

# Safeguard for Privileged Passwords 6.7

## Release Notes

**04 September 2020, 12:49**

These release notes provide information about the Safeguard for Privileged Passwords 6.7 release.

If you are updating a Safeguard for Privileged Passwords version prior to this release, read the release notes for the version found at: [One Identity Safeguard for Privileged Passwords Technical Documentation](#).

## Release options

Safeguard for Privileged Passwords includes two release versions:

- Long Term Support (LTS) maintenance release, version 6.0.7 LTS
- Feature release, version 6.7

The versions align with Safeguard for Privileged Sessions. For more information, see [Long Term Support \(LTS\) and Feature Releases](#) on page 20.

## About this release

Safeguard for Privileged Passwords Version 6.7 is minor feature release with new features, resolved issues, and known issues.

For more details, see:

- [New features](#)
- [Resolved issues](#)

- [Known issues](#)

**NOTE:** For a full list of key features in Safeguard for Privileged Passwords, see the *Safeguard for Privileged Passwords Administration Guide*.

## About the Safeguard product line

The Safeguard for Privileged Passwords 3000 and 2000 Appliances are built specifically for use only with the Safeguard for Privileged Passwords privileged management software, which is pre-installed and ready for immediate use. The appliance is hardened to ensure the system is secured at the hardware, operating system, and software levels. The hardened appliance approach protects the privileged management software from attacks while simplifying deployment and ongoing management and shortening the time frame to value.

Safeguard for Privileged Passwords virtual appliances and cloud applications are also available. When setting up a virtual environment, carefully consider the configuration aspects such as CPU, memory availability, I/O subsystem, and network infrastructure to ensure the virtual layer has the necessary resources available. See [One Identity's Product Support Policies](#) for more information on environment virtualization.

### Safeguard privileged management software suite

Safeguard privileged management software is used to control, monitor, and govern privileged user accounts and activities to identify possible malicious activities, detect entitlement risks, and provide tamper proof evidence. The Safeguard products also aid incident investigation, forensics work, and compliance efforts.

The Safeguard products' unique strengths are:

- One-stop solution for all privileged access management needs
- Easy to deploy and integrate
- Unparalleled depth of recording
- Comprehensive risk analysis of entitlements and activities
- Thorough Governance for privileged account

The suite includes the following modules:

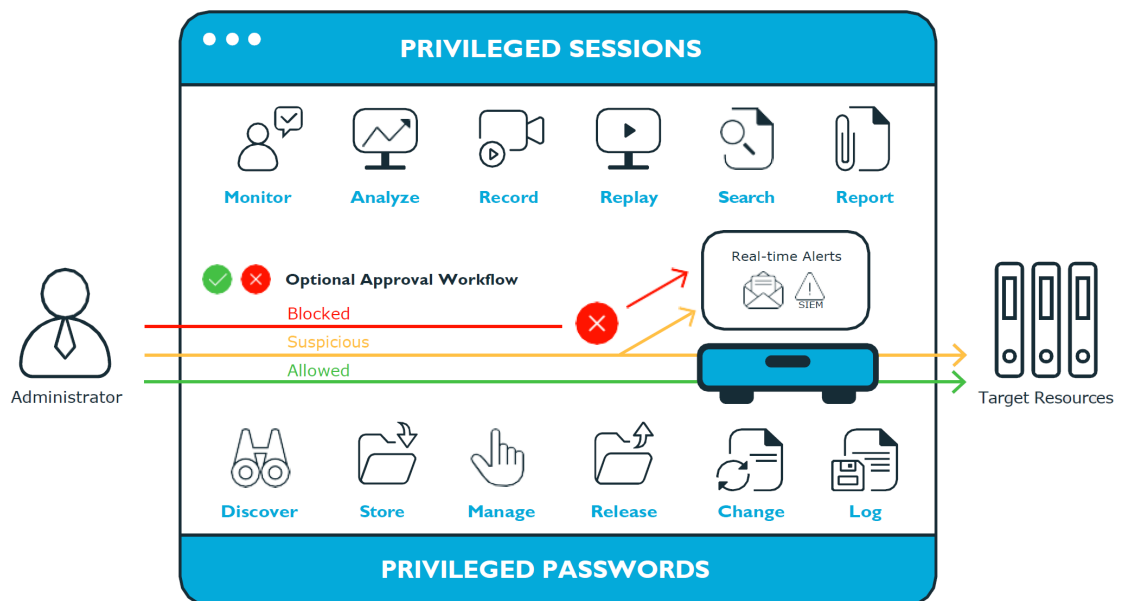
- **Safeguard for Privileged Passwords** automates, controls, and secures the process of granting privileged credentials with role-based access management and automated workflows. Deployed on a hardened appliance, Safeguard for Privileged Passwords eliminates concerns about secured access to the solution itself, which helps to speed integration with your systems and IT strategies. Plus, its user-centered design means a small learning curve and the ability to manage passwords from anywhere and using nearly any device. The result is a solution that secures your enterprise and enables your privileged users with a new level of freedom and functionality.

- **One Identity for Privileged Sessions** is part of One Identity's Privileged Access Management portfolio. Addressing large enterprise needs, Safeguard for Privileged Sessions is a privileged session management solution, which provides industry-leading access control, as well as session monitoring and recording to prevent privileged account misuse, facilitate compliance, and accelerate forensics investigations.

Safeguard for Privileged Sessions is a quickly deployable enterprise appliance, completely independent from clients and servers to integrate seamlessly into existing networks. It captures the activity data necessary for user profiling and enables full user session drill-down for forensics investigations.

- **One Identity Safeguard for Privileged Analytics** integrates data from Safeguard for Privileged Sessions to use as the basis of privileged user behavior analysis. Safeguard for Privileged Analytics uses machine learning algorithms to scrutinize behavioral characteristics, and generates user behavior profiles for each individual privileged user. Safeguard for Privileged Analytics compares actual user activity to user profiles in real time, and profiles are continually adjusted using machine learning. Safeguard for Privileged Analytics detects anomalies and ranks them based on risk so you can prioritize and take appropriate action and ultimately prevent data breaches.

**Figure 1: Privileged Sessions and Privileged Passwords**



# New features

## Audit log synchronization, archive, and purge (191603)

Audit log synchronization, archive, and purge has been enhanced. Appliance Administrators can configure Safeguard for Privileged Passwords to perform weekly maintenance, audit log purge, and audit log archiving. Navigate to **Administrative Tools | Settings | Backup and Retention | Audit Log Maintenance**.


## Backup protection (191610)

For maximum backup protection, Appliance Administrators can configure backup protection which will encrypt all backups generated from all appliances in the cluster.

- **Appliance (default):** Backups are encrypted as a genuine Safeguard backup and can only be decrypted on a Safeguard appliance.
- **Password:** Backups are encrypted as a genuine Safeguard backup and can only be decrypted on a Safeguard appliance. In addition, backups are encrypted with the provided password. The password is required to restore the backup.
- **GNU Privacy Guard (GPG) public key (RSA only):** Backups are encrypted as a genuine Safeguard backup and can only be decrypted on a Safeguard appliance. In addition, when a backup is downloaded or archived it is encrypted with the provided GPG public key. The private key is required to unencrypt the backup prior to uploading to a Safeguard appliance.



Once set, future backups created manually or automatically are protected.

Safeguard for Privileged Passwords detects the attempted upload of an invalid backup. An audit event is created for the failed backup load with the error reasons which will include an invalid signature.

Backup protection is set on **Administrative Tools | Settings | Backup and Retention | Safeguard Backup and Restore** then click  **Settings** and select **Backup Protection Settings**.

## Configure syslog servers that require TLS (191512)

Policy Security Administrators can configure the network protocol and syslog header type. For TCP (RFC 5424), you can specify TLS encryption and authentication (Client Certificate and Server Certificate).




-  web client: Navigate to ✕ **Settings** | ⇌ **External Integration | Syslog**.
-  desktop client: Navigate to **Administrative Tools | Settings | External Integration | Syslog**.

## Login notification and desktop client inactivity timeout (237174)

When configured by Appliance Administrators, login notifications are now displayed to all users prior to login. This requires users to consent to notifications and restrictions before they can log in. Be cautious in regards to including sensitive information in your login notification as it can be viewed by anyone without requiring authentication. The default is no login notification (access banner). For details, see:

-  web client: Navigate to ✕ **Settings** |  **Safeguard Access** | **Messaging**.
-  desktop client: Navigate to **Administrative Tools** | **Settings** | **Messaging** | **Login Notification**.

Appliance Administrators can now specify an inactivity timeout for the desktop client application, similar to what exists with the web client application. The default for the new desktop client application inactivity timeout is 1440 minutes (24 hours), after which the user will automatically be logged out.

-  web client: Navigate to ✕ **Settings** |  **Safeguard Access** | **Local Login Control**.
-  desktop client: Navigate to **Administrative Tools** | **Settings** | **Safeguard Access** | **Login Control**.

## Specify domain controller for Active Directory (225824)




Appliance Administrators can identify which domain controllers to use with the **Specify domain controllers** selection. If not specified, Safeguard for Privileged Passwords uses the domain controllers recommended from a DNS and CLDAP ping, as usual. In the *Safeguard for Privileged Passwords Administration Guide*, see:

- Management tab (add asset)
- Adding identity and authentication providers

## Security enhancements (234139)

### Trusted Servers, CORS, and Redirects





An Appliance Administrator can restrict login redirects and Cross Origin Resource Sharing (CORS) requests to the specified list of IP addresses, host names (including DNS wildcards), and CIDR notation networks.

-  web client: Navigate to ✕ **Settings** |  **External Integration** | **Trusted Servers, CORS and Redirects**.
-  desktop client: Navigate to **Administrative Tools** | **Settings** | **External Integration** | **Trusted Servers, CORS and Redirects**.

For more information, see the *Administration Guide*, Trusted Servers, CORS and Redirects.

### Secure token service login timeout

An Appliance Administrator can set select **Enable Secure Token Service Login Timeout** to set 15 minute expiration time for session based cookies used during login. Typically, a session based cookie does not expire and is deleted by the browser/user-agent when closed. Setting an expiration time adds security and can prevent some replay attacks.

-  web client: Navigate to  **Settings** |  **Safeguard Access** | **Local Login Control**.
-  desktop client: Navigate to **Administrative Tools** | **Settings** | **Safeguard Access** | **Login Control**.





For more information, see the *Administration Guide*, Login Control.

## SMTP authentication (191605)

Appliance Administrators can ensure only authenticated access is allowed to the mail server by configuring the SMTP client to support authentication. Authentication is set on **Administrative Tools** | **Settings** | **External Integration** | **Email**.




## SSH algorithms (210503)

An Appliance Administrator can restrict the SSH algorithms that are negotiated between Safeguard for Privileged Passwords and managed assets.

-  web client: Navigate to  **Settings** |  **Appliance** | **SSH Algorithms** .
-  desktop client: Navigate to **Administrative Tools** | **Settings** | **Appliance** | **SSH Algorithms** .

## Time zone handling updates (225573)

User Administrators control whether end users can set their time zone. Navigate to **Settings** | **Safeguard Access** | **Time Zone** and select or deselect the **Allow users to modify their own time zone** check box. The check box is selected by default.




The time zone of a user controls the time displayed in the user interface and Activity Center downloads. The **Time Zone** can be set in both the desktop client (  user avatar, **My Account**) and web client (  **Dashboard Settings** |  **General** tab).

## TLS audit event logging and debug logging (240492)

### TLS audit event logs

You can enable the TLS audit event logging which is automatically sent to the debug logs (available via a Support Bundle). If a syslog server is configured, the TLS audit event logging will also go to the syslog server (cluster-wide).

TLS audit events include connection, closure, and failures. Failures include the reason, the initiator, and the target. For example, a certificate validation failure will include the

initiator and the target.  web client only: Navigate to  **Settings** |  **External Integration** | **Syslog Events**.

### Debug logs

You can send debug logs to an existing syslog server. Debug logging is appliance specific.

 web client only: Navigate to  **Settings** |  **Appliance** | **Debug**.

## Undelete objects (244820)

Safeguard for Privileged Passwords Administrators can:

- Restore objects that have been accidentally deleted
- Set a policy with a time threshold to permanently delete objects that are in the "recycle bin" so they can be purged from the system

Administrator users can:

- Undelete objects they have accidentally deleted
- Permanently delete objects that have been deleted

The work is done via the API using these endpoints.

- `https://<network address>/service/core/v3/Deleted/Assets`
- `https://<network address>/service/core/v3/Deleted/AssetAccounts`
- `https://<network address>/service/core/v3/Deleted/Users`
- `https://<network address>/service/core/v3/Deleted/PurgeSettings`

## Web client for Appliance Administrator (220279)

An Appliance Administrator can perform most activities on the web client without needing to install the Windows desktop client.

## Changes to expired access requests (239692)

Administrators can now clear (Close or Acknowledge) access requests in the Pending Acknowledgment state. In addition, expired requests will be automatically cleared at a faster rate (approximately every hour).

See also:

- [Resolved issues](#) on page 8

# Resolved issues

Issues addressed by this release follow.

**Table 1: General resolved issues**

Resolved issue	Issue ID
Web client now allows releasing SSH key with a session request.	235825
Desktop client now allows releasing SSH key with a session request.	235707
When pressing the show button during a user supplied access request, the connection string and credentials don't disappear.	248560
An Asset Based request using User Supplied (My Credential) will no longer attempt to change the password or SSH key when a user supplied request is checked in.	249332
Safeguard for Privileged Passwords connects to Oracle 18c.	247599
Using the SPS host name to launch a session works correctly.	244542
The Safeguard Appliance Selection Algorithm selects the most fit SPS node.	244045
SSH Key rotation is performed when the ChangeSshKeyAfterCheckIn is set to true in the access policy.	243576
GET AssetGroups returns Assets.SshHostKey and Assets.SshHostKeyFingerprint data.	242942
Account Discovery Rules are evaluated in order.	242618
The charset response header was made consistent. The (charset=utf-8 is standard across all APIs.	242364
If an SPS_Initiated connection policy is selected when creating an access request, the assets associated by that request will not display. The session-related access policy assigned to SPS_Initiated is filtered out. A connection policy other than SPS_Initiated must be selected to create an Access Request for the asset.	242024
View Live Sessions button on the Dashboard is now correctly displaying as available for Auditors.	241808
A check box is available to change the password or SSH key after the user checks it back in. This check box is selected by default. Navigate to <b>Administrative Tools   Entitlements   Access Request Policies  </b> (create or edit a policy). The check boxes are: <b>Change password after check-in</b> and <b>Change SSH key after check-in</b> .	240577
If the scheduler is unable to complete a task within the scheduled interval, when it finishes execution of the task, it is rescheduled for the	240150



Resolved issue	Issue ID
next immediate interval.	
Safeguard for Privileged Sessions initiated RDP session works.	240079
When adding an asset, on the <b>Connections</b> tab, Safeguard for Privileged Passwords discovers the SSH host key of discovered assets even if you selected <b>None</b> as the service account credential type.	240015
Administrators can clear (Close or Acknowledge) access requests in the Pending Acknowledgment state.	239692
Can delete subscribers that were not created by the current user.	239371
New <b>Inactive User Logged Out</b> audit event type available in the Activity Center.  This issue was resolved as part of the Safeguard for Privileged Passwords 6.7 feature: Security enhancements (234139).	239132
External Federation metadata import works.	239032
Session request available time is refreshed in desktop client.	237250
Radius NAS configuration is supported.	236629
The <b>Enable Secure Token Service Login Timeout</b> can be set on <b>Settings</b>   <b>Safeguard Access</b>   <b>Login Control</b> .(desktop client). The default is 15 minutes.  This issue was resolved as part of the Safeguard for Privileged Passwords 6.7 feature: Security enhancements (234139).	230572
You can restrict login redirects and Cross Origin Resource Sharing (CORS) requests to a specified list of IP addresses, host names (including DNS wildcards), and CIDR notation networks.  This issue was resolved as part of the Safeguard for Privileged Passwords 6.7 feature: Security enhancements (234139). For more information, see the <i>Administration Guide</i> , <i>Trusted Servers</i> , <i>CORS</i> and <i>Redirects</i> .	230569 230359
Able to backup and archive successfully without error.	228123
Can add MS SQL named instance.	200348
SMTP configuration includes the ability to add authentication to the SMTP server. Authentication is set on <b>Administrative Tools</b>   <b>Settings</b>   <b>External Integration</b>   <b>Email</b> .  This issue was resolved as part of the Safeguard for Privileged Passwords 6.7 feature: SMTP authentication (191605).	191303
The range for <b>Token Lifetime</b> correctly reflects 10 minutes to 28,800 minutes (20 days).	189259

Resolved issue	Issue ID
Profiles for an Active Directory Asset can be changed.	188723
While joining, the maintenance status from the replica now takes into account all data streams when calculating the completion percentage.	188714
In the Activity Center, <b>Play</b> is available when the RDP session connects and is not available if the RDP session fails to connect.	187971
In the Web client, description is now displayed on the Asset and Account pickers in the Access Request dialogs.	249953
Desktop client, description is now displayed on the Asset and Account pickers in the Access Request dialogs.	188130

## Known issues

The following is a list of issues known to exist at the time of release.

Known issue	Issue ID
For the web client, you are unable to display the French language version. If you select French as your preferred language, the web client will instead display the default English language version.	252377

## System requirements and versions

Safeguard for Privileged Passwords has several graphical user interfaces that allow you to manage access requests, approvals, and reviews for your managed accounts and systems:

- The Windows desktop client consists of an end-user view and administrator view. The fully featured desktop client exposes all of the functionality of Safeguard based on the role of the authenticated user.
- The web client is functionally similar to the desktop client end-user view and useful for requestors, reviewers, and approvers. Many administration functions are available as well.
- The web management console displays whenever you connect to the virtual appliance and is used for first time configuration. When setting up a virtual environment, carefully consider the configuration aspects such as CPU, memory availability, I/O subsystem, and network infrastructure to ensure the virtual layer has the necessary resources available. See [One Identity's Product Support Policies](#) for more information on environment virtualization.

Ensure that your system meets the minimum hardware and software requirements for these clients.

If a Safeguard Sessions Appliance is joined to Safeguard for Privileged Passwords, session recording is handled via Safeguard for Privileged Session. The join is initiated from Safeguard for Privileged Sessions. For details about the join steps and issue resolution, see the [One Identity Safeguard for Privileged Sessions Administration Guide](#).

## Bandwidth

It is recommended that connection, including overhead, is faster than 10 megabits per second inter-site bandwidth with a one-way latency of less than 500 milliseconds. If you are using traffic shaping, you must allow sufficient bandwidth and priority to port 655 UDP/TCP in the shaping profile. These numbers are offered as a guideline only in that other factors could require additional network tuning. These factors include but are not limited to: jitter, packet loss, response time, usage, and network saturation. If there are any further questions, please check with your Network Administration team.

# Desktop client system requirements

The desktop client is a native Windows application suitable for use on end-user machines. You install the desktop client by means of an MSI package that you can download from the appliance web client portal. You do not need administrator privileges to install Safeguard for Privileged Passwords.

**NOTE:** PuTTY is used to launch the SSH client for SSH session requests and is included in the install. The desktop client looks for any user-installed PuTTY in the following locations:

- Any reference to putty in the PATH environment variable
- c:/Program Files/Putty
- c:/Program Files(x86)/Putty
- c:/Putty

If PuTTY is not found, the desktop client uses the version of PuTTY that it installed at:  
<user-home-dir>/AppData/Local/Safeguard/putty.

If the user later installs PuTTY in any of the locations above, the desktop client uses that version which ensures the user has the latest version of PuTTY.

**Table 2: Desktop client requirements**

Component	Requirements
Technology	Microsoft .NET Framework 4.6 (or later)
Windows platforms	64-bit editions of: <ul style="list-style-type: none"><li>• Windows 7</li></ul>

Component	Requirements
	<ul style="list-style-type: none"> <li>Windows 8.1</li> <li>Windows 10</li> <li>Windows Server 2008 R2</li> <li>Windows Server 2012</li> <li>Windows Server 2012 R2</li> <li>Windows Server 2016</li> <li>Windows Server 2019</li> </ul> <p>If the appliance setting, <b>TLS 1.2 Only</b> is enabled, (<b>Administrative Tools   Settings   Appliance   Appliance Information</b>), ensure the desktop client also has TLS 1.2 enabled. If the client has an earlier version of TLS enabled, you will be locked out of the client and will not be able to connect to Safeguard for Privileged Passwords.</p> <p><b>IMPORTANT:</b> The Windows 7 Desktop client has additional requirements in order to enable TLS 1.2. For information, see <a href="#">Update to enable TLS 1.1 and TLS 1.2 as default secure protocols in WinHTTP in Windows</a>.</p> <p>Considerations:</p> <ul style="list-style-type: none"> <li>Internet Explorer security must be set to use TLS 1.0 or higher. Ensure the proper "Use TLS" setting is enabled on the Advanced tab of the <b>Internet Options</b> dialog (In Internet Explorer, go to <b>Tools   Internet Options   Advanced</b> tab).</li> <li>To use FIDO2 two-factor authentication, you will need a web browser that supports the WebAuthn standard.</li> </ul>

Desktop Player	See <i>One Identity Safeguard for Privileged Sessions [version] Safeguard Desktop Player User Guide</i> available at: <a href="#">One Identity Safeguard for Privileged Sessions - Technical Documentation, User Guide</a> .
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## Web client system requirements

**Table 3: Web requirements**

Component	Requirements
Web browsers	Desktop browsers: <ul style="list-style-type: none"> <li>Apple Safari 13.1 for desktop (or later)</li> <li>Google Chrome 80 (or later)</li> </ul>

Component	Requirements
	<ul style="list-style-type: none"> <li>• Microsoft Edge 80 (or later)</li> <li>• Mozilla Firefox 69 (or later)</li> <li>• Microsoft Internet Explorer 11 (Newer features may not work with Internet Explorer. You are encouraged to upgrade to a browser that can support all functionality.)</li> </ul> <p>Mobile device browsers:</p> <ul style="list-style-type: none"> <li>• Apple iOS 13 (or later)</li> <li>• Google Chrome on Android version 80 (or later)</li> </ul>

## Web management console system requirements

**Table 4: Web kiosk requirements**

Component	Requirements
Web management console	<p>Desktop browsers:</p> <ul style="list-style-type: none"> <li>• Apple Safari 13.1 for desktop (or later)</li> <li>• Google Chrome 80 (or later)</li> <li>• Microsoft Edge 80 (or later)</li> <li>• Mozilla Firefox 69 (or later)</li> <li>• Microsoft Internet Explorer 11 (Newer features may not work with Internet Explorer. You are encouraged to upgrade to a browser that can support all functionality.)</li> </ul>

Platforms and versions follow.

- You must license the VM with a Microsoft Windows license. We recommend using either the MAK or KMS method. Specific questions about licensing should be directed to your Sales Representative.
- Supported hypervisors:
  - Microsoft Hyper-V (VHDX) version 8 or higher
  - VMware vSphere with vSphere Hypervisor (ESXi) versions 6.5 or higher
  - VMware Workstation version 13 or higher
- Minimum resources: 4 CPUs, 10GB RAM, and a 500GB disk. The virtual appliances default deploy does not provide adequate resources. Ensure these minimum resources are met.

# Supported platforms

Safeguard for Privileged Passwords supports a variety of platforms, including custom platforms.

## Safeguard for Privileged Passwords tested platforms

The following table lists the platforms and versions that have been tested for Safeguard for Privileged Passwords (SPP). Additional assets may be added to Safeguard for Privileged Passwords. If you do not see a particular platform listed when adding an asset, use the **Other**, **Other Managed**, or **Other Linux** selection on the **Management** tab of the **Asset** dialog.

## SPP joined to SPS: Sessions platforms

When Safeguard for Privileged Passwords (SPP) is joined with a Safeguard for Privileged Sessions (SPS) appliance, platforms are supported that use one of these protocols:

- SPP 2.8 or lower: RDP, SSH
- SPP 2.9 or higher: RDP, SSH, or Telnet

Some platforms may support more than one protocol. For example, a Linux (or Linux variation) platform supports both SSH and Telnet protocols.

**Table 5: Supported platforms: Assets that can be managed**

Platform Name	Platform Version	Architecture (all versions unless noted)	Supports SPP	Supports SPS Access
ACF2 - Mainframe	r14, r15	zSeries	True	True
ACF2 - Mainframe LDAP	r14, r15	zSeries	True	False
Active Directory			True	False
AIX	6.1, 7.1, 7.2	PPC	True	True
Amazon Linux	2	x86_64	True	True
Amazon Web Services	1		True	False
CentOS Linux	6 7	(ver 6) x86, x86_64 (ver 7) x86_64	True	True

Platform Name	Platform Version	Architecture (all versions unless noted)	Supports SPP	Supports SPS Access
	8	(ver 8) x86_64		
Cisco ASA	7.x, 8.x, 9.X		True	True
Cisco IOS	12.X, 15.X, 16.X		True	True
Debian GNU/Linux	6, 7, 8, 9,10	MIPS, PPC, x86, x86_64, zSeries	True	True
Dell iDRAC	7, 8, 9		True	True
ESXi (VSphere)	5.5, 6.0, 6.5, 6.7x		True	False
F5 Big-IP	12.1.2, 13.0, 14.0, 15.0		True	True
Fedora	21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32	x86, x86_64	True	True
Fortinet FortiOS	5.2, 5.6, 6.0, 6.2		True	True
FreeBSD	10.4, 11.1, 11.2, 12.0	x86, x86_64	True	True
HP iLO	2, 3, 4, 5	x86	True	True
HP iLO MP	2, 3	IA-64	True	True
HP-UX	11iv2 (B.11.23), 11iv3 (B.11.31)	IA-64, PA-RISC	True	True
IBM i (formerly AS400)	7.1, 7.2, 7.3, 7.4	PPC	True	True
Junos - Juniper Networks	12, 13, 14, 15, 16, 17, 18, 19		True	True
macOS	10.9, 10.10, 10.11, 10.12, 10.13, 10.14, 10.15	x86_64	True	True
MongoDB	3.4, 3.6, 4.0, 4.2		True	False
MySQL	5.6, 5.7, 8.0		True	False
OpenLDAP	2.4		True	False
Oracle	11g Release 2, 12c Release 1, 12c Release 2		True	False

Platform Name	Platform Version	Architecture (all versions unless noted)	Supports SPP	Supports SPS Access
	18c 19c			
Oracle Linux (OL)	6, 7, 8	(ver 6) x86, x86_64  (ver 7 and 8) x86_64	True	True
Other			False	False
Other Linux			True	True
Other Managed			True	False
PAN-OS	6.0, 7.0, 8.0, 8.1, 9.0		True	True
PostgreSQL	9.6, 10, 10.2, 10.3, 10.4, 10.5, 11, 12		True	False
RACF - Mainframe	z/OS V2.1 Security Server, z/OS V2.2 Security Server z/OS V2.3 Security Server	zSeries	True	True
RACF - RACF - Mainframe LDAP	z/OS V2.1 Security Server, z/OS V2.2 Security Server z/OS V2.3 Security Server	zSeries	True	False
Red Hat Enterprise Linux (RHEL)	6, 7, 8	(ver 6) PPC, x86, x86_64, zSeries  (ver 7 and 8) PPC, x86_64, zSeries	True	True
SAP HANA	2.0	Other	True	False
SAP Netweaver Application Server	7.3, 7.4, 7.5		True	False
Solaris	10, 11	(ver 10) SPARC, x86, x86_64  (ver 11) SPARC, x86_64	True	True



<b>Platform Name</b>	<b>Platform Version</b>	<b>Architecture (all versions unless noted)</b>	<b>Supports SPP</b>	<b>Supports SPS Access</b>
SonicOS	5.9, 6.2, 6.4, 6.5		True	False
SonicWALL SMA or CMS	11.3.0		True	False
SQL Server	2012, 2014, 2016, 2017, 2019		True	False
SUSE Linux Enterprise Server (SLES)	11, 12, 15	(ver 11) IA-64, PPC, x86, x86_64, zSeries, (ver 12 and 15) PPC, x86_64, zSeries	True	True
Sybase (Adaptive Server Enterprise)	15.7, 16, 17		True	False
Top Secret - Mainframe LDAP	r14, r15, r16	zSeries	True	False
Top Secret - Mainframe	r14, r15, r16	zSeries	True	True
Ubuntu	14.04 LTS, 15.04, 15.10, 16.04 LTS, 16.10, 17.04, 17.10, 18.04 LTS, 18.10, 19.04 19.10, 20.4	ver 14.04 to ver 19.04) x86, x86_64 (ver 19.10 and 20.4) x86_64	True	True
Windows	Vista, 7, 8, 8.1, 10 Enterprise (including LTSC and IoT) Server 2008, Server 2008 R2, Server 2012, Server 2012 R2, Server 2016, Server 2019		True	True
Windows (SSH)	7, 8, 8.1, 10 Server 2008 R2, 2012, 2012 R2, 2016, 2019 Windows SSH Other		True	True

**Table 6: Supported platforms: Directories that can be searched**

Platform Name	Platform Version
Microsoft Active Directory	Windows 2008+ DFL/FFL
OpenLDAP	2.4

For all supported platforms, it is assumed that you are applying the latest updates. For unpatched versions of supported platforms, Support will investigate and assist on a case-by-case basis but it may be necessary for you to upgrade the platform or use SPP's custom platform feature.

## Custom platforms

The following example platform scripts are available:

- Custom HTTP
- Linux SSH
- Telnet
- TN3270 transports are available

For more information, see *Custom Platforms and Creating a custom platform script* in the *Safeguard for Privileged Passwords Administration Guide*.

Sample custom platform scripts and command details are available at the following links available from the [Safeguard Custom Platform Home](#) wiki on GitHub:

- Command-Reference:  
<https://github.com/OneIdentity/SafeguardCustomPlatform/wiki/Command-Reference>
- Writing a custom platform script:  
<https://github.com/OneIdentity/SafeguardCustomPlatform/wiki/WritingACustomPlatformScript>
- Example platform scripts are available at this location:  
<https://github.com/OneIdentity/SafeguardCustomPlatform/tree/master/SampleScripts>

**⚠ CAUTION:** Example scripts are provided for information only. Updates, error checking, and testing are required before using them in production. Safeguard for Privileged Passwords checks to ensure the values match the type of the property that include a string, boolean, integer, or password (which is called secret in the API scripts). Safeguard for Privileged Passwords cannot check the validity or system impact of values entered for custom platforms.

# Licenses

## Hardware appliance

The Safeguard for Privileged Passwords 3000 Appliance and 2000 Appliance ship with the Privileged Passwords module which requires a valid license to enable functionality.

You must install a valid license. Once the module is installed, Safeguard for Privileged Passwords shows a license state of **Licensed** and is operational. If the module license is not installed, you have limited functionality. That is, even though you will be able to configure access requests, if a Privileged Passwords module license is not installed, you will not be able to request a password release

## Virtual appliance Microsoft Windows licensing

You must license the virtual appliance with a Microsoft Windows license. We recommend using either the MAK or KMS method. Specific questions about licensing should be directed to your Sales Representative. The virtual appliance will not function unless the operating system is properly licensed.

## Licensing setup and update

### ***To enter licensing information when you first log in***

The first time you log in as the Appliance Administrator, you are prompted to add a licenses. The **Success** dialog displays when the license is added.

On the virtual appliance, the license is added as part of Initial Setup.

### ***To configure reminders for license expiration***

To avoid disruptions in the use of Safeguard for Privileged Passwords, the Appliance Administrator must configure the SMTP server, and define email templates for the License Expired and the License Expiring Soon event types. This ensures you will be notified of an approaching expiration date.

Users are instructed to contact their Appliance Administrator if they get an "appliance is unlicensed" notification.

As an Appliance Administrator, if you receive a "license expiring" notification, apply a new license.

### ***To update the licensing file***

Licensing update is only available using a virtual machine, not via the hardware.

### ***web client: To perform licensing activities***

Go to the licensing page:

1. Navigate to **Settings | Appliance | Licensing**.
  - To upload a new license file, click **+ Upload a new license file** and browse to select the current license file.
  - To remove the license file, select the license and click **Remove selected license**.

 **desktop client: To perform licensing activities**

1. Navigate to **Administrative Tools | Settings | Appliance | Licensing**.
  - To upload a new license file, click **+ Add License** and browse to select the license file.
  - To update a license file, select the license then select **Update License** in the lower left corner of a module's licensing information pane, select the license file, and click **Open**.

## Long Term Support (LTS) and Feature Releases

Releases use the following version designations:

- Long Term Support (LTS) Releases: The first digit identifies the release and the second is a zero (for example, 6.0 LTS).
- Maintenance LTS Releases: A third digit is added followed by LTS (for example, 6.0.6 LTS).
- Feature Releases: The Feature Releases version numbers are two digits (for example, 6.6).

Customers choose between two paths for receiving releases: Long Term Support (LTS) Release or Feature Release. See the following table for details.

**Table 7: Comparison of Long Term Support (LTS) Release and Feature Release**

	<b>Long Term Support (LTS) Release</b>	<b>Feature Release</b>
<b>Release frequency</b>	<p><b>Frequency:</b> Typically, every 2 years</p> <p><b>Scope:</b> Includes new features, resolved issues and security updates</p> <p><b>Versioning:</b> The first digit identifies the LTS and the second digit is a 0 (for example, 6.0</p>	<p><b>Frequency:</b> Typically, every 3 months</p> <p><b>Scope:</b> Includes the latest features, resolved issues, and other updates, such as security patches for the OS</p> <p><b>Versioning:</b> The first digit identifies the LTS and the second digit is a number identifying the Feature</p>

	LTS, 7.0 LTS, and so on).	Release (for example, 6.6, 6.7, and so on).
<b>Maintenance Release</b>	<p><b>Frequency:</b> Typically, every 3 months during full support</p> <p><b>Scope:</b> Includes critical resolved issues</p> <p><b>Versioning:</b> A third digit designates the maintenance LTS Release (for example, 6.0.6 LTS).</p>	<p><b>Frequency:</b> Only for highly critical issues</p> <p><b>Scope:</b> Includes highly critical resolved issues</p> <p><b>Versioning:</b> A third digit designates the maintenance Feature Release (for example, 6.6.1).</p>
<b>Support</b>	Support extends typically 3 years after the original publication date or until the next LTS is published (whichever date is later).	Support extends typically 6 months after the original publication date or until the next feature or LTS Release is published (whichever date is later).

Release details can be found at [Product Life Cycle](#).

**⚠ CAUTION: Downgrading from the latest Feature Release, even to an LTS release, voids support for SPP.**

One Identity strongly recommends always installing the latest revision of the release path you use (Long Term Support path or Feature Release path).

### Moving between LTS and Feature Release versions

You can move from an LTS version (for example, 6.0.7 LTS) to the same feature version (6.7) and then patch to a later feature version. After that, you can patch from the minimum version for the patch, typically N-3. If you move from an LTS version to a feature version, you will receive a warning like the following which informs you that you will only be able to apply a Feature Release until the next LTS Release:

Warning: You are patching to a Feature Release from an LTS Release. If you apply this update, you will not be able to upgrade to a non-Feature Release until the next LTS major release version is available. See the Administration Guide for details.

You cannot move from a Feature Release to LTS Release. For example, you cannot move from 6.7 to 6.0.7 LTS. You have to keep upgrading with each new Feature Release until the next LTS Release version is published. For this example, you would wait until 7.0 LTS is available.

### Patching

You can only patch from a major version. For example, if you have version 6.6 and want to patch to 7.7, you must patch to 7.0 LTS and then apply 7.7.

An LTS major version of Safeguard for Privileged Passwords (SPP) will work with the same LTS major version of Safeguard for Privileged Sessions (SPS). For the best experience, it is recommended you keep both their SPP and SPS in sync on the latest and supported version.

# Appliance specifications

The Safeguard for Privileged Passwords Appliance is built specifically for use only with the Safeguard for Privileged Passwords privileged management software that is already installed and ready for immediate use. It comes hardened to ensure the system is secure at the hardware, operating system, and software levels.

The following two tables list the Safeguard for Privileged Passwords 3000 Appliance and 2000 Appliance specifications and power requirements.

**Table 8: 3000 Appliance: Feature specifications**

<b>3000 Appliance</b>	<b>Feature / Specification</b>
Processor	Intel Xeon E3-1275v6 3.8 GHz
# of Processors	1
# of Cores per Processor	4 cores (8 threads)
L2/L3 Cache	8MB L3 Cache
Chipset	Intel C236 Chipset
DIMMs	Unbuffered ECC UDIMM DDR4 2400MHz
RAM	32 GB
Internal HD Controller	LSI MegaRAID SAS 9361-4i Single
Disk Hard Drive	4 x Seagate 7E2000 2TB SAS 512E
Availability	TPM 2.0, EEC Memory, Redundant PSU
I/O Slots	x16 PCIe 3.0, x8 PCIe 3.0
RAID	RAID10
NIC/LOM	4 port - dual GbE LAN with Intel i210-AT
Power Supplies	Redundant, 700W, Auto Ranging (100v~240V), ACPI compatible
Fans	1 Supermicro SNK-P0046P and 2 Micron 16GB 2666MHz 2R ECC Unb Z01B Dual Label
Chassis	1U Rack
Dimensions (HxWxD)	43 x 437.0 x 597.0 (mm) 1.7 x 17.2 x 23.5 (in)
Weight	Max: 37 lbs (16.78 Kg)

**Table 9: 2000 Appliance: Feature specifications**

<b>2000 Appliance</b>	<b>Feature / Specification</b>
Processor	Intel Xeon E3-1275v5 3.60 GHz
# of Processors	1
# of Cores per Processor	4
L2/L3 Cache	4 x 256KB L2, 8MB L3 SmartCache
Chipset	Intel C236 Chipset
DIMMs	DDR4-2400 ECC Unbuffered DIMMs
RAM	32GB
Internal HD Controller	LSI MegaRAID SAS 9391-4i 12Gbps SAS3
Disk	4 x Seagate EC2.5 1TB SAS 512e
Availability	TPM 2.0, EEC Memory, Redundant PSU
I/O Slots	x16 PCIe 3.0, x8 PCIe 3.0
RAID	RAID10
NIC/LOM	3 x Intel i210-AT GbE
Power Supplies	Redundant, 700W, Auto Ranging (100v~240V), ACPI compatible
Fans	4 x 40mm Counter-rotating, Non-hot-swappable
Chassis	1U Rack
Dimensions (HxWxD)	43 x 437.0 x 597.0 (mm) 1.7 x 17.2 x 23.5 (in)
Weight	Max: 46 lbs (20.9 Kg)
Miscellaneous	FIPS Compliant Chassis

**Table 10: 3000 Appliance and 2000 Appliance: Power requirements**

Input Voltage	100-240 Vac
Frequency	50-60Hz
Power Consumption (Watts)	170.9
BTU	583

Safeguard for Privileged Passwords is also available as a virtual appliance and from the cloud.

# Appliance LCD and controls

The front panel of the Safeguard for Privileged Passwords 3000 Appliance and 2000 Appliance contain the following controls for powering on, powering off, and scrolling through the LCD display.

- ✓ Green check mark button: Use the **Green check mark** button to start the appliance. Press the **Green check mark** button for NO more than one second to power on the appliance.
  - ▲ **CAUTION:** Once the Safeguard for Privileged Passwords Appliance is booted, DO NOT press and hold the Green check mark button. Holding this button for four or more seconds will cold reset the power of the appliance and may result in damage.
- Red X button: Use the **Red X** button to shut down the appliance. Press and hold the **Red X** button for four seconds until the LCD displays POWER OFF.
  - ▲ **CAUTION:** Once the Safeguard for Privileged Passwords Appliance is booted, DO NOT press and hold the Red X button for more than 13 seconds. This will hard power off the appliance and may result in damage.
- Down, up, left, and right arrow buttons: When the appliance is running, the LCD home screen displays: Safeguard for Privileged Passwords <version number>. Use the arrow buttons to scroll through the following details:
  - Serial: <appliance serial number>
  - X0: <appliance IP address>
  - MGMT: <management IP address>
  - MGMT MAC: <media access control address>
  - IPMI: <IP address for IPMI>

**Table 11: Appliance LCD and controls**

Control	Description
Green check mark button	Use the <b>Green check mark</b> button to start the appliance. Press the <b>Green check mark</b> button for NO MORE THAN one second to power on the appliance. <ul style="list-style-type: none"> <li>▲ <b>CAUTION:</b> Once the Safeguard for Privileged Passwords Appliance is booted, DO NOT press and hold the Green check mark button. Holding this button for four or more seconds will cold reset the power of the appliance and may result in damage.</li> </ul>
Red X button	Use the <b>Red X</b> button to shut down the appliance. Press and hold the <b>Red X</b> button for four seconds until the LCD displays POWER OFF.



Control	Description
Down, up, left, and right arrow buttons	<p data-bbox="464 271 1362 412"><b>⚠ CAUTION:</b> Once the Safeguard for Privileged Passwords Appliance is booted, <b>DO NOT</b> press and hold the Red X button for more than 13 seconds. This will hard power off the appliance and may result in damage.</p> <p data-bbox="448 443 1273 472">When the appliance is running, the LCD home screen displays:</p> <ul data-bbox="496 495 1260 524" style="list-style-type: none"> <li>• Safeguard for Privileged Passwords &lt;version number&gt;</li> </ul> <p data-bbox="448 546 1252 575">Use the arrow buttons to scroll through the following details:</p> <ul data-bbox="496 598 1129 824" style="list-style-type: none"> <li>• Serial: &lt;appliance serial number&gt;</li> <li>• X0: &lt;appliance IP address&gt;</li> <li>• MGMT: &lt;management IP address&gt;</li> <li>• MGMT MAC: &lt;media access control address&gt;</li> <li>• IPMI: &lt;IP address for IPMI&gt;</li> </ul>

## Product licensing

The Safeguard for Privileged Passwords 3000 Appliance and 2000 Appliance ship with the following modules, each requiring a valid license to enable functionality:

- One Identity Safeguard for Safeguard for Privileged Passwords (SPP)
- One Identity Safeguard for Privileged Sessions (SPS)  
SPS is a separate product. To update the SPS license, see the *Safeguard for Privileged Sessions Administration Guide*, [Updating the SPS license](#).

### **To add a Safeguard for Privileged Passwords module license**

The first time you log in to the Safeguard for Privileged Passwords desktop client as the Appliance Administrator, it prompts you to add a license. In addition, you can add additional Safeguard for Privileged Passwords module licenses.

1. Navigate to **Administrative Tools | Settings | Appliance | Licensing** in the desktop client.
2. Click **+**.
3. **Browse** to select the license file.

Once you add a license, Safeguard for Privileged Passwords displays the current license information and additional links that allow you to update the license.

4. To add another module license, click **Add Another License** from the **Success** dialog.

**NOTE:** To avoid disruptions in the use of Safeguard for Privileged Passwords, the Appliance Administrator must configure the SMTP server, and define email templates for

the *License Expired* and the *License Expiring Soon* event types. This ensures you will be notified of an approaching expiration date.

## Update and installation instructions

The Safeguard for Privileged Passwords 3000 and 2000 Appliances are built specifically for use only with the Safeguard for Privileged Passwords privileged management software, which is pre-installed and ready for immediate use on the hardened appliances.

Safeguard for Privileged Passwords virtual appliances and cloud applications are also available.

### To set up a new deployment: 3000 Appliance, 2000 Appliance, Virtual Machine, or Cloud

If this is a new physical appliance, virtual machine, or cloud deployment, see the *Safeguard for Privileged Passwords Appliance Setup Guide*. The guide is also included in the package with a physical appliance.

### To update an existing physical appliance or virtual appliance with this patch

It is the responsibility of the Appliance Administrator to upgrade Safeguard for Privileged Passwords by installing an update file (patch). Consider the following:

- **Minimum patch version:** 6.0.0.12276. If you are running an earlier version of the Safeguard for Privileged Passwords Appliance, you must upgrade to this version before applying the 6.7 patch.
- **Clustered environment:** See the [Patching cluster members](#) section in the *Safeguard for Privileged Passwords Administration Guide* for instructions on how to deploy a patch so all appliances in the cluster are on the same version.
- During initial installation and when applying a patch, make sure the desktop client file is the one supplied with the appliance version. If the versions are not compatible, errors may occur. For more information, see [To install the desktop client](#) on page 27.


### Prepare to install a patch

1. Backup your appliance before you install a patch. Once you install a patch, you cannot uninstall it. See the *Safeguard for Privileged Passwords Administration Guide*, [Backup and restore](#) topic.
2. Download the latest physical appliance patch or virtual appliance patch from the One Identity Support Portal:  
<https://support.oneidentity.com/one-identity-safeguard-for-privileged-passwords/download-new-releases>

### To install the hardware patch

1. As an Appliance Administrator, log in to the Safeguard for Privileged Passwords desktop client.
2. From the **Home** page, select **Administrative Tools**.
3. Select **Settings | Appliance | Updates**.  
The current appliance and client versions are displayed.
4. Click **Upload a File** and browse to select the update file you downloaded from the One Identity support web site.  
**NOTE:** When you select a file, Safeguard for Privileged Passwords uploads it to the server, but does not install it.
5. Once the file has successfully uploaded, click **Install Now**.

### To install the virtual machine patch

1. Make adequate resources available. The virtual appliances default deploy does not provide adequate resources. The minimum resources required are: 4 CPUs, 10GB RAM, and a 500GB disk. Without adequate disk space, the patch will fail and you will need to expand disk space then re-upload the patch.
2. Go to the web management console and click  **Setup** and follow the wizard.

### To install the desktop client

Be sure to update the desktop client when you apply a new patch. The version of the appliance and desktop client must be compatible.

To define and enforce security policy for your enterprise, install the Windows desktop client application, which gives you access to the Administrative Tools. You install the Windows desktop client by means of an .msi package that can be downloaded from the appliance web client portal. You do not need administrator privileges to install the desktop client.

**NOTE:** PuTTY is used to launch the SSH client for SSH session requests and is included in the install. The desktop client looks for any user-installed PuTTY in the following locations:

- Any reference to putty in the PATH environment variable
- c:/Program Files/Putty
- c:/Program Files(x86)/Putty
- c:/Putty

If PuTTY is not found, the desktop client uses the version of PuTTY that it installed at:  
<user-home-dir>/AppData/Local/Safeguard/putty.

If the user later installs PuTTY in any of the locations above, the desktop client uses that version which ensures the user has the latest version of PuTTY.

### **Installing the Safeguard for Privileged Passwords desktop client application**

1. To download the Safeguard for Privileged Passwords desktop client Windows installer .msi file, open a browser and navigate to:  
`https://<Appliance IP>/Safeguard.msi`  
Save the **Safeguard.msi** file in a location of your choice.
2. Run the MSI package.
3. Select **Next** in the **Welcome** dialog.
4. Accept the **End-User License Agreement** and select **Next**.
5. Select **Install** to begin the installation.
6. Select **Finish** to exit the desktop client setup wizard.
7. Check your desktop resolution. The desktop client works the best at a resolution of 1024 x 768 or greater.

### **Installing the Desktop Player**

**⚠ CAUTION:** If the Desktop Player is not installed and a user tries to play back a session from the Activity Center, a message like the following will display: No Desktop Player. The Safeguard Desktop Player is not installed. Would you like to install it now? The user will need to click Yes to go to the download page to install the player following step 2 below.

1. Once the Safeguard for Privileged Passwords installation is complete, go to the Windows **Start** menu, **Safeguard** folder, and click **Download Safeguard Player** to be taken to the [One Identity Safeguard for Privileged Sessions - Download Software](#) web page.
2. Follow the *Install Safeguard Desktop Player* section of the player user guide found here:
  - a. Go to [One Identity Safeguard for Privileged Sessions - Technical Documentation](#).
  - b. Scroll to **User Guide** and click *One Identity Safeguard for Privileged Sessions [version] Safeguard Desktop Player User Guide*.
3. For Safeguard Desktop player version 1.8.6 and later, ensure your signed web certificate has a Subject Alternative Name (SAN) that includes each IP address of each of your cluster members. If the settings are not correct, the Safeguard Desktop Player will generate a certificate warning like the following when replaying sessions: Unable to verify SSL certificate. To resolve this issue, import the appropriate certificates including the root CA.

### **New Desktop Player versions**

When you have installed a version of the Safeguard Desktop Player application, you will need to uninstall the previous version to upgrade to a newer player version.

# Verify successful installation

You can verify that the correct version has been successfully installed from the Safeguard for Privileged Passwords desktop client or the LCD on the Safeguard for Privileged Passwords Appliance.

## ***To verify the uploaded patch was installed***

1. Log in to the Safeguard for Privileged Passwords desktop client as an Operations Administrator or an Appliance Administrator.
2. Select ✕ **Administrative Tools**.
3. Select **Settings | Appliance | Appliance Information**.
4. Verify the correct appliance version is displayed in the appliance properties pane.

In addition, when the appliance is running, the LCD home screen on the front panel of the appliance displays **Safeguard for Privileged Passwords** <version number>. Therefore, you can verify the correct appliance version is running from there, as well.

## More resources

Additional information is available from the following:

- Online product documentation: <https://support.oneidentity.com/one-identity-safeguard-for-privileged-passwords/technical-documents>
- One Identity Communities: <https://www.quest.com/community/one-identity/>
- Knowledge Base: <https://support.oneidentity.com/one-identity-safeguard-for-privileged-passwords/kb>

## Globalization

This section contains information about installing and operating this product in non-English configurations, such as those needed by customers outside of North America. This section does not replace the materials about supported platforms and configurations found elsewhere in the product documentation.

This release is Unicode-enabled and supports any character set. It supports simultaneous operation with multilingual data. This release is targeted to support operations in the following regions: North America, Western Europe and Latin America, Central and Eastern Europe, Far-East Asia, Japan. It supports bidirectional writing (Arabic and Hebrew). The release supports Complex Script (Central Asia – India, Thailand).

The release is localized to the following languages: Arabic (Saudi Arabia), Chinese (Traditional), Dutch, French, German, Italian, Japanese, Korean, Russian, Spanish.

# About us

One Identity solutions eliminate the complexities and time-consuming processes often required to govern identities, manage privileged accounts and control access. Our solutions enhance business agility while addressing your IAM challenges with on-premises, cloud and hybrid environments.

## Contacting us

For sales and other inquiries, such as licensing, support, and renewals, visit <https://www.oneidentity.com/company/contact-us.aspx>.

## Technical support resources

Technical support is available to One Identity customers with a valid maintenance contract and customers who have trial versions. You can access the Support Portal at <https://support.oneidentity.com/>.

The Support Portal provides self-help tools you can use to solve problems quickly and independently, 24 hours a day, 365 days a year. The Support Portal enables you to:

- Submit and manage a Service Request.
- View Knowledge Base articles.
- Sign up for product notifications.
- Download software and technical documentation.
- View how-to videos at [www.YouTube.com/OneIdentity](http://www.YouTube.com/OneIdentity).
- Engage in community discussions.
- Chat with support engineers online.
- View services to assist you with your product.

## Third-party components

This product contains third-party components (listed below). Copies of component licenses may be found at <https://www.oneidentity.com/legal/license-agreements.aspx>. Source code for components marked with an asterisk (\*) is available at <http://opensource.quest.com>.

**Table 12: List of third-party components**

<b>Component</b>	<b>License or acknowledgment</b>
@angular/animations 7.2.16	Copyright (c) 2010-2019 Google LLC License Text - MIT N/A
@angular/animations 8.2.14	Copyright (c) 2010-2019 Google LLC License Text - MIT N/A
@angular/cdk 7.3.7	Copyright (c) 2019 Google LLC. License Text - MIT N/A
@angular/cdk 8.2.3	Copyright (c) 2020 Google LLC. License Text - MIT N/A
@angular/common 7.2.16	Copyright (c) 2015 Cameron Spear License Text - MIT N/A
@angular/common 8.2.14	Copyright (c) 2010-2020 Google LLC. License Text - MIT N/A
@angular/compiler 7.2.16	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a> License Text - MIT N/A
@angular/compiler 8.2.14	Copyright (c) 2010-2020 Google LLC. License Text - MIT N/A
@angular/core 7.2.16	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a> License Text - MIT N/A
@angular/core 8.2.14	Copyright (c) 2010-2020 Google LLC. License Text - MIT N/A
@angular/forms 7.2.16	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a> License Text - MIT N/A
@angular/forms 8.2.14	Copyright (c) 2010-2020 Google LLC. License Text - MIT N/A
@angular/http 7.2.16	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a> License Text - MIT N/A
@angular/material 7.3.7	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a>



Component	License or acknowledgment
	License Text - MIT N/A
@angular/material 8.2.3	Copyright (c) 2020 Google LLC. License Text - MIT N/A
@angular/material-moment-adapter 7.3.7	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a> License Text - MIT N/A
@angular/material-moment-adapter 8.2.3	Copyright (c) 2019 Google LLC. License Text - MIT N/A
@angular/platform-browser 7.2.16	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a> License Text - MIT N/A
@angular/platform-browser 8.2.14	Copyright (c) 2010-2020 Google LLC. License Text - MIT N/A
@angular/platform-browser-dynamic 7.2.16	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a> License Text - MIT N/A
@angular/platform-browser-dynamic 8.2.14	Copyright (c) 2010-2020 Google LLC. License Text - MIT N/A
@angular/router 7.2.16	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a> License Text - MIT N/A
@angular/router 8.2.14	Copyright (c) 2020 Google LLC. License Text - MIT N/A
@types/humanize-duration 3.18.0	Copyright (c) 2010-2019 Google LLC. <a href="http://angular.io/license">http://angular.io/license</a> License Text - MIT N/A
@types/jquery 3.3.31	Copyright Notice - @types/jquery 3.3.31 Leonard Thieu, Boris Yankov, Christian Hoffmeister, Steve Fenton, Diullei Gomes, Tass Iliopoulos, Jason Swearingen, Sean Hill, Guus Goossens, Kelly Summerlin, Basarat Ali Syed, Nicholas Wolverson, Derek Cicerone, Andrew Gaspar, Seikichi Kondo, Benjamin Jackman, Poul Sorensen, Josh Strobl, John Reilly, Dick van den Brink, Thomas Schulz, Terry Mun License MIT 1.0

Component	License or acknowledgment
@types/nodes 13.13.5	Copyright Notice - @types/node 13.13.5 <a href="https://github.com/DefinitelyTyped/DefinitelyTyped/tree/master/types/node">https://github.com/DefinitelyTyped/DefinitelyTyped/tree/master/types/node</a> License MIT 1.0
@types/qrcode 1.3.4	Copyright Notice - @types/qrcode 1.3.4 York Yao, Michael Nahkies, Rémi Sormain License MIT 1.0
@types/signalr 2.2.35	Copyright Notice - @types/signalr 2.2.35 Boris Yankov, T. Michael Keeseey, Giedrius Grabauskas License MIT 1.0
ANTLR 3.5.0.2	Copyright © 2012 Terence Parr and Sam Harwell. All rights reserved. The component is governed by <i>BSD ANTRL 4</i> license.
Antlr.Unofficial 3.4.1	Copyright 2009-2014 The Apache Software Foundation This component is governed by the <a href="#">Apache 2.0 License</a> . Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
Apache Cassandra 3.11.6	Copyright 2009-2014 The Apache Software Foundation This component is governed by the <a href="#">Apache 2.0 License</a> . Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
AsyncIO 0.1.69*	Copyright © 2016 Doran Somech This component is governed by the <i>Mozilla Public License v2</i> .
Autofac 4.6.2 Autofac 4.8.1 Autofac 4.9.4 Autofac 5.2.0 Autofac.Extensions.DependencyInje	Copyright © 2014 Autofac Project The component is governed by the <i>MIT Autofac Project</i> license.

Component	License or acknowledgment
ction 6.0.0 Autofac.Owin 4.2.0 Autofac.Owin 5.0.1	
Autofac.WebApi 4.2.0 Autofac.WebApi 5.0.0	Copyright © 2015 Autofac Project This component is governed by the <i>MIT Autofac Project 2015</i> license.
Autofac.WebApi2.Owin 4.0.0 Autofac.WebApi2.Owin 5.0.0	Copyright 2007 James Newton-King
AutoMapper 9.0.0	Copyright © 2010 Jimmy Bogard This component is governed by the <i>MIT AutoMapper</i> license.
AWSSDK.Core 3.3.10.1 AWSSDK.Core 3.3.107.3 AWSSDK.IdentityManagement 3.3.2.3 AWSSDK.IdentityManagement 3.3.105.59	Copyright 2009-2017 Amazon.com, Inc. or its affiliates. All Rights Reserved. This component is governed by the <a href="#">Apache 2.0 License</a> . Version 2.0, January 2004 <a href="http://www.apache.org/licenses/">http://www.apache.org/licenses/</a>
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