multipart MIME messages. Typically, you would require the functionality provided by low-level APIs if your push solution handles push requests, subscriptions, and acknowledgements.	• Commons component (contains the `commons` package) • PAP component (contains the `pap` and `query` packages)
High-level APIs	The high-level APIs are built on top of the functionality provided by the low-level APIs and provide a number of value-added features. Typically, you would require the functionality provided by high-level APIs if your push solution does not handle push requests, subscriptions, and acknowledgements.	• Core component (contains the `push`, `pushappmgmt`, and `subscription` packages) • Acknowledgement component (contains the `acknowledgement` package) • Monitoring component (contains the `monitoring` package)

Support for typical feature sets

You can use the Push Service SDK to develop a Push Initiator by choosing a feature set from the following table, depending on your business needs. The feature set that you use must correspond to the service option that you choose when you install the SDK.

Feature set	Advantages	Disadvantages
The Push Initiator automatically tracks push messages. You might use this feature set to develop a Push Initiator that sends push messages to remote workers or for payment applications. This feature set requires the BlackBerry Push Plus service option.	• The PPG sends a result notification to the Push Initiator so that you know the final outcome of the push message that the PPG delivered to each subscriber. • You can perform a status query in the local database, instead of contacting the PPG, to check the status of a push message to each subscriber. • You can store details about a push message in the local database for as long as you want. The PPG keeps details about a push message for only 24 hours. • Based on the delivery status of the push message, you can perform subscription maintenance.	• The delivery status of push messages is stored in the local database, so there is increased use of the database.
You manually track push messages using result notification. You might use this feature set to develop a Push Initiator that sends push messages for advertising or brand promotion. This feature set requires the BlackBerry Push Plus service option.	• The PPG sends a result notification to the Push Initiator so that you know the final outcome of the push message that the PPG delivered to each subscriber. • You can perform a remote status query to the PPG to check the status of a push message to each subscriber. • The delivery status of push messages is not stored in the local database, so there is less use of the database. • Based on the delivery status of the push message, you can perform subscription maintenance.	• You must process the result notification manually.
You manually track push messages using status query. You might use this feature set to develop a Push Initiator that sends push messages that contain subscription content. This feature set requires the BlackBerry Push Plus service option.	• You can perform a remote status query to the PPG to check the status of a push message to each subscriber. • The delivery status of push messages is not stored in the local database, so there is less use of the database. • You do not have to process incoming result notifications.	• To determine the delivery status of a push message, you must manually query the PPG multiple times. • You can query the status of a push message for only 24 hours.

Feature set	Advantages	Disadvantages
You do not track push messages. You might use this feature set to develop a Push Initiator that sends push messages that contain broadcast news or weather headlines. This feature set requires the BlackBerry Push Essentials service option.	• There is very little overhead with this type of Push Initiator. You just need to determine the list of subscribers and the content that you want to send. • You do not need to check if a push message reached each subscriber.	• You do not know the delivery status of a push message. • You must perform subscription maintenance manually.

Helper applications

The Push Service SDK includes a number of helper applications. Helper applications are complete or partially complete web application templates that you can use to help you quickly access some of the features of the Push Service SDK with little or no development effort. Helper applications are available in .war file format.

Helper application	Description
DebugPortal	A complete Push Initiator that demonstrates some key features of the Push Service SDK server-side library by enabling quick setup and test runs of "Hello World" type push-enabled applications or by helping to debug and test production-grade push-enabled applications
PushSDK	A web application that helps you deploy the default implementations of the servlets from the Acknowledgement component to capture acknowledgments from the PPG, and the Subscription component to capture subscription requests from the device, when you use only the high-level API functionalities of the Push Service SDK server-side library
PAPNotify	A web application template that helps you deploy an implementation of the abstract servlet from the PAP component to capture acknowledgements from the PPG, when you use only the low-level API functionalities of the Push Service SDK

Cancellation of pending push messages

For content providers with a service level of BlackBerry® Push Plus, you can cancel a push message at any time during the life of the request. When the PPG receives a cancellation request, the PPG attempts to stop the delivery of the data to BlackBerry devices. Because the PPG typically processes requests quickly, however, in most cases, the cancellation request is unsuccessful.

The PPG does not attempt to recall push content from BlackBerry devices after the content has been successfully delivered.

Querying the status of a push message

For content providers with a service level of BlackBerry Push Plus, the PPG allows you to query the status of a push message for any or all of the addressees. The PPG returns a single response that contains the current status of the push message for all of the specified BlackBerry devices.

You can request a variety of information in your status query. For example, you can:

- query the status of the push message for all BlackBerry devices
- query for which BlackBerry devices the push message was cancelled
- query for which BlackBerry devices the push message failed
- query for which BlackBerry devices the push message is still pending

Querying the status of push a message is not available to content providers with a service level of BlackBerry Push Essentials.

Process flows

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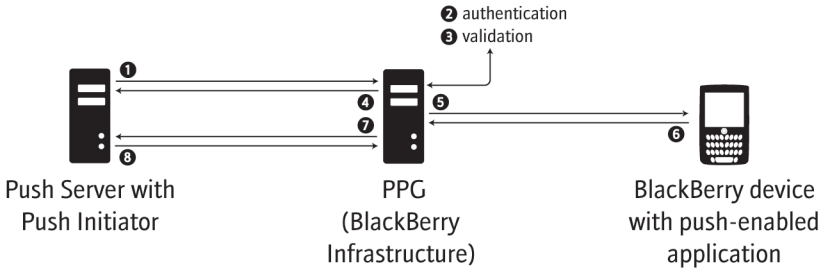
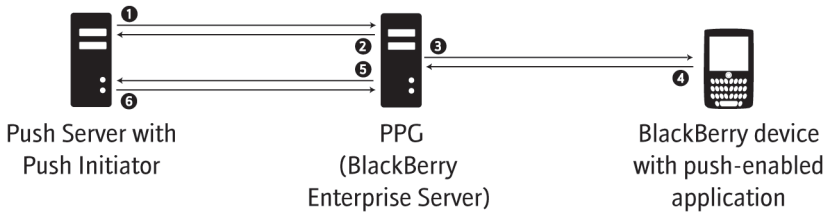
You can push data to subscribed users through the BlackBerry® Infrastructure, through the BlackBerry® Enterprise Server, or through both simultaneously. To push data in one of these ways, you must configure the Push Service SDK and you must create a Push Initiator with the appropriate type.

Process flow: Pushing data to subscribed users through the BlackBerry Infrastructure



1. The Push Initiator sends push message to the BlackBerry® Infrastructure in the form of an HTTPS POST. The push message is a MIME multipart message, which contains the following items:
   - a WAP PAP 2.1 XML control entity, which describes the delivery parameters and specifies one or more BlackBerry devices to which the content will be delivered
   - the push content to deliver to the specified BlackBerry devices
2. The BlackBerry Infrastructure receives the push message and attempts to authenticate the Push Initiator.
3. If the Push Initiator is successfully authenticated, the BlackBerry Infrastructure validates the push message.
   - If the Push Initiator is within the daily quota of push messages, and the request contains all the required information, the BlackBerry Infrastructure accepts the push message.
   - If the Push Initiator has exceeded the push limits, the BlackBerry Infrastructure rejects the message.
4. The BlackBerry Infrastructure returns a push response to acknowledge receipt of the push message, and indicates whether the message has been accepted for processing or rejected. If the push message has been rejected, the BlackBerry Infrastructure returns an error code to the content provider that provides the reason for the rejection.
5. The BlackBerry Infrastructure sends the push content to the specified BlackBerry devices.
6. Each BlackBerry device notifies the BlackBerry Infrastructure when the push content is received. A push message is considered successful if the push content is delivered before the specified expiry time and it meets the criteria specified by the `<quality-of-service>` element in the push message.
7. If the Push Initiator requests notification, the BlackBerry Infrastructure sends a result notification message to the push server.
8. The Push Initiator responds to the BlackBerry Infrastructure, acknowledging the receipt of the result notification.

Process flow: Pushing content to subscribed users through the BlackBerry Enterprise Server



1. The Push Initiator sends push message to the BlackBerry® Monitoring Service of the BlackBerry® Enterprise Server in the form of an HTTPS POST.
   The push message is a MIME multipart message, which contains the following items:
   - a WAP PAP 2.0 XML control entity, which describes the delivery parameters and specifies one or more BlackBerry devices to which the content will be delivered
   - the push content to deliver to the specified BlackBerry devices
2. The BlackBerry Monitoring Service returns a push response to acknowledge receipt of the push message, and indicates whether the message has been accepted for processing or rejected. If the push message has been rejected, the BlackBerry Monitoring Service returns an error code to the content provider that provides the reason for the rejection.
3. The BlackBerry Monitoring Service sends the push content to the specified BlackBerry devices.
4. Each BlackBerry device notifies the BlackBerry Monitoring Service when the push content is received. A push message is considered successful if the push content is delivered before the specified expiry time and it meets the criteria specified by the `<quality-of-service>` element in the push message.
5. If the Push Initiator requests notification, the BlackBerry Monitoring Service sends a result notification message to the push server.
6. The Push Initiator responds to the BlackBerry Monitoring Service, acknowledging the receipt of the result notification.

Prerequisites: Using the Push Service SDK 5

To use the Push Service SDK, be aware of the following considerations:

- You must identify the following requirements for your Push Initiator:
  - Whether it uses the BlackBerry® Infrastructure, BlackBerry® Enterprise Server, or both as the PPG
  - The number of daily push request messages it submits to the PPG
  - The size of the file or content that is included in the push request message
- If your Push Initiator uses the BlackBerry Infrastructure as the PPG to deliver content, you must register the Push Initiator with Research In Motion. To register, visit www.blackberry.com/developers/pushservice.
- To create a content delivery solution for BlackBerry devices using push technology, you must develop the following components:
  - A Push Initiator (an application that submits push request messages to the PPG) for the server-side
  - A push-enabled application (an application for the BlackBerry device that receives the content) for the client-side

Related resources

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Resource	Description
www.blackberry.com/Dev Zone	Visit the BlackBerry® Developer Zonefor information about the Push Service and to download the Push Service SDK.
docs.blackberry.com/en/developers/Push Service SDK	View Push Service SDK documentation, including a Getting Started guide, development guides, and Release Notes.
docs.blackberry.com/en/developers/JDE	View BlackBerry® Java® Development Environment documentation, including a Feature and Technical Overview, development guides, Release Notes, and sample applications. The BlackBerry JDE 5.0 and later contains the client-side library that you can use to develop a push-enabled application for BlackBerry devices.

Glossary

API

application programming interface

HTTPS

Hypertext Transfer Protocol over Secure Sockets Layer

MIME

Multipurpose Internet Mail Extensions

PAP

Push Access Protocol

PPG

Push Proxy Gateway

XML

Extensible Markup Language

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

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