

BlackBerry Enterprise Server software version 5.0 architecture

BlackBerry® Enterprise Server software version 5.0 components are described in the following table.

Component	Description
BlackBerry Configuration Database	<p>The BlackBerry Configuration Database is a relational database that stores configuration and state data used by the BlackBerry Enterprise Server components, such as:</p> <ul style="list-style-type: none"> • Details about the connection from a BlackBerry Enterprise Server to the wireless network, including SRP and CAL information • BlackBerry smartphone configuration and diagnostics data, including PIN information • BlackBerry smartphone user list, including mailbox information • BlackBerry smartphone encryption keys • Global statistics
BlackBerry Router	<p>The BlackBerry Router routes data to and from the BlackBerry smartphones through the wireless network or through the organization's network.</p> <p>As BlackBerry smartphones are connected and disconnected from computers that are running BlackBerry® Device Manager, the BlackBerry Router dynamically switches between sending and receiving data wirelessly or through the organization's LAN or WLAN.</p>
BlackBerry Dispatcher	<p>The BlackBerry Dispatcher is designed to perform the following functions:</p> <ul style="list-style-type: none"> • Compress and encrypt all data that is sent to the BlackBerry smartphones • Decrypt and decompress all data that is received from the BlackBerry smartphones • Manage the connection of the BlackBerry Enterprise Server to the BlackBerry® Infrastructure through the BlackBerry Router • Assign BlackBerry smartphone users to the BlackBerry Messaging Agent • Direct data traffic between BlackBerry Enterprise Server components • Control high availability of the BlackBerry Enterprise Server

Component	Description
BlackBerry Messaging Agent	<p>The BlackBerry Messaging Agent connects to the organization's messaging server to provide email message services, calendar services, and address lookup requests.</p> <p>The BlackBerry Messaging Agent is also designed to perform the following functions:</p> <ul style="list-style-type: none"> • Download attachments from the messaging server that have been requested from a BlackBerry smartphone • Synchronize BlackBerry smartphone user configuration information from the messaging server to the BlackBerry Configuration Database. • Provide encryption key generation services • Act as a gateway for the BlackBerry Synchronization Service to access organizer data on the messaging server
BlackBerry MDS Connection Service	<p>The BlackBerry MDS Connection Service allows BlackBerry smartphone users to access the Internet, the organization's intranet, and the organization's application and content servers using their BlackBerry smartphones.</p> <p>The BlackBerry MDS Connection Service also sends login requests and requests for instant messaging sessions from BlackBerry smartphones to the BlackBerry Collaboration Service. If the BlackBerry MDS Connection Service is stopped, the BlackBerry Collaboration Service also stops working.</p>
BlackBerry Attachment Service	<p>The BlackBerry Attachment Service is designed to convert supported attachment files to a format that can be viewed on the BlackBerry smartphone.</p> <p>The BlackBerry Attachment Service consists of the BlackBerry Attachment Server that controls the retrieval, distillation, and conversion of attachment data, and the BlackBerry Attachment Connector that controls the connections between the BlackBerry Messaging Agent or the BlackBerry MDS Connection Service and the BlackBerry Attachment Server.</p>
BlackBerry Collaboration Service	<p>The BlackBerry Collaboration Service provides a connection between the organization's instant messaging server and the collaboration client on the BlackBerry smartphones.</p>
BlackBerry Policy Service	<p>The BlackBerry Policy Service is designed to perform administration services over the wireless network that include sending IT policies, IT administration commands, and service books to the BlackBerry smartphones over the wireless network.</p> <p>The BlackBerry Policy Service is also responsible for the push of applications to the BlackBerry smartphones and for encryption key regeneration requests.</p>

Component	Description
BlackBerry Synchronization Service	<p>The functions of the BlackBerry Synchronization Service include the following:</p> <ul style="list-style-type: none"> • Synchronization of organizer data including tasks, memos, and contacts • Retrieval of BlackBerry smartphone diagnostics information • Wireless back up of BlackBerry smartphone configuration data to the BlackBerry Configuration Database • Wireless restore of BlackBerry smartphone configuration data to the BlackBerry smartphone during the activation process
BlackBerry Administration Service	<p>The BlackBerry Administration Service allows administrators to perform the following:</p> <ul style="list-style-type: none"> • Create and assign BlackBerry smartphone user groups, administrative roles, software configurations, and IT policies to BlackBerry smartphone user accounts • Manage BlackBerry smartphone user accounts, BlackBerry Enterprise Server instances, and distributed components in the BlackBerry Domain <p>The BlackBerry Administration Service consists of the BlackBerry Administration Service Application Server that handles tasks carried out in the BlackBerry Administration Service console, the BlackBerry Administration Service Native Code Container that handles access to native components and data sources, and the BlackBerry MailStore Service that reads data from the organization's directory and copies the data to the BlackBerry Configuration Database.</p>
BlackBerry MDS Integration Service	<p>The BlackBerry MDS Integration Service helps facilitate the installation and management of BlackBerry® MDS Runtime Applications and BlackBerry® Browser Applications. The BlackBerry MDS Integration Service also allows these types of applications to interact with back-end systems whose services can be accessed using web services or direct database connections.</p>

Component	Description
BlackBerry Monitoring Service	<p>The BlackBerry Monitoring Service monitors the health of the BlackBerry Enterprise Server environment and is designed to help administrators to identify and troubleshoot issues that could cause a service interruption for BlackBerry smartphones.</p> <p>The BlackBerry Monitoring Service polls each BlackBerry Enterprise Server component and retrieves SNMP data. The BlackBerry Monitoring Service stores the SNMP data in the BlackBerry Monitoring Service database and displays it in the BlackBerry Monitoring Service console.</p>
BlackBerry Controller	<p>The BlackBerry Controller monitors the BlackBerry Enterprise Server components and restarts them if they stop responding.</p> <p>Each BlackBerry Enterprise Server component reports a heartbeat every ten minutes. The heartbeats are recorded in the BlackBerry Controller log file. If two heartbeats are missed, by default, the BlackBerry Controller restarts the BlackBerry Enterprise Server component.</p> <p>The BlackBerry Controller is also responsible for starting the following BlackBerry Enterprise Server components:</p> <ul style="list-style-type: none"> • BlackBerry Messaging Agent • BlackBerry Policy Service • BlackBerry Synchronization Service • BlackBerry MailStore Service component of the BlackBerry Administration Service

What is a service book?

A service book is a set of records that configure how the BlackBerry smartphone interacts with the BlackBerry Infrastructure. Each service book record turns on specific services for the BlackBerry smartphone.

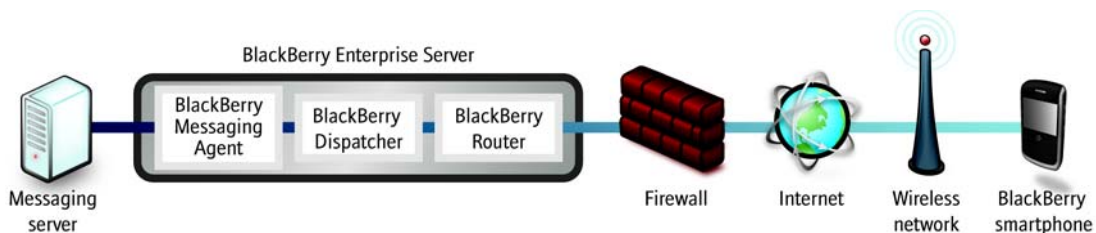
The types of service books on a BlackBerry smartphone depend upon the features provided by the wireless service provider and the IT policies set up by the administrator on the BlackBerry Enterprise Server.

The following table identifies common service books:

Service book	Description
ALP	Contains information that is required to perform wireless searches on the organization's directory
BBIM	Contains information required to send instant messages with an enterprise instant messaging service
BrowserConfig	Contains settings for the BlackBerry Browser, such as preconfigured homepage or bookmarks
CICAL	Contains information that is required for wireless calendar services
CMIME	Contains information that is required for wireless email services
IPPP	Contains information that is required to browse the Internet and intranet using the BlackBerry Browser. The BlackBerry Browser uses the BlackBerry Enterprise Server and the organization's network to access the Internet and intranet
SYNC	Contains information that is used to wirelessly synchronize organizer databases and to wirelessly backup and restore BlackBerry smartphone configuration data

Email message flow

The following diagram illustrates the BlackBerry Enterprise Server components required during email message flow.



Email message sent to the BlackBerry smartphone

The following steps describe the data flow when an email message is sent from the messaging server to the BlackBerry smartphone over the wireless network.

1. A new email message arrives in the BlackBerry smartphone user's mailbox.

2. The BlackBerry Messaging Agent retrieves the email message from the messaging server.
3. The BlackBerry Messaging Agent applies global filters first and individual filters second. If the email message must be forwarded to the BlackBerry smartphone, the BlackBerry Messaging Agent identifies the email message with a unique RefID, updates the individual and global statistics, and forwards the email message to the BlackBerry Dispatcher.
4. The BlackBerry Dispatcher compresses and encrypts the email message and forwards it to the BlackBerry Router.
5. The BlackBerry Router sends the encrypted email message through port 3101 on the firewall. The email message is sent through the Internet to the BlackBerry Infrastructure. The BlackBerry Infrastructure forwards the email message to the appropriate wireless network. The wireless network delivers the encrypted email message to the BlackBerry smartphone.
6. The BlackBerry smartphone sends a delivery confirmation to the BlackBerry Dispatcher. The BlackBerry Dispatcher sends the delivery confirmation to the BlackBerry Messaging Agent. The BlackBerry Messaging Agent updates the individual and global statistics as needed.

If the BlackBerry Messaging Agent does not receive a delivery confirmation within four hours, it sends the message to the wireless network again.

7. The BlackBerry smartphone decrypts and decompresses the email message and notifies the BlackBerry smartphone user that a new email message has arrived.

Email message sent from the BlackBerry smartphone

The following steps and diagram describe the data flow when an email message is sent from the BlackBerry smartphone through the wireless network.

1. The BlackBerry smartphone user sends an email message from the BlackBerry smartphone. The email message is assigned a RefID.
2. The BlackBerry smartphone compresses and encrypts the email message. The BlackBerry smartphone uses information from the CMIME service book to send the email message to the wireless network.
3. The wireless network forwards the message through the BlackBerry Infrastructure, the Internet, and port 3101 on the firewall to the BlackBerry Router.
4. The BlackBerry Router sends the encrypted email message to the BlackBerry Dispatcher.
5. The BlackBerry Dispatcher decrypts and decompresses the email message using the BlackBerry smartphone user's encryption key. Because the email message is

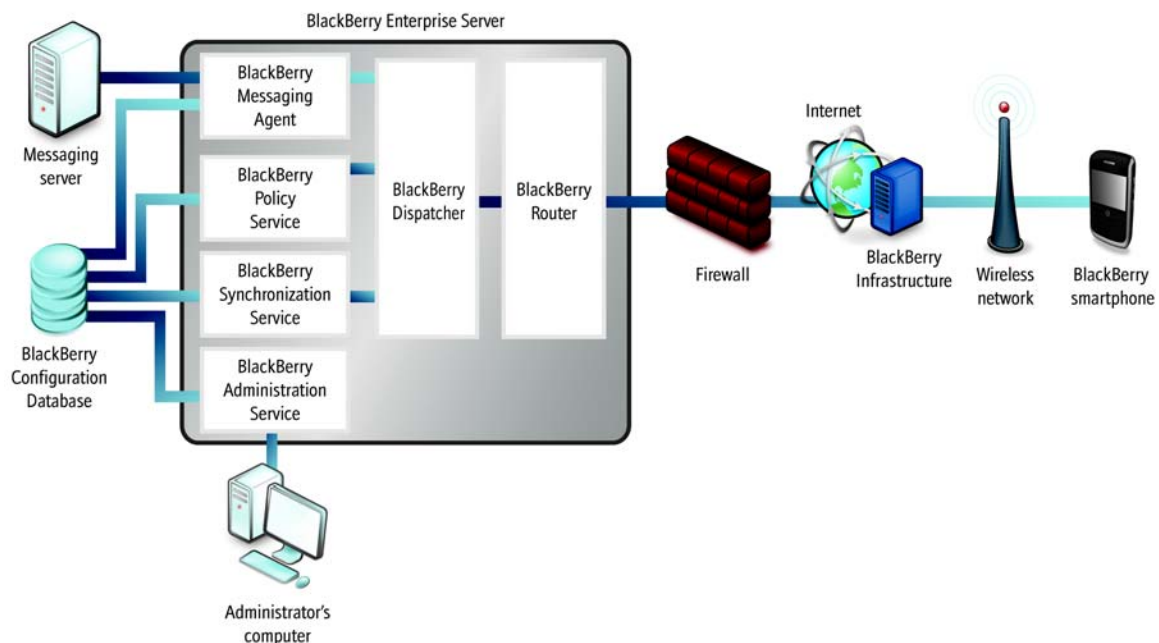
in CMIME format, the BlackBerry Dispatcher sends the email message to the BlackBerry Messaging Agent.

If the BlackBerry Dispatcher cannot decrypt the message using the BlackBerry smartphone user's encryption key, the BlackBerry Enterprise Server ignores the message and sends an error message to the BlackBerry smartphone.

6. The BlackBerry Messaging Agent updates BlackBerry smartphone user and BlackBerry Enterprise Server statistics.
7. The BlackBerry Messaging Agent places the email message in the messaging server. The BlackBerry Messaging Agent also sends a copy of the message to the Sent Items in the BlackBerry smartphone user's email application if configured to do so. The BlackBerry Messaging Agent then updates the individual and global statistics.
8. The email message is sent to the recipient by the messaging server using standard email delivery methods.

Activating a BlackBerry smartphone over the wireless network

The following diagram illustrates the BlackBerry Enterprise Server components required when activating a BlackBerry smartphone over the wireless network.



The following are the steps in the process of activating a BlackBerry smartphone over the wireless network.

1. The administrator creates a new BlackBerry smartphone user account and assigns an activation password using the BlackBerry Administration Service.
The BlackBerry smartphone user list stored in the BlackBerry Configuration Database is updated with the new BlackBerry smartphone user name, email address, mailbox information, activation password, activation status, and more.
2. The BlackBerry Dispatcher assigns the new BlackBerry smartphone user to a BlackBerry Messaging Agent. The BlackBerry Messaging Agent starts to monitor the BlackBerry smartphone user's mailbox on the messaging server for new email messages.
An email message containing an etp.dat file attachment is required to continue the activation process.
3. The BlackBerry smartphone user navigates to the **Enterprise Activation** application on the BlackBerry smartphone and types the email address and activation password. The BlackBerry smartphone user opens the options menu and selects **Activate**. The BlackBerry smartphone displays **Activating**.
4. The BlackBerry smartphone creates an activation request email that contains the email address, BlackBerry smartphone PIN, and public key authentication information based on the enterprise activation password typed by the BlackBerry smartphone user. The activation request email is sent to the BlackBerry Infrastructure through the wireless network.
5. The BlackBerry Infrastructure receives the secure activation email and identifies it as an activation request. The BlackBerry Infrastructure forwards the email message to the email address that was typed by the BlackBerry smartphone user on the enterprise activation screen using SMTP.
6. Upon arrival in the BlackBerry smartphone user's inbox, the BlackBerry Messaging Agent identifies the activation request email message and removes it from the BlackBerry smartphone user's mailbox. The BlackBerry Messaging Agent recognizes the etp.dat attachment in the activation request email and begins an authentication process.
7. The BlackBerry Messaging Agent compares the key received in the activation request email with the key generated from the activation password stored in the BlackBerry Configuration Database. If the keys match, the BlackBerry Messaging Agent notifies the BlackBerry smartphone that the activation request has been received. The BlackBerry Messaging Agent and the BlackBerry smartphone then generate their own copy of the BlackBerry smartphone user's encryption key that will be used to encrypt and decrypt all data.

8. At this point the BlackBerry Enterprise Server and the BlackBerry smartphone have established an encryption key and have verified their knowledge of the encryption key to each other.

All the data flowing between the BlackBerry smartphone and the BlackBerry Enterprise Server from now on will be compressed and encrypted using this encryption key.

The BlackBerry smartphone displays the following message: **Encryption Verified. Waiting for Services.**

9. The BlackBerry Messaging Agent forwards a request to the BlackBerry Policy Service to generate service books. The BlackBerry Policy Service receives and queues the request. The BlackBerry Policy Service adds the unique key that the BlackBerry Domain uses to sign IT policy data and then forwards the IT policy data through the BlackBerry Dispatcher to the BlackBerry smartphone. The BlackBerry Policy Service waits for confirmation from the BlackBerry smartphone that the IT policy has been applied successfully.
10. The BlackBerry smartphone applies the IT policy and sends a confirmation to the BlackBerry Enterprise Server. The IT policy in the BlackBerry smartphone is now in a read-only state and can be modified only by updates sent from the same BlackBerry Domain.
11. Once the BlackBerry Policy Service receives confirmation that the IT policy has been applied successfully, the BlackBerry Policy Service generates and sends the service books to the BlackBerry smartphone.
12. The BlackBerry smartphone receives the service books and is notified that the email address has been activated.

The BlackBerry smartphone displays the following status message: **Services Received. Your email address, *username@domain.com* is now enabled.**

At this stage the BlackBerry smartphone user can send and receive email messages on the BlackBerry smartphone.

13. The slow synchronization process begins. The BlackBerry smartphone requests the synchronization configuration information from the BlackBerry Synchronization Service. The configuration information indicates whether wireless data synchronization on the BlackBerry Enterprise Server is turned on and which organizer databases can be synchronized. The configuration information also provides database synchronization types (unidirectional or bidirectional) and conflict resolution settings.
14. The BlackBerry Synchronization Service returns the configuration information and synchronizes the databases on the BlackBerry smartphone using that information.

The BlackBerry smartphone and the BlackBerry Enterprise Server do not delete records during the initial synchronization process.

15. The slow synchronization process is complete when all databases are synchronized between the BlackBerry smartphone and the BlackBerry Enterprise Server.

The activation process is complete when the BlackBerry smartphone displays **Activation Complete** and the BlackBerry smartphone user account status is displayed as **Completed** in the BlackBerry Administration Service.

Acronym list

BlackBerry MDS – BlackBerry® Mobile Data System	LAN – local area network
CAL – client access license	PIN – personal identification number
CMIME – Compressed Multipurpose Internet Mail Extensions	SMTP – Simple Mail Transfer Protocol
ETP – Email Transfer Protocol	SNMP – Simple Network Management Protocol
IT – information technology	SRP – Server Routing Protocol
	RefID – Reference Identifier
	WLAN – wireless local area network

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