

## Basic Architecture

The purpose of the BlackBerry Enterprise Server is to centralize management and control of the BlackBerry solution within an organization. The BlackBerry Enterprise Server performs the following functions for each user:

1. Monitors the user's mailbox for new email.
2. Applies user-definable filters to new messages to determine if and how the message will be relayed to the user's BlackBerry Wireless Handheld.
3. Compresses and encrypts new messages and pushes them to the BlackBerry Wireless Handheld via the Internet and wireless network.
4. Receives, via the Internet, messages composed on the BlackBerry Wireless Handheld, then decrypts and decompresses the messages and places them in the user's Outbox for the corporate

Microsoft® Exchange Server to deliver

The BlackBerry Enterprise Server provides a secure, two-way link between the user's Microsoft Exchange account and the user's BlackBerry Wireless Handheld. Consider the BlackBerry Enterprise Server as a conduit rather than a mail server or message repository – all message storage is still left to the Microsoft Exchange Server. By maintaining a link to the messages in the user's Microsoft Exchange mailbox, the BlackBerry Enterprise Server provides several advanced features:

1. When forwarding a message from the handheld, the BlackBerry software forwards the complete original message from the user's Microsoft Exchange account, including all attachments that are appended to the message. Although attachments cannot be viewed on the handheld, they can still be forwarded to other email addresses.
2. When receiving a message from the handheld, the first 2K of a message are pushed to the handheld. The user is able to request more of the message to be delivered in 2K blocks up to a maximum of 32K.

When "replying with text" from the handheld, the BlackBerry software will append the entire original message to the reply, not just the 2K that was sent to the handheld.

The BlackBerry Enterprise Server is a Windows® NT service that can monitor many users at once over a single administrative connection to the Microsoft Exchange Server. The BlackBerry Enterprise Server uses a direct TCP/IP connection to the wireless network. Achieving this direct connection requires a one-time configuration of the company firewall and results in a considerable speed advantage. Figure 1 provides an overview of the system architecture. At the heart of this wireless email solution is the BlackBerry Enterprise Server:

- A. The BlackBerry Enterprise Server is administered through extensions to the standard Microsoft Exchange Administrator
- B. The configuration information is placed in the data store of an Administration account
- C. That must be set up for the BlackBerry Enterprise Server. This account must have privileges to read and write to the message stores of the users it serves.

# BlackBerry Enterprise Server components

## BlackBerry Dispatcher

The BlackBerry Dispatcher handles traffic to the BlackBerry Infrastructure. It compresses/decompresses and encrypts/decrypts wireless data. The BlackBerry Dispatcher handles all internal Service Routing Protocol (SRP) connections from the BlackBerry Messaging Agent and also manages communication from the BlackBerry MDS Connection Service, the BlackBerry Synchronization Service, the BlackBerry Policy Service, and the BlackBerry Collaboration Service to the BlackBerry Infrastructure. These components connect to the BlackBerry Dispatcher through specific ports and communicate with the BlackBerry Infrastructure through the BlackBerry Router using a unique SRP identifier that the BlackBerry Dispatcher establishes.

## BlackBerry Messaging Agent

The BlackBerry Messaging Agent handles BlackBerry Synchronization Service traffic, including contacts, tasks, memos, message settings, and message filters. The BlackBerry Messaging Agent also has a mechanism for wireless calendar initialization before wireless calendar synchronization is enabled. This mechanism is used to initially synchronize the BlackBerry device and the Microsoft Exchange message store, enabling wireless synchronization to occur. Each BlackBerry Messaging Agent owns a unique internal SRP identifier that connects to the BlackBerry Dispatcher.

The BlackBerry Messaging Agent also handles all Microsoft Exchange-related traffic using Messaging Application Programming Interface (MAPI) and Collaboration Data Objects (CDO).

## MAPI

The BlackBerry Messaging Agent uses thread pools that have a MAPI session to the Microsoft Exchange Server. New thread pools are created when an existing thread pool exceeds the 50-mailbox maximum or the BlackBerry Enterprise Server connects to another Microsoft Exchange Server. This thread pool system minimizes the number of MAPI sessions to the Microsoft Exchange Server, which provides added product stability.

## CDO

The BlackBerry Messaging Agent uses CDO sessions for wireless calendar activity. A CDO session is established for a user when a calendar-related request is made. If no activity occurs within five minutes, the session ends.

## BlackBerry Router

The BlackBerry Router acts as a gateway to the BlackBerry Infrastructure and user computers. It determines whether data should be transmitted wirelessly or routed through a network connection. When a BlackBerry device is connected to a computer, the BlackBerry Router routes data to the BlackBerry device and bypasses the wireless network.

## BlackBerry Controller

The BlackBerry Controller starts the BlackBerry Messaging Agents and monitors their health. If the BlackBerry Controller detects nonresponsive threads or if a BlackBerry Messaging Agent stops responding, the BlackBerry Controller restarts the BlackBerry Messaging Agent.

The BlackBerry Controller assigns BlackBerry user accounts to BlackBerry Messaging Agents based on the following criteria:

- Microsoft Exchange Server on which the user accounts reside (groups user accounts together or, if most user accounts reside on the same Microsoft Exchange Server, distributes the user accounts evenly)
- Amount of user accounts that currently reside on each BlackBerry Messaging Agent (up to 500 users)

The BlackBerry Controller also monitors all BlackBerry processes and restarts them if they are not in a running state.

### BlackBerry MDS Services

In BlackBerry Enterprise Server Version 4.1, RIM introduced a new component called the BlackBerry MDS Services. The BlackBerry MDS Services also require the BlackBerry MDS Connection Service to send data to BlackBerry devices.

The BlackBerry MDS Services are responsible for managing interactions and requests between BlackBerry devices and enterprise applications. The BlackBerry MDS Services include the following services:

- BlackBerry MDS Management Service: deals with policies, such as those that specify which applications users can download, the services available to applications, and so on
- BlackBerry MDS Provisioning Service: controls and manages which applications users can download to BlackBerry devices
- BlackBerry MDS Data Optimization Service: transforms data for efficient wireless transmission and use on BlackBerry devices
- BlackBerry MDS Connection Service: provides TCP/IP and HTTP-based connectivity between BlackBerry MDS Studio Java™ Applications and enterprise applications and between BlackBerry MDS Browser Applications and enterprise applications
- BlackBerry MDS Application Integration Service: supports the integration and transmission of data between BlackBerry MDS Studio on the BlackBerry device and web services applications
- BlackBerry MDS Studio Application Repository: manages published BlackBerry MDS Studio Applications centrally

The current version of this document includes benchmarking information for the BlackBerry MDS Connection Service. The document does not include benchmarking information for the BlackBerry MDS Services.

### BlackBerry MDS Connection Service

The BlackBerry MDS Connection Service enables push-based access to enterprise data and applications. Capitalizing on the BlackBerry Enterprise Server architecture, the BlackBerry MDS Connection Service provides a safe connection between the BlackBerry device and corporate application servers. Through this connection, users can access corporate data from enterprise applications. The data travels between the BlackBerry device and the BlackBerry Enterprise Server using the same path as the BlackBerry Collaboration Service, so no extra connections or firewall openings are required.

The BlackBerry MDS Connection Service also communicates with the BlackBerry Dispatcher. It permits persistent socket connections from the BlackBerry device to the corporate application server. You can configure the BlackBerry MDS Connection Service to run on a computer that is remote from the BlackBerry Enterprise Server computer.

### BlackBerry Attachment Service

The BlackBerry Attachment Service enables users to open and view message attachments on their BlackBerry devices. Attachment content is formatted and delivered to the BlackBerry device using the Universal Content Stream (UCS) format. When a user requests to view an attachment on the BlackBerry device, the BlackBerry Messaging Agent sends the request information to the BlackBerry Attachment Service, and the BlackBerry Attachment Service performs the conversion of the attachment content to UCS format. The BlackBerry Enterprise Server compresses and encrypts the attachment data and then sends the formatted attachment to the BlackBerry device.

The BlackBerry Attachment Service also enables users to view Microsoft PowerPoint® presentations in a slide format.

### BlackBerry Synchronization Service

The BlackBerry Synchronization Service synchronizes contacts, tasks, and memos between the email application on a user's computer and the user's BlackBerry device using Microsoft Exchange through the BlackBerry Messaging Agent. The BlackBerry Synchronization Service also synchronizes message settings and message filters. The wireless protocol also synchronizes a variety of database configurations, backs up databases on the BlackBerry device, and synchronizes items when necessary.

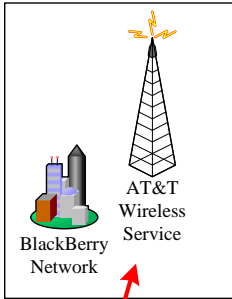
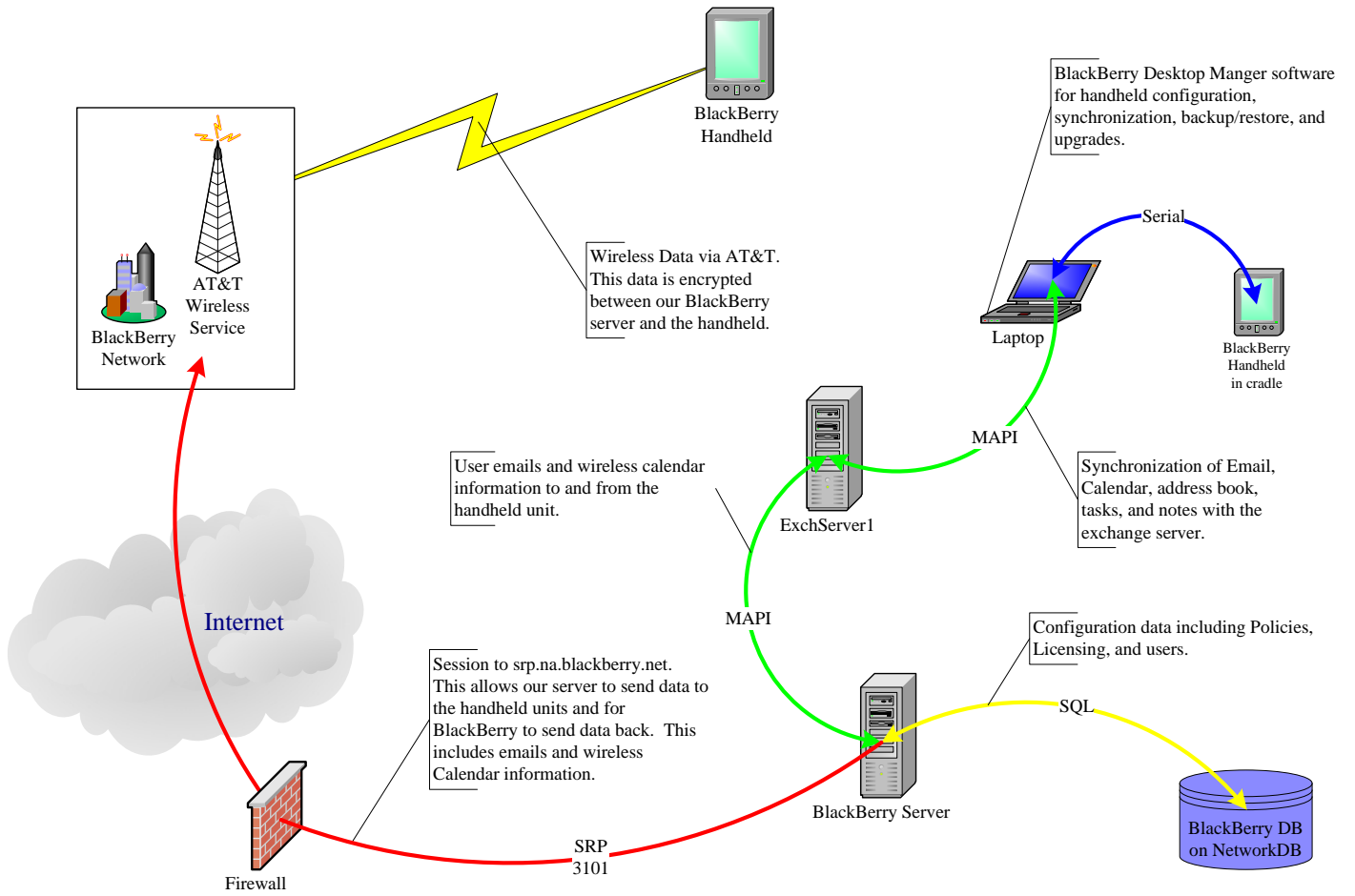
Initialization of the BlackBerry Synchronization Service is triggered when items on the BlackBerry device and the BlackBerry Configuration Database are not synchronized. This initialization can be triggered by activating a BlackBerry device wirelessly or moving user accounts. The initialization mechanism is also used to initially synchronize the BlackBerry device and message store, enabling wireless synchronization to occur. Because the initialization feature is not considered to maintain a steady state load on the BlackBerry Enterprise Server, its impact on the BlackBerry Enterprise Server performance is not included in this document. There are load conditions that the initialization places on the system that you should consider when initialization occurs.

### BlackBerry Policy Service

The BlackBerry Policy Service pushes IT policies and IT administrative commands to BlackBerry devices wirelessly. It is also responsible for creating and pushing service books to BlackBerry devices that are being activated wirelessly and for sending third-party applications to BlackBerry devices wirelessly. Because the BlackBerry Policy Service is not considered to maintain a steady state load on the BlackBerry Enterprise Server, its impact on the BlackBerry Enterprise Server performance is not included in this document.

### BlackBerry Collaboration Service

The BlackBerry Collaboration Service is designed to keep users in touch with their instant messaging community when they are connected to the wireless network. The BlackBerry Collaboration Service includes contact list management, presence awareness, notifications, and emoticons. It also supports the IBM® Lotus® Sametime®, Microsoft Live Communications Server 2005, and Novell® GroupWise® platforms. This document does not include benchmarking information for the BlackBerry Collaboration Service.



BlackBerry Desktop Manger software for handheld configuration, synchronization, backup/restore, and upgrades.

Wireless Data via AT&T. This data is encrypted between our BlackBerry server and the handheld.

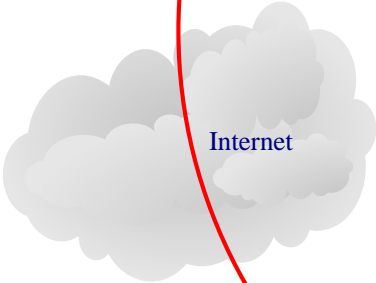


Synchronization of Email, Calendar, address book, tasks, and notes with the exchange server.

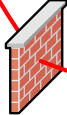


MAPI

Configuration data including Policies, Licensing, and users.



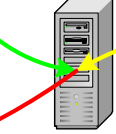
Internet



Firewall

Session to srp.na.blackberry.net. This allows our server to send data to the handheld units and for BlackBerry to send data back. This includes emails and wireless Calendar information.

SRP 3101



BlackBerry Server



BlackBerry DB on NetworkDB