Security Guide

BlackBerry Secure

Published: 2018-11-11
SWD-20181111144653659

Contents

Introduction: Security and privacy, deep and wide

BlackBerry has an extensive legacy of integrating security and privacy into all of its products. As the power and complexity of mobile devices has increased, BlackBerry's focus has remained on ensuring device integrity, and putting together the best security solution. BlackBerry focuses on building mobile devices that embed security into the hardware itself, creating secure, trusted end points for enterprise mobility.

BlackBerry Secure devices are professional and secure devices that run the Android™ OS. Just as BlackBerry has always built security into every layer of their products, the same renowned security features are brought to the Android OS with BlackBerry Secure. The result is a device that you can trust to give you better protection from threats against your apps, data, and networks.

This guide describes the privacy and security of BlackBerry Secure devices, including:

- The value of embedding security into the end points to create a hardware Root of Trust
- Layered defenses that have been added throughout the mobile device stack, including the hardware platform, firmware, mobile OS, and secure communications and collaboration apps
- Extra security of the Android OS
- The flexibility of various deployment models that allow you to secure devices regardless of who owns them, which network they're on, and which EMM solution you use

Download the PDF version of the security guide for BlackBerry powered by Android.

Device security: Layered defenses throughout the stack

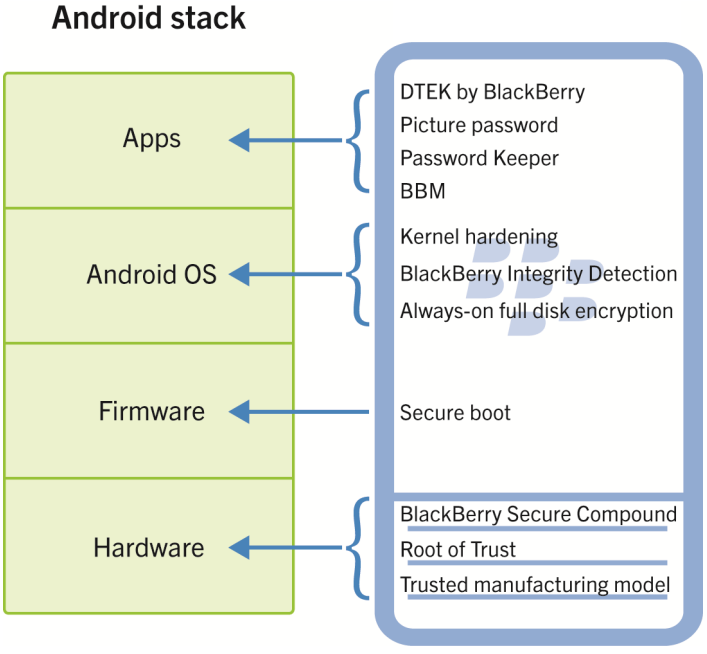
BlackBerry Secure devices are designed with security as a key feature. Security is built into every layer of the device, resulting in a layered defense approach that provides maximum protection against any attempts to attack the device and compromise your organization's information.

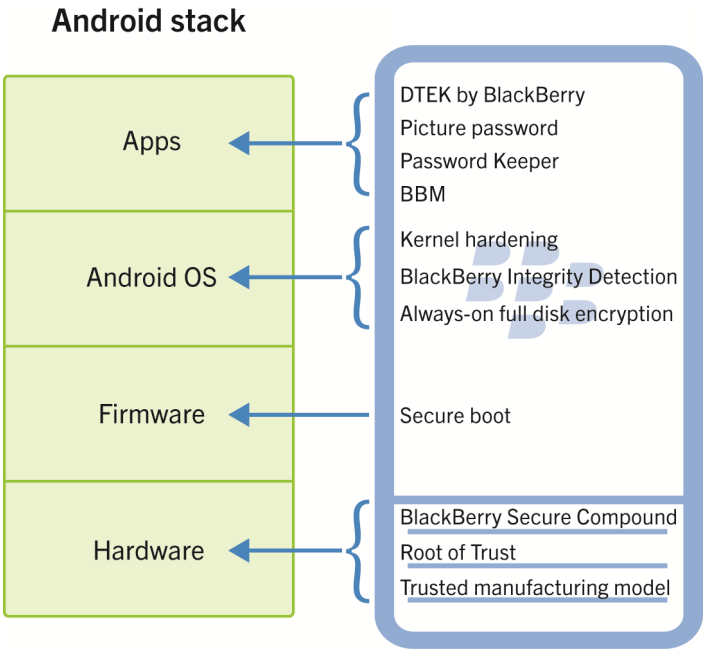
BlackBerry Secure devices ensure the integrity of the Android™ platform. Security starts with the device hardware and continues through every layer of the device. Vulnerability mitigations are incorporated into the device, to harden the platform against security compromises.

Various security measures are in place to protect device hardware and the Android OS, and to establish a Root of Trust. Encryption and authentication processes then use the Root of Trust to create encryption and signing keys that protect apps and data. This extensive security model helps keep your apps, data, and network safe from attacks.

Device architecture

BlackBerry leverages their extensive experience securing mobile platforms to harden all layers of the device stack.





From hardware right through to apps, BlackBerry Secure devices bring Android™ to a new level of security. Every area of the devices work together to protect the privacy, integrity, and confidentiality of your apps and data.

Hardware

You need to know that the mobile devices that connect to your organization's network are trustworthy and not counterfeit, spoofed, or compromised. Trustworthiness needs a solid foundation, which for computers or mobile devices ultimately means the hardware itself should be the foundation of trust.

Manufacturing model

BlackBerry Secure devices feature an end-to-end manufacturing model that is designed to securely connect the supply chain, manufacturing partners, networks, and devices.

During manufacturing, the device's hardware-based keys are used to track, verify, and provision each device as it goes through the manufacturing process.

BlackBerry Secure Integrated Manufacturing Service

The BlackBerry Secure Integrated Manufacturing Service (BSIMS) provides support for secure development and manufacturing. This allows for BlackBerry Secure devices to be manufactured by device manufacturing partners around the world.

BlackBerry Secure Identity Services

BlackBerry Secure Identity Services (BSIS) can help ensure the device hardware is genuine. Early in the manufacturing process, the device is provisioned with a BSIS key, both on the device and in BlackBerry's infrastructure, so each device can be validated by the infrastructure.

BSIS is designed to assert that the underlying hardware of a BlackBerry Secure device is genuine – an assertion that provides added confidence in the security and privacy of the device.

Root of Trust

A hardware-based Root of Trust is established during manufacturing by injecting cryptographic material that's later used for device authentication and secure boot.

Firmware

Various security measures in the firmware are designed to validate and ensure the integrity of the software running on BlackBerry Secure devices.

Secure boot

The secure boot process ensures that only a BlackBerry signed OS can be loaded and that the OS hasn't been tampered with. Each stage of the secure boot process verifies that the next component hasn't been tampered with before loading it.

Verifying the boot loader

The bootchain on BlackBerry Secure devices is validated in multiple stages.

Stage	Description
Primary boot loader	The primary boot loader is part of the CPU and is write-protected. It validates the BlackBerry security shim using a key that's provisioned during manufacturing (using RSA-2048 with SHA-256). BlackBerry Secure lock the boot media and the primary boot loader to load only the BlackBerry security shim.

Stage	Description
BlackBerry security shim	The BlackBerry security shim resides between the primary and secondary boot loaders. It verifies the cryptographic signature on the secondary boot loader (using ECC-521 and SHA-512) and enforces downgrade prevention. It's located in the primary boot partition of the eMMC and is write-protected.
Secondary boot loader	The secondary boot loader is a vendor-supplied component that consists of a hardware device image residing in the CPU internal memory. The secondary boot loader is loaded into the CPU internal memory locations and executes from there. The secondary boot loader validates the tertiary boot loader and BlackBerry Secure Compound using RSA-2048 with SHA-256. There are two signed copies of the secondary boot loader image: • A main image is stored in the user partition and is used during the normal boot process; it's not write-protected and can be updated. • A backup image is stored in the boot partition and is write-protected.
Tertiary boot loader	The tertiary boot loader runs from external DDR instead of internal RAM, so it's not memory-constrained like the other images. It calls and validates the boot image (ECC-521 and SHA-256). There are two copies of the tertiary boot loader image: • A main image is stored in the user partition and can be upgraded as part of the standard update process. • A backup image is stored in the boot partition and is write-protected.
Boot image	The boot image is the actual system kernel, located in the user partition of eMMC, on the boot partition. Before the boot image mounts the dm-verity protected read-only file system, it's validated with the dm-verity key (RSA-2048 using SHA-256). It then starts the Android OS. For more information about dm-verity, see https://source.android.com/devices/tech/security/verifiedboot/index.html

Downgrade prevention

Downgrade prevention stops a user from loading an old OS version after a device is upgraded. This protects against situations such as a user loading an OS version that doesn't have the latest security fixes or a malicious user exploiting a vulnerability that exists in an older OS version.

BlackBerry Integrity Detection

BlackBerry Integrity Detection continuously monitors BlackBerry Secure for events or configuration changes that could indicate a compromise to security. This includes validating that unauthorized apps haven't acquired escalated privileges (for example, rooting), performing checks on the integrity of the kernel, monitoring file system mounting permissions, unauthorized changes to the SELinux policy, and the disabling of security sensitive applications such as pathtrust. EMM and other third-party monitoring solutions can integrate with BlackBerry Integrity Detection to request integrity reports to monitor for device compromises.

DTEK by BlackBerry integrates with BlackBerry Integrity Detection for the operating system integrity sensor.

If your devices are managed by an EMM solution that's integrated with BlackBerry Integrity Detection (such as BlackBerry UEM), an administrator can configure remediation action if a potential compromise is detected, such as generating an alert, quarantining the device from accessing work resources, or wiping the device.

The BlackBerry Integrity Detection architecture leverages a trusted application running in the BlackBerry Secure Compound to provide a trusted anchor to ensure the integrity of the solution and generate signed integrity reports. Integrity sensors are deployed as both a kernel module and Java application.

The integrity reports are digitally signed by the trusted application with ECC-256 and backed by a certificate that chains up to a BlackBerry CA so that EMM solutions and monitoring apps that aren't developed by BlackBerry can verify their authenticity. The private key is protected by BlackBerry Secure Compound.

The Android OS

While the Android OS includes a number of built-in security features, BlackBerry Secure devices are designed to increase the security resilience of the Android OS.

Kernel hardening

BlackBerry Secure devices run a Linux kernel that's been hardened with patches and configuration changes to decrease the likelihood of a compromise due to a security vulnerability.

The kernel was modified to remove unneeded functionality, reducing the attack surface. Unused kernel configuration parameters were made read-only to user space processes, forcing a known-good configuration. Additional hardening is provided by the integration of several kernel patches. This hardening results in a kernel that's more restrictive than other Android devices, increasing resilience against unknown vulnerabilities.

Additional custom security verification is embedded in the kernel which restricts both privileged loading and execution of any content that's not integrity-verified.

As part of our hardening process, we reviewed public root exploits against other Android devices in an effort to identify and create generic approaches to mitigate against future attacks.

Enhanced memory protection

BlackBerry Secure devices support the native address space layout randomization offered in the Android OS to prevent the exploitation of device memory corruption.

By default, the memory positions of all areas of a program are randomly arranged in the address space of a process. Address space layout randomization is a technique that randomizes the location of system components in memory. This makes it more difficult for an attacker to know where a vulnerability exists, perform an attack that involves predicting target addresses to execute arbitrary code, and essentially exploit a device and run their own code.

We reinforced address space layout randomization by randomizing all executable memory segments and using different and varying memory layout for system and non-system applications.

BlackBerry Secure Compound

BlackBerry Secure Compound provides a trusted environment for the secure boot process, for the storage of sensitive data like keys and the device password, and for the execution of trusted apps like BlackBerry Integrity Detection.

Data encryption

Depending on the device, Android devices encrypt user data using Android full-disk encryption or Android file-based encryption. On BlackBerry Secure devices, encryption is turned on automatically and can't be turned off.

To make encryption more secure, a user can set a new device password and select the option to require their password to start the device. This generates a new key encryption key (or KEK, which is used to protect the device encryption key) based on the user's password, making it virtually impossible for anyone to decrypt the data on the device without knowing the user's password. Changing the password and creating a new KEK doesn't require the device's data to be re-encrypted, so there's no lengthy wait—only the KEK is updated.

If a user forgets their device password, they can't access any of their data. They must reset the device, deleting all of their data in the process. (For more information, see Data wipe.)

Depending on the device, BlackBerry enhances the security of Android encryption by using a FIPS 140-2 compliant or a FIPS 140-2 validated Certicom/BlackBerry Cryptographic Kernel, encrypting user data using AES-128 (AES-CBC-ESSIV:SHA-256), and protecting the key within BlackBerry Secure Compound.

Data protection

Passwords

Passwords protect access to your users' information and your organization's information stored on the device.

BlackBerry Secure devices add the following security features to the Android OS to enhance protection of the information stored on the device:

Item	Description
BlackBerry Secure Compound	BlackBerry Secure Compound handles secure password generation and protection on the device. The passwords are derived using PBKDF2 as the key derivation function with HMAC-SHA-512 and stored in NVRAM on the device. The data related to the password, such as the salt and the number of iterations, is also stored in NVRAM. This approach is designed to make it harder to access the password hash to then perform a brute force attack on the HMAC.
Wipe all user data after 10 incorrect password attempts	If the device is password-protected, a user has 10 attempts to enter the correct password. After the tenth incorrect attempt, the device deletes all user information and app data, and

Item	Description
	returns the device to factory default settings. If another user profile owner types their profile password incorrectly more than 10 times, their user profile is removed from the device. If the device is managed by an EMM solution, the EMM solution might determine how many incorrect password attempts a user can make before the device is wiped. The EMM administrator can also turn this feature off, so the device is not wiped after 10 incorrect password attempts. If another user profile owner types their profile password incorrectly more times than the EMM solution allows, their user profile is removed from the device.

If your devices are managed by an EMM solution, you can enforce password protection and control password requirements, such as complexity and length, to ensure that a device meets the requirements of your organization. An EMM administrator can also require a user to use a separate password to access work apps and data, and provide management options for a lost device, including the ability to lock it remotely. You can do this, for example, if a device is lost or if a user forgets their password.

Picture password

Note: Not all BlackBerry Secure devices support picture password. To find out if picture password is supported on a specific device, check the device's help at http://help.blackberry.com/detectLang/category/devices/#android-devices.

In addition to a numeric or alphanumeric password, users can set a picture password as a convenient secondary way to unlock their device. The user chooses a picture, a number, and a location in the picture. To unlock their device, the user drags a grid of randomly arranged numbers until an example of their chosen number aligns with their secret location in the picture.

To use a picture password, a user must first set a numeric or alphanumeric password as their primary password. If they get their picture password wrong five times, they must enter their primary password to unlock their device. If the user turned on secure start-up when they set their password, they must use their primary password when restarting their device. A picture password can only be used to unlock the device after it has booted.

A picture password helps prevent an attacker from breaking into a device using methods including the following:

Method	Description
Using smudges on the device screen	A picture password always shows a random number grid whenever a user unlocks their device, which means a user never follows the same pattern. Because a user always moves their number from a different location on the grid, an attacker won't see a smudge pattern.
Looking over a user's shoulder	When a user enters a simple password, an attacker can watch over their shoulder to see what they type. A picture password prevents this situation from occurring by drawing a random number grid and varying the size of the grid. For example, in addition to a random number grid, the grid size also randomly changes, increasing and decreasing the number of rows and columns to reduce the shoulder-attack vulnerability.
Brute force attack	A picture password addresses brute force attacks by limiting the number of guesses, varying the size, location, and pattern of the grid numbers, and requiring minimum movement of the number grid.

Media card protection

BlackBerry Secure devices protect data by controlling access to media cards. Media card access depends on the management option of the device:

Management option	Description
Unmanaged	If a device has multiple user profiles configured, only the primary user profile can use the device's media card.
Android for Work: Profile Owner mode	The user has read-only access to the media card when using apps in the work profile. Outside the work profile, the user has read/write access to the media card.
Android for Work: Device Owner mode	Because only one user profile is allowed with this type of management option, the device user has full access to the media card.

Data wipe

To protect your organization's data and user information, a user can delete their device data, including data on the media card.

If your devices are managed by an EMM solution, an administrator can control when a device must wipe its data.

BlackBerry Secure devices perform a full device wipe or work data wipe as follows:

- If the device is password-protected and the device owner types the device password incorrectly more times than an EMM solution or the device settings allow, the device deletes all user information and app data, and returns the device to factory default settings.
- If a secondary profile or guest profile user types their profile password incorrectly more times than an EMM solution or the device settings allow, the profile is removed from the device.
- If a user performs a factory reset on their device, the device permanently deletes all data so that it can't be recovered.
- If a user has a remote device management app, such as Android Device Manager, set up on their device, they may be able to perform a remote device wipe.

When a device wipe occurs, all data on the device and media card is permanently deleted, including email accounts, downloaded apps, media files, documents, browser bookmarks, and settings.

If a user adds any Google™ accounts to their device, they need to enter the username and password for one of these accounts before the device can be set up again, unless they wipe the device via **Settings** > **Backup & reset** > **Factory data reset**. A factory reset automatically removes all Google™ accounts.

For more information about user options for data wipe, see the user guides for BlackBerry Secure devices at http://help.blackberry.com/detectLang/category/devices/#android-devices.

Apps

BlackBerry Secure devices include a number of apps that are deeply integrated into the software and firmware of the device, to help users maintain control and protection of their information. These apps provide users a layer of insight into what is happening on the device, to help prevent other apps and services from accessing data or other information without the user's knowledge. These apps include the following:

- DTEK by BlackBerry, which assess device security by helping a user monitor, track, and control the level of security on their device from an easy-to-use app.
- BlackBerry Password Keeper, to securely store a user's security-related information, such as passwords, usernames, and security questions, in one password-protected app
- BlackBerry Privacy Shade, to help hide the contents of your screen from people around you.
- Remote device management apps to protect a lost or stolen device

DTEK by BlackBerry

DTEK by BlackBerry helps a user monitor and control the level of security on their device, by performing the following functions:

- Evaluates how or if a user has set up security features on their device, including screen lock, factory reset protection, remote device management, and trusted app sources.
- Assigns an overall security rating to the device along with a rating for each of the security features that it monitors. If a security feature receives a poor or good rating, DTEK recommends how the user can improve their security settings to achieve a better rating. A user can improve the overall security rating for their device by adjusting the settings of individual security features on their device.
- Monitors third-party apps that a user downloads onto their device or that their service provider pushes to the device. It doesn't monitor preloaded apps. It also doesn't monitor apps that an administrator might push to the device if the device is managed by an EMM solution.
- Lets a user see what third-party apps do on the device, such as use the camera, access contacts or the device's location, or send a text message from the device. Some apps must access these features to work correctly. Other apps might access features on the device without the user's knowledge.
- Allows a user to view the details of when an app used a device feature to access their data. A user can also set up notifications to monitor future access, view the runtime permissions the app has requested, stop the app from running, or uninstall the app from the device.
- Allows a user to set sensitive permissions, and for users to be notified when these sensitive permissions are accessed. This helps prevent device features such as the camera or microphone from being turned on by an app without the user's knowledge.

For more information about DTEK, see http://help.blackberry.com/detectLang/dtek-by-blackberry/.

BlackBerry Password Keeper

A user can use BlackBerry Password Keeper to store all passwords, usernames, and security questions in one place. Password Keeper protects the passwords with a master password, and a user is required to remember only the master password. In Password Keeper, a user can perform the following actions:

- Type a password and its identifying information (for example, which app or service the password is for), and save the information
- Generate secure random passwords that contain numbers, letters, and symbols and improve password strength
- Copy passwords and paste them into an app or a password prompt for a website
- Create backup files by exporting Password Keeper records into an encrypted (PKB2) or non-encrypted (CSV) file and securely store them where they want, for total control
- Back up and restore all password records using Google Drive.
- View a password strength meter when choosing their master password or entering new passwords to store, based on a proprietary algorithm that also considers commonly used passwords

The first time that a user opens Password Keeper on their device, they must create a master password for the app. When they sign into Password Keeper after the initial setup, they have 10 attempts to enter the correct master password. After the tenth incorrect attempt, Password Keeper wipes all stored password information from the device. Limiting incorrect master password attempts to 10 not only stops an attacker from having too many chances to guess a user's password, but also protects Password Keeper data from brute-force attacks while it's stored on the device. Password Keeper also offers extra protection for a user's sensitive data by not allowing screen shots when Password Keeper is open.

Password Keeper randomly generates a master key to lock and unlock Password Keeper data using AES-256 encryption. It also randomly generates a separate key to verify the encrypted data's integrity, ensuring that the data remains uncorrupted. The master password that the user sets for the app is used to generate a key that encrypts the master key, which means that Password Keeper data can't be decrypted without the master password.

BlackBerry Privacy Shade

BlackBerry Privacy Shade helps keep your sensitive data hidden from the people around you. When you turn on BlackBerry Privacy Shade, it blocks out everything on your screen except for a small view area that you control, while still letting you interact with the full screen. You can also adjust the size and shape of the view area, as well as the transparency of the shade that covers the rest of the screen.

With Redactor mode, you can quickly and easily block out portions of your screen, before taking a screen shot and sharing it seamlessly. Redactor mode helps you be more productive, without sacrificing privacy.

For more information about BlackBerry Privacy Shade, see http://help.blackberry.com/detectLang/privacy-shade/.

Remote device management apps

BlackBerry Secure support remote device management apps, such as Android Device Manager, that allow a user to safeguard their device and data in situations where the device is lost or stolen. A remote device management app typically provides a user with several options to locate their device. If the user can't locate their device, stronger steps can keep the data safe from an unauthorized user.

To locate a lost device, remote device management apps may allow a user to:

- View the current location of the device on a map
- Make the device ring, even if it's in silent mode
- Display a phone number or custom message on the locked device to provide contact instructions

To protect a stolen device, remote device management apps may allow a user to:

- Remotely lock it

- Change the password
- Delete all of the data on the device

If the device is managed by an EMM solution, an administrator may also be able to perform these tasks.

Protection of data in transit

Because many of your employees work outside the office, any mobile solution you use must protect data in transit across your entire network.

Wi-Fi connections

BlackBerry Secure devices support multiple encryption and authentication methods for Wi-Fi, including:

- WEP encryption (64-bit and 128-bit)
- IEEE 802.1X standard and EAP authentication using EAP-FAST, EAP-TTLS, and PEAP
- TKIP and AES-CCMP encryption for WPA-Personal, WPA2-Personal, WPA-Enterprise, and WPA2-Enterprise

The device stores the encryption keys and passwords in an encrypted form. To connect to a Wi-Fi network, the device first authenticates and then sends data in an encrypted form using the authenticated connection.

If your devices are managed by an EMM solution, an administrator may be able to send sensitive Wi-Fi information, such as encryption keys, passwords, security settings, and any required certificates, to a device so that it can connect to your Wi-Fi network.

Wi-Fi authentication

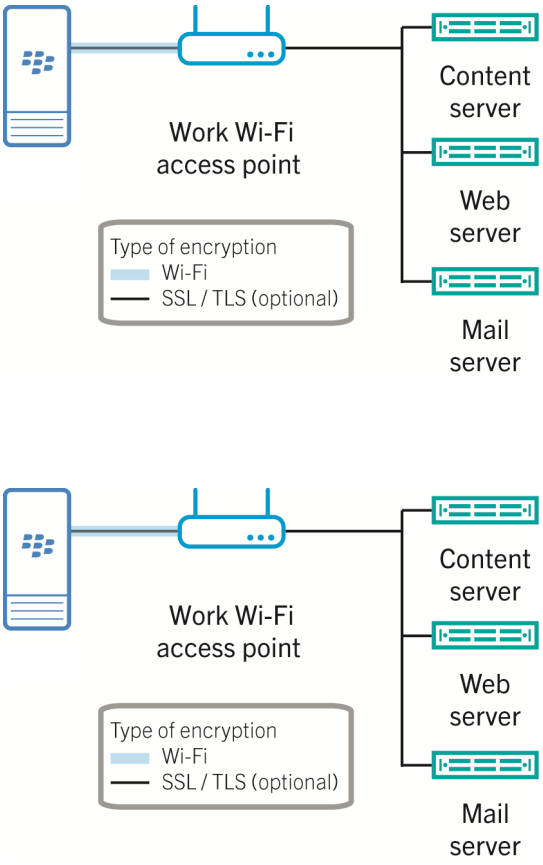
When BlackBerry Secure devices authenticate with the network, they use a dual-layered connection, which gives the credentials an extra layer of protection. The outer authentication method of EAP protects the connection tunnel. Device credentials are sent within the tunnel and protected with the inner authentication method. When a device uses EAP authentication with a username and password, we recommend that a valid server certificate be configured so that the device can validate the Wi-Fi network that it's connecting to.

When the device opens a Wi-Fi connection using WPA-Enterprise or WPA2-Enterprise security, it can use the following authentication methods:

Cryptographic protocol	Encryption	Outer EAP method	Inner EAP method
WPA2	TKIP, AES-CCMP	PEAP, EAP-TTLS, EAP-FAST, EAP-TLS, EAP-AKA, EAP-SIM	MS-CHAPv2, EAP-GTC, PAP

Wi-Fi encryption

BlackBerry Secure devices connect to your organization's resources through a Wi-Fi connection that an administrator sets up. SSL / TLS encryption is used if the wireless access point was set up to use it.



Wi-Fi network management

If your devices are managed by an EMM solution, an administrator may be able to deploy and manage specific Wi-Fi networks for use at work. The work Wi-Fi network configuration can't be changed by the user, and the administrator can choose whether or not personal apps can use the work Wi-Fi network.

Users also see an indicator icon on work Wi-Fi networks, so they're aware if they're connected to a work Wi-Fi network.

VPN

BlackBerry Secure devices support a number of native and third-party VPN solutions to provide secure connectivity to your organization's network from the outside:

- PPTP with user authentication by password

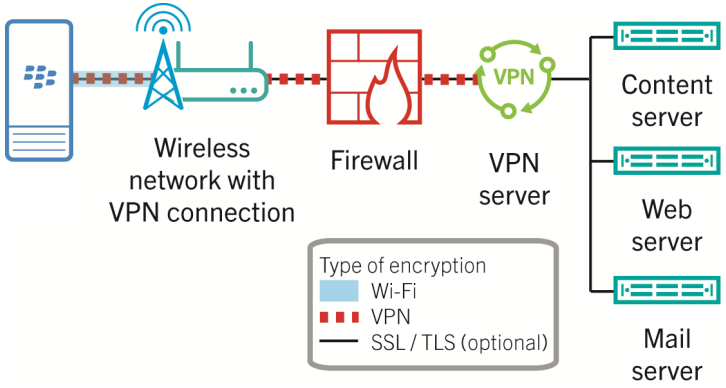
- L2TP/IPSec with user authentication by password and device authentication by shared secret or RSA certificate
- IPSec with user authentication by password and device authentication by shared secret or RSA certificate
- BlackBerry Secure Connect Plus (when managed by BlackBerry UEM)
- VPN clients installed through Google Play™ or Google Play for Work from suppliers such as Checkpoint, Cisco, Fortinet, Juniper, OpenVPN, and Palo Alto Networks

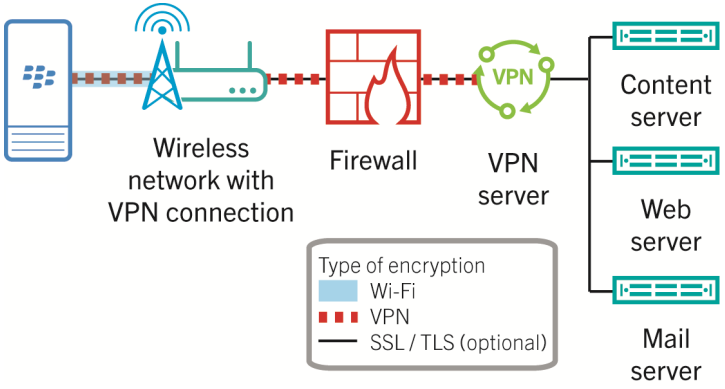
BlackBerry Secure devices support per-user VPN on multiuser devices. VPNs are applied to each user to allow a user to route all network traffic through a VPN without affecting other users on the device. On an Android for Work device, an administrator can configure the device to route all work profile network traffic through a VPN without affecting other users on the device.

BlackBerry Secure devices also support always-on VPN so that apps can't access the network until a VPN connection is established. This prevents apps from sending data across other networks.

VPN encryption

The following diagram shows how data is encrypted when a device uses a VPN.





Certificates

A certificate is a digital document that binds the identity and public key of a certificate subject. Each certificate has a corresponding private key that's stored separately. A CA signs the certificate to verify that it can be trusted.

BlackBerry Secure devices can use certificates to:

- Authenticate using SSL/TLS when it connects to webpages that use HTTPS
- Authenticate with a work mail server
- Authenticate with a work Wi-Fi network and, for devices that support it, VPN
- Encrypt and sign email messages using S/MIME protection

Private keys are protected by BlackBerry Secure Compound. A user can import certificates into the device's certificate store from various locations, including a computer, an email, or a smart card.

Depending on the EMM solution, certificates can be provided to a device in several ways. An administrator might need to distribute certificates to a device if the device uses certificate-based authentication to connect to a network or server in your organization, or if your organization uses S/MIME.

S/MIME

BlackBerry Secure devices support S/MIME in the BlackBerry Hub. S/MIME adds another level of security to email messages by allowing a user to digitally sign and encrypt email messages that they send from their device:

- Digital signatures: Digital signatures help a recipient verify the authenticity and integrity of messages that a user sends. When a user digitally signs a message with their private key, the recipient uses the sender's public key to verify that the message is from the sender and that the message hasn't changed.
- Encryption: Encryption helps to keep messages confidential. When a user encrypts a message, the device uses the recipient's public key to encrypt the message. The recipient uses their private key to decrypt the message.

A user can use S/MIME to sign, encrypt, or sign and encrypt messages that they send from their device using a work email account that supports S/MIME.

BlackBerry Secure devices support keys and certificates in the PEM (.pem, .cer), DER (.der, .cer), and PFX (.pfx, .p12) file formats (and file name extensions).

A user must store their private key and a certificate for each recipient that they want to send an encrypted email message to on their device. If a user's private key isn't stored on their device, the device can't read S/MIME-encrypted messages.

Users can manage certificates and configure S/MIME preferences on devices, including options for:

- Choosing certificates
- Choosing encoding methods
- Sending opaque-signed messages (only email apps that support encryption can open)
- Viewing, sending, and forwarding attachments in S/MIME-protected email messages

If your devices are managed by an EMM solution, you may be able to control S/MIME options on devices. For example, an administrator may be able to specify whether a device can send S/MIME-protected email messages. Depending on the EMM solution, an administrator can also choose to use an Online Certificate Status Protocol (OCSP) server or a Certificate Revocation List (CRL) server to check the status of S/MIME certificates.

S/MIME certificates and S/MIME private keys

BlackBerry Secure devices can use public key cryptography with S/MIME certificates and S/MIME private keys to encrypt and decrypt email messages in the BlackBerry Hub.

Item	Description
S/MIME public key	When a user sends an email message from a device, the device uses the S/MIME public key of the recipient to encrypt the message. When a user receives a signed email message on a device, the device uses the S/MIME public key of the sender to verify the message signature.
S/MIME private key	When a user sends a signed email message from a device, the device hashes the message using SHA-1 or SHA-2. The device then uses the S/MIME private key of the user to digitally sign the message hash. When a user receives an encrypted email message on a device, the device uses the private key of the user to decrypt the message. The private key is stored on the device.

Data flow: Sending an email message using S/MIME encryption

1. A user sends an email message from their device. The device performs the following actions:
   a. Checks the device keystore for the recipient's S/MIME certificate.
   b. Encrypts the email message with the recipient's public key.
   c. Sends the encrypted message to the mail server.
2. The mail server sends the S/MIME-encrypted message to the recipient.
3. The recipient's device decrypts the message using the recipient's private key.

Bluetooth technology

Bluetooth technology allows a user to create a direct connection between their smartphone and another device. Although files can be transferred over a Bluetooth connection, because of its ability to stream content, Bluetooth connections are more commonly used for actions such as playing the music on a device through a separate speaker or making calls from a headset that uses the device's mobile network connection.

A user must request a pairing with another Bluetooth device. Depending on the remote Bluetooth device, a user may also need to enter a passkey to complete the pairing. A device prompts the user each time a new device tries to set up a Bluetooth connection to their device. Device settings allow a user to decide what to allow Bluetooth devices to have access to on their device, such as contacts and messages.

BlackBerry Secure devices enforce Security Mode 2 and Mode 4 (Level 2) and support the following Bluetooth profiles:

- Hands-Free Profile 1.6
- Advanced Audio Distribution Profile 1.2
- Audio/Video Remote Control Profile 1.3
- Message Access Profile 1.1 (SMS & Email)
- Personal Area Networking Profile 1.0
- Multi Profile 1.0
- Human Interface Device Profile 1.0
- Device ID Profile 1.3
- Remote SIM Access Profile 1.0
- Object Push Profile 1.2
- Phone Book Access Profile 1.1
- BLE - GATT Profile
- BLE – HID over GATT Profile

If your devices are managed by an EMM solution, check the documentation for the EMM solution to see which Bluetooth controls it supports.

NFC

NFC is a short-range wireless technology that can be used for quickly creating connections between a smartphone and another NFC-enabled device or NFC tag. With NFC, a user doesn't need to enter pairing information to make a connection, so it's useful for on-the-go actions such as transferring contact cards with other people, or getting information from a poster that contains an NFC tag. Depending on wireless service providers and the apps that are installed on a device, NFC can also be used to turn a device into a digital wallet and allow a user to do things, such as make payments, with their device.

If your devices are managed by an EMM solution, you may be able to control what devices can do with NFC. For example, you may be able to control whether a device can use NFC.

Platform security: End-to-end defenses

In addition to many device security features, BlackBerry Secure devices also offer support for various EMM deployment models, data in transit protection, and plug-ins that help provide end-to-end security for devices and your organization's resources.

Secure device management

BlackBerry Secure devices support a number of options for enterprise management. Building on the hardware and platform security features provided by the device, the following management options are available:

Management option	Description
MDM controls	A device can be managed using native Android IT administration commands and IT policy rules, or the administrative controls provided by BlackBerry specifically for BlackBerry Secure devices. A separate work space isn't installed on the device and there's no added security for work data. During activation, a user must grant device administrator permissions to install the app. As part of this activation, it's possible that a VPN app (or equivalent) will be installed to manage secure network communication between the device and your organization's network. This is required to allow secure connectivity for email, calendar, contacts, and any additional apps that maybe pushed by the administrator.
Container	A device has an encrypted container that includes a separate file system for work apps and data. A user accesses the container through a container app and the container is typically protected by a password. The container separates work apps and data from personal apps and data and prevents any data leakage from the container to the personal space, unless explicitly enabled by an administrator. For example, for some containers, your organization can specify that a user can access personal contact information from inside the container. An EMM solution that supports Android devices and provides a container solution is required.
Android for Work: Profile Owner mode	A device has a work profile that's isolated on the device. An administrator can manage the work profile and your organization's policies apply only to the work profile. When a device is activated to use this Android for Work option, the activation process creates a work profile on the device. Work apps and data are isolated in the work profile. The work profile includes the following apps:

Management option	Description
	• A device policy controller app that connects to the EMM server to receive management commands for the work profile • Email and organizer apps that you select for installation in the work profile • Google Play for Work where a user can download and install work apps that an administrator has approved • Work apps that you specify can run in the work profile. If a device has the same app installed outside the work profile, each instance of the app is kept separate from the other and operates under the rules and restrictions that apply inside or outside the work profile. • A VPN app that you select for installation and configuration in the work profile An EMM solution that supports Android for Work is required.
Android for Work: Device Owner mode	A device has a single profile that an administrator controls. An administrator can manage the entire device and your organization's policies apply to the entire device. When a device is activated to use this Android for Work option, the device policy controller app has full control of the device. Work apps and data are isolated in the work profile. The following apps are added to a device: • Device policy controller app that connects to the EMM server to receive management commands • Email and organizer apps that you select for installation on the device • Google Play for Work, where a user can download and install work apps that you've approved • Work apps that you permit a device to use • VPN app that you select for installation and configuration on the device An EMM solution that supports Android for Work is required.

World-class product security

BlackBerry Product Security begins with our front-line responders. BlackBerry's Security Incident Response Team (BBSIRT) is the industry's gold standard in security incident response, ensuring that public and private reports of vulnerabilities are rapidly received, triaged, analyzed, and mitigated in order to protect your organization. An essential part of the daily work of BBSIRT includes collaborating with customers, partners, vendors, governments, academics, and the security research community, with a triage team monitoring the Android threat landscape 365 days a year from several top private and industry sources. This ongoing resource engagement helps BlackBerry deliver a unique level of security that customers depend on, by building collaborative relationships across the industry, responding rapidly to emerging incidents, and providing the guidance and tools customers need to protect their systems and devices.

The Security Research Group (SRG) within BlackBerry Product Security provides groundbreaking insights into both the hardware and software security we're developing and the malware and hacking tools constantly coming to light in the field. A global team of ethical hackers, their mandate is to ensure and extend the security of BlackBerry products and remove security-specific barriers to success related to product security. SRG identifies security issues in the BlackBerry product portfolio and works closely with development teams to get issues resolved. They also actively conduct research into advanced security threats to BlackBerry products and recommend defensive technologies.

Security patching

BlackBerry's security patching approach includes security maintenance releases and hotfixes.

Security maintenance releases

Each month, Google™ releases a security bulletin containing a list of recently discovered Android vulnerabilities to BlackBerry and other Android OEMs. BlackBerry will release these security maintenance releases (SMRs) to users that have purchased devices through shopblackberry.com and to resellers (carriers and other authorized dealers) that have agreed to participate in our regular SMR program and deliver our SMRs OTA to their subscribers.

Hotfixes

Some critical Android vulnerabilities, for example, one that can be easily and remotely exploited with a publicly disclosed method to execute “root” privileged malware, simply can’t wait for a monthly SMR cycle. Depending on the severity of the problem, complexity of the fix, and timing relative to the SMR cycle, BlackBerry will opt to perform a hotfix, where the code to address only the specific critical problem is pushed to customers. Because a hotfix is typically limited in scope, the balance between a longer testing and approval process and the risk from the critical flaw makes this approach an important addition to helping keep users safe and secure. BlackBerry works with our partners on the approval and delivery of hotfixes.

Glossary

AES

Advanced Encryption Standard

AES-CCMP

Advanced Encryption Standard Counter Mode CBCMAC Protocol

BBSIRT

BlackBerry Security Incident Response Team

BLE

Bluetooth Low Energy

CA

certification authority

CBC

cipher block chaining

DDR

double data rate

DMZ

A demilitarized zone (DMZ) is a neutral subnetwork outside of an organization's firewall. It exists between the trusted LAN of the organization and the untrusted external wireless network and public Internet.

EAP

Extensible Authentication Protocol

EAP-AKA

Extensible Authentication Protocol Authentication and Key Agreement

EAP-GTC

Extensible Authentication Protocol Generic Token Card

ECC

Elliptic Curve Cryptography

EMM

Enterprise Mobility Management

eMMC

embedded MultiMediaCard

ESSIV

encrypted salt-sector initialization vector

FAST

Flexible Authentication via Secure Tunneling

FIPS

Federal Information Processing Standards

GATT

General Attribute Profile

HID

Human Interface Device

HMAC

keyed-hash message authentication code

HTTPS

Hypertext Transfer Protocol over Secure Sockets Layer

IEEE

Institute of Electrical and Electronics Engineers

IP

Internet Protocol

MAC

message authentication code

MDM

mobile device management

MS-CHAP

Microsoft Challenge Handshake Authentication Protocol

NFC

Near Field Communication

NVRAM

nonvolatile random access memory

OEM

original equipment manufacturer

OTA

over the air

PAP

Password Authentication Protocol

PBKDF2

password-based key derivation function 2

PEAP

Protected Extensible Authentication Protocol

PIN

personal identification number

PKI

Public Key Infrastructure

S/MIME

Secure Multipurpose Internet Mail Extensions

SaaS

Software as a Service

SHA

Secure Hash Algorithm

SIM

Subscriber Identity Module

SMR

Security Maintenance Release

SMS

Short Message Service

SRG

Security Research Group

SSL

Secure Sockets Layer

TCP

Transmission Control Protocol

TKIP

Temporal Key Integrity Protocol

TLS

Transport Layer Security

TTLS

Tunneled Transport Layer Security

URI

Uniform Resource Identifier

WEP

Wired Equivalent Privacy

WPA

Wi-Fi Protected Access

UDP

User Datagram Protocol

UEM

Unified Endpoint Manager

Legal notice

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 BLACKBERRY 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 BLACKBERRY PRODUCTS OR SERVICES, DOWNTIME COSTS, LOSS OF THE USE OF BLACKBERRY 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 BLACKBERRY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW IN YOUR JURISDICTION, BLACKBERRY 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 BLACKBERRY AND ITS AFFILIATED COMPANIES, THEIR SUCCESSORS, ASSIGNS, AGENTS, SUPPLIERS (INCLUDING AIRTIME SERVICE PROVIDERS), AUTHORIZED BLACKBERRY 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 BLACKBERRY OR ANY AFFILIATES OF BLACKBERRY 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 BlackBerry'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 BlackBerry'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 BlackBerry and BlackBerry 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 BlackBerry.

The terms of use of any BlackBerry product or service are set out in a separate license or other agreement with BlackBerry applicable thereto. NOTHING IN THIS DOCUMENTATION IS INTENDED TO SUPERSEDE ANY EXPRESS WRITTEN AGREEMENTS OR WARRANTIES PROVIDED BY BLACKBERRY FOR PORTIONS OF ANY BLACKBERRY PRODUCT OR SERVICE OTHER THAN THIS DOCUMENTATION.

BlackBerry Enterprise Software incorporates certain third-party software. The license and copyright information associated with this software is available at http://worldwide.blackberry.com/legal/thirdpartysoftware.jsp.

BlackBerry Limited
2200 University Avenue East
Waterloo, Ontario
Canada N2K 0A7

BlackBerry UK Limited
200 Bath Road
Slough, Berkshire SL1 3XE
United Kingdom

Published in Canada