



BeyondTrust

Privileged Identity 7.3 Upgrade Guide

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Upgrade Privileged Identity

This guide describes how to upgrade Privileged Identity (PI) from a previous installation.



Note: If you are on a version prior to 5.5.3.0, you must upgrade to version 5.5.3.0 before upgrading further. If you are on a version prior to 5.5.4.4, you must upgrade to version 5.5.4.4 before upgrading further. If you are on version 5.5.4.4 or later, you may upgrade to the latest version. Failure to follow this upgrade path may result in unexpected post-upgrade behavior.



For details on each release of Privileged Identity, please see the [Privileged Identity Release Notes](https://www.beyondtrust.com/docs/release-notes/privileged-identity/index.htm) at <https://www.beyondtrust.com/docs/release-notes/privileged-identity/index.htm>.

Upgrade Preparation and Prerequisites

- Prior to upgrading, be sure to back up the program's database. During the upgrade, structures within the database are updated and may not be compatible with older versions of the product.
- If the program database is running on SQL Server 2005 or older, the database will need to be re-hosted on SQL Server 2012 or newer version prior to upgrading.
- If upgrading from version 4.83.4 or older and you are running the solution on a Windows 2003 Server, you must migrate the installation to a Windows Server 2012 or later operating system. Privileged Identity is not supported on any version of Windows Server prior to Windows Server 2012.
- Versions of the product prior to version 4.83.4 did not use ASP.NET. The ASP.NET IIS role must be installed and enabled prior to upgrading to this version.
- Starting with version 5.5.2 of the product, Microsoft .NET Framework version 4.5.2 is a requirement for the web service, CLR interop (Extension framework), SAML/DUO and some of the propagation types.
- Starting with version 5.5.2 of the product, the web service is a requirement for the web application to function. This also adds new requirements to the host servers.



For more information on prerequisites prior to upgrading, please see [Privileged Identity Installation Prerequisites](https://www.beyondtrust.com/docs/privileged-identity/install/prerequisites/index.htm) at <https://www.beyondtrust.com/docs/privileged-identity/install/prerequisites/index.htm>.

Upgrade Roadmap

The following provides a roadmap for the steps necessary to upgrade Privileged Identity.

Preparation

Document an Inventory of Your Existing Privileged Identity Environment

You will need a complete inventory of every server that is running one or more PI components during the upgrade process. Documenting every piece of your PI environment is crucial.

i For more information, please see "[Document an Inventory of Your Existing Privileged Identity Environment](#)" on page 9.

Download the Privileged Identity Installer

Log into the [BeyondTrust Customer Portal](#) to download the Privileged Identity installer file.

i For more information, please see "[Download the Privileged Identity Installer](#)" on page 10.

Review Prerequisites and Install Required Software

Understand the product requirements prior to installation by reviewing the release notes, prerequisites, host system requirements, database requirements, and service account requirements.

Also, run the Prerequisites Checker on each PI component server and resolve any noted deficiencies.

i For more information, please see "[Review Prerequisites and Install Required Software](#)" on page 11.

Back Up Privileged Identity Data Store, Components, and Servers

If there are any difficulties during or after upgrade and a rollback is required, the upgraded database may prevent previous functionality from working. The database and encryption key are required for disaster recovery purposes. The encryption key is the only way to recover PI data if PI itself is not available.

The license key and recovery access password should be backed up in case you need to perform a fresh install of PI. Store the license key and recovery access password in a location outside of your PI environment (for example, external media or a server not used to host any PI components).

Create and test backups of the servers that host one or more PI components in your environment.

i For more information, please see "[Back Up Privileged Identity Data Store, Components, and Servers](#)" on page 13.

Perform Database Maintenance and Delete Stored Procedures and Views

This step is optional; however, it is highly recommended. Perform SQL Server database maintenance, including SQL Server Index Defragmentation, SQL Server Index Tuning, and Privileged Identity App Data Store Maintenance in accordance with your organization's data retention policies. Also run a query to remove stored procedures and views and remove the version tracking from the database.

 For more information, please see "[Perform Database Maintenance and Delete Stored Procedures and Views](#)" on page 15.

Remove Existing Privileged Identity Components

Remove All Deferred Processors and Zone Processors

Use the PI management console or Windows Services snap-in to stop and remove all of the deferred and zone processing services. This ensures that jobs will not be processed during the database upgrade and helps prevent any data loss or corruption.

 **Note:** In product versions 5.5.2 and earlier, the **Deferred Processing Service** was called **Enterprise Random Password Manager Deferred Processing Service**.

 For more information, please see "[Remove Deferred Processors and Zone Processors](#)" on page 18.

Remove All Web Application Instances and Web Services

If upgrading from version 5.5.2 or earlier, the web site registration and naming process follows a different process than 5.5.2.1 or later. Failure to remove existing web sites will cause multiple registrations with different names to appear in the web site registration dialog and can cause your security and other settings not to take effect.

 For more information, please see "[Remove All Web Application Instances and Web Services](#)" on page 20.

Upgrade Privileged Identity Components

Upgrade the Management Console

The primary management console is the administrative component where most settings for Privileged Identity are configured. If you have multiple management consoles, upgrade your primary licensed management console first. Launch that console, and then upgrade any other secondary management consoles.

 **IMPORTANT!**

All Privileged Identity management consoles must be closed prior to running the upgrade installer.

i For more information, please see "[Upgrade the Management Console](#)" on page 23.

Upgrade the Web Application Instance

The web application is used by consumers and auditors. Consumers will retrieve secured passwords or establish sessions through a delegated and audited process. Auditors will be able to generate reports and audit settings.

i For more information, please see "[Upgrade the Web Application Instance](#)" on page 27.

Upgrade the Web Service

The web service provides API-based functionality via a SOAP or REST-based URI and is required by the web application, PowerShell, federated logins (SAML/OAUTH), and application launcher modules. The web service is deployed from a separate installer or can be pushed from the management console with version 5.5.2.1 or later of the product.

i For more information, please see "[Upgrade the Web Service](#)" on page 29.

Upgrade Scheduling Services

Upgrade the Deferred Processing Services as well as Zone Processors.

i For more information, please see "[Upgrade Scheduling Services](#)" on page 36.

Install One or More Zone Processors

This step is optional. A zone processor is a remotely deployed scheduling service designated to perform specific jobs against a specific list of systems and devices (management set). Conversely, the default deferred processor is installed with the management console and will handle any configured jobs against any and all lists of systems. Zone processors are typically used in demilitarized zones (DMZs) or distributed networks where normal communication may not be allowed. Zone processors are also used to improve the job processing throughput of the entire solution. Zone processors may also require secondary installations of integration components and the cross-platform support library.

i For more information, please see [Deploy Zone Processors](#) at <https://www.beyondtrust.com/docs/privileged-identity/deployment/deploy-zone-processors.htm>.

Upgrade the PowerShell Cmdlets

PowerShell cmdlets extend the management of Privileged Identity to a command line scripting environment.

i For more information, please see "[Upgrade PowerShell](#)" on page 39.

Upgrade Application Launching and Session Recording Components

Application launching allows users to enter a privileged session without gaining access to the underlying credentials (password, key, etc.) using a secured host where session recording may also be enabled for the session.

i For more information, please see "Upgrade Application Launcher and Session Recording Software" on page 40.

Install the Syslog Forwarder Service

This service is listed for syslog UDP traffic and retransmits it using SSL or TCP for greater security and reliability when forwarding events to loggers and SIEM products.

i For more information, please see *Using the Syslog Forwarder to Forward Syslog & MSMQ* in the [Privileged Identity Admin Guide](#) at <https://www.beyondtrust.com/docs/privileged-identity/documents/pi-admin.pdf>.

Prepare for Upgrade

This section covers the following preparation steps required before upgrading your PI installation.

1. Document a system inventory of your existing Privileged Identity environment.
2. Download the Privileged Identity installer from the [BeyondTrust Customer Portal](#).
3. Review product release notes, prerequisites, and requirements for all Privileged Identity component servers.
4. Run the Privileged Identity Prerequisites Checker on all component servers, and make updates where necessary.
5. Backup the Privileged Identity data store, encryption key, license key, and the recovery access password.
6. Perform maintenance on the data store and delete stored procedures and views.
7. Back up servers and checkpoint virtual machines.

Document an Inventory of Your Existing Privileged Identity Environment

You will need a complete inventory of every server that is running one or more PI components during the upgrade process. Documenting every piece of your PI environment is crucial.



IMPORTANT!

If a component that you are unaware of is missed during the upgrade and allowed to connect to the upgraded Data Store, the result will be data corruption. In the worst case scenario you may lose some or all of your data (passwords, jobs, logs, etc.) and cause a production outage.

Document system names, fully qualified domain names (FQDN), NetBIOS names, IP addresses, as well as which PI components or services that run on each system. For each zone processor, document its **Job Types** and **Management Set Affinities**. You will encounter fewer problems and make your upgrade more efficient if you have a complete understanding of your PI environment, including any other systems that PI may rely on, such as load balancers. Below is an example spreadsheet that documents a PI environment.

	A	B	C	D	E	F	G	H	I	J	K
1	System Name	FQDN	NETBIOS Name	IP Address	PI Console?	PI Deferred Processor?	PI Zone Processor?	PI Web Service?	PI Web Instance?	PI Data Store?	Other
2											
3	pim	pim.xyzcorp.com	PIM	x.x.x.x	Y	Y	N	Y	Y	N	
4	pim2	pim2.xyzcorp.com	PIM2	x.x.x.x	N	N	N	Y	Y	N	
5	sqldb1	sqldb1.xyzcorp.com	SQLDB1	x.x.x.x	N	N	N	N	N	Y	
6	sqldb2	sqldb2.xyzcorp.com	SQLDB2	x.x.x.x	N	N	N	N	N	Y	
7	sqlisten	sqlistener.xyzcorp.com	SQLIST	x.x.x.x	N	N	N	N	N	N	Listener for SQL cluster that hosts PI Data Store
8	intranet	intranet.xyzcorp.com	INTRANET	x.x.x.x	N	N	Y	N	N	N	
9	nlb	nlb.xyzcorp.com	nlb	x.x.x.x	N	N	N	N	N	N	Web Load Balancer

Download the Privileged Identity Installer

1. Log into the [BeyondTrust Customer Portal](#).
2. Click **Downloads**.
3. Under **Categories**, select **File Downloads**.
4. Click the **File Downloads** link.
5. From the **Product** list, select **BeyondTrust Privileged Identity**.
6. From the **Version** list, select the most recent version.
7. Click **Submit**.
8. When the page refreshes, click the link in the automated response to download the installer. The file is named similar to this: **PrivilegedIdentityInstaller_6.0.0.0_999999_9999_z9z99z9z99.exe**.
9. After the file downloads to the local **Downloads** folder, you can copy it to any folder on the server that hosts your primary management console.

Review Prerequisites and Install Required Software

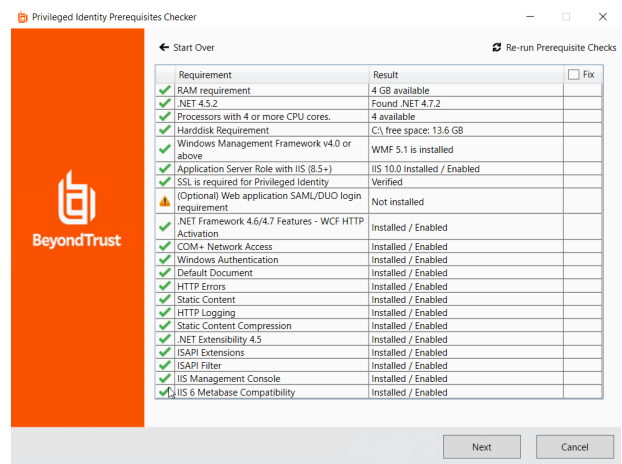
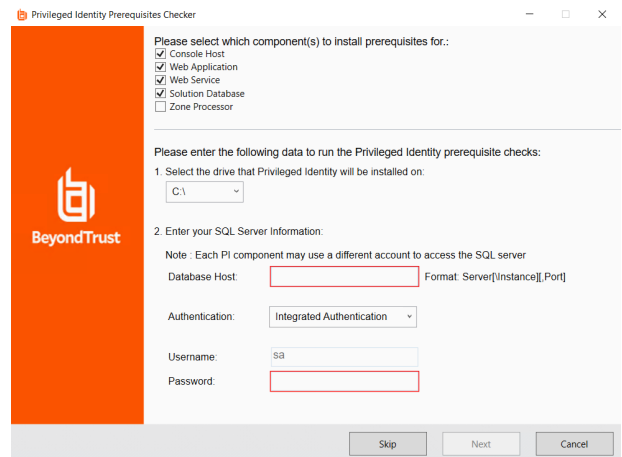
Understand the product requirements prior to installation by reviewing the following:

- [Release notes for the release you are installing](#)
- [Privileged Identity Installation Prerequisites](#)
- [Host System Requirements](#)
- [Database Requirements](#)
- [Service Account Requirements](#)

Run the Privileged Identity Prerequisites Checker on All Component Servers

Run the Prerequisites Checker on each PI component server and resolve any noted deficiencies, as follows:

1. Copy the PI Installer to each PI component server and perform the following steps on each PI component server.
2. Double-click the installer to extract it. When the extraction process is complete, the Privileged Identity Prerequisites Checker displays.
3. Select the PI components that run on this server where you are running the checker, and then click **Next**.
4. Compare each result to the requirement and resolve deficiencies where necessary.
5. Click **Cancel** to close the checker and cancel the PI software installation process.





Note: The Prerequisites Checker may not recognize the proper amount of RAM and number of CPU cores allocated to virtual machines, in which case those warnings can be ignored.

Also, the Prerequisites Checker may display a warning if PI Identities (service accounts) do not have the **dbcreator** role on the database. The **dbcreator** role is required only for new installations, so in the case of an upgrade, this warning can be ignored.

The optional ASP.NET Core IIS Module is required only if SAML/DUO authentication is used.



IMPORTANT!

If there are any remaining warnings or failures after running the Prerequisites Checker on every PI server, please stop your upgrade and contact BeyondTrust Technical Support at support.beyondtrust.com for assistance.

Back Up Privileged Identity Data Store, Components, and Servers

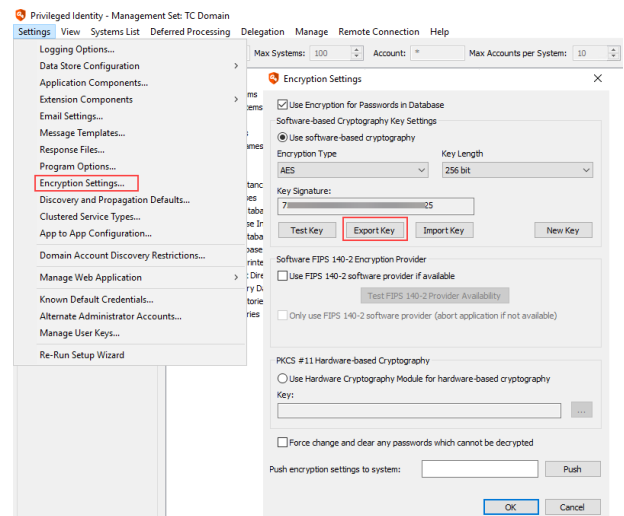
Back Up the Data Store

Make a complete backup of the database(s) that contain your PI Data Store, following your database vendor's documentation and your organization's backup procedure. Also, test your backup. Store the backup in a location outside of your PI environment. For example, store it on external media or on a server not used to host any PI components.

Back Up the Encryption Key

The PI encryption key should not be needed for a successful upgrade; however, it should be backed up before making major changes, because it is the only way to recover PI data if PI itself is not available.

1. In the PI management console, select **Settings > Encryption Settings**.
2. Click **Export Key** to save a Windows registry edit file that contains the key.
3. Store the backup key in a location outside of your PI environment. For example, store it on external media or a server not used to host any PI components.



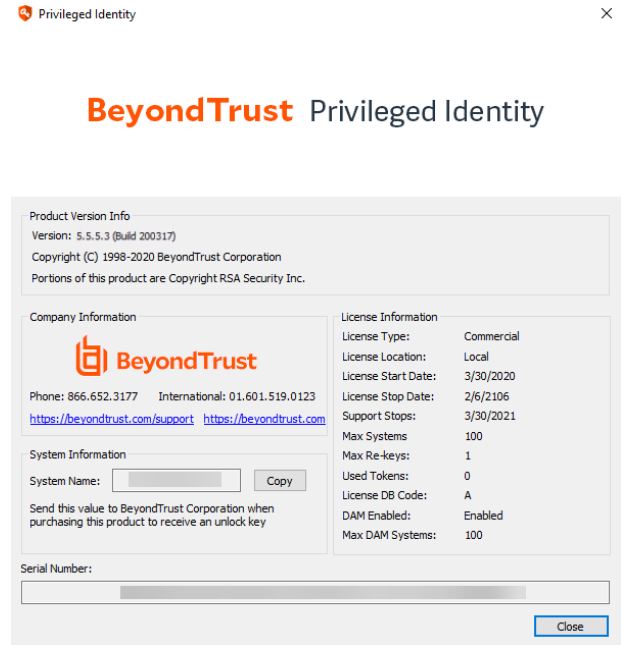
Note: If using a hardware security module (HSM), be sure you know the key store and PIN to access your HSM.

Back Up the License Key

The PI license key should not be needed for a successful upgrade; however, it should be backed up before making major changes, because it is required to perform a fresh install of PI, if necessary.

1. In the PI management console, select **Help > About**.

2. Copy the **System Name**, which is the NetBIOS host name, and the **Serial Number**, which is the license key.
3. Store the backup key in a location outside of your PI environment. For example, store it on external media or a server not used to host any PI components.



Back Up the Recovery Access Password

It allows you to view stored managed passwords in the management console. Your recovery access password is not stored in PI. To use this password in *break glass* situations, you need to locate it from where you have it stored externally. Ensure you have the recovery access password stored before upgrading your PI software.

Back Up Privileged Identity Servers and Checkpoint Virtual Machines

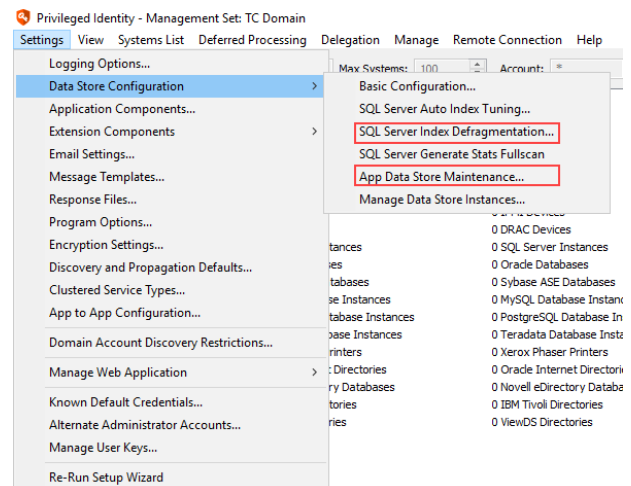
Create and test backups of the servers that host one or more Privileged Identity components in your PI environment. This includes, but is not limited to:

- Primary and secondary management console servers
- Web service servers
- Web instance application servers
- All servers that host a zone processor
- All servers that host an additional deferred processor
- Load balancers, proxies, and other servers that do not host PI components but are required to access PI in your production environment

Perform Database Maintenance and Delete Stored Procedures and Views

Perform SQL Server Database Maintenance

Performing maintenance on your PI Data Store is optional; however, it is recommended. Perform SQL Server database maintenance, including **SQL Server Index Defragmentation** and **App Data Store Maintenance** in accordance with your organization's data retention policies. These options can be accessed from the **Settings > Data Store Configuration** menu in the PI management console.



Delete Stored Procedures and Views

Run the following SQL Query against your PI database to ensure that stored procedures and views do not carry forward to your upgraded database. The query removes stored procedures and views, and also removes the version tracking from the database. This triggers a rewrite of the stored procedures the first time you launch your upgraded PI management console and it connects to the database.

```

DECLARE @procedureName varchar(500)
DECLARE cur CURSOR
    FOR SELECT [name] FROM sys.objects WHERE type = 'p'
OPEN cur

    FETCH NEXT FROM cur INTO @procedureName
    WHILE @@fetch_status = 0
    BEGIN
        EXEC('DROP PROCEDURE ' + @procedureName)
        FETCH NEXT FROM cur INTO @procedureName
    END
CLOSE cur
DEALLOCATE cur
DECLARE @viewName varchar(500)
DECLARE cur CURSOR
    FOR SELECT [name] FROM sys.objects WHERE type = 'v'
OPEN cur

    FETCH NEXT FROM cur INTO @viewName
    WHILE @@fetch_status = 0

```

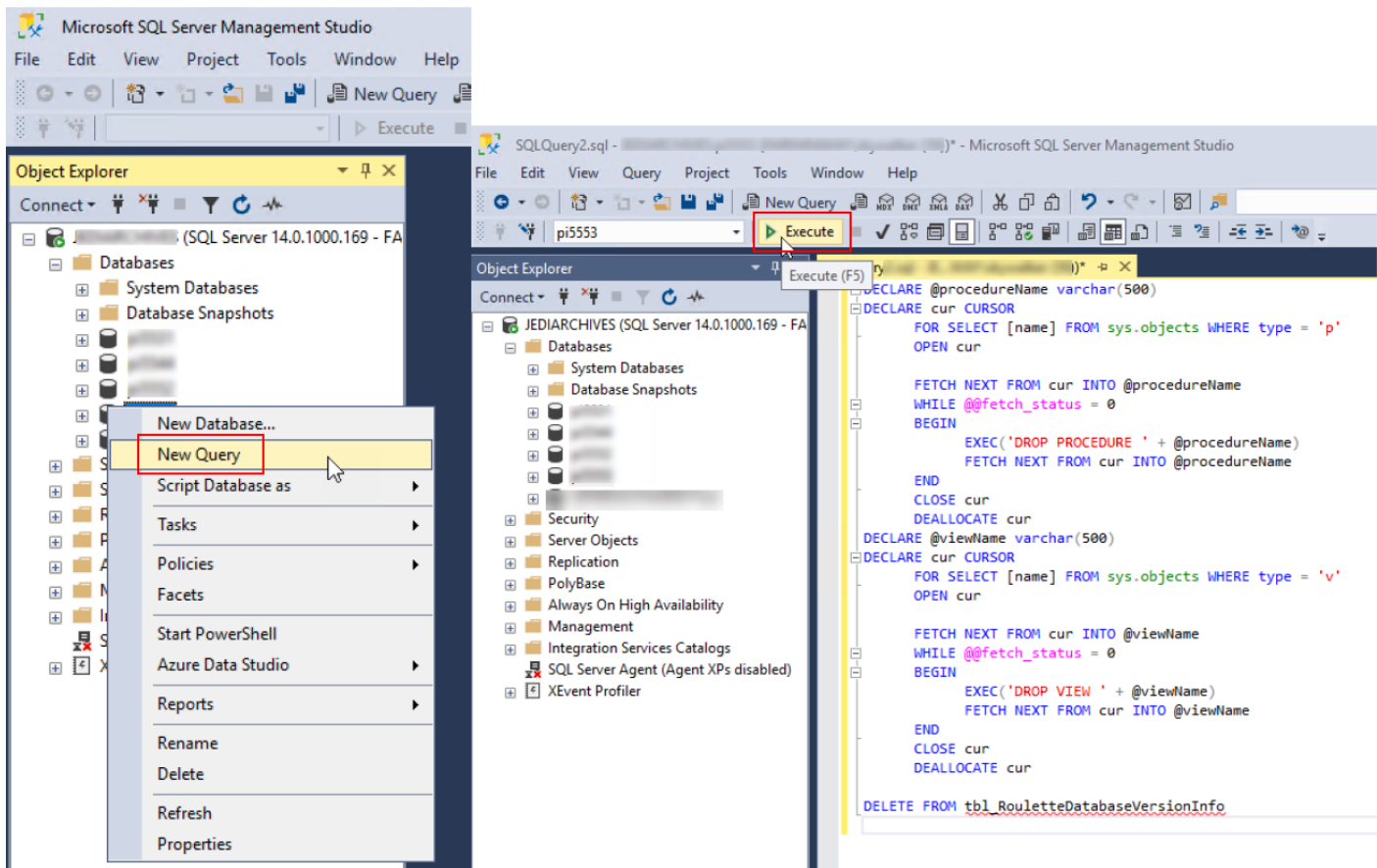
```

BEGIN
    EXEC('DROP VIEW ' + @viewName)
    FETCH NEXT FROM cur INTO @viewName
END
CLOSE cur
DEALLOCATE cur

DELETE from tbl_RouletteDatabaseVersionInfo
    
```

To run the query:

1. In SQL Server Management Studio, right-click your PI database, and then select **New Query** from the menu.
2. Copy and paste the above query into the blank query window on the right.
3. Click **Execute**.
4. Close SQL Server Management Studio without saving the query.



Remove Existing Privileged Identity Components

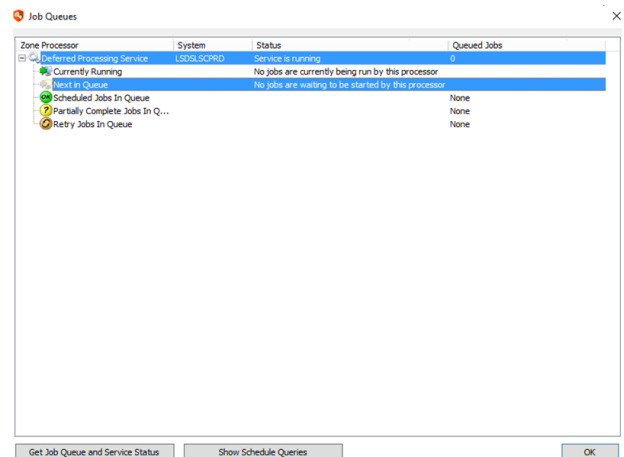
Before installing a newer version of Privileged Identity, components of your existing installation must be removed. This section walks you through removing the following PI components:

- Deferred Processor
- Zone Processors
- Web Application
- Web Service

Remove Deferred Processors and Zone Processors

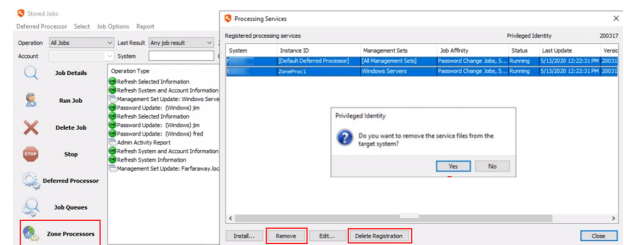
Remove deferred processors and zone processors to ensure that jobs will not be processed during the database upgrade. This prevents data corruption or loss of data. We recommend removing all processors as opposed to simply stopping them. System reboots are required during the upgrade process which cause the processors to restart. Before removing the processors, ensure that jobs are not currently running.

1. From the **Actions** pane in the management console, click **Jobs**, and then click **Job Queues**.
2. In the **Job Queues** dialog, select all items, and then click **Get Job Queue and Service Status**.
3. Expand each service and check the status column for **Currently Running**. The status should indicate **No jobs are currently being run by this processor**.
4. If the status indicates a job is running, it is best to wait for the job to finish or you may damage the job or cause other problems in your network due to a partially complete job. Further, if a job is running, also check the **Queued Jobs** column for each processor and note how many jobs are in the queue to process. It is best to wait for the jobs to finish or to take note of their Job IDs and disable them before they are run so you may perform the upgrade.



Note: If a zone processor's job queue is not accessible from the primary management console, you will need a secondary management console in that zone processor's zone.

5. If the jobs list is empty or no jobs are currently running, close the **Job Queues** dialog.
6. On every management console, from the **Actions** pane, click **Jobs**, and then click **Deferred Processor**.
7. In the **Deferred Processor** dialogue, under the **Deferred Processor Controls**, click **Stop**, then click **Remove**.
8. From the **Actions** pane, click **Zone Processors**.
9. In the **Processing Services** dialog, select each service one at a time, and then click **Remove**.
10. When prompted to remove the service files and service registry settings, click **Yes** for each prompt, and then click **Delete Registration**.



Note: If there are any problems communicating with the services control manager on the remote systems, you should go to each system, and then open the **Services snap-in** within Windows, locate **RouletteSked\${ZONE-NAME}**, and stop the service.

Also, if a remote zone processor was not deployed by the management console, you may not be able to remove it using the management console. There is no way to tell in the console how a zone processor was deployed. If you are encountering issues with removal, follow the steps below for removal by logging into the remote host system for that zone processor.

Remove Zone Processor Manually from Remote Host System

If the remote zone processor was not deployed by the management console, follow these steps:

1. Log into the host system for the remote zone processor.
2. Open **Programs and Features**.
3. Find the **BeyondTrust Zone Processor** installer and remove it.
4. From the **Actions** pane in the management console, click **Jobs**, and then click **Zone Processors**.
5. In the **Processing Services** dialog, select the zone processors in question one at a time, and then click **Delete Registration**.

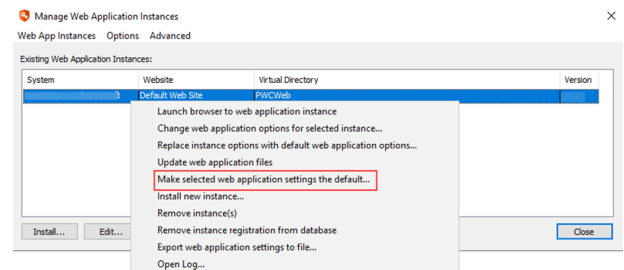
**IMPORTANT!**

Failure to locate and permanently stop or remove ALL job processors may cause corruption in your PI Data Store and could result in system-wide data loss and unrecoverable passwords after your Data Store has been upgraded.

Remove All Web Application Instances and Web Services

Remove Web Application Instances

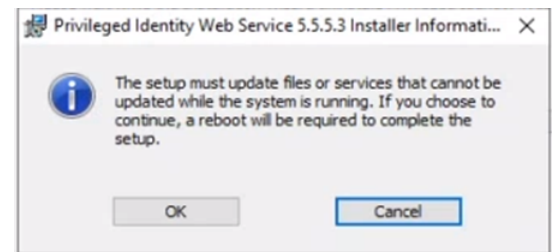
1. On all servers hosting web components, open **Services** and stop the **IIS Admin Service**.
2. On all servers hosting web components, open **Component Services** and shut down the following applications:
 - PWCWebComApp
 - Lieberman ERPMWebService
 - PWC Extension - Account Store (CLR)
 - RSA SecureID
3. From the **Actions** pane, click **Manage Web App**.
4. In the **Manage Web Application Instances** window, right-click a web application instance, and then select **Make selected web application settings the default**. This stores the current web app settings in the database, which saves time and reduces possible upgrade errors when deploying the upgraded web app instances.



5. With web app settings now stored, select each web app instance one at a time, and then click **Remove**.
6. Click **Yes** when prompted with the *Are you sure you want to remove these installations?* message.

Remove Web Services

1. If the PI web service resides on the same server where your primary management console resides, take the following steps to launch the web service install wizard. If the web service resides on remoter servers, go to step #2.
 - Open the management console, and then click **Manage Web App** from the **Action** pane.
 - In the **Manage Web Application Instances** dialog, click **Install Web Service**.
2. Copy the **ERPMWebService.exe** web service installation file for the currently installed PI version from your primary PI management console server to each web service host server, and then double-click the file to start the web service install wizard.
3. Click **Next** on the **Welcome** screen.
4. Click **Next** on the **Program Maintenance** screen.
5. Click **Remove** on the **Remove the Program** screen.
6. If you see this information message during the removal process, this indicates there is a component running in **Component Services** or in the **Application Pools** in **IIS Manager**. Click **OK**. A system reboot will be required.



7. Click **Finish** on the **Installation Wizard Completed** screen.
8. Repeat this process for all installations of the web service.
9. Close the primary management console.

Upgrade the Privileged Identity Components

In this section, we walk through installing the Privileged Identity software to upgrade the following components:

- Management Console
- Web Application Instance
- Web Service
- Scheduling Services
- PowerShell
- Application Launcher

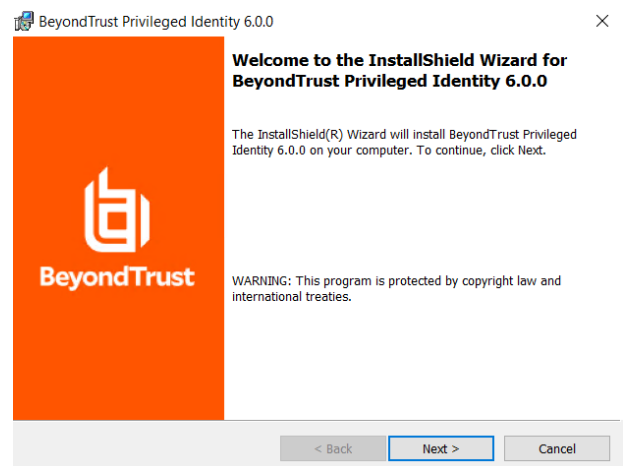
Upgrade the Management Console

Performing an upgrade is very much like performing an initial installation except that all previous settings configured in the management console are stored in the Data Store and will not need to be reconfigured.

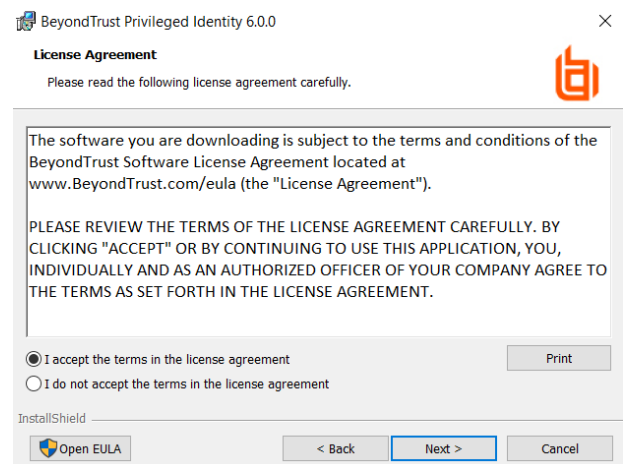
After upgrading the management console and before performing any other steps, be sure to launch the management console at least once. This step is required to upgrade the database.

If you have multiple management consoles, upgrade your primary licensed management console first. Launch that console, and then upgrade any other secondary management consoles.

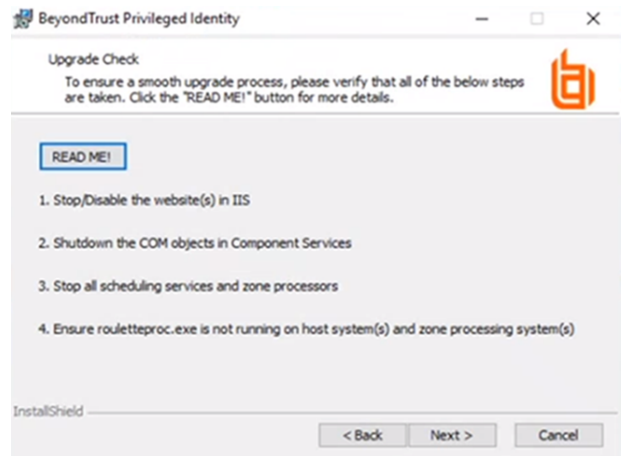
1. Launch the Privileged Identity installer.
2. Click **Skip** on the **Prerequisites Checker**.
3. On the **Welcome** screen, click **Next**.



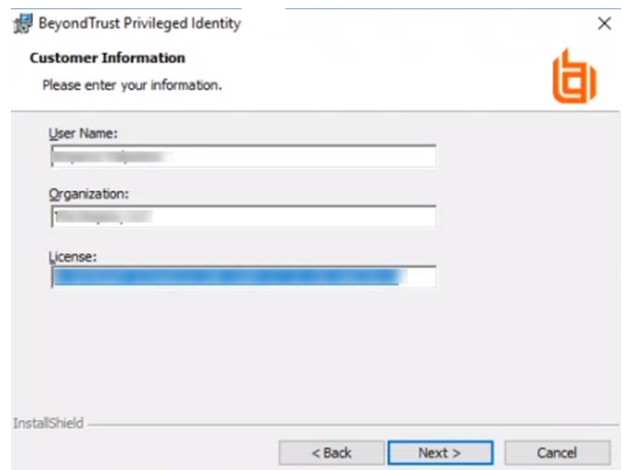
4. Read the license agreement. If you agree, accept it, and then click **Next**.



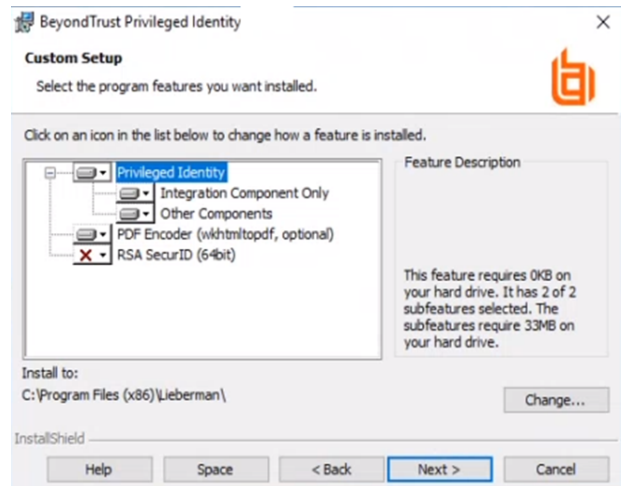
- Verify the steps indicated on the **Upgrade Check** screen have been taken before continuing with the upgrade, and then click **Next**.



- Verify your **User Name**, **Organization**, and **License** are populated. If not, re-enter any missing information. Click **Next**.



- Select the features to install:
 - BeyondTrustPrivileged Identity: (required) Installs the Privileged Identity software.
 - PDF Encoder**: (recommended) Allows you to turn compliance reports into PDF documents.
 - RSA SecureID**: If RSA multi-factor authentication is used with Privileged Identity, select this option to install it. Otherwise, leave this option unselected.
- To change the installation location, click **Change**.
- To make sure you don't exceed your available disk space, click **Space**.
- Click **Next**.

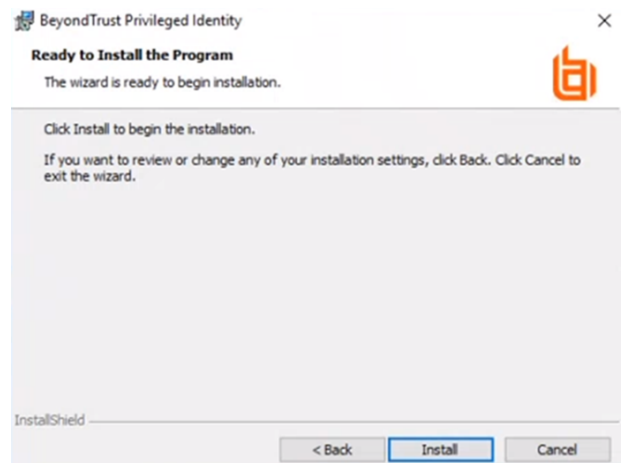
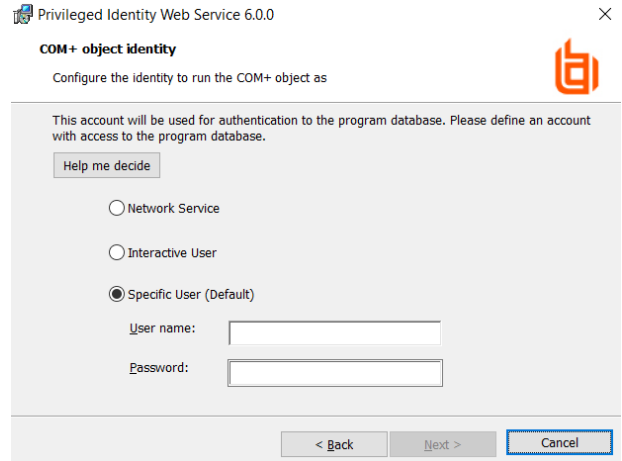


11. Choose the identity to run the CLR COM application. The default is **Network Service**. The CLR COM Identity is used to provide network and local system access for the solution to various cloud services. Individual account stores (Azure, AWS, ESX, etc.) will be configured with specific connection credentials when they are enrolled. Options for the identity are:

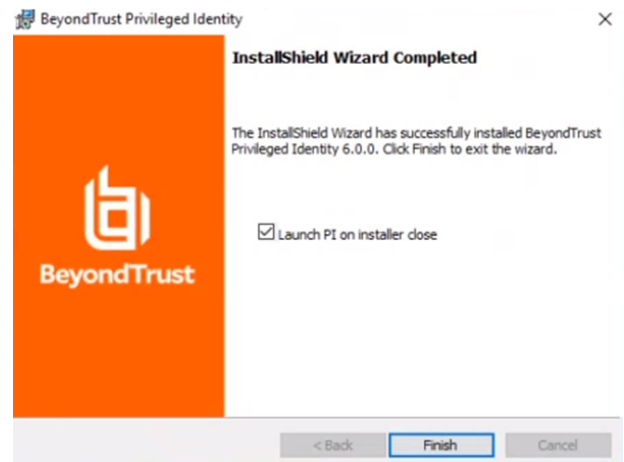
- **Interactive User:** Use the same logon information as the calling identity. This is an administrator-level account because the calling identity will either be the admin running the console or the deferred processor service account. This option requires the least configuration but provides significantly more privileges than is required.
- **Network Service:** (recommended) Use the network service account. For this option you do not have to manage a password or grant additional rights, although in some cloud management cases, you may need to grant additional permissions on the file system.
- **Local Service:** Use the local service account. For this option you do not have to manage a password or grant additional rights, although in some cloud management cases, you may need to grant additional permissions on the file system. The local service account has many more rights and privileges than the network service.
- **This User:** Use a specified username and password. This user could be a local account that is configured to never authenticate to any other machine in the network (unlike network service or local service), but it does represent another account to manage a credential for. In some cloud management cases, you may need to grant additional permission to it on the file system. This account also needs **Logon as a batch** rights granted to it.

12. Click **Next**.

13. Click **Install** to begin the installation.



14. When you receive confirmation that the application has been successfully installed, click **Back** to make any needed changes or **Finish** to complete the installation.



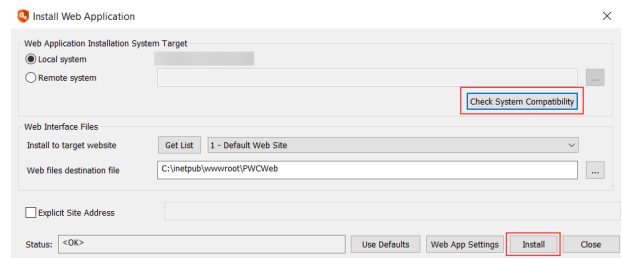
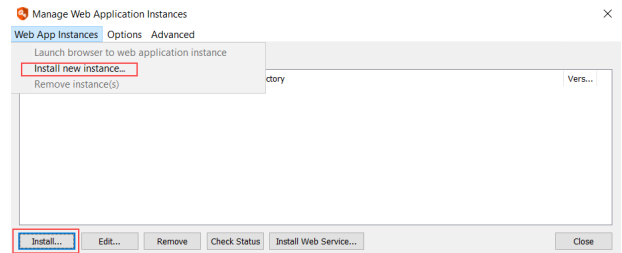
15. Launch the primary management console to perform the database upgrade. After this step is complete, repeat steps 1-14 for all other management consoles.
16. Continue the installation by upgrading the web application, then web service, and then the deferred and zone processors.

Upgrade the Web Application Instance

The Privileged Identity web application is the primary method for accessing stored credentials, whether managed or static, as well as auditing access to those credentials. The web app also provides features such as the file store, the personal password store, privilege escalation, and job management. In this section, we'll cover installation of the web app from the management console.

- From the **Actions** pane, click **Manage Web App**.
- On the **Manage Web Application Instances** dialog, click **Install** or select **Web App Instances > Install new instance** from the menu.
- On the **Install Web Application** dialog, select the target installation system.
 - Local system** is the computer you're currently working on.
 - If you choose **Remote System**, enter the remote system's fully qualified domain name.
 - Click **Check System Compatibility**. This checks that IIS and the file system are accessible on the target system, and that remote registry and Remote COM access are possible. Resolve any access errors before continuing.
 - You will receive prompt to specify connection credentials. To use the currently logged in user account, click **No**. To specify a different account, click **Yes**, then enter the access credentials and click **OK**.
- If the system compatibility check completes successfully, the **Web Interface Files** section is filled in automatically. If you need to change any of this information, the following are the details:
 - Install to target website:** All root web sites on the target server are listed here. Choose the root web site to host the web application.
 - Web files destination path:** This is where the web application files will be copied. The path is resolved from IIS on the target server, which defaults to `%inetpub%\wwwroot\PWCWeb`.
- Click **Install**.
- You may receive a *COM Account Confirmation* warning. This appears if the COM account specified on the installation dialog is different from the currently logged in user. The warning asks you to be sure that the account specified has data store access. If it does not, the web app will fail to function until the access issue is resolved.

If you are sure about the account information, click **Yes** to continue. Alternatively, click **No** to change to a different account.
- When the web application install is complete, a success prompt appears. Click **OK**.



Privileged Identity



Web Application Installed

Successfully installed web application on target system [redacted].

OK

8. You are prompted to launch a browser to the web application. Click **No**.

Privileged Identity**Launch Browser to Web Application Instance**

Would you like to launch a web browser to the web application?

Note: You will be automatically logged into the web application using the auto-created management account, and will be able to perform all web application operations.

9. Click **Close**.

The **Manage Web Application Instances** dialog in the management console is populated with a list of all known web applications.



For additional steps and verifications, please see "Post Installation or Upgrade Steps" on page 41.

Upgrade the Web Service

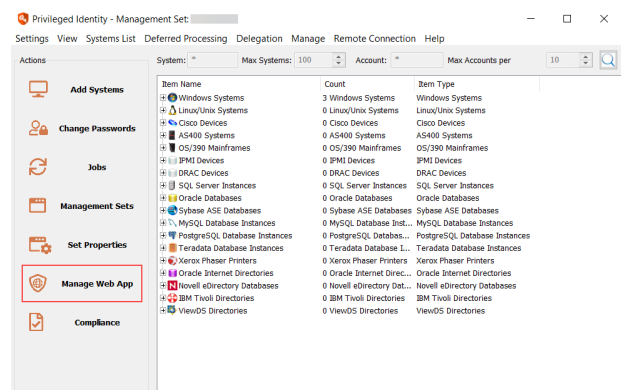
Starting with Privileged Identity version 5.5.2, the web service is a requirement for the web application to function. In prior versions, the web service was an optional component used only for PowerShell cmdlets, application launcher, session recording, and API access.

You must install the web service locally to its host; it cannot be pushed to a target system from the management console.

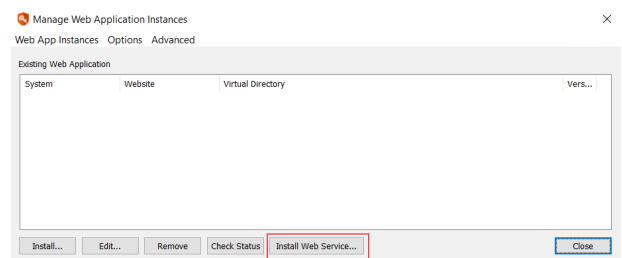
To install the web service on a separate host, copy the manual installer to the remote host and run it there. The manual installer is found in the installation directory, typically **C:\Program Files (x86)\Lieberman\Roulette\SupplementalInstallers\ERPMWebService.exe**. Follow the steps below to complete the install wizard.

To install the web service on the same machine as the management console:

1. From the **Actions** pane, click **Manage Web App**.

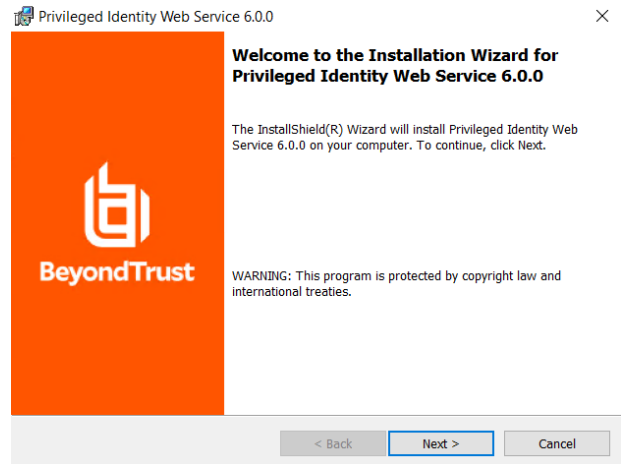


2. In the **Manage Web Application Instances** dialog, click **Install Web Service**.



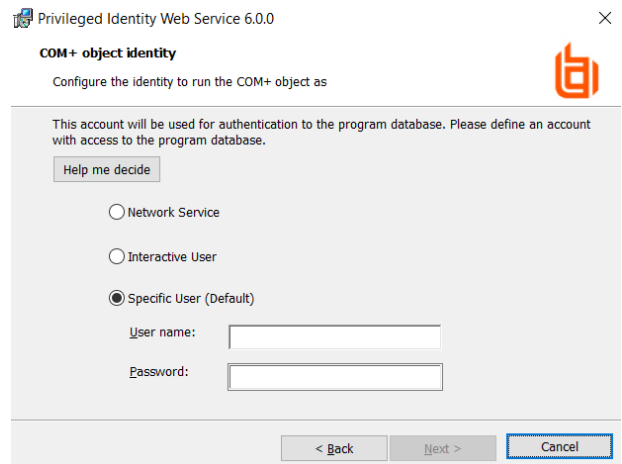
Follow the below steps to complete the install using the wizard:

1. On the welcome page, click **Next**.



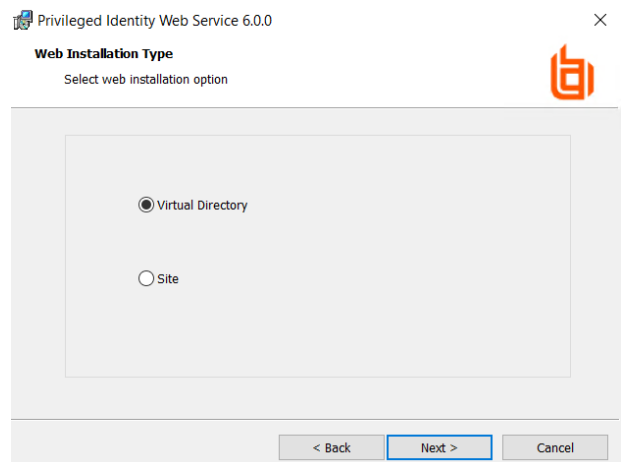
2. On the **COM+ Object Identity** screen, choose an appropriate identity and click **Next**. Valid identity options are:

- **Network Service:** Choose this option when using database native authentication mode to connect to the database (for example, SA).
- **Interactive User:** (not recommended) Choose this option when you want the user calling the web service to pass their authentication token to the database. This works when using **Integrated Windows Authentication** but requires considerably more security configurations in the program data store.
- **Specific User:** (recommended, default) Choose this option when using **Integrated Windows Authentication** to the database or when you want to minimize rights granted to the COM application. This is the most compatible option. Supply the **User name** as **DomainName\Username**.

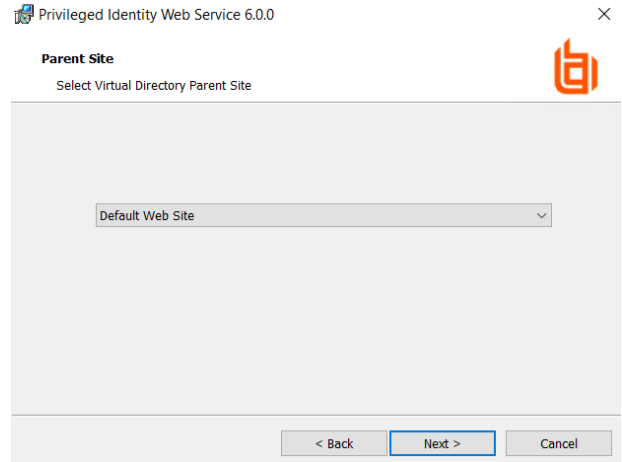


3. On the **Web Installation Type** screen, select the location in the local IIS instance to install the web service to, and then click **Next**. Valid options are:

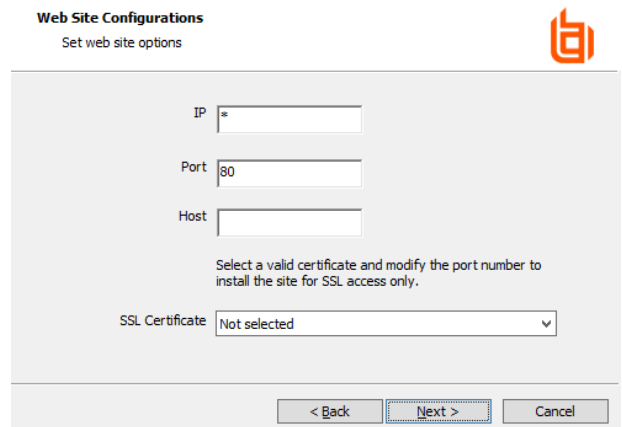
- **Virtual Directory:** (recommended, default) This installs the web service to a virtual directory called **ERPWebService**, located under the parent web site you'll select next. This is the safest option to choose for both security and configuration reasons.
- **Site:** Choose this option to install the web service to the root web site. If there are multiple root web sites configured on the host, you will be presented with a selection of root web sites to choose from.



- If you chose **Virtual Directory** on the **Web Installation Type** screen, select a web site on **Parent Site** screen, and then click **Next**.

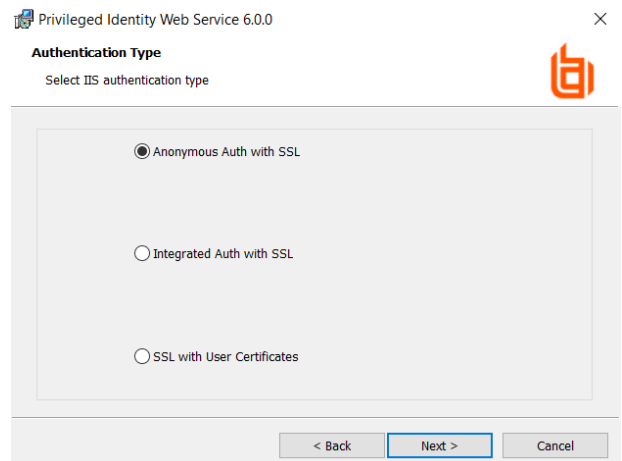


- If you chose **Site** on the **Web Installation Type** screen, configure site options on the **Web Site Configuration** screen.

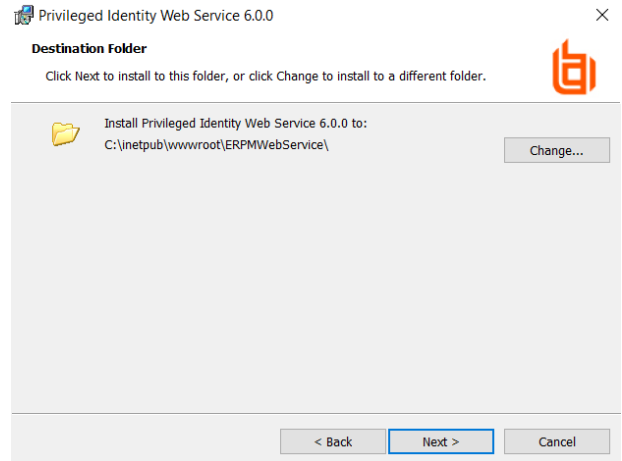


- On the **Authentication Type** screen, select the authentication method for connecting to the web service, and then click **Next**. Valid methods include:

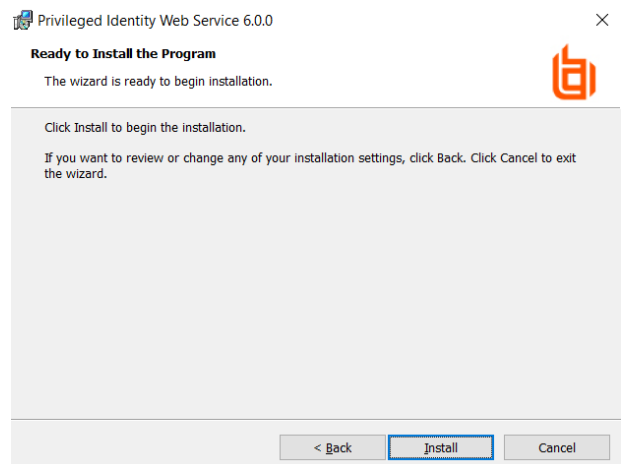
- Anonymous Auth with SSL:** Choose this when SSL is configured but Integrated Windows Authentication is not used.
- Anonymous Auth without SSL:** (not recommended) Choose this when neither Integrated Windows Authentication nor SSL are used. Application Launcher will not work with this configuration.
- Integrated Auth with SSL:** Choose this when SSL and Integrated Windows Authentication are used.
- Integrated Auth without SSL:** Choose this when Integrated Windows Authentication is used but SSL is NOT configured. Application Launcher will not work with this configuration.
- SSL with User Certificates:** Choose this when users must supply a user-based certificate (smart card, biometrics, etc.) to authenticate to the web site and web service. This causes more overhead in the overall configuration and may cause problems with some features.



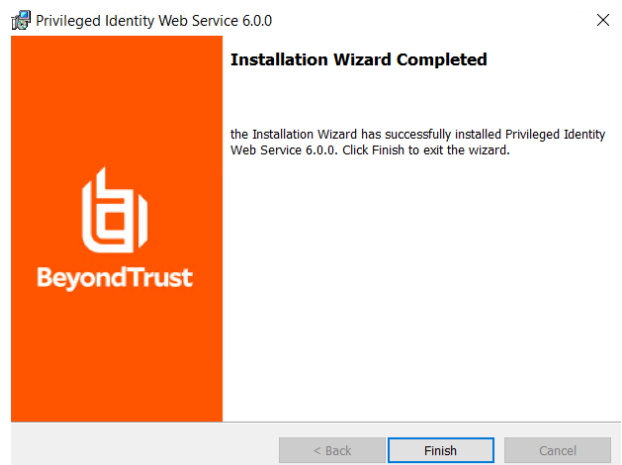
7. On the **Destination Folder** screen, choose where to install the web service, and then click **Next**. The default location is **%inetpub%\wwwroot\ERPWebService**, which automatically grants all permissions required for proper hosting. Changing the location may require additional configurations on the web server.



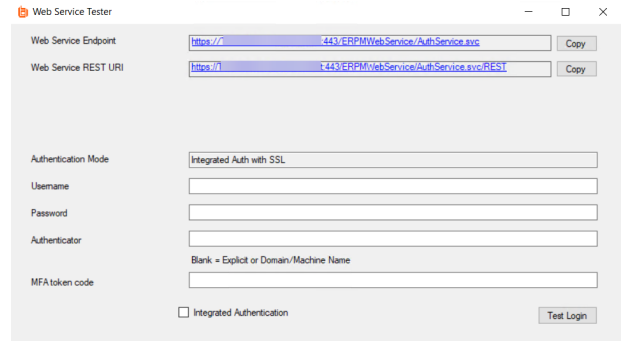
8. Click **Install**.



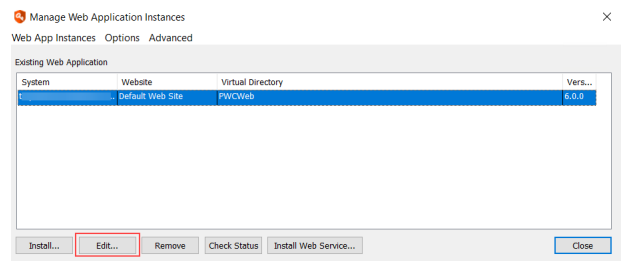
9. Click **Finish** to exit the install wizard. The web service page and web service tester launches.



10. From the **Web Service Tester**, make note of the **Web Service REST URI**, as it is required when configuring the web application. At this point, the web service will be non-functional, as it also requires settings. If the web service and web app are installed on the same host, the web service requires no further configuration. Close the **Web Service Tester**.

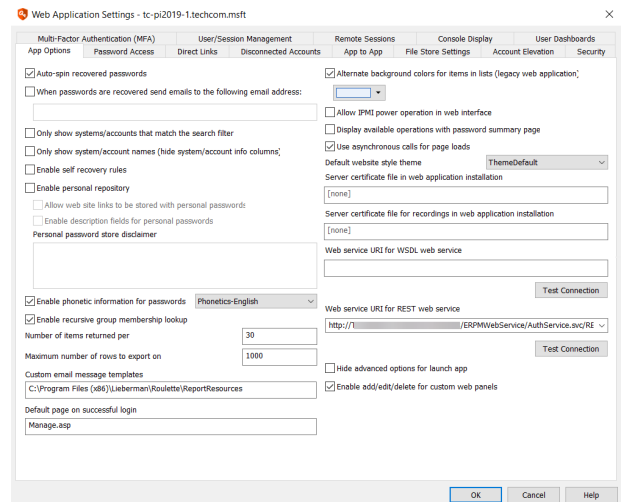


11. On the **Manage Web Application Instances** dialog, select the web app, and then click **Edit**.



12. When prompted to confirm settings overwrite, click **Yes**.

13. On the **App Options** tab, find **Web service URI for REST web service endpoint** at the lower right of the dialog. Paste in the web service REST URI.



Note: If you have installed the web service on the same machine as the web app using the default settings, the web service REST URI is virtually the same as the web app URL.

For example, let's say your server uses SSL on port 443 and your SSL certificate uses the fully qualified domain name of the server (**server.example.int**). The web service adds onto that (**/erpmmwebsevice/authservice.svc/REST**), making the URI **https://server.example.int/erpmmwebsevice/authservice.svc/REST**.

If you were behind a load balancer and the name of the load balanced cluster was **securestore.example.com**, the web service URI would be **https://securestore.example.com/erpmmwebsevice/authservice.svc/REST**.

14. Click **Test Connection** to verify the settings.

15. Click **OK**. When prompted that the settings have updated, click **OK** again.

16. If the Privileged Identity web applications are behind a load balancer, the **WebServiceConfig.json** file located at `...\\inetpub\\wwwroot\\PWCWeb\\assets\\` must specify the load balanced web service URI. For example:
`{"WebServiceAddress": "https://FullyQualifiedWebServer/ERPWebService/AuthService.svc/REST"}`.
17. If you are load balancing the websites and using either SAML authentication or DUO MFA, you must install Microsoft .NET Core Runtime - 3.1.1, as well as updating the **appsettings.json** files located at `...\\inetpub\\wwwroot\\SAML` and `...\\inetpub\\wwwroot\\DUO` with the load balanced web service URI.

**IMPORTANT!**

If you install to a virtual directory, the install process creates a virtual directory called **ERPWebService**. This directory inherits the authentication settings, SSL settings, and other settings from the parent web site. If the parent site is configured to use anonymous authentication and the web service installer is configured to use Integrated Windows Authentication, the virtual directory is created with faulty settings. To correct this, you must open IIS and reconfigure the authentication settings after install.

**IMPORTANT!**

If you install the web service on a machine that is NOT also hosting the web app, you must export the web app settings from the management console and import them onto the web service host. Otherwise, the web service will fail to load. To export the settings from the management console:

1. Click **Manage Web App** from the left action pane.
2. Select the desired web application instance from the list.
3. From the top tools menu, select **Advanced > Export web app registry config**. This exports a regedit file; save this locally.
4. You are prompted to generate the file for 64-bit Windows. Click **Yes**.
5. Copy the registry export to the target web service host and double-click the file to import it.

These steps provide the web service with the necessary information to connect to the data store, the hardware security module, the encryption key, and other settings. Any time these settings change on the web app host, you must repeat these steps.

**IMPORTANT!**

If the web service and web app have different host systems, and if the systems are accessed through different URLs (specifically the protocol, server name, or port), your web browser will block access to the web service, causing processes to malfunction.

To resolve this, enable cross-origin resource sharing (CORS). After you install the web service, open **web.config** and set **EnableCORS** to **true**.

Your specific browser may require additional configuration and may not work in all configurations. Please refer to your browser's documentation for more information on enabling CORS support.



For more information, please see the following:

- *Web Service Host Requirements*
- *"Service Account Requirements" on page 1*
- *"Post Installation or Upgrade Steps" on page 1*

Upgrade Scheduling Services

This section covers upgrading the Deferred Processing Services as well as zone processors. Not all methods below will necessarily apply to your installation. Please choose the sub-headings that apply to your situation and upgrade accordingly.

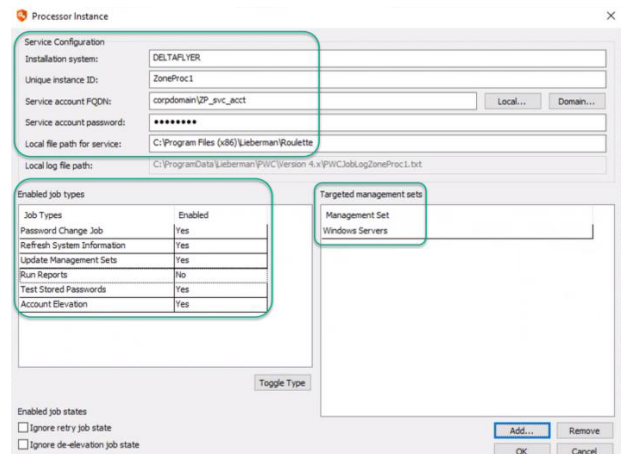
Start the Deferred Processor

Follow these steps if the deferred processor was previously installed.

1. Once the management console has been upgraded, open the management console and navigate to **Settings > Application Components**.
2. Note the component version. It should match the build date of the management console as noted in **Help > About** (see the build number in parenthesis, for example, 170123).
3. Once verified, click **Jobs** from the left **Actions** pane.
4. In the **Stored Jobs** dialog, click **Deferred Processor**.
5. Click **Start**.
6. There should be no errors when starting the deferred processor, as no settings have changed. The deferred processor begins polling the database looking for work.

Upgrade Zone Processors 5.5.0 and Later Using Manual Method

1. From the **Actions** pane in the management console, click **Jobs**.
2. In the **Stored Jobs** dialog, click **Zone Processors**.
3. In the **Processor Instance** dialog, configure a zone processor using the same **Service Configuration** and **Enabled job types**.
4. Click **Add** to specify what **Targeted management sets** the zone processor will use.



Job Types	Enabled
Password Change Job	Yes
Refresh System Information	Yes
Update Management Sets	Yes
Run Reports	No
Test Stored Passwords	Yes
Account Elevation	Yes

5. If previously installed, copy **CrossPlatformSupportLibrary.msi** from the **SupplementalInstallers** sub-directory to the target zone processor host.
6. If **IntegrationComponents.msi** was previously installed on zone processors or web servers, copy the Privileged Identity Installer to the target system and run the Installer on those systems choosing **Integration Components Only**.



Note: *IntegrationComponents.msi* is the installer for ticketing systems, email, etc., and *CrossPlatformSupportLibrary.msi* is the installer for SSH, Telnet, and other non-Windows support.

7. On the zone processor host, open **Programs and Features**.
8. If upgrading from any version of the **CrossPlatformSupportLibrary** or **IntegrationComponents** prior to version 5.5.2, uninstall the existing **Cross Platform Support Library** and **Integration Components** programs.
9. Run the installers for **Integration Components** and **CrossPlatformSupportLibrary**.
10. Start the zone processor (this causes database re-registration for this zone processor) using the **Windows Services** snap-in. The service is named **RouletteSked\${ZoneName}**. The service should start without any problems. Typical errors at this point include:
 - **Inability to connect to the program data store:** Check connectivity to database using the service account credentials and the current database provider is installed on the zone processor host (the management console does not push database providers to the remote system).
 - **Bad service account information:** Examine the **Logon** tab of the service in the Windows Services snap-in and validate the username and password.
11. Repeat this processor for all zone processor hosts.

Upgrade Zone Processors Using Console Push Method

As noted in the upgrade preparation steps, it is best to remove the zone processors and re-install them using the management console if the zone processor host can be reached from the console (remote registry and file system).

1. From the **Actions** pane, in the management console, click **Jobs**.
2. In the **Stored Jobs** dialog, click **Zone Processors**.
3. Click **Install**.
4. **Supply all necessary information to fully reconfigure the service:** zone ID, service account, job types, and management set affinity.
5. Click **OK**.
6. Start the zone processor (this will cause database re-registration for this zone processor) by right-clicking on the service registration and selecting **Start**. The service should start without any problems. Typical errors at this point include:
 - **Inability to connect to the program data store:** Check connectivity to database using the service account credentials and the current database provider is installed on the zone processor host (the management console does not push database providers to the remote system).
 - **Bad service account information:** Examine the **Logon** tab of the service in the Windows Services snap-in and validate the username and password.
7. Repeat this processor for all zone processor hosts.

Upgrade Zone Processors Using Standalone Installer

If zone processors were previously deployed using the **Standalone Zone Processor Installer** (typically due to inability to connect to the zone processor host from the management console), open **Windows Explorer**, navigate to the program installation directory, and open the **SupplementalInstallers** sub-directory.

1. Launch **CreateZoneInstaller.exe**.
2. Supply the necessary information to the installer and click **Create**.
3. Copy the created file to the target zone processor hosts and run the package to update installed zone processors.
4. Start the zone processor (this will cause database re-registration for this zone processor) by right-clicking on the service registration and selecting **Start**. The service should start without any problems. Typical errors at this point include:

- **Inability to connect to the program data store:** Check connectivity to database using the service account credentials and the current database provider is installed on the zone processor host (the management console does not push database providers to the remote system).
 - **Bad service account information:** Examine the **Logon** tab of the service in the Windows Services snap-in and validate the username and password.
5. Repeat this entire process for zone processors hosts managing different zones or having different configurations.

Upgrade PowerShell

For the users leveraging the PowerShell cmdlets, the PowerShell upgrade is simply a matter of distributing the updated cmdlet DLLs.

1. On the management console host, open **Windows Explorer**.
2. Navigate to the **SupplementalInstallers** folder from the program installation directory.
3. Open the **LSCPowerShellCmdlets** folder.
4. Open **LSCClientAgentCommandlets**.
5. Distribute **LSCClientAgentCommandlets.dll** to the users who use the PowerShell cmdlets.
6. Replace **LSCClientAgentCommandlets.dll** on the client systems. The default recommended location is **%userprofile%\Documents\WindowsPowerShell\Modules\LSCClientAgentCommandlets**.
7. Version 5.5.2 introduced two new sets of cmdlets called **LSCClientUpdateConfiguration** and **LSCClientUpdatePassword**. For any users leveraging these additional cmdlets, copy and replace those DLLs into their respective folders, as well.

Upgrade Application Launcher and Session Recording Software

The upgrade process for the application launcher software and session recording software is straightforward: simply re-run the installation routines on the host servers. Your previous settings are remembered with one notable exception: you need to re-enter the service account credentials that are asked for during the session recording installation routine.

These upgrade routines should be performed after the core BeyondTrust Privileged Identity software (console, web application, and web service) have already been upgraded.

There is no need to reestablish previously configured applications or application settings.



If you have deployed Application Launcher and Session Recording in your previous version, please see the [Application Launcher and Session Recording guide](https://www.beyondtrust.com/docs/privileged-identity/app-launcher-and-recording/index.htm) at <https://www.beyondtrust.com/docs/privileged-identity/app-launcher-and-recording/index.htm> and follow the installation protocols to perform the upgrade.

Post Installation or Upgrade Steps

After the web application and web service are installed, there may be additional steps to take depending on the options enabled or desired. Additional actions may be required for the following scenarios:

- Use of Integrated Windows Authentication for web application access
- Required use of SSL
- Use of IIS redirects
- Use of user certificates, required for web application access
- Use of File Store

CORS Support

If the web service and web app have different host systems, and if the systems are accessed through different URLs (specifically the protocol, server name, or port), your web browser will block access to the web service, causing processes to malfunction.

To resolve this, enable cross-origin resource sharing (CORS). After installing the web service, open its **web.config** file (typically found at **C:\Program Files (x86)\Lieberman\Roulette\ERPWebService\web.config**), and set **EnableCORS** to **true**.

CORSDomain is used to control the source domain allowed for CORS support. The initial value is set to an asterisk (*), which means the web service will allow references from any web server. To limit communication to a particular domain, change * to **domain.name**. For example:

```
<add key="CORSDomain" value="lsds.int" />
```

The above example will set **Access-Control-Allow-Origin** to **lsds.int**, and requests from servers in other domains will not be allowed.



Note: Only one **CORSDomain** value can be specified at a time.

Additional configurations may be required in your specific browser and may not work in all configurations (non-Microsoft browsers especially).

About CORS



CORS is defined in [RFC6454](https://www.ietf.org/rfc/rfc6454.txt) at <https://www.ietf.org/rfc/rfc6454.txt>. This specification defines that a resource is considered to have the same origin if it uses the same scheme (protocol), host, and port.

If your web application and web service are installed on the same host, both accessed by HTTPS, and both running on the same default port (443), then they are considered to be of the same origin, so your browser will not block communication to either component. If any of those elements are different, the browser will by default block communication to the web service via the web application, which will prevent many operations from working, such as password retrieval through the web application. Controls for browser behavior surrounding CORS vary by browser.



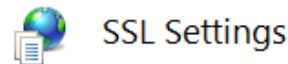
For more information, please see your browser's specific documentation on enabling CORS support.

SSL

When installing to a virtual directory (or upgrading an existing installation), the virtual directory will inherit the settings of the parent web site. That means if the parent web site has certain settings, the virtual directory will automatically inherit those settings. Thus, if the parent web site is not configured to require SSL, then your virtual directory will not be configured to require SSL.

To require SSL on your virtual directory, assuming your parent web site already has a proper SSL certificate and binding, follow these steps:

1. On the host server, open **Internet Information Services (IIS) Manager**.
2. Expand your server node, then **Sites**, and then your web site.
3. Select your virtual directory. The default for the web app is **PWCWeb**, and the default for the web service is **ERPWebService**.
4. From the center pane, open **SSL Settings**.
5. Check the **Require SSL** box,
6. Click **Apply**.



This page lets you modify the SSL settings for the content of a website or application.

Require SSL

Client certificates:

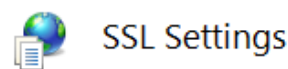
- Ignore**
- Accept**
- Require**

User Certificates

When installing to a virtual directory (or upgrading an existing installation), the virtual directory inherits the settings of the parent web site. That means if the parent web site has certain settings, the virtual directory automatically inherits those settings. Thus, if the parent web site is not configured to require user certificates, then your virtual directory will not be configured to require user certificates.

To require user certificates on your virtual directory, assuming your parent web site already has a proper SSL certificate and binding and user certificates are properly configured, follow these steps:

1. On the host server, open **Internet Information Services (IIS) Manager**.
2. Expand your server node, then **Sites**, and then your web site.
3. Select your virtual directory. The default for the web app is **PWCWeb**, and the default for the web service is **ERPWebService**.
4. From the center pane, open **SSL Settings**.
5. Check the **Require SSL** box,
6. Under **Client Certificates**, select one of the following options:
 - **Accept:** Allows users to pass a user certificate but will also allow users who do not have a user certificate. Select this option if some users will require certificates but you are unsure if ALL users will be using certificates.
 - **Require:** All users accessing this site must supply a valid user certificate.
7. Click **Apply**.



This page lets you modify the SSL settings for the content of a website or application.

Require SSL

Client certificates:

- Ignore**
- Accept**
- Require**

URL Redirects

URL redirects are not configured by default in IIS. In fact, they are not even available in a default installation of IIS and must be enabled. URL redirects are typically used so that when a user connects to a particular address, such as a root web site using HTTP, they may be redirected to the proper virtual directory with HTTPS.

When installing to a virtual directory (or upgrading an existing installation), the virtual directory inherits the settings of the parent web site. That means if the parent web site has certain settings, the virtual directory automatically inherits those settings. Thus, if the parent web site is configured with a redirect, the virtual directory is configured with a redirect. In this particular case, this can cause a redirect loop which causes the user to never be able to connect to the web application or web service. In short, the redirect needs to be removed from the virtual directory.

Integrated Windows Authentication

When installing to a virtual directory or upgrading an existing installation, the virtual directory inherits the settings of the parent web site. That means if the parent web site has certain settings, the virtual directory automatically inherits those settings. Thus, if the parent web site is not configured to use Integrated Windows Authentication, or is mis-configured by also enabling another form of authentication, your virtual directory inherits the same incorrect settings.

To require Integrated Windows Authentication on your virtual directory, assuming the IIS module for Integrated Windows Authentication is already installed, follow these steps:

1. On the host server, open **Internet Information Services (IIS) Manager**.
2. Expand your server node, then **Sites**, and then your web site.
3. Select your virtual directory. The default for the web app is **PWCWeb**, and the default for the web service is **ERPWebService**.
4. From the center pane, select **Authentication**.
5. Right-click on **Windows Authentication** and select **Enable** (note that the status column changes to **Enabled**).
6. If any other forms of authentication are enabled, right-click on those methods and disable them.

Next, your browsers may require additional configuration.

Internet Explorer

For Internet Explorer (IE) to willingly use Integrated Windows Authentication, the URL connected to must be seen as being part of the local intranet rather than the internet or trusted network. IE will only automatically treat locations entered with their short name (as opposed to a fully qualified domain name (FQDN)) as being in the intranet zone. If you access the web application and web service using their short names, you should be able to connect without error, SSL certificates permitting. If you access the web application and web service using an FQDN, IE will not treat these URLs as intranet zone items, and Integrated Windows Authentication will fail.

To rectify this when using FQDNs, you may either have every user add the web application and web service FQDN into the intranet zone in IE, or you may use group policy to push the proper settings. To configure group policy, configure the following group policy to add the FQDN (wildcards allowed) as a trusted site:

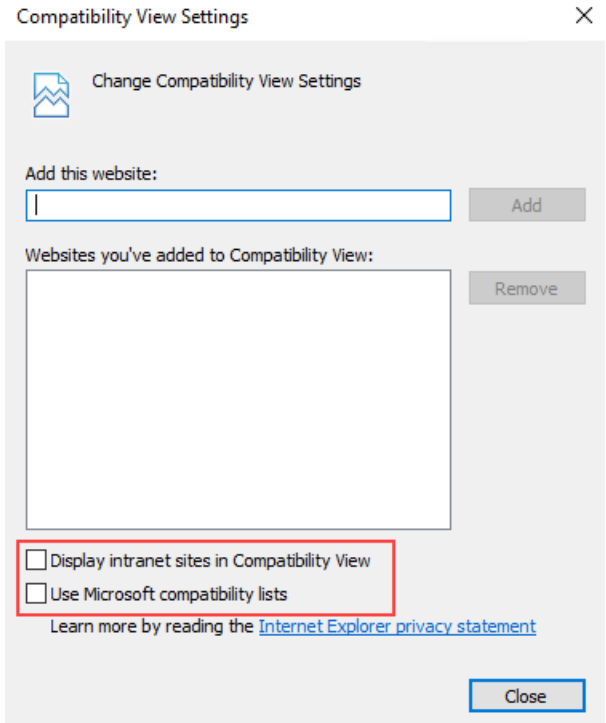
- For Kerberos authentication: **network.negotiate-auth.trusted-uris**
- Define if Kerberos ticket passing is required: **network.negotiate-auth.delegation-uris**
- Define if NTLM authentication is allowed: **network.automatic-ntlm-auth.trusted-uris**

In each policy, define the domain name. If your domain name were **example.int**, you would enter **.example.int** for the Kerberos exchange (notice the leading dot).



Note: Firefox may not function properly when working with cross-origin requests (CORS), in which the web service is located on a machine separate from the web application and called by a different URL when using Integrated Windows Authentication. These settings have also been noted to be lost between Firefox upgrades.

If the login page fails to display, open **Compatibility View Settings** in IE and uncheck both check boxes.



Chrome

Recent versions of Chrome will support Integrated Windows Authentication when run from a Windows host without further configuration required.



Note: Chrome may still not work properly when working with cross-origin requests (CORS) where the web service is located on a machine separate from the web application and called by a different URL when using Integrated Windows Authentication.



For more information on additional settings, please consult your Google Chrome documentation.