



BeyondTrust

AD Bridge 24.1 Windows Administration Guide

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AD Bridge Windows Administration Guide

This guide shows system and security administrators how to best use BeyondTrustAD Bridge.

Find out how to:

- use the [Management Console](#),
- work with [ADB Cells](#),
- manage [Users](#), [Groups](#), [Computers](#), and [Licenses](#),
- configure [Auditing and Reporting](#),
- run [Reports](#),
- monitor [Events](#),
- and more.



Tip: Read the information carefully, including all notes, tips, and important notifications.

Access the Configuration Wizard

At the end of the installation, you can start the Configuration wizard to configure Directory Integrated mode, and follow best practices for configurations. The Configuration wizard is designed to simplify AD Bridge deployments. The essential components for a successful deployment can all be set up using the wizard.



For more information, see [Use the Configuration wizard](#), in the *ADB Installation guide*, at <https://www.beyondtrust.com/docs/ad-bridge/getting-started/installation/install-console/configuration-wizard.htm>.

Use the BeyondTrust Management Console

Use the console to perform the following tasks:

- Run multiple instances of the console and point them at different domains.
- Run the console with a different user account.
- Upgrade your Active Directory schema.
- Obtain status information about your Active Directory forests and domains.
- Migrate Unix and Linux users and groups by importing **passwd** and **group** files and mapping the information to users and groups in Active Directory.
- Remove orphaned objects.
- Generate reports about users, groups, and computers.
- Start **Active Directory Users and Computers (ADUC)**, **Cell Manager**, and the **Migration** tool.

Start the BeyondTrust Management Console

Depending on the options chosen during installation, start the BeyondTrust Management Console by:

- Double-clicking the **BeyondTrust Management Console** shortcut.
- Clicking **Start > All Programs > BeyondTrust AD Bridge > BeyondTrust Enterprise Console**.
- At the command prompt, executing the following command:

```
cd %ProgramFiles%\BeyondTrust\PBIS\Enterprise\iConsole.bmc
```

After you start the console, you can navigate to all other pages in the console, including the **BeyondTrust AD Bridge Status** page.

The **BeyondTrust AD Bridge Status** page displays the following information for the selected Active Directory forest. After you start the console, it may take a few moments to retrieve information about your domains.

- **BeyondTrust AD Bridge Version:** The AD Bridge version and build number. BeyondTrust technical support personnel may ask you for this information when you contact them for assistance.
- **Cell count:** Displays the number of cells that are associated with organizational units in the selected domain, including the Default Cell.
- **Mode:** Directory Integrated, Schemaless (see note below), or ID Range. Directory Integrated indicates that the selected forest is using the RFC 2307-compliant schema. Schemaless indicates that it is not. ID Range defines a range available to the domain; it is configurable at the forest root, via GPO, or locally, using the config tool.
- **Licenses Installed:** Indicates if valid product licenses are deployed.



Note: *Schemaless mode is deprecated.*

Connect to an Active Directory Forest

If AD Bridge detects more than one Active Directory forest, it displays them on the AD Bridge Status page. Connect to a forest by double-clicking the forest name.

To connect to another domain:

1. In the **BeyondTrust Management Console** tree, right-click the **Enterprise Console** node, and then click **Connect to Domain**.
2. Enter the FQDN of the domain that you want to connect to.
3. Enter the credentials of an Active Directory administrator.

Replication in a Large Forest or in Multiple Domains

When you set up AD Bridge in an environment with a large forest or multiple domains, it may take some time for the AD Bridge objects and the schema update to replicate to the rest of the domain.

Replication must complete before the domain and its child domains are fully enabled for AD Bridge. You will be unable to connect to a child domain until replication finishes.

Add a Plug-In with the AD Bridge Console

The console includes several plug-ins:

- **Access and Audit Reporting**
- **Enterprise Database Management**
- **Operations Dashboard.**

To add a plug-in:

1. In the console, on the **File** menu, click **Add/Remove Plug-in**.
2. Click **Add**.
3. Click the plug-in that you want, and then click **Add**.
4. Click **Close**, and then click **OK**.

Manage Work in AD Bridge Cells

To manage your AD Bridge Cells, use the following tools:

- **Active Directory Users and Computers:** An **AD Bridge Cell Settings** tab is added to the dialog box of the following objects in the Active Directory Users and Computers MMC snap-in:
 - Domain
 - Users
 - Groups
 - Organizational Units
- **Cell Manager:** **Cell Manager** is an AD Bridge MMC snap-in for managing your AD Bridge Cells. **Cell Manager** is installed when you install the BeyondTrust Management Console.

The AD Bridge Active Directory Users and Computers snap-in can work without cells. The plug-in can manage the RFC2307 attributes on users and groups without using a cell. In this case, a Default Cell is assumed. The **AD Bridge Cell Settings** tab will display **(Default Assumed)**.



For more information, see "[Use the btopt.exe Tool to Manage Options](#)" on page 75.



Note: Ensure the account you use to manage AD Bridge Cell properties is a member of the **Domain Admins** group or **Enterprise Admins** group. The account needs privileges to create and change objects and child objects in Active Directory.

Understand AD Bridge Cells and their Roles

An AD Bridge Cell is a container of Unix settings for Active Directory users and groups so they can log into Linux and Unix computers.

For each user, the settings include a Unix user identifier (UID), the group identifier (GID) of the primary group, a home directory, and a login shell.

You can use cells to map a user to different UIDs and GIDs for different computers.

Review the details in this section to learn more about how cells work.

Default and Named Cells in AD Bridge

When you create a cell, AD Bridge creates a container object, **CN=\$LikewiseIdentityCell**, in the domain root or in the OU where you created the cell.

There are two types of AD Bridge Cells:

- **Default Cell:** A cell located at the root of the domain, the Linux/Unix specific data is stored directly in the AD user or group object. It gets its name from becoming the default when no other cells are found. This should be your primary method for mapping identities.

In a *multi-domain* or *multi-forest* enterprise, the Default Cells of the domains merge into a single, enterprise-wide Default Cell, where users from each domain can authenticate with their credentials. Users' UIDs, GIDs, and other settings are defined separately in each domain, but nothing additional is needed at the domain-level to enable the user to authenticate.

Each forest that has a two-way transitive forest trust with the computer's forest is listed in the Default Cell. Each domain, in each forest, can opt in to this enterprise-wide Default Cell by creating a Default Cell in that domain. Any user who is listed in the Default Cell in a domain can be seen by the AD Bridge-enabled operating systems of any computer joined to the Default Cell.

When used with Directory Integrated mode, various attributes are indexed in the global catalog. This enables faster look-ups and login across the forest.

- **Named Cell:** A Named Cell is associated with an organizational unit (OU). It gets its name from the OU the cell resides in. The Unix-specific data is stored in **CN=Users** and **CN=Groups** in the **\$LikewiseIdentityCell** container object. The objects point to the Active Directory user or group information with a backlinked security identifier. This allows for unique mapping *outside* of what is configured in the user/group object.

Which cell should we use?

Default Cell should always be used. It allows for seamless integration across the forest and naturally uses the information storage in the user/group attributes.

Named Cells should be used when there are systems that require different mapping from what is in the Default Cell or for foreign users (across 1-way trusts) that we cannot easily look up their information.

How Cells Are Processed in AD Bridge

AD Bridge Searches Active Directory for Cell Information

When an Active Directory user logs on to an AD Bridge client computer, the AD Bridge agent searches Active Directory for the user's AD Bridge Cell information.

The search typically begins at the node where the computer is joined to Active Directory and can extend to all forests that have a two-way transitive trust with the client computer's forest.

AD Bridge Agent Checks the Cell Type

The AD Bridge agent determines the OU where the computer is a member and checks whether a Named Cell is associated with it.

AD Bridge Agent Continues Search If No Cell Found for the OU

If a cell is not associated with the OU, the AD Bridge agent on the Unix or Linux computer moves up the directory structure, searching the parent and grandparent OUs until it finds an OU that has an AD Bridge Cell associated with it.

Named Cell Found

If a Named Cell is found, AD Bridge searches for a user or group's attributes in the cell associated with the computer.

If an OU with an associated cell is not found, the AD Bridge agent uses the Default Cell for the domain to map the username to UID and GID information.

Default Cell Processing

A Default Cell is processed differently than a Named Cell. When processing a Default Cell, AD Bridge searches for a user or group's attributes in the Default Cell of the domain where the user or group resides. For example, a two-domain topology configured with one domain for users and another domain for computers would require two Default Cells:

- a Default Cell in the domain where user and group objects reside
- a Default Cell in the domain where computer objects are joined

A Linux or Unix computer can be a member of an OU that does not have a cell associated with it. In such a case, the Group Policy Objects (GPOs) associated with the OU apply to the Linux or Unix computer, but user UID and GID mappings follow the policy of the nearest parent cell or the Default Cell.

AD Bridge does not require you to have a Default Cell, but for AD Bridge to operate properly you must ensure that the AD Bridge agent can always find a cell.



For more information about modes, cells, and user rights, see the [AD Bridge Best Practices Guide](https://www.beyondtrust.com/docs/ad-bridge/how-to/best-practices) at www.beyondtrust.com/docs/ad-bridge/how-to/best-practices.

Cell Design and Identities in AD Bridge

AD Bridge Cells allow managing overlapping Unix identities in a single Active Directory organization for AD Bridge. Cells work in **Directory Integrated** mode only.

Storing Unix Identities

Cells store Unix identity information separate from other cells. This allows a single user or group to have different names or different numerical ID values (UID or GID) in different environments, all associated with the same AD identity.

This also allows multiple users or groups to have overlapping names or numerical ID values (UID or GID) in separate environments. Each cell requires additional overhead for the standard procedure for account management and for troubleshooting end-user logon issues, because both cases require the additional step of determining which cell the operation must be performed against.



Tip: To minimize complexity while allowing the flexibility of cells, we recommend that you use no more than four cells.

Named Cells

Named Cells store Unix identity information (**uid**, **uidNumber**, **gidNumber**, **gecos**, **unixHomeDirectory**, **logonShell**) in a subcontainer of the organizational unit (OU) which is associated with the cell.

Whether a user exists in the local domain or a trusted domain, the Unix identity information exists in an object in the cell. In other words, a Named Cell can reference users or groups from outside the current AD domain.

Default Cells

Default Cell mode refers to how an AD domain is set up. There is one Default Cell, and it is enterprise-wide. All trusted Microsoft Active Directory Global Catalogs are part of the Default Cell. However, individual AD domains participate in the Default Cell by creating the Default Cell object in the root of those domains.

In Default Cell mode, the Unix identity information is stored in the same OU as the user object that the Unix Identity information is related to. This enforces a single Unix identity for a single AD user across the entire enterprise. Therefore, the Default Cell should be viewed as the ultimate authority for Unix information within an enterprise.

Directory Integrated Mode - Default Cell Configurations

In Directory Integrated mode, the Default Cell stores the Unix identity information directly to the user or group object in the same manner as **First Name** (**givenName**), **Address** (**address**, **city**, **state**), and **Email** (**emailAddress**) attributes.

Because the Directory Integrated Mode - Default Cell stores the information to the user or group object, existing Identity Management (IDM) products do not need to be modified to provision users for the Default Cell in Directory Integrated Mode. This also allows non-AD Bridge computers that use the RFC 2307 attributes to use the same identity information as AD Bridge.

In Directory Integrated mode, the Default Cell is the preferred method for all AD Bridge installations. In all cases where Unix identity information can be made to be non-overlapping, the Directory Integrated Mode - Default Cell should be used.

Directory Integrated Mode - Named Cell Configurations

In Directory Integrated mode, Named Cells create objects of class **PosixAccount** and **serviceConnectionPoint**, which are linked back to the user or group object associated with the AD Bridge object.

Directory Integrated Mode - Named Cells are recommended wherever multiple cells beyond the Default Cell are required.


Schemaless Mode Cells

IMPORTANT!

*Schemaless mode is **deprecated**. The content below is for information only.*

The AD Bridge clients determine cell and schema configuration at startup and re-check this configuration periodically. Because of how the data is stored, migration from a Schemaless Default Cell to a Directory Integrated Mode - Default Cell configuration requires more work, more steps, and more potential risks than any other cell migration.

For migration and long-term support purposes, Schemaless Mode Cells should only be created as Named Cells.

 **Note:** *Directory Integrated mode is preferred for the performance benefits and because Microsoft Active Directory is moving towards Directory Integrated Mode by default.*

Helpful Tips for Multiple Cell Use


If you have multiple Unix and Linux computers but are not using a centralized scheme to manage UIDs and GIDs, it is likely that each computer has unique UID-GID mappings.

When using multiple cells, it can be helpful to identify what Unix and Linux objects each cell represents. For example:

- Individual Unix or Linux computers
- A single domain
- Multiple domains (which require multiple cells)

Assign Permissions to Manage AD Bridge Cells

If you want to assign users to help manage AD Bridge Cells, ensure the users have the permissions to create container objects in an OU.

 For more information about delegating control, see [Delegating administration](https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2003/cc778807(v=ws.10)) at [https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2003/cc778807\(v=ws.10\)](https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2003/cc778807(v=ws.10)).

1. In **Active Directory Users and Computers**, right-click an OU, and then select **Delegate Control**.
2. Go through the **Delegation of Control** wizard, and ensure the following permissions are selected:
 - **Read**
 - **Write**
 - **Create All Child Objects**
 - **Delete All Child Objects**
 - **Read All Properties**
 - **Write All Properties**
3. Click **Finish**.

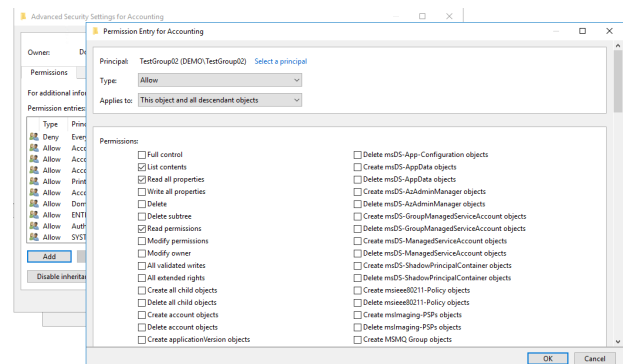
Assign Users to Manage UNIX Attributes in Directory Integrated Mode

This section applies to AD Bridge administrators that are working in an AD Bridge Directory Integrated - Default Cell mode environment.

i In a Named Cell environment, you can use the **Delegation of Control** wizard accessible from the **Cell Manager**. For more information, see ["Assign Users to Manage AD Bridge Cells" on page 21](#).

1. In **Active Directory Users and Computers**, right-click the OU, and then select **Properties**.
2. Select the **Security** tab.
3. Click **Advanced**, and then click **Add**.
4. Select **Select a Principal**.
5. Select the user or group that you are delegating permissions to, and then click **OK**.
6. From the **Type** menu, select **Allow**.
7. From the **Applies to** menu, select the object type that the permissions will apply to.
8. Go through the list of properties and select the UNIX attributes:

i For a list of the required properties, see ["Provision User Accounts" on page 15](#) and ["Provision Group Accounts" on page 15](#).



9. Click **OK**.

Provision User Accounts

When provisioning UNIX user accounts, AD Bridge administrators must be able to manage the following RFC2307 attributes:

- **displayName**
- **GECOS**
- **gidNumber**
- **loginShell**
- **uidNumber**
- **uid**
- **unixHomedirectory**

Provision Group Accounts

When provisioning UNIX groups, AD Bridge administrators must be able to manage the following RFC2307 attributes:

- **description**
- **gidNumber**
- **displayName**. You must set the permission in **adsiedit.msc**.

Create a Cell and Associate it with an OU or a Domain

To associate a cell with an OU, for example, you must be a member of the Domain Administrators security group, or you must be assigned permissions to manage container objects in an OU.

IMPORTANT!

Before you associate a cell with an OU, make sure you chose the schema mode. You cannot easily change the schema mode after you create a cell, including a Default Cell.

1. Start **Active Directory Users and Computers**.
2. In the console tree, right-click the OU or the domain for which you want to create a cell, click **Properties**, and then click the **AD Bridge Cell Settings** tab.
3. Under **AD Bridge Cell Information**, select the **Create Associated AD Bridge Cell** check box, and then click **OK**.

You can now associate a user with cells.

 For more information, see "[Associate a User with AD Bridge Cells](#)" on page 17.

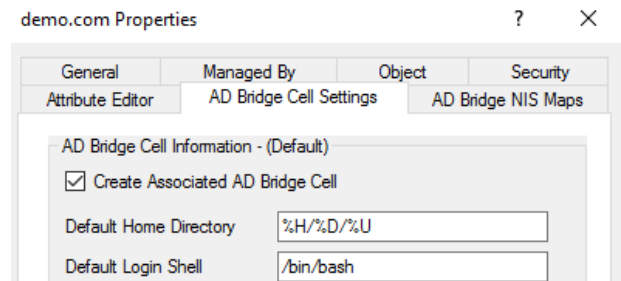
Create a Default Cell for AD Bridge

You can create a Default Cell that maps computers that are not in an OU with an associated cell. The Default Cell can contain the mapping information for all your Linux and Unix computers. AD Bridge does not require a Default Cell.

A Linux or Unix computer can be a member of an OU that does not have a cell associated with it. In such cases, the group policies associated with the OU apply to the Linux and Unix computer, but user UID-GID mappings follow the policy of the nearest parent cell, or the Default Cell.

To create a Default Cell:

1. Start **Active Directory Users and Computers**.
2. Right-click the name of your domain, and then select **Properties**.
3. Select the **AD Bridge Cell Settings** tab, and then check the **Create Associated AD Bridge Cell** box.



Use Pre-Existing RFC 2307 Data

To recognize and use pre-existing Unix data that is stored in Active Directory with RFC 2307 attributes, make sure AD Bridge is in Directory Integrated mode and then create a Default Cell.

Associate a User with AD Bridge Cells

You can associate a user with one or more AD Bridge Cells to give the user access to the Linux and Unix computers that are members of each cell.

1. Start **Active Directory Users and Computers**.
2. In the console tree, click **Users**.
3. In the details pane, right-click a user, and then click **Properties**.
4. Select the **AD Bridge Cell Settings** tab.
5. Under **AD Bridge Cells**, select the check box for the cell that you want to associate the user with. You can select more than one cell.
6. Under **User info**, a default GID value, typically 100000, is automatically populated in the GID box.



Note: The user's settings can vary by cell.

7. To set the UID, click **Suggest**, or type a value in the UID box.

The **Suggest** button generates an ID based on the same hash used in Unprovisioned mode. This allows systems to retain user IDs when migrating to ADB Enterprise.



IMPORTANT!

Setting UIDs below 1,000 is not advised, as they can result in a security vulnerability.



For more information about Unprovisioned mode, see [Storage Modes in Active Directory at https://www.beyondtrust.com/docs/ad-bridge/getting-started/installation/storage-modes-in-ad.htm](https://www.beyondtrust.com/docs/ad-bridge/getting-started/installation/storage-modes-in-ad.htm).

Access and Link Cells with AD Bridge

When you link cells, computers in one cell can be accessed by the users in the cell that you linked.

To provide a mechanism for inheritance and to ease system management, AD Bridge can link cells. Users and groups in a linked cell can access resources in the target cell.

For example, if your Default Cell contains 100 system administrators and you want those administrators to have access to another cell, called **Engineering**, you do not need to provision those users in the **Engineering** cell. Link the **Engineering** cell to the Default Cell. The **Engineering** cell will inherit the settings of the Default Cell.

To ease management, in the **Engineering** cell you can set any mapping information that should differ from the Default Cell.

Although you can use linking to create a hierarchy of cells, linking is not transitive. For example, consider the following linked cells:

- **Civil** cell linked to **Engineering** cell
- **Engineering** cell linked to **Default** cell

In this scenario, the **Civil** cell will not inherit the settings of the Default Cell.

Link to Multiple Cells

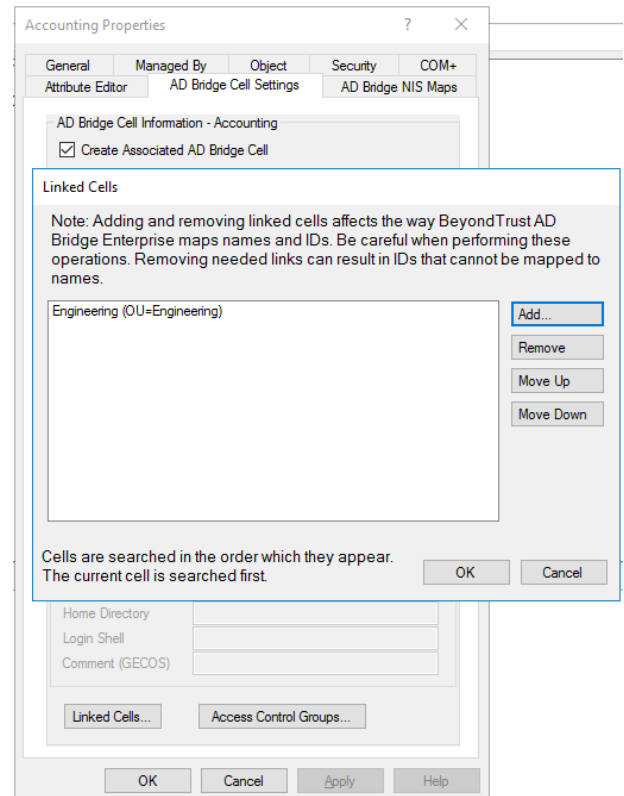
The order of the UIDs controls the search order. Consider the following scenario:

Kathy, a system administrator, has UIDs set in the Default Cell (100,000) and in the **Engineering** cell (150,000). In the **Civil** cell, however, the UID from the **Engineering** cell must be used to log into **Civil** computers.

If the **Civil** cell is linked to the Default Cell and the **Engineering** cell, the order is important. If **Engineering** does not precede the Default Cell in the search order, Kathy will be assigned the wrong UID and will be unable to log on computers in the **Civil** cell.

In the following scenario, a link is created to the **Engineering** cell. With this link, users in the **Engineering** cell can access the computers in the **Accounting** cell:

1. Start **Active Directory Users and Computers**.
2. In the console tree, right-click the organizational unit that is associated with the cell you want to link to another cell, and then click **Properties**.
3. Click the **AD Bridge Cell Settings** tab.
4. Click **Linked Cells**, click **Add**, click the cell that you want, and then click **OK**.
5. When you link to multiple cells, the order that you set is important because it controls the search order. The cells are searched in the order listed. Use **Move Up** or **Move Down** to set the order of the cells.
6. Click **OK**.



Assign Access Control Groups in AD Bridge

You can apply access control to UNIX and Linux agents (hosts) using the access control group setting that is available through **AD Bridge Cell Settings**. Using an access control group you can apply restrictive access control to the AD Bridge hosts and users that can access those hosts.

An access control group can be used to supplement existing Group Policy Allow Logon Rights settings and cumulative policy settings. The resultant set of groups will be a combination of the group membership for the AD Bridge host together with the Group Policy Allow Logon Rights settings and cumulative policy.

Configuring and using access control groups is a two-step process:

- Create an Active Directory group: this is a host access group. Create host access groups using a common attribute in the naming convention. For example, prefix all group names with **ADB_**.

Add the user accounts and the AD Bridge hosts to the group.

Members can be added directly to the group or through nested group membership. For a user to access an AD Bridge agent, the user and the agent must be a member of the same host access group (directly or through nested groups).

- Add the groups to the Access Control Groups associated with the AD Bridge Cell.

A template is a way to associate the groups with the cell. Host access templates identify the groups to use for the Access Control Group. The host access template can match on group names using wildcards. The name matching is applied to the “Group name (pre-Windows 2000) attribute”. This is the **sAMAccountName** attribute.



Note: When an AD Bridge agent has no membership in any host access group, restrictions will not apply to that host. This can be confusing when removing a host from a host access group. If you want the default behavior to disable access to all AD Bridge hosts unless they are a member of a host access group then create a host access template for **Domain Computers** where only hosts are defined.

Apply Changes to the Access Control Group

The agent checks for changes to the Access Control Group during the **lsass** refresh. Each group the computer object belongs to that also matches the template name is added to the Host Access Groups. The **lsass** refresh interval is every 30 minutes. To apply the settings immediately, run the following command:

```
/opt/pbis/bin/lwsm refresh lsass
```

Confirm Configuration on the Agent

To confirm the templates are applying on an agent system use the **pbis acl** command. This returns the template that is configured and all the matching groups that have been applied.

Example Scenario

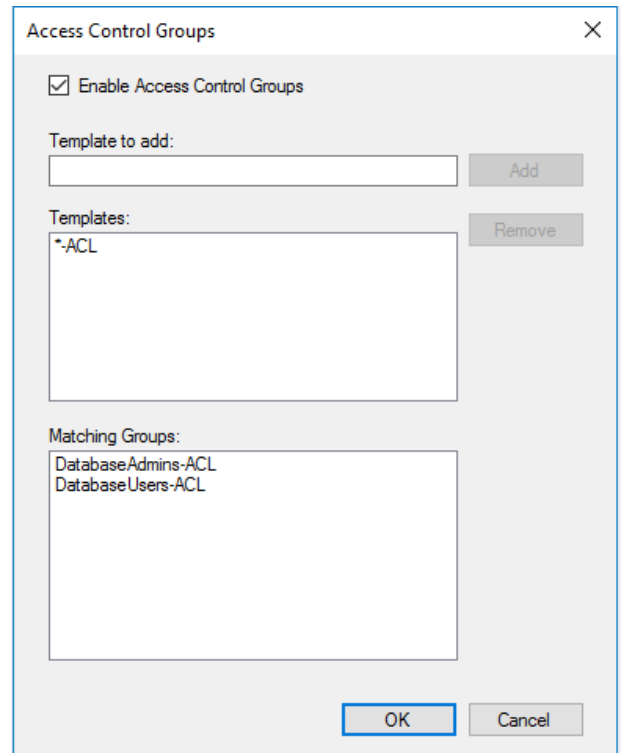
In a database environment, control access is required on a set of hosts running database applications that include the following:

- Group of database server hosts DatabaseServers: dbsrv1, dbsrv2, dbsrv3
- Group of database client hosts DatabaseClients: dbcli1, dbcli2, dbcli3
- Group of database administrator accounts: DatabaseAdmins: dbadm1, dbadm2, dbadm3
- Group of database application user accounts: DatabaseUsers: dbusr1, dbusr2, dbusr3

Database administrators can access all database hosts by creating a DatabaseAdmins-ACL group that includes the following groups as members: DatabaseServers, DatabaseClients and DatabaseAdmins.

Database users can access only database client hosts by creating a DatabaseUsers-ACL group that includes the following groups as members: DatabaseClients and DatabaseUsers.

On the **Access Control Groups** dialog box, enter the template name similar to the following: *-ACL. The wildcard matching adds all groups that contain -ACL to the list, as shown.



Move a Computer to Another Cell

When you move a computer from one cell to another, you must do the following if you want the cell information to be updated immediately on the client:

- Clear the authentication cache for user and group membership:

```
/opt/pbis/bin/ad-cache --delete-all
```

- Restart the AD Bridge authentication service by running this command as root:

```
/opt/pbis/bin/lwsm restart lsass
```

- Force the computer to refresh its Group Policy settings by running this command as root:

```
/opt/pbis/bin/gporefresh
```

Manage Cells with AD Bridge Cell Manager

Using **AD Bridge Cell Manager**, you can:

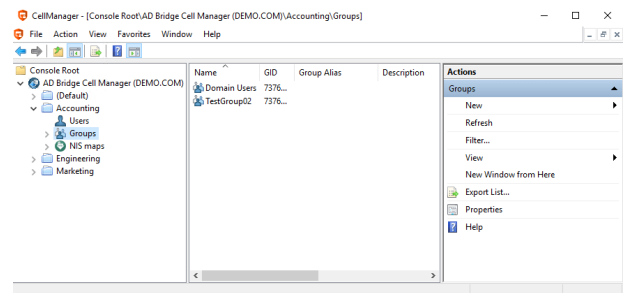
- Delegate control of a cell
- Change permissions for a cell
- Add cells, view cells
- Associate cells with OUs to provide users and groups with Linux and Unix access
- Connect to another domain and filter cells to reduce clutter

Start AD Bridge Cell Manager from the Management Console

To start **AD Bridge Cell Manager**:

1. In the **BeyondTrust Management Console**, expand **Enterprise Console** and click **Diagnostics & Migration**.
2. Under **Tasks**, click **Launch Cell Manager**.

Alternatively, start **Cell Manager** from the **Start** menu. Select **Start > All Programs > BeyondTrust AD Bridge > AD Bridge Cell Manager**.



Assign Users to Manage AD Bridge Cells

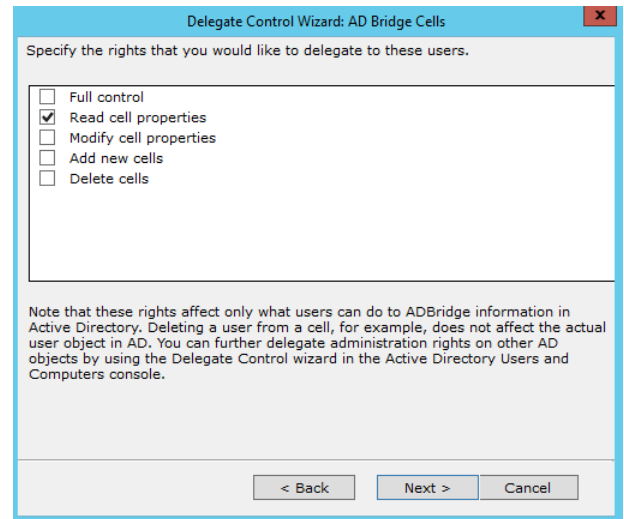
Use **AD Bridge Cell Manager** to create an access control list (ACL) that allows users or groups without administrative privileges to manage AD Bridge Cells.

For example, you can assign permissions to particular users to add users or remove users from a cell. This procedure applies to Named Cells.

i For more information on delegating control in a Default Cell, see "[Assign Users to Manage UNIX Attributes in Directory Integrated Mode](#)" on page 15.

1. In **Cell Manager**, right-click a cell, and then select **Delegate Control**.
2. Click **Start**.
3. Click **Add**, and then choose the users or groups that you are delegating permissions to.

- Click **Next**, and then select the permissions that you want to assign.



- Review the information that you entered, and then click **Finish**.

Change Permissions of a Cell, Group, or User

To change the permissions of a cell, a group, or a user:

- In the **AD Bridge Cell Manager** console tree or in the details pane, right-click the object that you want to change permissions for, and then click **Properties**.
- Click **Permissions**.
- Change the permissions, and then click **OK**.

Use the AD Bridge Cell Manager to Add a Cell

When you add a cell, you must attach it to an organizational unit (OU) in Active Directory.

To add a cell:

- In **AD Bridge Cell Manager**, right-click the top-level **Cell Manager** domain node, select **New**, and then click **Cell**.
- Select the OU to which you want to attach the cell.
- On the **Cell Defaults** page, select the following:
 - Default Home Directory:** type the path for the home directory that you want to set for users in the cell. For example, `/home/%D/%U`.



IMPORTANT!

When you set the home directory, you must use the default user name variable (`%U`). You can set the default domain name using the domain name variable (`%D`) but it is not required.

- Default Login Shell:** type the path to the default shell that you want to use. For example, `/bin/sh`.
- Enable Your User Account in the Cell:** select to add your account to the cell.

- To create a GPO for the OU, select the **Create Group Policy Object** check box and configure the following settings as necessary:
 - Forward audit event to**
 - Prepend default domain name to AD users and groups**
 - Set group policy refresh interval**
- Click **Start**.

Add a User or Group to a Cell using the AD Bridge Cell Manager

Default attributes are used when you add a user or group to a cell using **AD Bridge Cell Manager**. You can change the properties later using **Active Directory Users and Computers**.

i For more information, see "[Configure Cell Settings for Users](#)" on page 24

- In **Cell Manager**, right-click a cell, select **New**.
- Select **User** or **Group**.
- Click **OK**.
- Enter Search for the user or group that you want to add, and then click **OK**.

Use the AD Bridge Cell Manager to Filter Cells

Use filtering to set the maximum number of cells to display and show only the cells that match a pattern.

- In **AD Bridge Cell Manager**, right-click the top-level Cell Manager domain node, and then click **Filter**.
- Set the filtering values that you want to use:
 - Maximum number of cells to display:** Enter the number of cells to display. The default is **300**.
 - Only show cells that match pattern.**
 - Interpret pattern as regular expression.**
- Click **OK**.

Use the AD Bridge Cell Manager to Connect to a Different Domain

Even though users and groups imported from a different domain appear in **AD Bridge Cell Manager**, you cannot modify their settings from outside their original domain. To modify the settings of a user or group imported from another domain, use **Cell Manager** to connect to that domain, and then make the changes that you want.


- In **Cell Manager**, right-click the top-level Cell Manager domain node, and then click **Connect To Domain**.
- In the **Domain** box, type the domain. Alternatively, click **Browse**, and then locate the domain.

Manage Users and Groups

Using AD Bridge, you can manage the AD Bridge Cell settings for Unix and Linux users and groups in Active Directory Users and Computers.

Configure Cell Settings for Users

In Active Directory Users and Computers, you can configure AD Bridge Cell settings for your users.

 *Administrative privileges are required to manage AD Bridge Cell settings. Ensure you are logged on as a Domain Administrator, Enterprise Administrator, or that you are assigned the appropriate permissions. For more information, see ["Assign Permissions to Manage AD Bridge Cells" on page 14](#).*

To establish connection between Active Directory and your clients, the following cell settings can be configured:

- **UID:** The Unix user ID. The user's settings can vary by cell.
- **GID:** The Unix primary group ID. By default, you can select any group or enter an arbitrary primary group ID for the user account. If you need to restrict this to only allow groups enabled in the cell and assigned to the user, you can use the **btopt.exe** tool to enforce this validation.

 *For more information, see ["Use the btopt.exe Tool to Manage Options" on page 75](#).*

- **Login Name:** Provide an alias for an Active Directory user so that the user can log into a bridged client using the alias. An alias only applies to the selected cell.
- **Home Directory:** When you set the default home directory, you must use the default user name variable (**%U**). Using the default domain name using the domain name variable (**%D**) but it is optional.

IMPORTANT!

*On Solaris, you cannot create a local home directory in **/home**, because **/home** is used by **autofs**, Oracle's automatic mounting service. The standard on Solaris is to create local home directories in **/export/home**.*

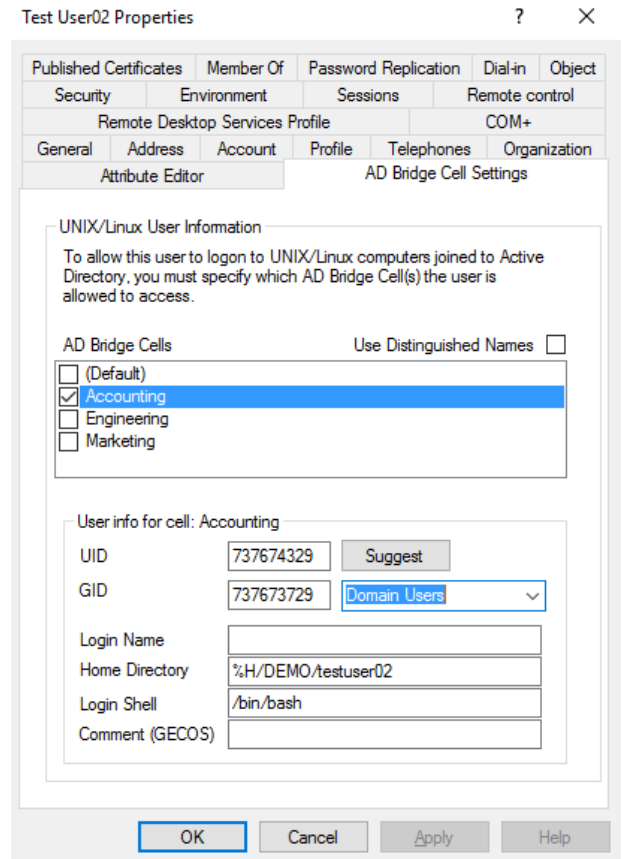
- **Login Shell:** When assigning a login shell, you can select a user or more than one user. You can assign the login shell at the OU level or user level.
- **Comment (GECOS)**

 ***Tip:** The Cell Access Report can show you existing values for UID, GID, home directory, and login shells for users. For more information, see ["Run Reports With Audit and Access Reporting" on page 60](#).*

You can configure cell settings at the OU level, user level, or select a range of users in a selected OU. To configure cell settings for your users:

1. Start **Active Directory Users and Computers**.
2. Navigate to the OU where your users reside.

3. Right-click the user and then select **Properties**.
4. Select the cells where you want the settings to apply. When editing the properties for a particular cell, if the box is already checked, then select the cell to activate the settings in the user info section.



5. Enter information for the following:
 - **UID:** Click **Suggest**, or type a value in the box.
 - **GID:** The GID value is automatically populated. Select a group from the list to change the primary group for the user account.



Note: If you select another group from the list, the GID can be validated. If the group is unavailable, be sure to add the group to the cell. For more information, see "[Configure Cell Settings for a Group](#)" on page 26.

- **Login Name:** Type an alias for the user. The user must log on using the Active Directory account if a login name is not set here.
 - **Home Directory:** To override the default home directory, type the directory that you want to set for the user. For example, `/home/%D/%U`
 - **Login Shell:** Enter a login shell if you want to override the default. For example, `/bin/sh` or `/bin/bash`.
 - **Comment (GECOS):** Enter a comment (Optional).
6. Click **OK**.

Assign Settings to More Than One User

You can assign settings to more than one user at the same time. For example, you can assign users to a cell and then set the home directory. The users must be members of a group already associated to a cell and each user must have a UID-GID mapping.

Configure Cell Settings for a Group

In **Active Directory Users and Computers**, you can configure AD Bridge Cell settings for a group. You can configure a GID and group alias.

i Administrative privileges are required to manage AD Bridge Cell settings. Ensure you are logged on as a Domain Administrator, Enterprise Administrator, or that you are assigned the appropriate permissions. For more information, see ["Assign Permissions to Manage AD Bridge Cells" on page 14](#).

A cell must already be created.

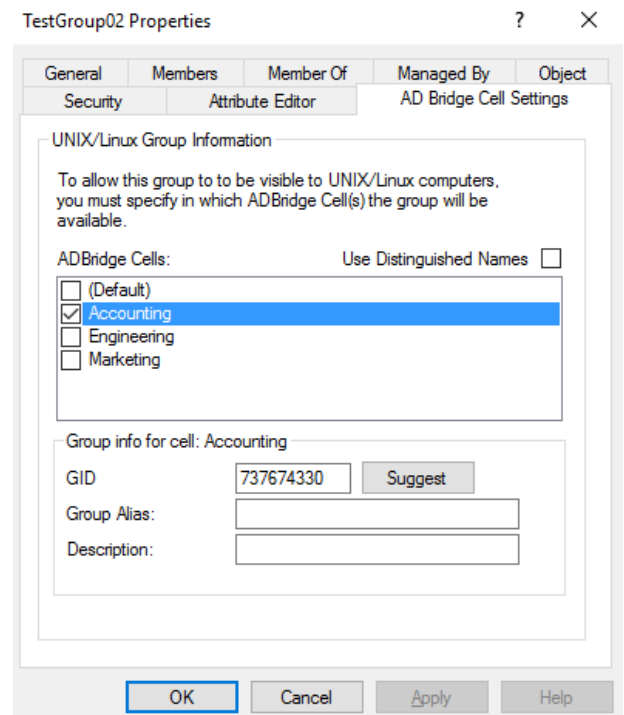
i For more information, see the following:

- ["Create a Cell and Associate it with an OU or a Domain" on page 16](#)
- ["Create a Default Cell for AD Bridge" on page 16](#)

1. Start **Active Directory Users and Computers**.
2. In the console tree, right-click a group, and then click **Properties**.
3. Click the **AD Bridge Cell Settings** tab.
4. In the **AD Bridge Cells** section, select the check box for the cell that you want to provide the group access to.
5. In the **Group info for cell** section, set the following:
 - **GID:** Click **Suggest**, or type a value in the **GID** box.

You can assign a group identifier (GID) to an Active Directory group by associating the group object with a cell and setting a GID value for the group object. The GID information that you enter is applied to all objects in the group. However, the settings are not applied to nested groups; you must apply the GID information to each group.

 - **Group Alias:** Set an alias for the group (Optional). The alias applies only within the cell.



Disable a User's Access with AD Bridge



Note: When a computer cannot communicate with a domain controller, a user whose account was disabled on the domain controller, but who logged on to the computer prior to their account being disabled, can continue to log on until you clear the cache or until the computer regains communication with the domain controller.

By default, the cache expires after 4 hours. You can configure the interval using an AD Bridge Group Policy setting or, if the policy setting has not been configured, by using the AD Bridge config tool.

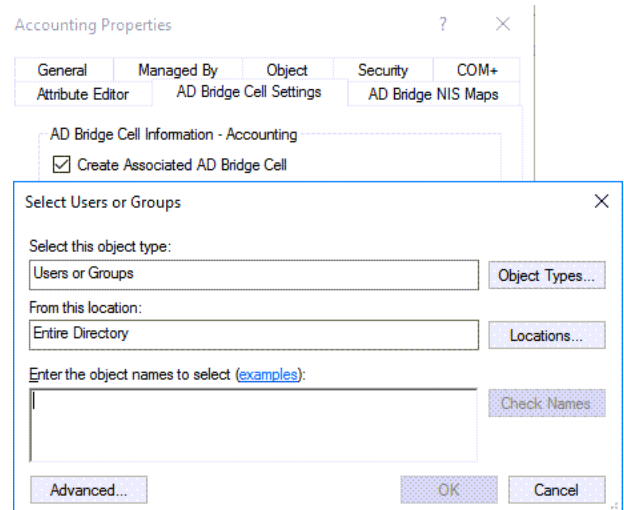
1. Start **Active Directory Users and Computers**.
2. Find the user.
3. Right-click the user that you want to disable, and then click **Properties**.
4. Click the **AD Bridge Cell Settings** tab.
5. In the **AD Bridge Cells** section, clear the boxes for the cells where you want to disable the user. To disable the user's access to all Linux and Unix computers, clear all the boxes.

Find Users and Groups in Active Directory Users and Computers

Because of a limitation with the Active Directory Users and Computers snap-in, when you try to find an AD Bridge user or group by right-clicking an OU and then clicking **Find**, the user or group will not appear in the results even when the user or group is in the OU. The **Find** command does, however, work at the domain level.

As an alternative, you can find AD Bridge users and groups in an OU using the following procedure:

1. Right-click the OU with an associated cell, select **Properties**, and then click the **AD Bridge Cell Settings** tab.
2. Click **Add**, and then search the *user* or *group*.



Use the BeyondTrust Management Console to Find Orphaned Objects

Use the BeyondTrust Management Console to find and remove orphaned objects. An orphaned object is a linked object, such as a Unix or Linux *user ID* or *group ID*, that remains in a cell after you delete a group or user's security identifier, or SID, from an Active Directory domain.

Removing orphaned objects from Active Directory cleans up manually assigned user IDs and improves search speed. We recommend that you remove orphaned objects before you use the migration tool with a domain that operates in Schemaless mode (see note below).



Note: *Schemaless mode is deprecated.*

To find and remove orphaned objects:

1. In the BeyondTrust Management Console tree, expand **Enterprise Console**, and then click **Diagnostics & Migration**.
2. From the **Tasks** list, click **Find Orphaned Objects**.
3. Click **Select Domains**, select the domains that you want to scan, and then click **OK**.
4. Click **Begin Scan**.
5. To remove the objects that appear in the **Orphaned objects to delete** box, click **Delete Objects**.

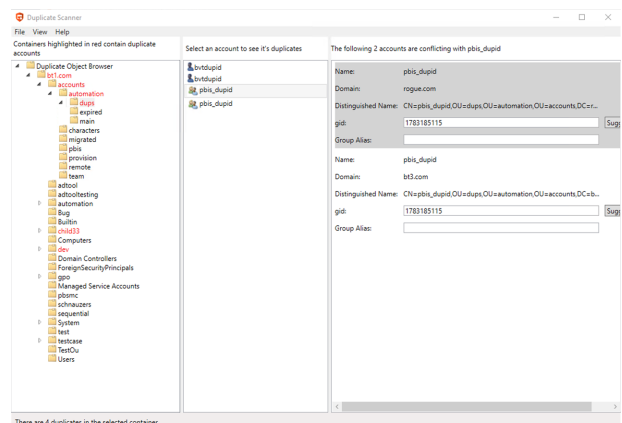
Find Duplicate Objects

Use the BeyondTrust Management Console to find and remove duplicate objects. Duplicate objects are any objects with the same Unix or Linux user ID or group ID, User login name, or Group Alias in the Active Directory domain.

Removing duplicate objects from Active Directory cleans up manually assigned user IDs and prevents conflicts. We recommend that you remove duplicate objects whenever they exist.

To find duplicate objects:

1. In the BeyondTrust Management Console tree, expand **Enterprise Console**, and then click **Diagnostics & Migration**.
2. From the **Tasks** list, click **Find Duplicate Objects**.
3. Navigate the folders indicated in red to find the duplicates.



Migrate Users to Active Directory

The Network Information System (NIS) migration tool imports Linux and Unix passwd files and group files and maps them to users and groups in Active Directory. The migration tool includes options to ease your NIS migration to Active Directory, including:

- Migration of account information to the organizational units that you want.
- Creation of groups in Active Directory to match your Linux and Unix groups.
- Generation of scripts to repair file ownership and group settings.
- Changes to the GID of imported users to that of the AD Domain Users group.
- Automatically setting an alias for each migrated user.
- Generation of Visual Basic scripts to migrate users and groups in an automated and custom way.
- Modification of GIDs during migration.
- Selection of only the groups and users that you want to migrate from your full list of groups and users.
- Setting the home directory and shell for migrated users.
- Filtering out standard Unix and Linux accounts, such as mail and news.
- Modification of UID information during migration.
- Use of NIS map files to migrate netgroups, automounts, and other services to Active Directory.

Overview

The AD Bridge migration tool can import Linux and Unix password and group files (typically `/etc/passwd` and `/etc/group`) and automatically map their UIDs and GIDs to users and groups defined in Active Directory.

You can also generate a Windows automation script to associate the Unix and Linux UIDs and GIDs with Active Directory users and groups. Before you commit the changes, you can resolve ambiguous user names and other conflicts.



IMPORTANT!

*Before you migrate users to a domain that operates in Schemaless mode (note that Schemaless mode is **deprecated**), we recommend that you find and remove orphaned objects. The IDs associated with orphaned objects are reserved until you remove the orphaned objects. For more information, see "[Use the BeyondTrust Management Console to Find Orphaned Objects](#)" on page 28.*

Before Running the Migration Tool

Before running the migration tool, obtain the following information:

- The name of the domain where you want to migrate the account information.
- The credentials that allow you to modify the domain.
- The Unix or Linux `passwd` file and corresponding group file that you want to add to Active Directory. The password and group files can be from a computer or an NIS server.

Run the Migration Tool

Use the Migration tool to import Linux and Unix password and group files and automatically map UIDs and GIDs to users and groups in Active Directory:

1. In the BeyondTrust Management Console tree, expand **Enterprise Console**, and then click **Diagnostics & Migration**.
2. From the **Tasks** list, click **Run Migration Tool**.
3. Click **Next**.
4. In the **Domain** box, type the domain name that you want to migrate the account information to.
5. Select credentials:
 - **Use logon credentials:** Select if your logon credentials allow you to modify the domain.
 - **Use alternate credentials:** Select if your logon credentials are not allowed to modify the domain, and then enter credentials that have the appropriate privileges.
6. Click **Next**.
7. Select your mapping files:
 - Click **Import** to import a Linux/Unix password and group file, and then provide the following information.
 - **Map name:** The migration tool imports the passwd file and group file into the map file, which is then matched to existing Active Directory user and group names.
 - **Passwd file:** Type the path and name of the file that you want to import, or click **Browse** to find the file.
 - **Group file:** Type the path and name of the passwd file's corresponding group file, or click **Browse** and then find the file.
 - To import default Unix or Linux user accounts such as **root** and **public**, clear the **Omit standard Linux/UNIX user accounts** check box.
 - In the list under **Users**, clear the **Import** check box for any user that you do not want to import, and then click **Next**.
 - Click **Import NIS Map** to import an NIS Map File. You can run the **yppcat** command on the NIS server to create the map file.
 - **NIS Map file:** Click **Browse** to find the map file.
 - **Map type:** Select the map file type: **Netgroups**, **Automounts**, or **Services**.
8. Select the OU where you want to migrate the Linux or Unix account information.
 - If you select the top of your domain, the information is migrated to the default AD Bridge Cell of your Active Directory forest and UID numbers are automatically assigned within the domain's range.
 - If you select an OU, AD Bridge creates a cell for the OU and migrates the account information to it. UIDs and GIDs are maintained if the passwd and group files agree, and if the UIDs and GIDs do not conflict with existing users or groups.

The migrated account information applies only to computers that are members of the OU.

9. Click **Next**.
10. Select from the following list of migration options:
 - **Create groups in Active Directory to match Linux/Unix groups:** Create groups in Active Directory that match your Linux or Unix groups.
 - **Create all groups in AD:** Create all groups in Active Directory, not just the referenced ones. To select this option, you must first select the **Create groups in Active Directory to match Linux/UNIX groups** check box.
 - **Generate scripts to repair file ownership and group settings:** Run scripts that can repair ownership issues and group settings issues.
 - **Change GID of imported users to Domain Users**

- **Always set Login Name (alias), even when same as sAMAccountName**
- **Generate VBScript to perform migration:** Enter the name of the script in the **Script name** box. Enter the directory where the script is located.
- **Name map file (optional):** File to automatically map Linux and UNIX users and groups to Active Directory accounts and groups in the form of the key/value pairs (delimited by = sign). The value can use the LDAP path to the Active Directory user or group or it can use the format **DOMAIN\username**.

For example, **john=LDAP://CN=jdoe,OU=accounts,DC=thedomain,DC=com** or **john=thedomain\jdoe**, where Unix user with login **john** is matched to AD user with **CN=jdoe**.

If **[name map file]** is not provided or a successful match is not found, then the Migration tool will try to find the best match in the target domain.

11. Click **Next**.
12. Click the **Users** tab and verify that the information is correct.
13. Click the **Groups** tab and verify that the information is correct.
14. To import the passwd and group files after you verify that the information is correct, click **Next**.

Migrate NIS Domains

If you use AD Bridge to migrate all your Unix and Linux users to Active Directory, in most cases you will assign these users a UID and GID that is consistent across all the Unix and Linux computers that are joined to Active Directory. This is a simple approach that reduces administrative overhead.

In cases when multiple NIS domains are in use and you want to eliminate these domains over time and migrate all users and computers to Active Directory, mapping an Active Directory user to a single UID and GID might be too difficult. When multiple NIS domains are in place, a user typically has different UID-GID maps in each NIS domain. With AD Bridge, you can eliminate these NIS domains but retain the different NIS mapping information in Active Directory because AD Bridge lets you use a cell to map a user to different UIDs and GIDs depending on the Unix or Linux computer that they are accessing.

To move to Active Directory when you have multiple NIS servers, you can create an OU or choose an existing OU, and join to the OU all the Unix computers that are connected to the NIS server. You can then use cells to represent users' UID-GID mapping from the previous identity management system.

Manage Computers in Active Directory with AD Bridge

Using AD Bridge, you can manage the AD Bridge Cell settings for Unix and Linux computers in Active Directory Users and Computers.

Use AD Bridge with a Single Organizational Unit

You can use AD Bridge if you have *write* privileges for only one OU. Your AD rights to create objects in the OU allow you to join Linux and Unix computers to the OU even though you do not have Active Directory Domain Administrator or Enterprise Administrator privileges.

 For more information, see "[Assign Permissions to Manage AD Bridge Cells](#)" on page 14.

There are additional limitations to this approach:

- You must join the computer to a specific OU, and you must know the path to that OU.
- You cannot use AD Bridge in Directory Integrated mode unless you have Enterprise Administrator privileges, which are required to upgrade the schema.

Join a Linux Computer to an Organizational Unit

To join a computer to a domain, you need:

- The user name and password of an account that has privileges to join computers to the OU
- The full name of the domain that you want to join. The OU path is from the top OU down to the OU that you want.

As root, execute the following command, replacing **organizationalUnitName** with the path and name of the OU that you want to join, **domainName** with the FQDN of the domain, and **joinAccount** with the user name of an account that has privileges to join computers to the domain:

```
/opt/pbis/bin/domainjoin-cli join --ou organizationalUnitName domainName joinAccount
```



Example:

```
/opt/pbis/bin/domainjoin-cli join --ou Engineering example.com Administrator
```

Example of how to join a nested OU:

```
domainjoin-cli join --ou topLevelOU/middleLevelOU/LowerLevelOU/TargetOU example.com  
Administrator
```

After you join a domain for the first time, you must restart the computer before you can log on.

Rename a Joined Computer in AD Bridge

To rename a joined computer, you must:

- Leave the domain.
- Rename the computer using the domain join command-line interface.
- Rejoin the computer to the domain.



IMPORTANT!

Do not change the name of a Linux or Unix computer using the `hostname` command because some distributions do not permanently apply the changes.

Rename a Computer Using the Command-Line Tool

The following procedure removes a Unix or Linux computer from the domain, renames the computer, and then rejoins it to the domain.



Note: Renaming a joined computer requires the user name and password of a user with privileges to join a computer to a domain.

1. With root privileges, at the shell prompt of a Unix computer, execute the following command:

```
/opt/pbis/bin/domainjoin-cli leave
```

2. To rename the computer in `/etc/hosts`, execute the following command, replacing **computerName** with the new name of the computer:

```
/opt/pbis/bin/domainjoin-cli setname computerName
```



Example:

```
/opt/pbis/bin/domainjoin-cli setname RHEL44ID
```

3. To rejoin the renamed computer to the domain, execute the following command at the shell prompt, replacing **DomainName** with the name of the domain that you want to join and **UserName** with the user name of a user who has privileges to join a domain:

```
/opt/pbis/bin/domainjoin-cli join DomainName UserName
```

**Example:**

```
/opt/pbis/bin/domainjoin-cli join example.com Administrator
```

It may take a few moments before the computer is joined to the domain.

4. After you change the hostname of a computer, you must also change the name in the AD Bridge local provider database so that the local AD Bridge accounts use the correct prefix. Execute the following command as root, replacing **hostName** with the name that you want:

```
/opt/pbis/bin/lsa set-machine-name hostName
```

Remove a Computer from a Domain

You can remove a computer from a domain in the following ways:

- Remove the computer account from ADUC.
- Run the domain join tool on the Unix or Linux computer.

i For more information, see *Leave Commands* in the [AD Bridge Linux Administration Guide](http://www.beyondtrust.com/docs/ad-bridge/getting-started/linux-admin) at www.beyondtrust.com/docs/ad-bridge/getting-started/linux-admin.

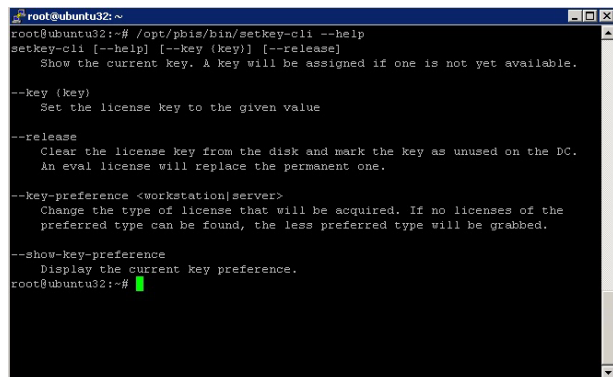
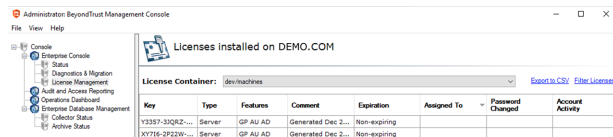
Manage AD Bridge Licenses

There are two options to manage the assignment of AD Bridge licenses:

- Globally using the **License Management** page in the BeyondTrust Management Console on a Windows administrative workstation connected to Microsoft Active Directory.

We recommend that you manage your licenses through the BeyondTrust Management Console.


- Locally using an AD Bridge command-line utility (**setkey-cli**) on a Unix or Linux computer.



License Types

Evaluation Licenses and Permanent Licenses

When you install the AD Bridge agent without a permanent license on a Unix or Linux computer, a 90-day product evaluation key is automatically generated. If a permanent license key or an extended evaluation license key is unavailable, AD Bridge will stop authenticating users and applying Group Policy settings after 90 days. The expiration date of an evaluation license applies only to the computer on which the license is installed.

 **Note:** To obtain a permanent license or to convert a trial license to a full license, contact a BeyondTrust sales representative at www.beyondtrust.com/contact.

You can upgrade an evaluation license to a permanent license by importing the permanent license key into the BeyondTrust Management Console, and applying it to a client computer. If the automatic assignment feature is in use, the AD Bridge agent will automatically apply a permanent license when you log on a client with an AD account, restart the AD Bridge authentication service, or run the command-line utility for managing licenses.

Single-Computer Licenses

BeyondTrust offers single-computer licenses for each of its agents.

If there are multiple domains, a different license file is required for each domain. To spread a set of single-computer licenses across two or more domains, you can request BeyondTrust sales to distribute the licenses in two or more license files.

The number of concurrent logins is unlimited.

Parent-Level Licensing

AD Bridge supports **parent-level licensing**, a feature where AD Bridge agents running in *child* domains can obtain license keys from a license container in the *root* of the domain. This simplifies license management by eliminating the need for license containers in child domains. License containers in child domains are still supported and are useful in restricting the number of license keys issued to agents joined to that domain.

AD Bridge agents obtain license keys by first looking for a license container in the organizational unit (OU) the computer is joined to:

- **If it obtains a license from that container**, it assigns it to the agent machine. If the agent does not obtain a license, an evaluation license is issued.
- **If it does not find a license container**, it will start going up through the AD tree, repeating the process until it reaches the root of the domain. If no license containers are found in the domain the agent is joined to, it then looks in the root of the parent domain for a license container. Once a license container is found, whether a license key is obtained from it or not, the agent does not look for further license containers.

For child domains to acquire and delete licenses that are applied to the agent machines, you must add Permissions to licenses in the root of the domain's license container.

1. At the root of the domain, right-click the **License** object within the License Container.
2. Add the child/domain computers account and allow **Create all child objects** and **Delete all child objects**. This allows the child domain computers group to acquire and delete licenses from the parent domain.

When you leave the domain using **--deleteAccount**, the credentials used to leave that domain must also be added to each of the license objects so that the license can be freed.

License Feature Codes

Licenses contain codes that can include or exclude features. When a license is displayed in the console, the codes in the **Features** column indicate the entitlements that the license covers.

License Container: dev/machines		
Key	Type	Features
Y3357-3JQRZ-...	Server	GP AU AD
XY716-2P22W-...	Server	GP AU AD

The following table describes each feature code:

Feature Code	Description
SC	Covers the use of two-factor authentication with a smart card
GP	Covers the application of GPOs
AU	Covers the auditing and reporting components
AD	Covers the use of the AD Bridge management tools for Active Directory

Search for a License in AD Bridge

Obtain a License Key

An AD Bridge agent obtains a license key by first looking for a license container in the organizational unit (OU) the computer is joined to. If it obtains a license from that container, it will assign it to the agent machine.

If an AD Bridge agent does not find a license container, it will start to search higher in the hierarchy of the AD Bridge tree, repeating the process, until it reaches the root of the domain.

Once the agent discovers a license container, and whether or not a license key can be found, the agent will not look for additional license containers.

Verify a License Key

The AD Bridge agent verifies a license in the following instances:

- When you run the **setkey-cli** utility
- When you start the AD Bridge authentication service
- When you log in

To verify a license, the **setkey-cli** utility uses the computer's Active Directory account to search for licenses in the computer's OU hierarchy up to the top of the domain. When the computer's domain controller is down, the utility loads the license from the disk without verifying its assignment in Active Directory.

The AD Bridge Group Policy service also checks for a license when it refreshes the computer's Group Policy Objects (GPOs). If the license is invalid, the service ignores the GPOs. Once the license becomes permanent and valid, the service applies the GPOs when it restarts.



Note: If the message "Invalid computer!" is displayed in the **Assigned To** column, revoke the license and return it to the pool of available licenses. Right-click the license you want to revoke and click **Revoke License**.

Create an AD Bridge License Container

You can install AD Bridge licenses manually on each client, or you can install the licenses in Active Directory and manage them from a central location. In Active Directory, you must create a license container before you can import an AD Bridge license key file.

Recommendations

Review the following recommendations for creating a license container.

- Manage licenses in Active Directory and create your license container in a common location at the highest level of the organizational unit (OU) hierarchy to which you have write access.

For instance, if you have separate OUs for your Linux computers, creating the licensing container in a common location above the OUs for the Linux computers can simplify license management.

- If you have a Default Cell, create the license container at the level of the domain.

Any OU may have a license container. The container need not be in the same OU as an AD Bridge Cell. The AD Bridge agent searches the OU hierarchy for a license container in the same way that it searches for a cell. When a license container is found, the agent stops trying to find a key in another container (even if the container it finds is empty) and checks whether the license is assigned to the computer. When the agent finds a license in Active Directory, it marks it as assigned to the computer.

When you create a license container, computers can automatically acquire a license. You can turn off automatic licensing depending on your requirements. However, after you create the license container you must assign a license to each computer manually.



For more information, see "[Assign a License to a Computer in AD](#)" on page 39.

If there is no license container in Active Directory, the agent verifies the license locally. This is a scenario reserved for licenses set with **setkey-cli**.



IMPORTANT!

You must be a member of the **Domain Administrators** security group or have privileges sufficient to create and modify containers where you want to create the licensing container. We recommend that you do not create a license container in the **Domain Controllers** OU.

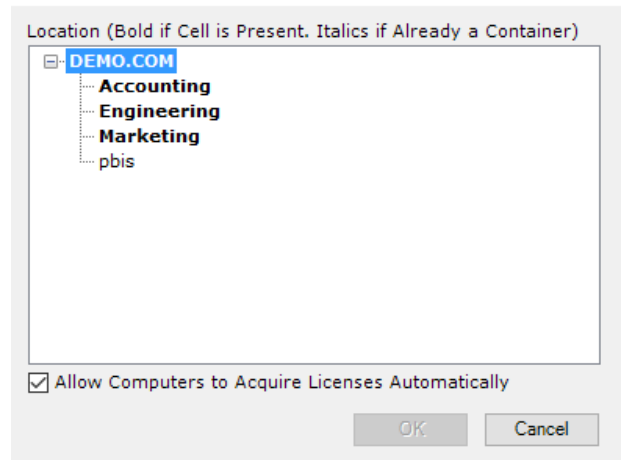
To create a license container:

1. In the BeyondTrust Management Console, expand the **Enterprise Console** node, right-click the **License Management** node, and then click **Create License Container**.
2. Clear the **Allow Computers to Acquire Licenses Automatically** box to prevent computers from obtaining a license (Optional).

If you clear the box, you must manually assign a license to each computer.
3. Select the location where you want to create a container and then click **OK**.

You are now ready to import a license file, which will populate the AD Bridge licenses container in Active Directory with licenses for your Unix and Linux computers.

Create License Container



Location (Bold if Cell is Present. Italics if Already a Container)

- DEMO.COM
 - Accounting
 - Engineering
 - Marketing
 - pbis

Allow Computers to Acquire Licenses Automatically

OK Cancel

Add License Permissions

Add permissions to licenses in the root of the domain's license container in order for child domains to acquire and delete licenses.

To add permissions for child domains:

1. At the root of the domain, right-click the license object within the license container.
2. Add the child or domain computer's account .
3. Allow **Create all child objects** and **Delete all child objects**.



Note: Enabling **Create all child objects** and **Delete all child objects** will allow the child domain computers group to acquire and delete licenses from the parent domain.

When you leave the domain with **--deleteAccount**, the credentials used to leave that domain must also be added to each of the license objects with the intention that the license will be freed.

Import an AD Bridge License File

AD Bridge license keys are distributed in an XML file. Using the BeyondTrust Management Console on your Windows administrative workstation, you can import a license key file containing licenses.

Note: When you import a license file an Active Directory object is created for every license. For example, if your license XML file contains 100 licenses, then 100 Active Directory objects are created.

You must create a license container in Active Directory before you can import a license key file.

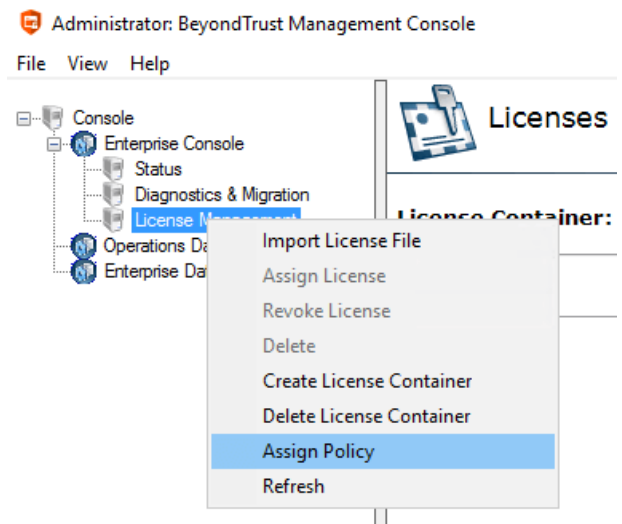
1. Make sure the XML file containing the licenses is available on your Windows administrative workstation that is running the BeyondTrust Management Console.
2. Under **Enterprise Console**, right-click **License Management**, and then click **Import License File**.
3. Locate the XML file that contains the licenses, and then click **Open**.

Turn on Automatic Licensing

If you turned off automatic licensing when you created the license container, you can turn on the feature at any time.

To turn on automatic licensing:

1. In the BeyondTrust Management Console, expand the **Enterprise Console** node, right-click the **License Management** node, and then click **Assign Policy**.
2. Check the box to allow automatic licensing and click **OK**.



Assign a License to a Computer in AD

By default, AD Bridge automatically assigns licenses to computers running the AD Bridge agent when the computers connect to the domain. If you turn off the default setting, then a computer cannot automatically obtain a license. However, you can manually assign a license using the BeyondTrust Management Console.

To manually assign a license:

1. In the BeyondTrust Management Console, expand **Enterprise Console**, and then click **License Management**.
2. Right-click the license that you want to assign, and then click **Assign License**.
3. In the **Select Computer** dialog box, click **Locations**, select the location that contains the computer you want, and then click **OK**.
4. In the **Enter the object names to select** box, type the name of one or more computers. For example, **AppSrvSeattle-1**.
 Separate multiple entries with semicolons. For a list of examples, click **examples**.
5. Click **Check Names**, and then click **OK**.

Manage a License Key from the Command Line

Although we recommend that you manage licenses in the BeyondTrust Management Console, you can also manage a license locally from the command line on a Linux or Unix computer.

From the command line of an AD Bridge client, you can check the computer's license, set a license key, release a license, and adjust the type of license that you want the computer to obtain.



Tip: For more information, run the following command:

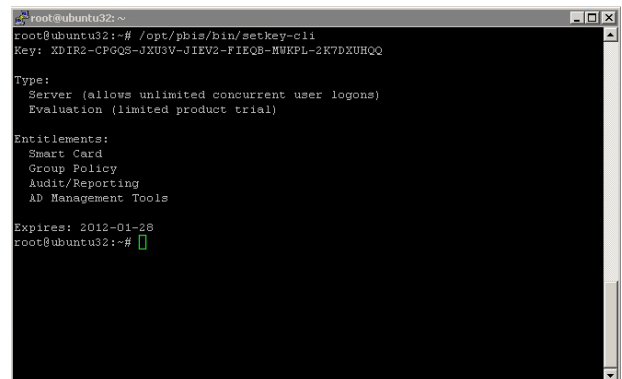
```
/opt/pbis/bin/setkey-cli --help
```

Check the License Key

To view the license key that is installed on a Linux or Unix computer, execute the following command at the shell prompt:

```
/opt/pbis/bin/setkey-cli
```

Here is an example:



```

root@ubuntu32:~
root@ubuntu32:~# /opt/pbis/bin/setkey-cli
Key: XDIR2-CPGQS-JXU3V-JIEV2-FIEQB-MUKPL-2K7DXUHQQ

Type:
  Server (allows unlimited concurrent user logons)
  Evaluation (limited product trial)

Entitlements:
  Smart Card
  Group Policy
  Audit/Reporting
  AD Management Tools

Expires: 2012-01-28
root@ubuntu32:~#
  
```

Set a License Key

You can set a license key for the AD Bridge agent by using the command line. You should, however, use this method of setting a key only when there is no licensing container in Active Directory and you want the agent to verify the license locally.

To set a license key, run the following command as root, replacing **LicenseKeyNumber** with a valid license key number:


```
/opt/pbis/bin/setkey-cli --key LicenseKeyNumber
```



Note: If there is a license container in Active Directory, you can only use **--key** to assign available keys from the license container. In this scenario, **--key** cannot be used to apply an additional license. Check for available licenses from Active Directory.

Release a License Key

When you decommission a computer, you can release a computer's license so it can be used by another computer. When you release a permanent license key, it is replaced by a temporary evaluation license.

You can also release a license to apply a different permanent license to the computer.

```
/opt/pbis/bin/setkey-cli --release
```

Configure Auditing and Reporting

The following AD Bridge reporting components depend on the use of the database and the data collectors:

- Audit and Access Reporting
- Operations Dashboard
- Enterprise Database Management

Overview

The reporting system includes the following components. We recommend that you deploy each component to a dedicated server.

- Database server hosting SQL Server. The database server stores the AD Bridge event data and information about the Active Directory configuration related to AD Bridge.
- The Collector and Reaper data collection services make up the collection server. The collection server stores AD Bridge agent event data from multiple agents and periodically copies that data to the database server, BeyondInsight, or both.
- A Windows machine with AD Bridge and RSAT installed and joined to the domain. In this section, this machine is referred to as the Admin machine.
 - AD Bridge group policies must be configured to allow event forwarding from AD Bridge agents to the database server through the collection server.
 - User access must include a user who can create a SQL Server database.
 - The reporting environment contains the AD Bridge agents which generate events that are forwarded to a collection server, and the LDBUpdate utility, which updates the database server with information on cells, computers, etc.

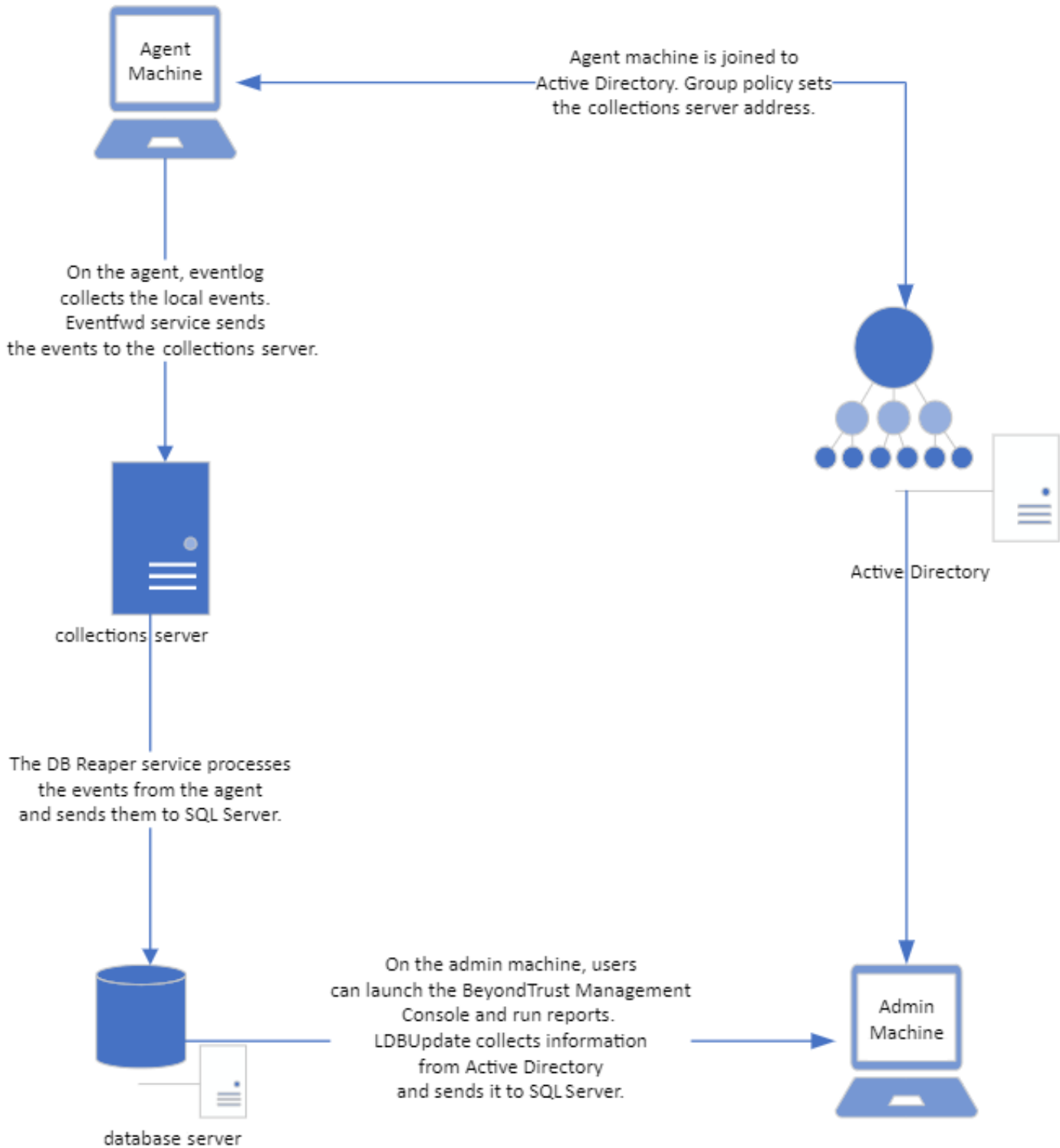
To communicate with SQL Server, AD Bridge currently only supports .NET Framework Data Provider for SQL Server (SqlClient) in the **System.Data.SqlClient** namespace. OLE DB and ODBC are not supported.



For more information, see *.NET Framework Data Providers* at <https://docs.microsoft.com/en-us/dotnet/framework/data/adonet/data-providers>.

The AD Bridge Reporting Landscape

The diagram outlines the flow between the agent machine, collection server, database server and the admin machine for the BeyondTrust Management Console.



System Requirements for AD Bridge

The following are the requirements for the reporting system.

Database Server

- Install SQL Server 2012 or higher.
- SQL Server must be a member of the domain.
- Windows Authentication must be enabled.

This section assumes you are a database administrator who knows how to set up and administer SQL Server, including configuring the database to comply with your IT security policy.

i For more information, see the following:

- [AD Bridge Installation Guide](https://www.beyondtrust.com/docs/ad-bridge/getting-started/installation/index.htm) at <https://www.beyondtrust.com/docs/ad-bridge/getting-started/installation/index.htm>.
- For a complete list of prerequisites for Microsoft SQL Server 2012 or higher, [Hardware and Software Requirements for Installing SQL Server](https://docs.microsoft.com/en-us/sql/sql-server/install/hardware-and-software-requirements-for-installing-sql-server-ver15?view=sql-server-ver15) at <https://docs.microsoft.com/en-us/sql/sql-server/install/hardware-and-software-requirements-for-installing-sql-server-ver15?view=sql-server-ver15>.

Collection Server

- .NET Framework version 4.5.
- Collection server must be a member of the domain.
- Microsoft Windows Server 2012 R2 or higher to act as a server for the event collection server.
- We recommend that you use a separate collection server, and calculate the number of computers using this formula: Total Collectors = ((number of AD Bridge Agents) / 400) + 1. The requirements might vary with the size of your network.

Item	Requirement
Memory	8GB
Disk space	10GB free disk space (for local event storage before copying to the central database). The size you require might vary depending on the number of events, the number of systems, and other factors.
Processor	2GHz dual core
Network	1Gb Ethernet (minimum to database server)

Admin Machine

When you install AD Bridge, you must install the BeyondTrust Management Console and the reporting components:

- Reporting Components
- Database Update and Management Tools
- Operations Dashboard
- Microsoft Report Viewer 2015 (**ReportViewer.exe**)



For more information, see the following:

- [AD Bridge Installation Guide](http://www.beyondtrust.com/docs/adbridge/getting-started/installation) at www.beyondtrust.com/docs/adbridge/getting-started/installation.
- To download the Report Viewer, [Microsoft® Report Viewer 2015 Runtime](https://www.microsoft.com/en-us/download/details.aspx?id=45496) at <https://www.microsoft.com/en-us/download/details.aspx?id=45496>.

Plan SQL Server Database Security

Although the SQL Server database will contain no user passwords or other highly confidential information, it will contain a list of user accounts, information about resources the users can access, and other information that could be used for nefarious purposes. In considering the security of the database, you should ask yourself several questions:

- Who will be allowed to *write* to the database?
- Who will be allowed to *read* from the database?
- What accounts will be used to *access* the database?

Data is written to the database in several cases:

- When a collection server copies events to the database
- When the **LDBUpdate** utility writes information from Active Directory to the database
- When administrators perform maintenance operations on the database (for example, creating or restoring event archives)

Active Directory Groups and SQL Server Roles

The following table provides general guidelines on securing reporting components using Active Directory groups.



Note: Create the groups in the table prior to creating the database. The supplied reporting database creation script relies on the existence of the groups to create the corresponding SQL Server roles and set database object permissions.

Active Directory Group	Description
ADB_DB_Administrators	Contains accounts that are required to configure and maintain the reporting database. We recommend that a minimum number of AD Bridge administrators tasked with maintaining the reporting infrastructure be included here. This group can access all Reporting and Auditing nodes in the BeyondTrust Management Console.
ADB_Collectors	Contains the service accounts used to run the collector services. The collection server must be part of this group. This group can access the Enterprise Database Management node.
ADB_DB_Archive_Administrators	Contains the service accounts used for automated archiving. This group can access the Archive Status .
ADB_Report_Viewers	Contains accounts that need to view the Operations Dashboard . This group can access the Operations Dashboard .
ADB_LDBUpdate	Contains the service accounts that need to run the LDBUpdate utility to import Active Directory information into the database. This group can access all Reporting and Auditing nodes in the BeyondTrust Management Console.

Set up the Reporting Environment

The AD Bridge reporting environment consists of multiple endpoints:

- **Admin machine:** The computer that manages the domain with the BeyondTrust Management Console (BMC) and group policy extension.
- **Agent machine:** The computers that generate and forward the events to the collection server.
- **Collection server:** Hosts the collector and reaper services (**BTEventdbreaper** and **BTCollector**).
- **Database server:** Stores all the records.

In the reporting environment, data (events) flow from the agent machine computers to the configured collection server and from there to the database server and other configured integrations. For the purposes of configuration, this guide goes in the reverse order so that dependencies are met: database server, collection server, and admin machine.

Configure the Database Server

This guide provides general guidelines on configuring SQL Server security and assumes the database administrators are already familiar with the steps required to configure logins, users, and roles.

This section provides a reference for users unfamiliar with SQL Server.

SQL Server Permissions and Roles

These steps assume the use of SQL Server Management Studio:

1. On the domain to which the database server instance is joined, ensure the following groups are created in Active Directory:
 - **ADB_DB_Administrators**
 - **ADB_Collectors**
 - **ADB_DB_Archive_Administrators**
 - **ADB_Report_Viewers**
 - **ADB_LDBUpdate**
2. Ensure that the user has access to an SQL Server administrator account.

Set Up the Collection Server

The collector and reaper services must be installed on the collection server. Use the database utilities package (**ADBridgeDBUtilities.msi**) to install the following to your data collection server:

- **BTCollector:** Contains RPC server code to enable the agent's forwarding service, **eventfwd**, to upload events to the database server by using secure, authenticated transport protocols. **BTCollector** runs as a Windows auto-start service and can be managed from the command line.
- **BTEventDBReaper:** Copies events from the collector server to the central database. The process runs as a Windows auto-start service and can be managed from the command line. **BTEventDBReaper** depends on **BTCollector** to work properly: If **BTCollector** is not running, **BTEventDBReaper** fails.

BTEventDBReaper generates logs in the following directory: **C:\Program Data\BeyondTrust\logging** and is configurable using **nlog.conf** file found in **C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities\nlog.config**.

Install Database Utilities



Note: The following scripts are now installed with the **ADBridgeDBUtilities*** package located in **C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities\Resources: CreateLikewiseEnterpriseDatabase.sql** and **ReportingPermissions.sql**.

To install the database utilities:

1. Run the AD Bridge Database Utilities installer program (**ADBridgeDBUtilities-x.x.x.x.msi**)
2. Follow the install to completion.

Create the LikewiseEnterprise Database and DBReaper

After the collector and reaper services are installed, create the database using the **Reporting Database Connection Manager**.

SQL Server administrator rights are required for the user creating and installing the database.

1. From the **Start** menu, go to **BeyondTrust > AD Bridge**, and select **Reporting Database Connection Manager**.



Note: Alternatively, you can run the tool from the command line:
C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities\bteventdbreaper /gui.

1. Select **Enable BeyondTrust AD Bridge Reporting**.
2. Select the **SQL Server\Instance** from the list.
3. Select the authentication method. We recommend you use **Windows Authentication** as a best practice. If you select **SQL Server Authentication**, enter the credentials.
4. Enter the **Timeout** value.
5. Click **Test Connection** to confirm that the permissions are correct.
6. Click **Create Database**.
7. When prompted to create roles and permissions, click **Yes**. The database creation and roles and permission scripts remain on the machine in the **C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities\Resources** directory.
8. Click **OK** to set the connection settings.



Note: You can also create the database from the *BeyondTrust Console* (see ["Set up the Admin Machine" on page 48](#)).

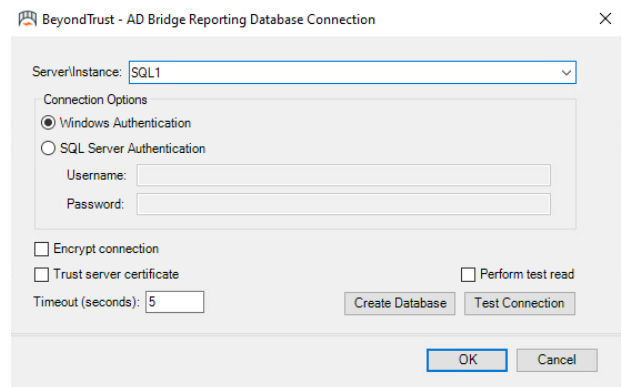
Set up the Admin Machine

This section assumes that the BeyondTrust Management Console and the following AD Bridge components are installed: **Reporting Components, Database Update and Management Tools, Operations Dashboard.**

Connect the Management Console to the Database

To add the Enterprise Database Management plug-in and connect to the database server instance using a user account with valid access:

1. In the console tree, right-click the **Enterprise Database Management** node, and then click **Connect to database**.
2. Click **Change**. The **AD Bridge Reporting Database Connection** window appears.
3. Select the name of your database server **ServerInstance**.
4. Select your connection option. We recommend using **Windows Authentication**. If you select **SQL Server Authentication**, enter the credentials of your database account.
5. (Optional). To **Encrypt connection**, select the box.
6. (Optional). To **Trust server certificate**, select the box.
7. (Optional). To **Perform test read**, select the box.
8. Enter the **Timeout** value.
9. Click **Test Connection**.
10. With a successful connection, then click **OK**.



Configure Agents to Forward Events to the Collector Service

You can globally set the agents to forward events by configuring an AD Bridge Group Policy setting. Events are generated by various AD Bridge services, and, if configured, from various syslog messages.

Configure Event Forwarding with Group Policy

The **Event Forwarder** policy setting modifies the settings in the AD Bridge registry to forward events from agent computers to the **BTCollector** service that resides on a Windows computer.

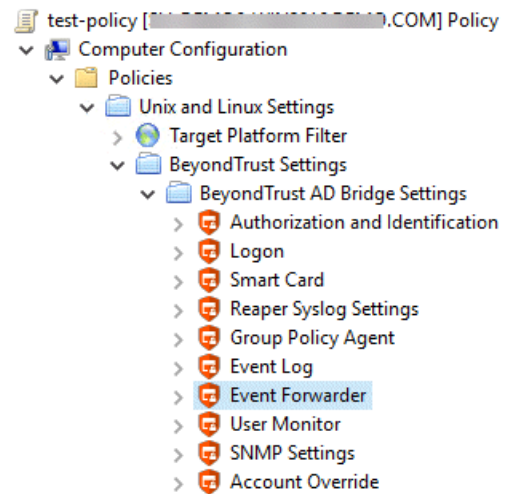
IMPORTANT!

To use this policy, you must first turn on event logging. For more information, see the [AD Bridge Group Policy Administration Guide](http://www.beyondtrust.com/docs/ad-bridge/how-to/group-policy) at www.beyondtrust.com/docs/ad-bridge/how-to/group-policy. Depending on your network configuration, you may also have to configure a policy setting to specify the service principal of the collector.

To configure event forwarding using policy settings:

1. In the Group Policy Management Console, create a Group Policy Object (GPO) for an organizational unit, and then edit it in the Group Policy Management Editor.

- In the console tree, expand **Computer Configuration > Policies > Unix and Linux Settings > BeyondTrust Settings > BeyondTrust AD Bridge Settings**, and then click **Event Forwarder**.



- Double-click **Event log collector**, and then check the **Define this policy setting** box.
- Enter the host name of the computer running **BTCollector**. Example: **w2k19-r2.example.com**.

Configure Syslog to Cull Events in AD Bridge

To collect sudo events and other system events that appear in syslog, you must configure syslog to write data to a location where the AD Bridge **reapsysl** service can find it and copy it to the local event log.



Note: You can set an AD Bridge Group Policy setting to modify `/etc/syslog.conf` on target computers.

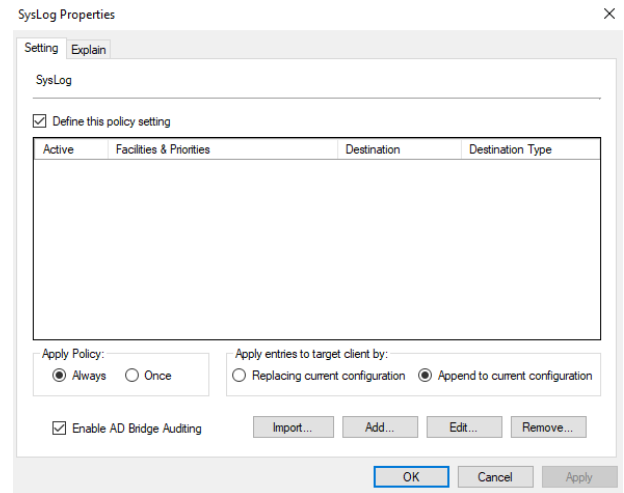
The **reapsysl** service creates three named pipes and picks up the syslog information written to them:

```
/var/lib/pbis/syslog-reaper/error
/var/lib/pbis/syslog-reaper/warning
/var/lib/pbis/syslog-reaper/information
```

To configure event forwarding using policy settings:

- In the Group Policy Management Console, create a Group Policy Object (GPO) for an organizational unit, and then edit the OU in the Group Policy Management Editor.
- In the console tree, expand **Computer Configuration > Policies > Unix and Linux Settings > BeyondTrust Settings > Logging and Auditing Settings**, and then click **SysLog**.
- Double-click **SysLog**, and then check the **Define this policy setting** box.

4. At the bottom left, check the **Enable AD Bridge Auditing** box.



5. Click **OK**.

Additionally, these settings can be changed on the agent machine. To configure syslog to write to the pipes, add the following lines to **/etc/syslog.conf**:

```
*.err          /var/lib/pbis/syslog-reaper/error
*.warning      /var/lib/pbis/syslog-reaper/warning
*.debug        /var/lib/pbis/syslog-reaper/information
```

The last entry is not analogous to the first two. Some versions of syslog require a tab character rather than spaces to separate the two components of each line.

After you modify **syslog.conf**, you must restart the syslog service for the changes to take effect:

```
/etc/init.d/syslog restart
```

```
systemctl restart syslog
```



For more information, see the following:

- [AD Bridge GPO Reference Guide at https://www.beyondtrust.com/docs/ad-bridge/how-to/index.htm](https://www.beyondtrust.com/docs/ad-bridge/how-to/index.htm).
- [Your syslog documentation](#).

Recommended Configuration Settings

Outlined below are some recommended configurations for the collector service through the BeyondTrust Management Console. These settings can be adjusted to meet network requirements and the number of collectors and endpoints.

This section assumes the BeyondTrust Management Console and the following AD Bridge components are installed: Reporting Components, Database Update and Management Tools, and Operations Dashboard.

Configure Performance Settings on the Collector Service

To change the parameters on the **Collector** service:

1. In the console tree, expand **Enterprise Database Management**.
2. Right-click **Collector Status**, and then select **Set collector parameters**.

Alternatively, in the list of collectors, right-click the collector that you want to modify, and then select **Set collector parameters**.

Collectors					
	Name	Status	Period	Max Events p/Period	Last Upload
<input checked="" type="checkbox"/>	SERVICES	Warning	15	5000	3/28/2019 5:08:12

Set collector parameters...
 Delete collector
 Refresh

3. Set the following parameters (or use the default values):
 - **Period (seconds):** 15
 - **Maximum events per period:** 5000

Endpoint Parameters:

- **Period (seconds):** 10
- **Maximum events per period:** 1000
- **Events per batch:** 250

Collector Parameters ✕

Collector: COLLSRVR

Period (seconds):

Maximum events per period:

Endpoint Parameters

Period (seconds):

Maximum events per period:

Events per batch:

Remote ACL:

i For more info including detailed descriptions on the performance parameters, see ["Configure the Collector Service" on page 53](#).

Run the Database Update Utility

You can run the **LDBUpdate** utility from the command line or from the BeyondTrust Management Console.

The **LDBUpdate** utility is a Windows program that reads information from Active Directory and writes it to the AD Bridge database so you can generate reports about computers and users in Active Directory. You can run the utility on demand from the BeyondTrust Management Console, or you can configure a scheduled task.

If the information in Active Directory has changed since you last ran the utility and if you want those changes included in your reports, run the utility before you generate your reports.

To access Active Directory, the **LDBUpdate** utility uses the LDAP and RPC ports.

The **Update DB** button is enabled only if the update utility is available on the current machine. The AD Bridge installer allows you to select whether the utility is installed on a machine.

Ensure the following is in place before you run **LDBUpdate**:

- The current user must have privileges to read and write to any table in the Enterprise database.
- The Windows administrative workstation where you run **LDBUpdate** must be connected to Active Directory.
- The user account that runs **LDBUpdate** must have at least read permission for objects and child objects in Active Directory.

To run **LDBUpdate** from the console:

1. In the console tree, click the **Audit and Access Reporting** node and then click **Advanced**.
2. Click **Update DB**, and then click **Run**.
3. Click **Close**.

Advanced Command Line Configuration

This section provides information on using advanced methods to set up the collection server and the database server, and running the **LDBUpdate** utility. We recommend following the simplified procedures provided in earlier sections.

Configure the Collectors Using the Shell Prompt

You can use the shell prompt as an alternative to configuring the collector services using the BeyondTrust Management Console.

i For information about configuration using the console, see ["Configure Agents to Forward Events to the Collector Service" on page 48](#).

Configure the Collector Service

You can configure the following performance and security settings on **BTCollector**:

- Set the maximum number of events that an endpoint can send.
- Set how frequently the endpoints connect to the collector and send data.
- Set permissions on a collector that services more than one domain.

A provider name and a connection string are the only required parameters to run the **BTCollector**, which is auto-started as a Windows process at **C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities**.

To view the arguments, run the following command:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities>BTCollector /h
```

Option	Description
/h	Displays help.
/p <integer>	<p>Sets the maximum number of events that an endpoint can send to a collector per period. A period consists of sending multiple batches and then sleeping until the period is over.</p> <p>This number, in combination with the /t parameter, can be set to control the load on endpoints imposed by the event forwarding service (eventfwd) sending events to collectors.</p> <p>If this number is <i>large</i>, the event forwarder might consume excessive CPU time and network bandwidth.</p> <p>If the number is <i>small</i>, however, the endpoint might fall behind with the incoming event rate and end up with a large backlog of uncollected events.</p>

Option	Description
<i>/b <integer></i>	<p>Sets the records that the event forwarder can send per batch. A batch is sent with a single RPC call, so setting this too high delays adding any records in the batch until the entire batch is sent.</p> <p>The collector sends events in batches until the number of sent events reaches the value that you set (or until there are no more left to send, whichever number is smaller).</p> <p>If set too <i>high</i>, the network transaction might fail because of a connection that times out.</p> <p>If set too <i>low</i>, the event forwarding service might consume too much CPU time and bandwidth because there are more network transactions.</p>
<i>/t <integer></i>	<p>Sets the forwarding period in seconds. If an event forwarder finishes sending its events before this length of time is up, it will sleep to finish the period.</p> <p>The parameter controls how often the endpoint connects to the collector to forward events.</p> <p>If the forwarding period is set to 300 seconds, for example, the endpoint event forwarder service sends events to a collector once every 5 minutes.</p> <p>The smaller the number is, the more frequently endpoints communicate with collectors and the smaller the latency between the time when an event is generated and when it appears in the database.</p> <p>If the number is too small, however, it can result in excessive load on the endpoints and in excessive network traffic.</p>
<i>/a <string></i>	<p>Sets the access control list (ACL) of the computers allowed to communicate with the collector. The remote access security descriptor uses SDDL syntax. The default value is O:LSG:BAD:PAR (A;;CCDCRP;;;BA)(A;;CCDCRP;;;DA)(A;;CC;;;DC).</p> <p>The parameter sets configuration information that affects the collector rather than the endpoints that communicate with it. By default, the ACL for the collector's RPC port is set to allow computers in the Active Directory Domain Computers group to write to the collector. This is the permission set by the long SDDL formatted string shown in the usage information for the <i>/a</i> parameter.</p> <p>In the case of collectors that are servicing multiple domains, however, this ACL is insufficient, because it allows only endpoints joined to the same domain as the collector to write to it. In such cases, you can use the <i>/a</i> parameter to specify a more inclusive ACL.</p>
<i>/l <level></i>	Sets the log level to error , warning , info , verbose , or debug .
<i>/s</i>	Shows the current settings.

The */s* parameter displays the default settings:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities>BTCollector /s
Current settings:
Records per period      10000
Records per batch      100
Seconds in a period    10
Database location C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities\BTCollector.db
Remote access security descriptor O:LSG:BAD:P(A;;CC;;;DC)(A;;CC;;;DA)(A;;RP;;;DA)(A;;DC;;;DA)
(A;;CC;;;BA)(A;;RP;;;BA)(A;;DC;;;BA)(A;;CC;;;S-1-5-21-418081286-1191099226-2202501032-515)
```

Remote Access Permissions

The remote access security descriptor shown in the above output is the default. It provides the following group accounts with these permissions:

- Domain Computers are allowed to create children (add events).
- Domain Administrators are allowed to create children (add events).
- Domain Administrators are allowed to read properties (read events).
- Domain Administrators are allowed to delete children (delete events).
- Built-in AD Bridge Administrators are allowed to create children (add events).
- Built-in AD Bridge Administrators are allowed to read properties (read events).
- Built-in AD Bridge Administrators are allowed to delete children (delete events).

The ACL is stored in the Windows registry of the collection server. The AD Bridge Console writes the ACL to the AD Bridge database. The **BTEventDBReaper** service pulls it from the database and writes it to the registry.

Configure the Reaper Service

BTEventDBReaper gathers events from a collector (forwarded by endpoints) and writes the events to the database. **BTCollector** stores incoming events in a local, intermediate database while **BTEventDBReaper** writes the events to the central SQL Server database.

BTEventDBReaper runs as a Windows service, but can be run from the command line to set up parameters for the service.

To view **BTEventDBReaper** arguments, run the following command:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities>BTEventDBReaper /?
```

Option	Description
/?	Displays help.
/gui	Opens a GUI where you can set the database provider and connection string. Use as an alternative to command-line.
/d PROVIDER	Sets the database provider: System.Data.SqlClient for SQL Server (default)
/c DBSTRING	Sets the database connection string to connect to the BeyondTrust database.
/f NUMBER	Sets the earliest record ID that should be copied when the agent runs. Use this parameter with caution. The /f parameter is used to control the point at which the first event in the local collector database is written to the central AD Bridge database. Under normal circumstances, it should not be necessary to set this parameter.
/r	Refreshes the agent with new registry settings.
/s	Shows the current status.
/debug	Runs as command line application with logging.

Any parameters set from the command line take effect the next time the **BTEventDBReaper** runs. To apply the settings immediately, run **BTEventDBReaper** with the **/r** argument.

To display the current configuration settings for the service, use the **/s** option:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities>BTEventDBReaper /s

Current settings:
  Database provider:      System.Data.SqlClient
  Connection string:     Data Source=RVLN-BUILD;
                        Initial Catalog=LikewiseEnterprise;
                        Integrated Security=True
  Record id last copied: 1794
  Records per period:    300
  Seconds in a period:   1200
```

Although the settings include **records per period** and **seconds in a period**, the parameters cannot be configured from the command line. The default values can be changed using the Enterprise Database Management plug-in.

Verify the Collector Processes Are Running

BTCollector and **BTEventDBReaper** are started automatically. You can run the following commands to confirm the processes are running.

Verify BTCollector is Running

1. Run the following command on the Windows computer running the collector:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities>sc query BTCollector

SERVICE_NAME: BTCollector
        TYPE               : 10   WIN32_OWN_PROCESS
        STATE                : 4    RUNNING
                        (STOPPABLE, NOT_PAUSABLE, IGNORES_SHUTDOWN)
        WIN32_EXIT_CODE      : 0    (0x0)
        SERVICE_EXIT_CODE   : 0    (0x0)
        CHECKPOINT          : 0x0
        WAIT_HINT            : 0x0
```

2. If the collector is not running, run the following command:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities>sc start BTCollector
```

Verify BTEventDBReaper is Running

1. Run the following command:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities>sc query BTEventDBReaper

SERVICE_NAME: BTEventDBReaper
        TYPE               : 10   WIN32_OWN_PROCESS
        STATE                : 4    RUNNING
                        (STOPPABLE, NOT_PAUSABLE, ACCEPTS_SHUTDOWN)
```



```
WIN32_EXIT_CODE      : 0 (0x0)
SERVICE_EXIT_CODE  : 0 (0x0)
CHECKPOINT           : 0x0
WAIT_HINT            : 0x0
```

2. If the collector is not running, run the following command:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities>sc start BTEventDBReaper
```


Set Up the Database Server Using the Command Line

IMPORTANT!

Active Directory groups must be created before you run through this procedure.

To create the AD Bridge Reporting Database using SQL Server:

1. Create a database named **LikewiseEnterprise**.
2. Copy the SQL Server database creation script (**CreateLikewiseEnterpriseDatabase.sql**) to a location accessible from SQL Server.
3. In SQL Server Management Studio, on the **File** menu, click **Open** and load the database creation script: **CreateLikewiseEnterpriseDatabase.sql**.
4. Connect to the **LikewiseEnterprise** database and run the script. If the script executes with errors, run the script again.

 For more information, see "[Active Directory Groups and SQL Server Roles](#)" on page 45.

To assign recommended roles to the database:

1. Copy **ReportingPermissions.sql** to a location accessible from SQL Server.
2. In SQL Server Management Studio, expand the **Databases** node, right-click **LikewiseEnterprise** and click **New Query**.
3. Open the **ReportingPermissions.sql** file and execute.

 **Note:** You can create the database through the Reporting Database Connection Manager (see "[Connect the Management Console to the Database](#)" on page 48).

Run the Database Update Script from the Command Line

To view the command line options for **LDBUpdate**, run the following command:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise>ldbupdate.exe /?
Usage: LDBUpdate OPTIONS
Where OPTIONS include:
-f LDAPPATH          Path of the forest to synchronize; required
-d FQDN              Domain (in forest or in trusts) to process; can repeat
```

```

-o FILE           Send output to FILE
-p PROVIDER       Use PROVIDER as the database type(default: System.Data.SqlClient)
-c STRING         Use STRING as the database connection parameter
-nogpo           Don't analyze GPOs (faster)
-v              Display verbose output
--force          Ignore the database status and perform update even if marked as busy
--debug          Display debug level output
--transaction    Perform all database operations under a single transaction.
                 Allow interactions to the database with reporting tools while
                 update is performed in the background.
--class STRING   Identify the objects to update, leaving others as is from a
                 previous update.(Examples: Users, Groups, GPOLinks, GPOs, Computers).
                 Can be repeated to identify several class types
                 LDBUpdate --class Users --class Groups -f <domain>...
--help           Displays this usage information
If the -d option is not specified, all the domains in the forest and in any trusted forests will
be processed.

```



Example: Use the command-line utility to set the provider and the connection string for a SQL Server database:

```

ldbupdate.exe -f dc=example,dc=com -p System.Data.SqlClient -c "Data Source=RVLN-BUILD;
Initial Catalog=LikewiseEnterprise; Integrated Security=True" --force

```

Troubleshoot Reporting Components Checklist

The checklists in this section can help you troubleshoot issues with the reporting components.

Endpoints

To check for issues with endpoint, confirm the following:

- **eventlog** service running
- **eventfwd** service running
- **reapsysl** service running
- **eventfwd** service properly configured
- Collector name resolvable and address reachable
- Collector principal properly set
- **/etc/syslog.conf** properly configured
- Events present in local event log (test with **eventlog-cli**)
- **eventfwd** service seems to forward messages properly (run from command line to test)
- Firewall not blocking RPC access of collector server

Collection Servers

To check for issues with the collection servers, confirm the following:

- **BTCollector** service running
- **BTEventDBReaper** service running
- Events present in local collector database (test with **BTCollector-cli**)
- **BTEventDBReaper** properly configured (test with **BTEventDBReaper /s**)
- Database provider and connection string properly set
- Collector ACL allows endpoints to write to it (set with Event Management Console)
- Collector machine account has sufficient privileges to write to database (member of **ADB_Collectors**)
- No unusual errors in Windows event log (run **eventvwr.exe**)
- Firewall not blocking incoming RPC connections or outgoing database connections

Database

To check for issues with the database, confirm the following:

- Can connect to the database with SQL Server Management Studio
- **Events** table contains events
- **EventsWithOUName** view contains events
- Database security set to allow writing by collection servers, by **ADB_LDBUpdate** and by **ADB_DB_Administrators**
- **ldbupdate** utility recently run to account for new endpoints joined to AD
- Firewall not blocking incoming database connection

Windows Reporting Components

To check for issues with the Windows reporting components, confirm the following:

- Database connection strings set properly
- User has sufficient privileges to access database
- Firewall not blocking database connections

Run Reports With Audit and Access Reporting

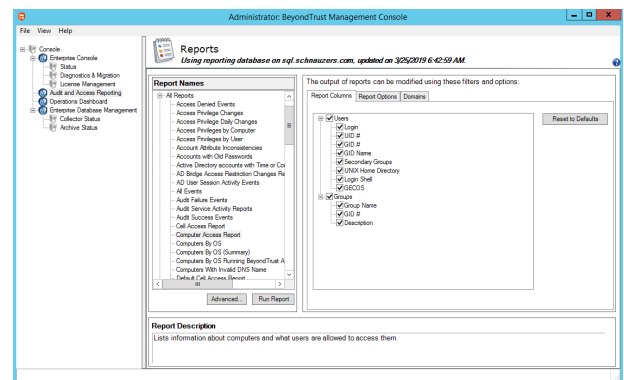
i For a list of reports available in AD Bridge, refer to the AD Bridge Report Book.

Generate a Sample Report

You can generate reports using the **Audit and Access Reporting** plug-in for the BeyondTrust Management Console.

The following procedure shows how to create a computer access report.

1. In the BeyondTrust Management Console tree, click the **Audit and Access Reporting** node.
2. Under **Report Names**, expand **All Reports**, and then select **Computer Access Report**.
3. Click **Run Report**.



Review Accounts with AD Bridge Entitlement Reporting

Entitlement reporting can provide a detailed analysis of accounts. You can use it to help review how group memberships impact access for users. You can also use entitlement reports as part of your regulatory compliance efforts.

The AD Bridge agent includes a User Monitor service that logs entitlement changes detected from local accounts and groups on each end-point computer, as well as Active Directory (AD) changes that could affect account access and roles on computers.

All detected changes in entitlement are recorded in the Event Log subsystem for each AD Bridge agent. Using event forwarding, this data can be sent to an AD Bridge audit collector computer that can provide reporting across a centralized, enterprise-wide database.

Note: For AD users, the User Monitor reports only the users who have access to the computer due to the **RequireMembershipOf** setting. If **RequireMembershipOf** is not enabled, a special pseudo user is reported. If the computer is running in Schemaless mode (see note below), the pseudo user uses the **All Users accessible from domain %s** format; otherwise the pseudo user uses the **All Users in cell %s** format.

The User Monitor only reports the AD groups of which at least one of the reported AD users is a member.

Note: Schemaless mode is deprecated.

The following entitlement reports are a sample of the many reports available. View the full list under **All Reports**, in the BeyondTrust Management Console.

Access Privileges by User

This entitlement report, organized by user name, shows which users can log into which computers and how that list has changed over time. The state of access privileges at the start date and end date are compared. Intermediate changes are not shown, so if a new user is added then deleted in the middle of the reporting time span, no change is shown in the report.

The status date field indicates the date of the last change to the user during the report time span. If a user was added and later the user's UID was changed, the date of the UID change is shown in the report.

When all of the fields in multiple rows match except for **Computer Name** and **Status Date**, those rows are collapsed so that one row is shown with a space separated list of the computers to which it applies.

When the **User Display Name**, **UID**, or **Account Type** is changed, the new value is shown followed by an asterisk (*).

Access Privileges by Computer

This entitlement report, organized by computer name, shows which users can log into which computers and how that list has changed over time. The state of access privileges at the start date and end date are compared. Intermediate changes are not shown, so if a new user is added then deleted in the middle of the reporting time span, no change is shown in the report.

The status date field indicates the date of the last change to the user during the report time span. If a user was added and later the user's UID was changed, the date of the UID change is shown in the report.

When the **User Display Name**, **UID**, or **Account Type** is changed, the new value is shown followed by an asterisk (*).

Access Privilege Changes

This entitlement report shows changes to user privileges by date. Every change is shown, including changes that are later undone. This report does not provide a list of all users who can log into the computers, only those users for which there have been changes.

When the **User Display Name**, **UID**, or **Account Type** is changed, the new value is shown followed by an asterisk (*).

Access Privilege Daily Changes

This entitlement report shows changes to user privileges on a daily basis. Every change is shown, including changes that are later undone. This report does not provide a list of all users who can log into the computers, only those users for which there have been changes.

This report provides the same information as the Access Privilege Changes by User report, but with simplified search criteria.

When the **User Display Name**, **UID**, or **Account Type** is changed, the new value is shown followed by an asterisk (*).

Account Attribute Inconsistencies

This entitlement report shows conflicts between UID, username, and GECOS.

BeyondInsight Reporting in AD Bridge

The AD Bridge GPO, **User Monitor**, sends the following data to the **BTEventDBReaper** service that then forwards the data to BeyondInsight:

- Users that are added, deleted, or changed.
- If the user has the Allow Logon rights GPO set, then changes and deletions are recorded.

No historical data is retained in the BeyondInsight database. Data is overwritten when new updates are sent to the BeyondInsight database.

Requirements

- Configure a group policy that has user monitor and event forward configured.
- If running an earlier version of **User Monitor**, you must upgrade the **BTEventDBReaper** service before upgrading User Monitor.
- After **BTEventDBReaper** is upgraded, you can upgrade the agent. If the **BTEventDBReaper** service is not updated first, it cannot process the records from the agent which will result in a failure of processing data.
- **Allow Logon Rights** must be turned on and configured for users and groups that you want to log into the agents.



Note: If **Allow Logon Rights** is not configured, the BeyondInsight report will show a single record for **All Users**. To populate the report with individual users, **Allow Logon Rights** must be set.

- AD Bridge collectors must be installed.



For more information, see ["Set Up the Collection Server" on page 46](#).

- BeyondInsight 6.2 or later.

Generate a Certificate

Generate a client certificate using the BeyondInsight Configuration tool. A certificate must be created and copied to the AD Bridge server certificate store to ensure secure communications.

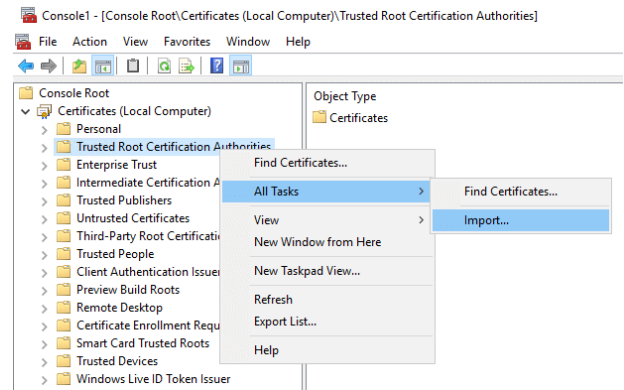
To generate a certificate:

1. Run the configuration tool, and then click **Certificate Management**.
2. Select **Generate Certificate**, and then select **Client Certificate** from the **Certificate type** menu.
3. Enter a password.
4. Click **OK**.

Copy the Certificate to the AD Bridge Server

To copy the certificate:

1. Log into the AD Bridge server, open MMC and add the Certificates Snap-in for the Local Computer account.
2. Expand **Certificates (Local Computer)**.
3. Right-click **Trusted Root Certificates > All Tasks**, and select **Import**.
4. Import the certificates created using the BeyondInsight Configuration tool.



5. Move the client certificate (**eEyeCmsClient**) to the **Personal** certificates store.

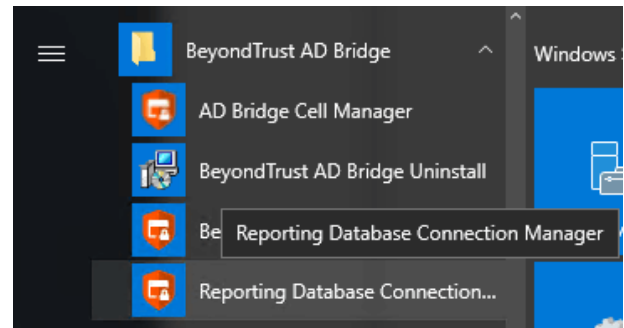
Run the Reporting Database Connection Manager Tool

You must establish a connection to the BeyondInsight server.

To run the **DBUtilities** tool:

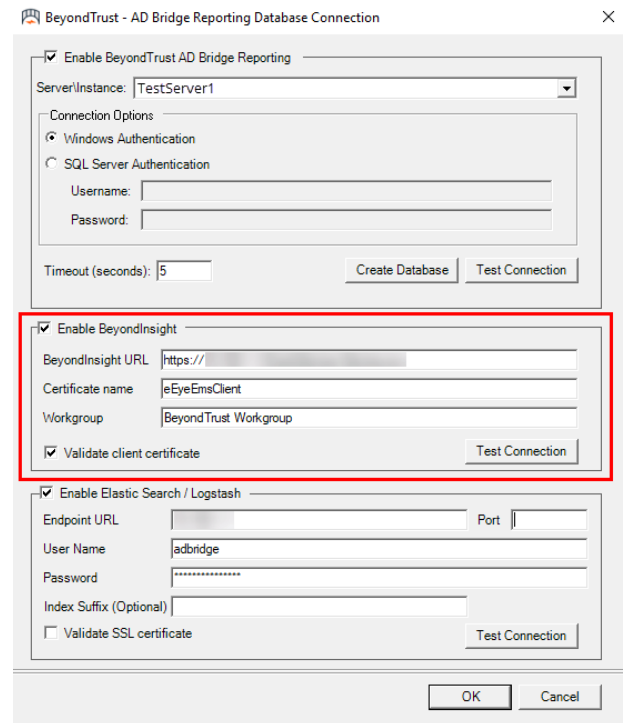
1. From the **Start** menu, select **Reporting Database Connection Manager**. You must run the connection manager as Administrator. Right-click the menu item, and then select **Run as administrator**.
 - Alternatively, you can also run the tool from the command line:

```
bteventdbreaper /gui
```



2. Check the **Enable BeyondInsight** box.

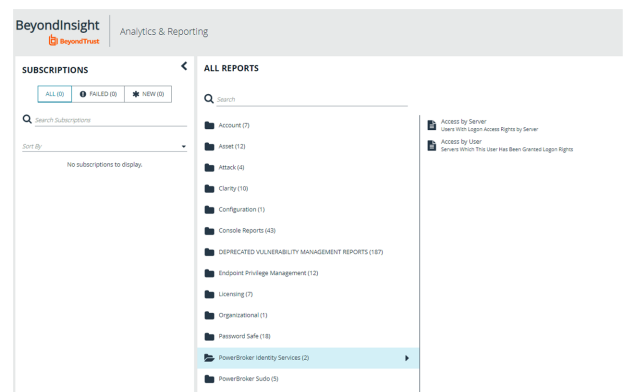
3. Enter the URL to the BeyondInsight server.
4. Enter the name of the client certificate generated earlier.
5. Optionally, create a workgroup name. A workgroup name can be used as a unique identifier.
6. Click **Test Connection** to ensure the connection between the servers is successfully established.
7. Click **OK**.



View Reports in BeyondInsight Analytics and Reporting

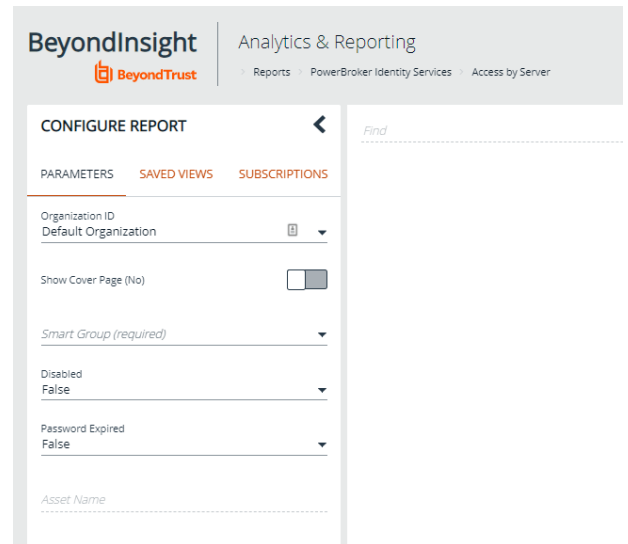
To view reports:

1. Log into **Analytics & Reporting**.
2. From the menu, select **View All Reports**.
3. Select **AD Bridge**.



4. Select a report.

5. Enter the report parameters, and then click **View Report**.



BeyondInsight | Analytics & Reporting
BeyondTrust | Reports | PowerBroker Identity Services | Access by Server

CONFIGURE REPORT

PARAMETERS | SAVED VIEWS | SUBSCRIPTIONS

Organization ID
Default Organization

Show Cover Page (No)

Smart Group (required)

Disabled
False

Password Expired
False

Asset Name

Find

Configure Elasticsearch or Logstash Reporting

Integrate the AD Bridge reporting component with Elasticsearch or Logstash. The BTEventReaper service can send events to Elasticsearch or Logstash in addition to SQL Server and BeyondInsight.

! IMPORTANT!

Either Elasticsearch or Logstash can be configured, but not both.

Note: BeyondTrust provides a common mapping for Elastic Common Scheme (ECS) that allows customers to search across events from ADB, BIUL, and PMUL.

Requirements

- Configure a Group Policy with user monitor and event forwarder enabled.
- AD Bridge collectors must be installed.
- An existing Logstash or Elasticsearch environment must already be configured. Credentials are required to connect to the Elasticsearch or Logstash server.

Run the Reporting Database Connection Manager:

1. From the **Start** menu, select **Reporting Database Connection Manager**.

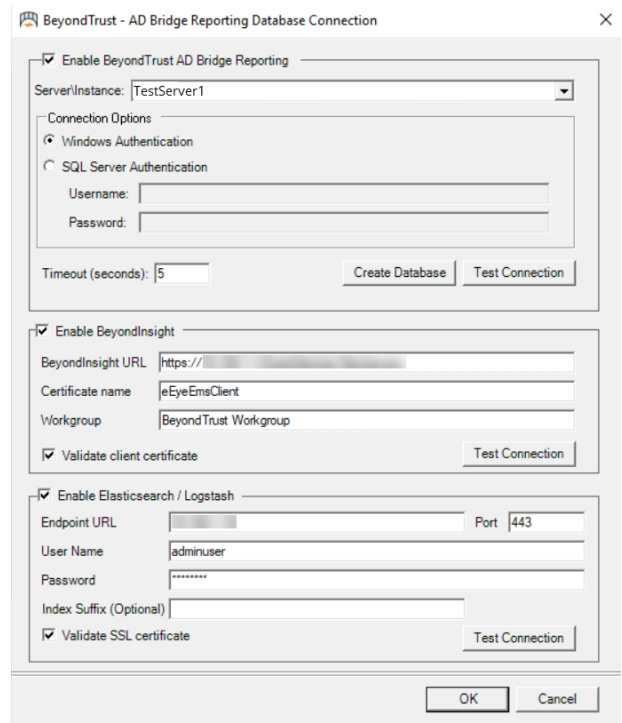
Alternatively, you can also run the tool from the command line:

C:\Program Files\BeyondTrust\PBIS\Enterprise\DBUtilities\bteventdbreaper /gui

2. Check the **Enable Elasticsearch/Logstash** box.
3. Enter the endpoint URL, user name, and password.
4. Enter the port number.
5. Click **Test Connection** to ensure the connection between the servers is successfully established.
6. Click **OK**.

Note: *Index Suffix* is an optional field. This sets the index suffix in Elasticsearch/Logstash.

i For more information about AD Bridge collectors, see ["Set Up the Collection Server"](#) on page 46.



Configure Logstash for AD Bridge

Use the following template to set up Logstash to work with AD Bridge.

Sample Configuration File

In your pipelines **.conf** file, add the following:

```
input {
  http {
    port => [PORT]
    codec => json
    password => [PASSWORD]
    user => [USERNAME]
    ssl => true
    ssl_certificate => [SSL CERT LOCATION]
    ssl_key => [SSL KEY LOCATION]
    additional_codecs => { "application/json" => "es_bulk" }
  }
}

filter {
}

output {
  #On Prem Connection Output
  elasticsearch {
    hosts => [ [URL/IP] ]
    ssl => true
    ssl_certificate_verification => true
    cacert => [CA CERT LOCATION]
    user => [USERNAME]
    password => [PASSWORD]
    index => "%{[@metadata][_index]}"
  }
  #Cloud Connection Output
  elasticsearch {
    cloud_id => [CLOUD ID - Get this from ES]
    cloud_auth => [User:Password]
    index => "%{[@metadata][_index]}"
  }
}
```

**Example:**

```
input {
  http {
    port => 8080
    codec => json
    password => "*****"
    user => "username"
    ssl => true
    ssl_certificate => "/etc/pki/tls/certs/logstash_combined.crt"
    ssl_key => "/etc/pki/tls/private/logstash.key"
    additional_codecs => { "application/json" => "es_bulk" }
  }
}

filter {

}

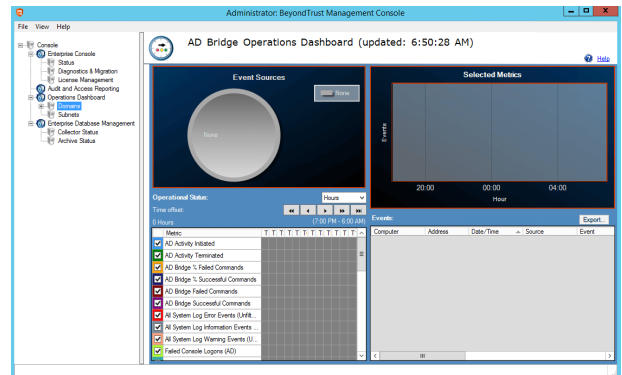
output {
  elasticsearch {
    hosts => ["https://elasticsever.com:9200"]
    ssl => true
    ssl_certificate_verification => true
    cacert => "/etc/logstash/elasticsearch-ca.pem"
    user => logstash_user
    password => password
    index => "%{[@metadata][_index]}"
  }
  elasticsearch {
    cloud_id =>
    "elasticCloud:fGtdSdffFFerdfg35sDFgsdvdsfhFRDDFZSQ1YjZiOWYzNDQwNTU0NGRkYmZiYjFjYzYzZmY2EzNzc5OQ=="
    cloud_auth => "esUser:yyNrZ4BMcpCkDbW"
    index => "%{[@metadata][_index]}"
  }
}
```

Monitor Events with the Operations Dashboard

The AD Bridge Operations Dashboard is a management plug-in for the BeyondTrust Management Console. The dashboard runs on a Windows administrative workstation connected to the AD Bridge Reporting Database and an Active Directory domain controller.

The dashboard retrieves information from the AD Bridge database to display authentication transactions, authorization requests, network events, and other security events on Linux and Unix computers.

Monitoring events such as failed logon attempts and failed sudo attempts can help prevent unauthorized access to commands, applications, and sensitive resources.



The following are some of the events the dashboard can display. You can also create and monitor custom events.

- All Success Audit Events
- All System Log Error Events
- Console Logons (AD or Local)
- Domain Joins
- Domain Leaves
- Failed Console Logons (AD or Local)
- Failed Group Policy Updates
- Failed Kerberos Refresh
- Failed Password Change
- Failed Root Logons (Local)
- Failed SSH Logons (AD or Local)
- Failed Sudo
- AD Bridge Services Failures
- Network Offline Warning
- Root Account Logons (Local)
- SSH Logons (AD or Local)
- Sudo

Configure Settings for the Dashboard

By default, the dashboard is set to display selected metrics. As you become familiar with these metrics, you can customize settings so you can track critical activities occurring in your clients.

You can:

- change the list of metrics displayed
- configure alerting
- change the refresh rate for the display
- customize metrics

Add the Dashboard to the Console

By default, the **Operations Dashboard** node is displayed in the BeyondTrust Management Console. If it is not displayed, you can add the dashboard plug-in to the console.

1. On a Windows administrative workstation, start the BeyondTrust Management Console.
2. From the **File** menu, click **Add/Remove Plug-in**.
3. Click **Add**.
4. Click **Operations Dashboard**, click **Add**, and then click **Close**.
5. Click **OK**.

Connect to a Database using the BeyondTrust Management Console

To connect to a database or change your database connection:

1. Log into the BeyondTrust Management Console.
2. Right-click **Operations Dashboard** and then click **Connect to**.
3. Click **Change**.
4. Select the database type.
5. From the **Server\Instance** list, select the instance, and then select the credentials.
6. Click **OK**.

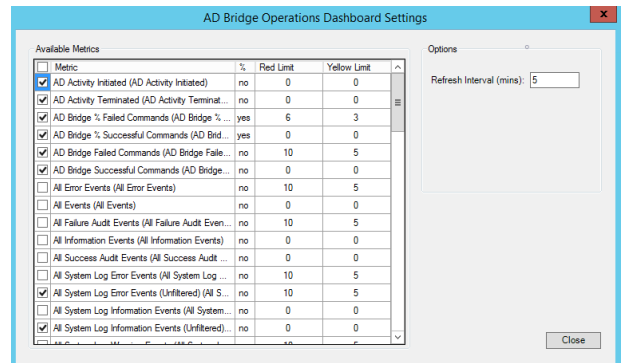
Change the Refresh Rate in the BeyondTrust Management Console

You can change the minutes that pass before the information on the dashboard is updated with the latest metrics. The default value is 5 minutes.

To change the refresh rate:

1. Log into the BeyondTrust Management Console.
2. Right-click **Operations Dashboard** and then click **Metric settings**.

- In the **Refresh Interval** box, enter the minutes that pass before the information on the dashboard is updated with the latest metrics.



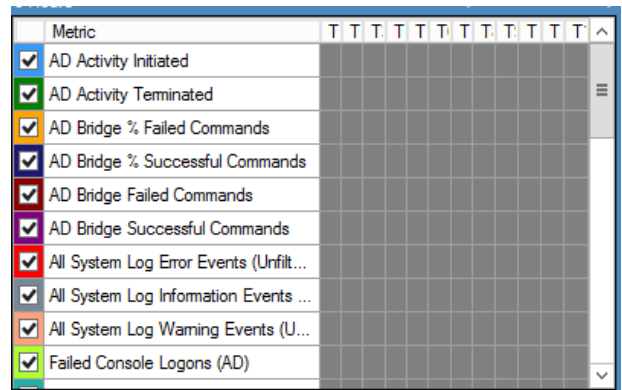
- Click **Close**.

Change the Metrics to Display on the Operations Dashboard

You can change the metrics that you want to display on the **Operations Dashboard**.

- To change the metrics displayed, log into the BeyondTrust Management Console.
- Right-click the **Operations Dashboard** node, and then click **Metric settings**.
- Scroll through the list of metrics and check or clear the boxes depending on the metrics that you want to display.

After you change the metrics, the database update program runs to ensure the data between the database and Active Directory is synchronized.



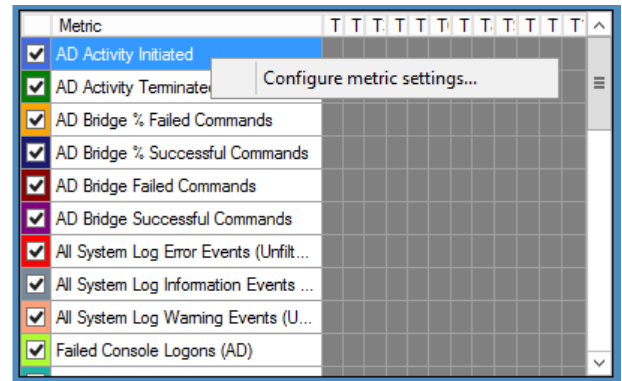
Change the Properties for a Metric

You can configure the following properties for a metric:

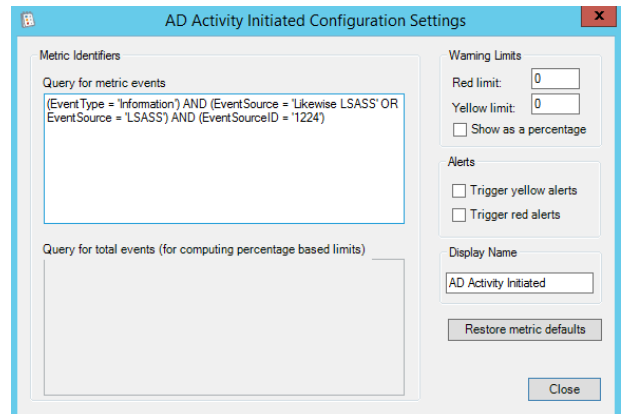
- Warning limits
 - For example, you might want to set a Red flag limit on a metric. When the activity exceeds that value, a Red flag is issued.
- Alerts
 - If you configure the warning limits, you can set an alert that will be issued when the limit is reached.
- Add a query that adds the total number of events.

To set properties for a metric:

1. Log into the BeyondTrust Management Console.
2. Expand the **Operations Dashboard** node.
3. Right-click the **Domains** node, or **Subnets** node, and then select **Metric settings**.
4. Right-click a metric, and then select **Configure metric settings**.



5. Set the warning limits.
6. Depending on your requirements, check the boxes to turn on the alerts for the warning limits.



7. Click **Close**.

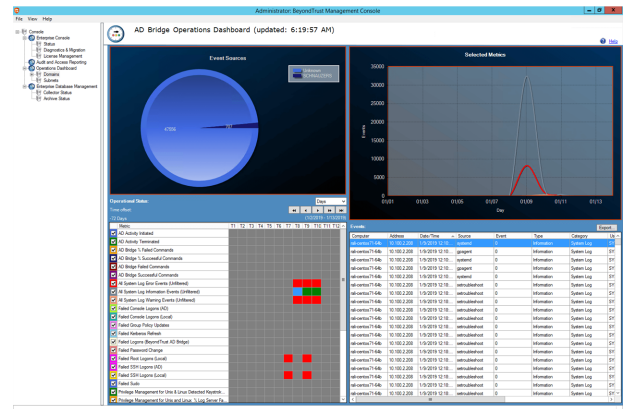
Analyze Events on the Dashboard

After you configure and customize the view on the dashboard, you can quickly view the results to determine if assets are out of compliance.

To view the number of events:

1. Log into the BeyondTrust Management Console.
2. Expand the **Operations Dashboard** node, and then expand the **Domain** node or **Subnets** node.
3. Select the domain that you want to see the events for. The following example shows **Event Sources** and **Selected Metrics**.
 - **Event Sources:** Displays the number of events that have been tracked and displays the domain name where the events occurred.
 - **Selected Metrics:** Displays the total number of events collected and the selected collection period. You can select the time frame from the **Operational Status** list to analyze trends over the time period.

In the metrics pane, you can view the assets where the events occurred. For example, in the following, select a green rectangle (that represents a period in time), which will display the computers in the right pane where the activity occurred.

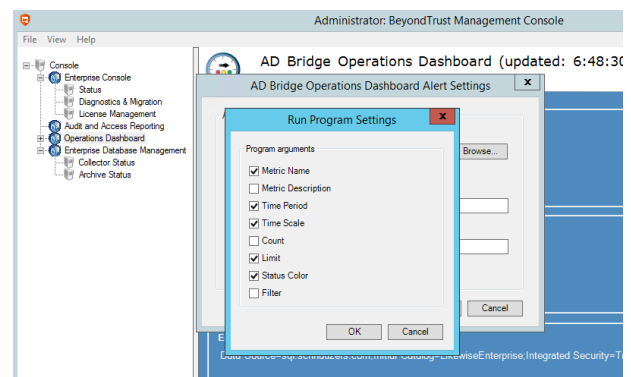


Set Alert Notifications in the BeyondTrust Management Console

You can track specific activities and receive email alerts when the activity occurs.

To track event activities and configure alerts:

1. Log into the BeyondTrust Management Console.
2. Right-click the **Operations Dashboard**, and then select **Alert Settings**.
3. On the **Operations Dashboard Alert Settings** dialog box, select the following:
 - **Run this program:** Check the box, and then click **Browse** to navigate to the program that you want to run.
 - **Command Line Arguments** Click to select the activities that you want to monitor. Click **OK**.
 - **Sent email message to:** Check this box to send email alerts. Click the **Email Settings** button to configure the SMTP server and add the email account that will receive the alerts.



Archive Events with the BTArchive

You can archive events in two ways: either with the Enterprise Database Management plug-in or with the command line.

The AD Bridge event-archiving utility **BTArchive** combines events older than one year into compressed archives and stores them in a separate database table. A separate archive is created for each month of old event data. After events are archived, they are deleted. The event-archiving utility is intended to be run according to a monthly schedule.

Archive Events using the Console

To archive events using the console:

1. In the console tree, expand **Enterprise Database Management**.
2. Right-click **Archive Status**, and then select **Create archive**.

3. Follow the instructions in the wizard.

Archive Events using the Command Line

To view the arguments of **BTArchive**, execute the following command at the shell prompt on a Windows computer running the AD Bridge collectors:

```
C:\Program Files\BeyondTrust\PBIS\Enterprise>btarchive --help
```

The **-p** and **-c** options identify the database type and connection string of the central AD Bridge database.

The connection string is the same as the one that you used when you configured the connection to the database. With SQL Server, for example, you enter a string like this:

```
Data Source=DBSERVERNAME;Initial Catalog=LikewiseEnterprise;Integrated Security=True
```



Example:

```
Data Source=W2K12-R2\SQL;Initial Catalog=LikewiseEnterprise;Integrated Security=True
```

The **-a** and **-t** options are used to control the archive time unit and the date threshold for archiving.



Note: We suggest you use the default settings, which are **-a monthly** and **-t 12**. These defaults create monthly archives for data older than 12 months.

The **-o** option is used to control where the log output of **BTArchive** is written.

By default, the output is written to the console.

Use the btopt.exe Tool to Manage Options

Using the **btopt.exe** tool, you can manage options for AD Bridge from the command-line of a Windows administrative workstation connected to Active Directory. You can, for example, set an option to use *sequential IDs* instead of *hashed IDs*. In addition, after you set the option to use sequential IDs, you can set the initial UID number for a cell.

The **btopt.exe** tool is installed on computers running AD Bridge in the following directory:

C:\Program Files\BeyondTrust\PBIS\Enterprise

```
C:\Program Files\BeyondTrust\PBIS\Enterprise> .\btopt.exe --help
btopt - configures local Windows options
Usage: btopt OPTIONS
OPTIONS:

--status                Show current configuration status
--narrowsearch          Only search the Default Cell on the local domain
--widesearch           Search the Default Cell across all domains and two-way forest
                        trust
--sequential           Use sequential IDs instead of hashed IDs
--hashed               Use hashed IDs
--foreignaliases       Allow the use of aliases for users and groups from other domains.
--noforeignaliases     Disallow the use of aliases for users and groups from other
                        domains.
--usegc               Use the Global Catalog to speed up searches (default)
--ignoregc            Do not use the Global Catalog to speed up searches
--startUID=#          Sets the initial UID number for a cell (if --sequential)
--startGID=#          Sets the initial GID number for a cell (if --sequential)
--minID=#             Sets minimum UID and GID number configurable through the UI
--cell=LDAPPATH       Identifies the cell whose initial IDs (if --sequential)
                        Example: LDAP://somedc/ou=anou,dc=somecom,dc=com
--enableloginnames    Sets the default login names to all the users enabled in all the
                        cells.
--disableloginnames   Disable the enable default login names option to all users
                        enabled in all the cells.
--disablesuggestbutton Disable "Suggest" button, which is used to suggest UID/GID
                        assignment to users and groups in the cells.
--enablesuggestbutton Enable "Suggest" button, which is used to suggest UID/GID
                        assignment to users and groups in the cells.
--maxGroupsForUser=#  Sets the maximum number of groups to display for a user on the
                        Properties dialog box.
--maxArchiveEventsPerBatch=# Sets the maximum number of events that can be used in a batch
                        while archiving.
--enablegidvalidation The Active Directory user account will be associated with the GID
                        value migrated from the UNIX/Linux account information.
--disablegidvalidation When turned off, you can set the GID value to any number – the
                        GID value is not associated with a specific group. GID validation
                        is disabled by default. When GID validation is disabled, the
                        --minID option is enforced but there are no other restrictions.
                        Any numerical GID can be selected.
--enableAssumeDefaultCell Enables Assume Default Cell.
--disableAssumeDefaultCell Disables Assume Default Cell.
--help                Displays this usage information
```

If the `--startUID` or `--startGID` option is set, the `--cell` option must also be set.

Communicate With BeyondTrust Technical Support

BeyondTrust provides an online knowledge base, as well as telephone and web-based support.



For BeyondTrust Technical Support contact information, please visit www.beyondtrust.com/support.

Before Contacting BeyondTrust Technical Support

To expedite support, collect the following information to provide to BeyondTrust Technical Support:

- AD Bridge version: available in the AD Bridge Console by clicking **Help > About** on the menu bar
- AD Bridge Agent version and build number
- Linux or Unix version
- Windows or Windows Server version

If you are contacting BeyondTrust Technical Support about one of the following issues, also provide the diagnostic information specified.

Segmentation Faults

Provide the following information when contacting BeyondTrust Technical Support:

- Core dump of the AD Bridge application:

```
ulimit - c unlimited
```

- Exact patch level or exact versions of all installed packages

Program Freezes

Provide the following information when contacting BeyondTrust Technical Support:

- Debug logs
- tcpdump
- An **strace** of the program

Domain-Join Errors

Provide the following information when contacting BeyondTrust Technical Support:

- Debug logs: copy the log file from **/var/log/pbis-join.log**
- tcpdump

All Active Directory Users Are Missing

Provide the following information when contacting BeyondTrust Technical Support:

- Run `/opt/pbis/bin/get-status`
- Contents of `nsswitch.conf`

All Active Directory Users Cannot Log On

Provide the following information when contacting BeyondTrust Technical Support:

- Output of `id <user>`
- Output of `su -c 'su <user>' <user>`
- `lsass` debug logs

i For more information, see *Generate Debug Logs in the AD Bridge Troubleshooting Guide*, at www.beyondtrust.com/docs/ad-bridge/how-to/troubleshoot.

- Contents of `pam.d/pam.conf`
- The `sshd` and `ssh` debug logs and `syslog`

AD Users or Groups are Missing

Provide the following information when contacting BeyondTrust Technical Support:

- The debug logs for `lsass`
- Output for `getent passwd` or `getent group` for the missing object
- Output for `id <user>` if user
- `tcpdump`
- Copy of `lsass` cache file.

Poor Performance When Logging On or Looking Up Users

Provide the following information when contacting BeyondTrust Technical Support:

- Output of `id <user>`
- The `lsass` debug log
- Copy of `lsass` cache file.

i For more information about the file name and location of the cache files, see the *AD Bridge Linux Administration Guide*, at www.beyondtrust.com/docs/ad-bridge/getting-started/linux-admin.

- `tcpdump`

Generate a Support Pack

The AD Bridge support script copies system files that AD Bridge needs to function into an archive. This archive can then be sent to support to assist in the investigation.

Installed location:

`/opt/pbis/libexec/pbis-support.pl`