



# BeyondTrust

## **Privileged Remote Access Security in Cloud Whitepaper**

## Table of Contents

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<b>Security in BeyondTrust Privileged Remote Access (Cloud)</b> .....	<b>3</b>
BeyondTrust Overview .....	3
<b>Architecture of BeyondTrust Privileged Remote Access (Cloud)</b> .....	<b>4</b>
Infrastructure .....	4
Compliance .....	5
Physical Security .....	5
Network Security .....	5
Customer Data .....	5
<b>Authentication to BeyondTrust Privileged Remote Access (Cloud)</b> .....	<b>6</b>
<b>Credential Management in BeyondTrust Privileged Remote Access (Cloud)</b> .....	<b>7</b>
Credential Management with BeyondTrust Vault .....	7
Frequently Asked Questions about BeyondTrust Vault .....	7
<b>Encryption and Ports in BeyondTrust Privileged Remote Access (Cloud)</b> .....	<b>9</b>
<b>Auditing of BeyondTrust Privileged Remote Access (Cloud)</b> .....	<b>10</b>
<b>Validation of BeyondTrust Privileged Remote Access (Cloud)</b> .....	<b>11</b>

# Security in BeyondTrust Privileged Remote Access (Cloud)

The purpose of this document is to help technically-oriented professionals understand the security-related value BeyondTrust can bring to your organization. BeyondTrust can help your organization stay secure and compliant, while improving the efficiency and success of your organization with a better user experience.

## BeyondTrust Overview

BeyondTrust connects and protects people and technology with leading secure access solutions that strengthen security while increasing productivity. BeyondTrust Privileged Remote Access lets you control access to critical systems without hindering the work privileged users need to perform. You can define how users connect, monitor sessions in real time, and record every session for a detailed audit trail.

BeyondTrust Privileged Remote Access integrates with external user directories, such as LDAP, for secure user management. BeyondTrust also integrates with leading systems management and identity management solutions and includes an API for deeper integration.

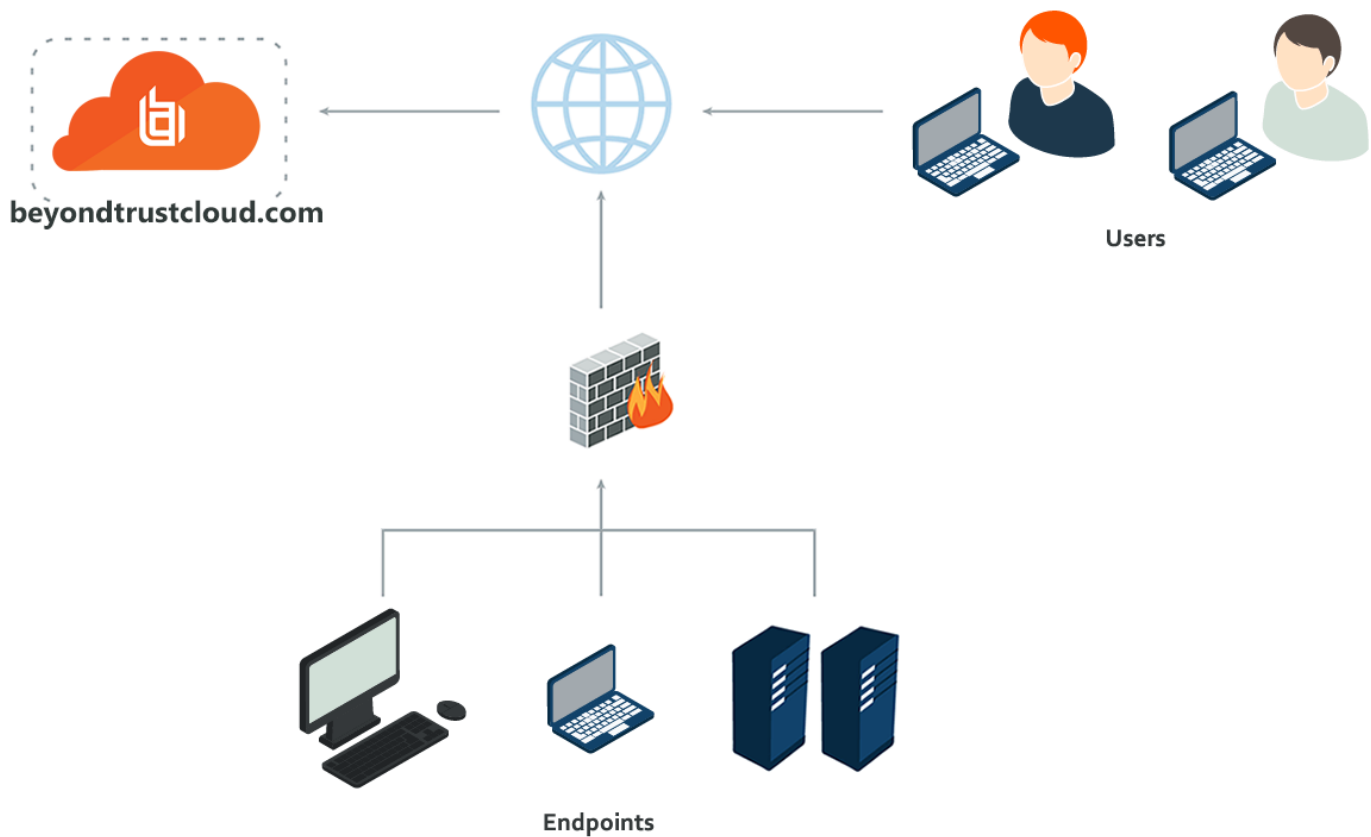
BeyondTrust enables remote access to multiple operating systems, including Windows, Mac, various Linux distributions, and mobile operating systems. BeyondTrust also enables remote control of various kinds of systems, including laptops, desktops, servers, kiosks, point-of-sale systems, smartphones, and network devices.

BeyondTrust mediates connections between users and remote systems, allowing file downloads/uploads, remote control of desktops, and access to system information and diagnostics, the command line, and the registry editor.

# Architecture of BeyondTrust Privileged Remote Access (Cloud)

## Infrastructure

The BeyondTrust Cloud infrastructure is currently spread across six Tier 3 or higher data centers. BeyondTrust customers can designate a regional data center to host their BeyondTrust solution so that performance is not hindered by geographic distance between users of the solution. All data centers leverage advanced electrical and cooling systems and N+1 redundancy with uninterruptable power solutions and generator backup. The data centers have advanced networking capabilities such as 10Gb+ connectivity and a 40Gb+ core network.



## Compliance

Data centers hosting the BeyondTrust Cloud have achieved ISO/IEC 27001 certification of its information security management systems. Additionally all data centers have completed the following examinations:

- SOC II Type 1
- SSAE 16
  - SOC 1 Type II
  - SOC 2 Type II

They are also Privacy Shield certified to meet European Data Privacy compliance regulations.

## Physical Security

All BeyondTrust Cloud servers are housed in data centers that employ a high standard of physical protection. The measures include multiple levels of physical security, such as:

- Man traps / air lock
- Badged access
- Securely locked cages
- Biometric access
- Securely isolated storage area
- 24/7 security personnel on duty

## Network Security

The network architecture is built to protect all entry points assigned to customers. Highly-available edge gateways and segmented network components are dedicated and configured in BeyondTrust. The infrastructure is continuously monitored, and vulnerability testing is conducted regularly by internal security staff.

## Customer Data

All customer data is confined to a dedicated instance of BeyondTrust allocated to your organization. The data physically and logically resides in a siloed BeyondTrust instance and is not shared between customers. This unique approach to the segregation of customers keeps your data safe.

# Authentication to BeyondTrust Privileged Remote Access (Cloud)

BeyondTrust may be provisioned for locally defined BeyondTrust user accounts or can be integrated into existing authentication sources. For instance, a commonly integrated authentication source is Microsoft Active Directory. When using a directory such as this, all authentication follows the existing controls and processes in place for safeguarding user accounts.

Additional security providers are available that allow for user authentication using Kerberos or SAML (for single sign-on) or using RADIUS (for multi-factor authentication). Each of these providers can be configured to use LDAP groups to set the permissions for the user, allowing you to map existing LDAP groups to teams in BeyondTrust.

There are a large number of granular permissions that can be granted to users. These permissions determine which features in BeyondTrust a user has access to.

# Credential Management in BeyondTrust Privileged Remote Access (Cloud)

BeyondTrust Privileged Remote Access can be integrated with an Endpoint Credential Manager (ECM) to improve password security for privileged users and vendors.

An ECM functions as the middleware for communication, and the ECM can be used to integrate BeyondTrust Privileged Remote Access with password vaults.

Credential injection is a built-in feature of BeyondTrust Privileged Remote Access. It allows administrators and privileged users to seamlessly inject credentials into systems without exposing plain text passwords, and this feature can also be used with third-party vault tools.

## Credential Management with BeyondTrust Vault

BeyondTrust Vault is a credential store that exists on the B Series Appliance, enabling discovery of and access to privileged credentials. You can manually add privileged credentials, or you can use the built-in discovery tool to scan and import Active Directory and local accounts into BeyondTrust Vault.

BeyondTrust Vault fits seamlessly with service desk workflow because it is integrated directly with the Privileged Remote Access solution. Technicians do not have to learn to use another tool or even exit BeyondTrust to retrieve passwords. With just one click in the BeyondTrust representative console, users can simply select the correct credential from the dropdown and log directly into a remote system - without ever having to know or even see the actual password.

## Frequently Asked Questions about BeyondTrust Vault

### What communication pathways are used with BeyondTrust Vault (ports, protocols, connection types, etc.)?

- **Active Directory and Discovery:**

- By default, discovery occurs over LDAP via the Active Directory Service Interface (ADSI) on port 389.
- If LDAPS is enabled, Active Directory queries run over LDAP under an SSL/TLS layer on port 636, unless another port is specified. This transport-layer security encrypts all data communicated to and from Active Directory.

- **Windows Local Discovery:**

- Local Windows accounts are discovered via a series of calls directly to Windows APIs.
- These APIs use Remote Procedure Calls (RPCs) and named pipes as the network protocol.
- The RPC process translates the request parameters as well as any response data into a standard, encoded format for transmission.
- Protection is negotiated at the operating system level.

## Where does encryption for BeyondTrust Vault occur?

- Passwords and private SSH keys are encrypted at rest using AES-256-GCM in addition to any full disk encryption enabled for the B Series Appliance.
- Passwords and private SSH keys are encrypted in transit using an ephemeral public+private key pair when used for injection. This encryption occurs in addition to Privileged Remote Access's use of TLS to encrypt communication among all BeyondTrust components, such as the B Series Appliance, Jumpoint, customer client, etc.
- Passwords are encrypted in transit by TLS.
- Passwords used by Jumpoints to authenticate with Active Directory are never sent in plaintext to Active Directory.

## Where is the Vault encryption key stored? Can it be accessed via /login or /appliance?

- The Vault encryption key is needed to decrypt credentials managed by BeyondTrust Vault. This key is stored in one of the credential stores configured on the appliance.
- The encryption key can be backed up by going to **/login > Management > Software Management > Backup Vault Encryption Key**. The backup file format used for the encryption key is the same .nsb file format used for configuration and reporting data.

## Is the BeyondTrust application database encrypted, and if so, how?

- BeyondTrust Vault stores data in an encrypted format in the database. If full disk encryption is enabled for your B Series Appliance, the BeyondTrust application database is also encrypted. However, this is independent of the encryption performed by BeyondTrust Vault.

## What best practices are recommended to maintain the highest level of security across all points of connection (discovery, injections, support, etc)?

- BeyondTrust recommends using a valid CA-signed SSL certificate to protect communication among all BeyondTrust components.
- Jumpoints should run on a system only a few privileged users have permissions to access.



For more information about Jumpoints, please see [Privileged Remote Access Jumpoint Guide: Unattended Access to Computers in a Network](https://www.beyondtrust.com/docs/privileged-remote-access/how-to/jumpoint/index.htm) at <https://www.beyondtrust.com/docs/privileged-remote-access/how-to/jumpoint/index.htm>.



**Note:** At this time, there are no user-visible security settings for BeyondTrust Vault.



# Encryption and Ports in BeyondTrust Privileged Remote Access (Cloud)

BeyondTrust can be configured such that it enforces the use of SSL for every connection made to the site. BeyondTrust requires that the SSL certificate being used to encrypt the transport is valid.

BeyondTrust can natively generate certificate signing requests. Configuration options also are available to disable the use of TLSv1 and/or TLSv1.1. BeyondTrust always has TLSv1.2 enabled to ensure proper operation of the software. Available cipher suites can be enabled or disabled and reordered as needed to meet the needs of your organization.

The BeyondTrust software itself is uniquely built for each customer. As part of the build, an encrypted license file is generated that contains the site Domain Name System (DNS) name and the SSL certificate, which is used by the respective BeyondTrust client to validate the connection that is made to the Cloud site.

The chart below highlights the required ports and the optional ports. Note that there is very minimal port exposure of the BeyondTrust Cloud infrastructure. This drastically reduces the potential exposed attack surface of the site.

Below are example firewall rules for use with BeyondTrust Cloud, including port numbers, descriptions, and required rules.

Firewall Rules	
<b>Internal Network to the BeyondTrust Cloud Instance</b>	
TCP Port 443 (required)*	Used for all session traffic.
<b>BeyondTrust Cloud Instance to the Internal Network</b>	
TCP Port 25, 465, or 587 (optional)	Allows the B Series Appliance to send admin mail alerts. The port is set in SMTP configuration.
TCP Port 443 (optional)	B Series Appliance to web services for outbound events.

## Auditing of BeyondTrust Privileged Remote Access (Cloud)

BeyondTrust provides two types of session logging. All the events of an individual session are logged as a text-based log. This log includes users involved, session tools used, chat transcripts, system information, and any other actions taken by the BeyondTrust user. This data is available on the B Series Appliance in an un-editable format for up to 90 days, but it can be moved to an external database using the BeyondTrust API or the BeyondTrust Integration Client. All sessions are assigned a unique session ID referred to as an LSID. The session LSID is a 32-character string that is a unique GUID for each session. The LSID is stored as part of each session log for every session conducted.

BeyondTrust also allows enabling video session recordings. This records the visible user interface of the endpoint screen for the entire screen sharing session. The recording also contains metadata to identify who is in control of the mouse and keyboard at any given time during the playback of the recorded session. The period of time these recordings remain available depends on the amount of session activity and the available storage, up to 90 days maximum. As with the session logging, these recordings can be moved to an external file store using the BeyondTrust API or the BeyondTrust Integration Client.

The BeyondTrust Integration Client can be used to export data from the site and store it if needed to comply with security policies. BeyondTrust can also be configured to store data for a shorter period of time to help comply with security policies.

The Integration Client (IC) is a Windows application that uses the BeyondTrust API to export session logs, recordings, and backups from the BeyondTrust Cloud site according to a defined periodic schedule. The IC uses plug-in modules to determine the repository for the exported data.

BeyondTrust provides two IC plug-in modules. One handles export of reports and video recordings to a file system destination. The second exports select report information (a subset of the entire data collection) to a Microsoft SQL Server database. Setup of the IC for SQL Server includes all of the procedures needed to automatically define the necessary database, tables, and fields.

In practice, the Integration Client is used to export session data that must be retained for legal and compliance reasons. The reports and recordings are archived in a file system, indexed by session IDs. Data stored in the SQL Server tables may be queried to locate the BeyondTrust session ID corresponding to given search criteria such as date, user, or IP address.

All authentication events, such as when a user logs into the access console or accesses the /login interface, generate a syslog event which can be logged on a syslog server. Additionally, any configuration change that is made to the BeyondTrust Cloud instance also generates a syslog event showing the change that was made and by which user.

## Validation of BeyondTrust Privileged Remote Access (Cloud)

To ensure the security and value of our product, BeyondTrust incorporates vulnerability scanning in our software testing process. We track the results of vulnerability scans performed prior to a software release and prioritize resolution based on severity and criticality of any issues uncovered. Should a critical or high-risk vulnerability surface after a software release, a subsequent maintenance release addresses the vulnerability. Updated maintenance versions are distributed to our customers via the update manager interface within the BeyondTrust administrative interface. When necessary, BeyondTrust Support contacts customers directly, describing special procedures to follow to obtain an updated maintenance version. Additionally, BeyondTrust Cloud instances may be automatically updated based on the update interval chosen by the customer at the time of purchase.

In addition to internal scanning procedures, BeyondTrust contracts with third-parties for a source code level review as well as penetration testing. The source code review conducted essentially provides validation from a third party that coding best practices are followed and that proper controls are in place to protect against known vulnerabilities. A penetration test is conducted to confirm the findings.