

One Identity Safeguard for Privileged Sessions 7.0 LTS

Release Notes

22 July 2022, 11:37

These release notes provide information about the One Identity Safeguard for Privileged Sessions release. For the most recent documents and product information, see [One Identity Safeguard for Privileged Sessions - Technical Documentation](#).

About this release

One Identity Safeguard for Privileged Sessions Version 7.0 LTS is a long-term supported feature release with new features and resolved issues. For details, see:

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

NOTE: For a full list of key features in One Identity Safeguard for Privileged Sessions, see [Administration Guide](#).

About the Safeguard product line

The One Identity Safeguard Appliance is built specifically for use only with the Safeguard 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 timeframe to value.

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:

- **One Identity 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 Safeguard 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 - integrating 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.

New features

New features in One Identity Safeguard for Privileged Sessions (SPS) version 7.0 LTS:

- SPS licensing

The new SPS license has the following license options:

- Basic proxies
- Sudo iolog
- Analytics

No HA license is required anymore and license upload does not require traffic restart.

SPS does not run an active license check for the ongoing traffic sessions and the license limits are evaluated on demand.

The license update will stop the services of the disabled license options.

- Credential injection

The RDP Application session initiated on the SPP side provides the password automatically for the RemoteApp Launcher.

To use credential injection, use a connection policy for the RDP Application session that has the `Credential injection` flag selected.

- Data migration from an SPS instance to another SPS instance

If you need to switch from an One Identity Safeguard for Privileged Sessions (SPS) instance to another SPS instance, for example, your SPS appliance is old and you want to switch it to a new one, you can use the console menu to copy all data between SPS instances.

For more information, see *Data migration from an SPS instance to another SPS instance* in the *Administration Guide*.

- Configuring custom AA plugins in connection policies shared with SPP

For more information, see *Sharing RDP connection policies with SPP* and *Sharing SSH connection policies with SPP* in the *Administration Guide*.

Other improvements:

- The SPS login pane is visually improved. All available login methods are now organized in a drop-down menu.
- If you create a new authentication method, SPS automatically fills out the **Script reference** field when you specify the name of the login method for the first time.
- The **Cleanup** option has been separated from the **Archive** option. Using the **Cleanup** option, you can delete the `.zat` file and the corresponding metadata of the sessions.

You can set the cleanup time in **Connections**, or under **Global Options**.

Changes and improvements in SPS REST API Reference Guide version 7.0 LTS:

- Listing available login methods. List login methods (local, LDAP, RADIUS, or x509) to determine which login methods are available to you to authenticate to SPS. For more information, see *Listing SPS login methods* and *Authenticate to the SPS REST API* in the *SPS REST API Reference Guide*.
- Downloading and installing SPS firmware through HTTP. To avoid having to manually upload large SPS firmware ISO files before upgrading, download and install SPS firmware files by providing a URL through the SPS REST API. You can download a single file, or download multiple files simultaneously. For more information, see *Downloading and installing SPS firmware through HTTP* in the *SPS REST API Reference Guide*.
- Enhanced appliance health status monitoring. New parameters have been added to monitor RAID and indexer capabilities. For more information, see *Monitor appliance health status* in the *SPS REST API Reference Guide*.
- Creating statistics from custom queries using the `/api/configuration/reporting/custom_subchapters` endpoint has been deprecated.

Deprecated features

Apache lucene database

In SPS 7.0 LTS, One Identity modified the search for screen content in session data to use the Elasticsearch database only. The Apache lucene database support is phased out, but the query language remained lucene-like.

After the switch to the Elasticsearch database, you will be able to access content stored in an Apache lucene database only if you regenerate the content with the reindex tool. For more information, see [Regenerate content stored in lucene indices](#).

Due to the removal of lucene indices, users are not able to search for content in lucene indices with the **content request** parameter on the `/api/audit/sessions` and `/api/audit/sessions/stats` endpoints.

For more information, see ["Searching in the session database" in the REST API Reference Guide](#) and ["Session statistics" in the REST API Reference Guide](#).

Additionally, in **Reporting**, statistics subchapters that included the **audit_content** filter will not work. Alternatively, you can use Search-based subchapters with the **screen.content** filter to create statistic reports from connection metadata that included a specific content in the audit trail.

For more information, see ["Creating search-based report subchapters from search results" in the Administration Guide](#).

Content search option deprecation

On the **Search** page, the **Content search** option has been deprecated.

Advanced statistics

Creating statistics from custom queries using the **Reporting > View & edit subchapters > Advanced statistics** page has been deprecated. The `/api/configuration/reporting/custom_subchapters` REST API endpoint has also been deprecated.

During the upgrade process, existing advanced statistics subchapters and their references are removed from the SPS configuration. Additionally, advanced statistics ACLs assigned to user groups are also removed from the SPS configuration. Note that if a user group only had the advanced statistics ACL assigned under **Users & Access Control > Appliance Access**, the whole ACL entry is removed during the upgrade process.

Alternatively, you can use search-based subchapters to query connection metadata. For more information, see ["Creating search-based report subchapters from search results" in the Administration Guide](#).

Resolved issues

The following is a list of issues addressed in this release.

Table 1: General resolved issues in release 7.0 LTS

Resolved Issue	Issue ID
<p>An error message or a blank page is displayed when visiting the user interface the first time after an upgrade.</p> <p>Due to an error, the previous versions of SPS redirected the users to the login page with a permanent redirect. Since the browsers remembered this information and the URL was not available anymore, SPS showed a blank page or an error message on the first visit of the user interface after an upgrade. This has been fixed and SPS now correctly redirects to the login page.</p>	PAM-16656
<p>Copying files over the clipboard in RDP could cause all connections to terminate.</p> <p>In some rare edge cases, copying files to or from an RDP session host using clipboard copy and paste could cause all RDP connections to terminate during the paste operation. In this case, a core file was generated. The issue was caused by an insufficient safety check, in case the RDP client or server requested an invalid file from the clipboard.</p> <p>This has been fixed by correcting the safety check. In case of an invalid paste request, the message "Invalid file index in cliprdr file content request" will appear in the system log, and the request will be dropped properly in all cases.</p>	PAM-16569
<p>Online player video share did not work.</p>	PAM-16519

Resolved Issue	Issue ID
<p>Video share did not work when the other user was not logged into the SPS. This issue has been fixed.</p>	
<p>Generated reports displayed session start and session end times only with month precision.</p> <p>A previous patch for "Session history" and "Verdicts history by sessions" subchapters that fixed the resolution of charts for daily reports unfortunately had an unwanted side effect that caused other subchapters that displayed session start and session end times like "Top 10 longest sessions" or "Top 10 shortest sessions" to display session start and session end times only with month precision as opposed to second precision.</p> <p>This has been fixed and reports generated now display session start and session end times with second precision.</p>	PAM-16485
<p>SPS falsely displayed the "Play video" button and screenshot viewing possibilities for mssql sessions.</p> <p>The features for playing video or displaying screenshots for mssql sessions have not yet been implemented.</p>	PAM-16461
<p>If there is no license configured, then the firmware test denies the upgrade without displaying the reason.</p> <p>When there was no license configured, and you clicked the Test firmware icon, or at Basic Settings/System/Firmwares you selected a different firmware to be active after the reboot, then the firmware test failed, but none of the test results indicated any problems. This issue has been fixed.</p>	PAM-16450
<p>Audited connections, mostly RDP, could fail to write the audit trail and connection could be terminated.</p> <p>In certain cases, auditing a connection could run into an issue when the audited traffic contained an overly large message. In this case, auditing failed, and the connection was terminated.</p> <p>Also, the message "Failed to send request to audit writer service;" was added to the system log.</p> <p>The issue mostly affected RDP clipboard transfers, for example when image data was copied between the RDP session host and the RDP client host.</p> <p>This issue has been mitigated, by increasing the limit of single transfers to 128 megabytes, which allows copying uncompressed 4K 32bpp images in RDP. Also, logging has been improved to help determine if a connection closed due to this limit.</p>	PAM-16379
<p>Setting a server certificate or private key in the last step of the Welcome Wizard fails with an error.</p>	PAM-16282

Resolved Issue	Issue ID
<p>The web server's certificate and private key can be configured in the last step of the Welcome Wizard before finishing it, but due to an error, it was not possible to set a custom certificate and key pair, or to view the automatically generated one. This has been fixed.</p>	
<p>LDAP connections can accumulate over a short time period in some cases. Open LDAP connections could accumulate in several cases, for example when an anonymous bind was used. The reason for this was incorrect internal caching. This was fixed.</p>	PAM-16198
<p>Health status information was not up-to-date on the API. After upgrading to SPS 6.13.0, the <code>/{api/health-status}</code> information was not updated. This has been fixed.</p>	PAM-16197
<p>SSH SFTP file transfer might fail from certain servers. In some cases, transferring files from certain servers using the SFTP protocol failed due to a packet size limit. In this case, the message 'Invalid packet length;' was written to the system log. The interoperability with these servers has been improved by increasing the packet size limit to match the server limit.</p>	PAM-16188
<p>After upgrading from 5.0.11 to 6.0.12, SPS fails to boot, due to invalid <code>nodeid.json</code>. Though the upgrade finishes successfully, SPS stops before starting up the system. The web UI gets stuck on "Firmware is starting up, please wait...", and the last message on the screen reads "Fatal error: could not start core firmware because makeworld has failed". This issue has been fixed.</p>	PAM-16172
<p>The Login options page was visible for those as well who had no permission to change or view anything. This issue has been fixed and now the Login options page is only visible for those who have permission to it, and read-only mode has been added.</p>	PAM-16125
<p>When trying to visualize session data on the timeline on the Search page, if the start time attribute of a session that is to be included on the timeline is missing, the UI displays <code>InternalError</code>. SPS Search UI provides a feature to visualize session metadata on a timeline chart within a set time range specified by the date filters on the search page. In order to build the timeline, sessions that fall into the given time range specified by the date filters on the search page are collected. Unfortunately, there can be situations, when the start time property of a session is missing. In this case, if the session is included in the timeline, the UI displays <code>InternalError</code>.</p>	PAM-16086

Resolved Issue	Issue ID
<p>In order to solve this problem, sessions for which the start time attribute is not specified, are not included in the timeline.</p>	
<p>Gateway authentication, Four eyes and Active connections were not available on the web interface.</p> <p>Due to an authorization error, the Gateway authentication, Four eyes and Active connections pages were not available on the web interface. This issue has been fixed.</p>	PAM-16029
<p>The UI did not accept the ecdsa-sha2-nistp384, ecdsa-sha2-nistp521 host key algorithms.</p> <p>On the SSH options page, setting the host key algorithms field to ecdsa-sha2-nistp384 or ecdsa-sha2-nistp521 was not possible on the client and server side. This issue has been fixed.</p>	PAM-15959
<p>The Quick Connection Setup configuration could not be finished if a commit log was required, but its dialog was canceled.</p> <p>This issue has been fixed: canceling the commit log takes you to the Review page of the Quick Connection Setup configuration.</p>	PAM-15913
<p>Encrypted sudo-iolog sessions can be replayed without decryption keys.</p> <p>Even though users had no decryption keys for encrypted sudo-iolog sessions, screenshots and videos were available for inspection. This issue has been fixed. Now, encrypted sudo-iolog sessions cannot be replayed without decryption keys.</p>	PAM-15862
<p>Some of the Mssql connections fail if TLS is configured.</p> <p>Mssql connections from clients running on either Windows or Linux could fail when TLS was configured.</p> <p>On Windows, the connections could fail because the Microsoft command line tool could not parse TDS messages sent in multiple fragments due to a timing related issue.</p> <p>On Linux, connections could fail if OpenSSL 1.1.1 or later was installed, because the Microsoft command line tool falsely advertised support for TLS v1.3. Currently this TLS version cannot be used due to limitations in the TDS protocol.</p> <p>Both issues have been fixed. Negotiating TLS v1.3 has been temporarily disabled until proper support is implemented in the TDS protocol.</p> <p>Furthermore, the initial packet size has been raised during the TLS handshake.</p>	PAM-15839
<p>Vault details information box width was too small to read.</p> <p>The information box width is corrected, it can be read easily.</p>	PAM-15825

Resolved Issue	Issue ID
<p>Users could not upload all supported certifications to trust stores.</p> <p>Some of the certifications were not visible and the user could not upload those to trust stores. This issue is fixed.</p>	PAM-15822
<p>Disk fill-up prevention does not stop active connections.</p> <p>Due to an error, the active connections were not stopped after the disk fill-up prevention threshold was reached. This has been corrected.</p>	PAM-15785
<p>"Accepted" verdict of RDP session could incorrectly turn to "Rejected".</p> <p>In some rare cases, when the RDP session was established using multiple TCP connections, then failing intermediate connection, 'Rejected' status was displayed in UI search page for the session, even if a subsequent connection in the same session was accepted. This was fixed by correctly displaying the final session verdict.</p>	PAM-15616
<p>SPS does not support openssh 8.5 and later clients using pubkey auth.</p> <p>After openssh 8.5 there were some changes related to the pubkey sign algorithm; therefore, the client waits for a message from the server containing the supported server sign algorithms. If this message was missing, the client closed the connection.</p> <p>This has been fixed, SPS now supports pubkey auth with openssh 8.5 and later clients.</p>	PAM-15596
<p>On editing the Error Templates, we changed the logo. After that, we changed the logo again, and canceled this change, and the loading got stuck.</p> <p>This issue has been fixed and now the loading is displayed only if a file is selected.</p>	PAM-15588
<p>Configuration lock isn't released when used app switcher</p> <p>When the user used the app switcher while holding the configuration lock, is it not released and another user wasn't able to configure the SPS.</p>	PAM-15562
<p>tsadaemon tracebacks after reboot.</p> <p>There is a known bug in the openssl-ts tool, which can corrupt its serial file if it is terminated during a timestamping request. The fix prevents this situation and handles the serial file in a failsafe mode.</p>	PAM-15401
<p>Disk space fill-up prevention can be triggered after an upgrade.</p> <p>In SPS 6.10.0, a change was introduced in disk space fill-up prevention, requiring +3 GB of free disk space in addition to the configured disk space fill-up prevention value. The pre-check before the upgrade did not use the new rules and this could lead to a situation where the pre-check is successful but after the upgrade and the reboot, the disk fill-up prevention is triggered. To avoid this situation, the pre-check was modified to verify</p>	PAM-15005

Resolved Issue	Issue ID
the disk space with the new rules.	
<p>For iolog sessions, the Terminate button has been removed from Safeguard Desktop Player.</p> <p>In some cases, the Safeguard Desktop Player showed a non-functioning Terminate button, while playing iolog sessions. This issue has been fixed. As terminating iolog sessions is not supported, the Terminate button was removed for iolog sessions.</p>	PAM-14611
<p>Deleting a failed report without a generated pdf may cause an internal server error.</p> <p>It can happen that there is an error during the pdf creation of a report. If you tried to delete such a report on the Reporting > Download Reports page, it resulted in an internal server error, because SPS tried to delete a pdf that did not exist.</p> <p>This issue has been fixed and now you can delete the failed reports.</p>	PAM-13632
<p>On the SPS Search UI, in the Advanced search filter, for the deprecated 'psm.index_status' field, there was no valid option to search for sessions with INDEXING_ABORTED index status.</p> <p>When a new index status called INDEXING_ABORTED was introduced for the 'recording.index_status' field, there was no option provided for its deprecated field, 'psm.index_status' to search for sessions with INDEXING_ABORTED index status. As a result, sessions with INDEXING_ABORTED status could not be searched by the psm.index_status field.</p> <p>This has been fixed by adding the value '7' to the psm.index_status field as a valid option, which is mapped to the value of the INDEXING_ABORTED status of the recording.index_status field.</p>	PAM-12584

Table 2: Resolved Common Vulnerabilities and Exposures (CVE) in release 7.0 LTS

Resolved Issue	Issue ID
bash:	CVE-2019-18276
bind9:	CVE-2021-25220
cifs-utils:	CVE-2020-14342
	CVE-2021-20208
	CVE-2022-27239
	CVE-2022-29869

Resolved Issue	Issue ID
cups:	CVE-2019-8842
	CVE-2020-10001
	CVE-2022-26691
curl:	CVE-2022-22576
	CVE-2022-27774
	CVE-2022-27775
	CVE-2022-27776
	CVE-2022-27781
	CVE-2022-27782
cyrus-sasl2:	CVE-2022-24407
dbus:	CVE-2020-35512
dpkg:	CVE-2022-1664
expat:	CVE-2021-45960
	CVE-2021-46143
	CVE-2022-22822
	CVE-2022-22823
	CVE-2022-22824
	CVE-2022-22825
	CVE-2022-22826
	CVE-2022-22827
	CVE-2022-23852
	CVE-2022-23990
	CVE-2022-25235
	CVE-2022-25236
	CVE-2022-25313
	CVE-2022-25314
	CVE-2022-25315

Resolved Issue	Issue ID
fribidi:	CVE-2022-25308
	CVE-2022-25309
	CVE-2022-25310
glibc:	CVE-2016-10228
	CVE-2019-25013
	CVE-2020-27618
	CVE-2020-29562
	CVE-2020-6096
	CVE-2021-27645
	CVE-2021-3326
	CVE-2021-35942
	CVE-2021-3999
	CVE-2022-23218
	CVE-2022-23219
gzip:	CVE-2022-1271
klibc:	CVE-2021-31870
	CVE-2021-31871
	CVE-2021-31872
	CVE-2021-31873
libinput:	CVE-2022-1215
libsepol:	CVE-2021-36084
	CVE-2021-36085
	CVE-2021-36086
	CVE-2021-36087
libxml2:	CVE-2022-23308
	CVE-2022-29824

Resolved Issue	Issue ID
linux:	CVE-2020-27820
	CVE-2021-26401
	CVE-2022-0001
	CVE-2022-0435
	CVE-2022-0492
	CVE-2022-0516
	CVE-2022-0847
	CVE-2022-1016
	CVE-2022-1055
	CVE-2022-1116
	CVE-2022-23960
	CVE-2022-25636
	CVE-2022-26490
	CVE-2022-27223
	CVE-2022-27666
	CVE-2022-29581

Resolved Issue	Issue ID
mysql-8.0:	CVE-2022-21412
	CVE-2022-21413
	CVE-2022-21414
	CVE-2022-21415
	CVE-2022-21417
	CVE-2022-21418
	CVE-2022-21423
	CVE-2022-21425
	CVE-2022-21427
	CVE-2022-21435
	CVE-2022-21436
	CVE-2022-21437
	CVE-2022-21438
	CVE-2022-21440
	CVE-2022-21444
	CVE-2022-21451
	CVE-2022-21452
	CVE-2022-21454
	CVE-2022-21457
	CVE-2022-21459
CVE-2022-21460	
CVE-2022-21462	
CVE-2022-21478	
nginx:	CVE-2020-11724
	CVE-2020-36309
	CVE-2021-3618
nss:	CVE-2020-25648

Resolved Issue	Issue ID
openjdk-lts:	CVE-2022-21248
	CVE-2022-21277
	CVE-2022-21282
	CVE-2022-21283
	CVE-2022-21291
	CVE-2022-21293
	CVE-2022-21294
	CVE-2022-21296
	CVE-2022-21299
	CVE-2022-21305
	CVE-2022-21340
	CVE-2022-21341
	CVE-2022-21360
	CVE-2022-21365
	CVE-2022-21366
	CVE-2022-21426
	CVE-2022-21434
	CVE-2022-21443
	CVE-2022-21476
	CVE-2022-21496
openldap:	CVE-2022-29155
openssl:	CVE-2022-0778
	CVE-2022-1292
pcre3:	CVE-2019-20838
	CVE-2020-14155

Resolved Issue	Issue ID
php7.4:	CVE-2017-8923
	CVE-2017-9118
	CVE-2017-9119
	CVE-2017-9120
	CVE-2021-21707
	CVE-2021-21708
postgresql-12:	CVE-2022-1552
python3.8:	CVE-2022-0391
redis:	CVE-2022-0543
rsync:	CVE-2018-25032
sqlite3:	CVE-2021-36690
tar:	CVE-2021-20193
tcpdump:	CVE-2018-16301
	CVE-2020-8037
tiff:	CVE-2020-35522
	CVE-2022-0561
	CVE-2022-0562
	CVE-2022-0865
	CVE-2022-0891
xz-utils:	CVE-2022-1271
zlib:	CVE-2018-25032

Table 3: Resolved Common Vulnerabilities and Exposures (CVE) between releases 6.0.0 and 6.13.0

Resolved Issue	Issue ID
apt:	CVE-2014-0487
	CVE-2019-3462
	CVE-2020-27350
	CVE-2020-3810
avahi:	CVE-2021-3468
bash:	CVE-2019-18276

Resolved Issue	Issue ID
bind9:	CVE-2018-5738
	CVE-2018-5740
	CVE-2018-5743
	CVE-2018-5744
	CVE-2018-5745
	CVE-2019-6465
	CVE-2019-6471
	CVE-2019-6477
	CVE-2020-8616
	CVE-2020-8617
	CVE-2020-8618
	CVE-2020-8619
	CVE-2020-8620
	CVE-2020-8621
	CVE-2020-8622
	CVE-2020-8623
	CVE-2020-8624
	CVE-2020-8625
	CVE-2021-25214
	CVE-2021-25215
CVE-2021-25216	
CVE-2021-25219	
CVE-2021-25220	
bubblewrap:	CVE-2020-5291
busybox:	CVE-2011-5325
	CVE-2017-15873
	CVE-2018-1000500
	CVE-2018-1000517
	CVE-2018-20679

Resolved Issue	Issue ID
	CVE-2019-5747
	CVE-2021-28831
	CVE-2021-42374
	CVE-2021-42378
	CVE-2021-42379
	CVE-2021-42380
	CVE-2021-42381
	CVE-2021-42382
	CVE-2021-42384
	CVE-2021-42385
	CVE-2021-42386
bzip2:	CVE-2008-1372
	CVE-2016-3189
	CVE-2019-12900
cairo:	CVE-2018-19876
cifs-utils:	CVE-2020-14342
	CVE-2021-20208
	CVE-2022-27239
	CVE-2022-29869
cloud-init:	CVE-2020-8632
cpio:	CVE-2015-1197
	CVE-2016-2037
	CVE-2021-38185
cron:	CVE-2017-9525
cryptsetup:	CVE-2016-4484
	CVE-2020-14382
	CVE-2021-4122
cups:	CVE-2018-4180
	CVE-2018-4181

Resolved Issue	Issue ID
	CVE-2018-4182
	CVE-2018-4183
	CVE-2018-4700
	CVE-2018-6553
	CVE-2019-2228
	CVE-2019-8675
	CVE-2019-8696
	CVE-2019-8842
	CVE-2020-10001
	CVE-2020-3898
	CVE-2022-26691
curl:	CVE-2018-0500
	CVE-2018-1000120
	CVE-2018-1000121
	CVE-2018-1000122
	CVE-2018-1000300
	CVE-2018-1000301
	CVE-2018-14618
	CVE-2018-16839
	CVE-2018-16840
	CVE-2018-16842
	CVE-2018-16890
	CVE-2019-3822
	CVE-2019-3823
	CVE-2019-5435
	CVE-2019-5436
	CVE-2019-5481
	CVE-2019-5482
	CVE-2020-8169

Resolved Issue	Issue ID
	CVE-2020-8177
	CVE-2020-8231
	CVE-2020-8284
	CVE-2020-8285
	CVE-2020-8286
	CVE-2021-22876
	CVE-2021-22890
	CVE-2021-22898
	CVE-2021-22924
	CVE-2021-22925
	CVE-2021-22946
	CVE-2021-22947
	CVE-2022-22576
	CVE-2022-27774
	CVE-2022-27775
	CVE-2022-27776
	CVE-2022-27781
	CVE-2022-27782
cyrus-sasl2:	CVE-2019-19906
	CVE-2022-24407
db5.3:	CVE-2019-8457
dbus:	CVE-2019-12749
	CVE-2020-12049
	CVE-2020-35512
dpkg:	CVE-2022-1664
e2fsprogs:	CVE-2019-5094
	CVE-2019-5188
elfutils:	CVE-2018-16062
	CVE-2018-16402

Resolved Issue	Issue ID
	CVE-2018-16403
	CVE-2018-18310
	CVE-2018-18520
	CVE-2018-18521
	CVE-2019-7146
	CVE-2019-7148
	CVE-2019-7149
	CVE-2019-7150
	CVE-2019-7664
	CVE-2019-7665
expat:	CVE-2018-20843
	CVE-2019-15903
	CVE-2021-45960
	CVE-2021-46143
	CVE-2022-22822
	CVE-2022-22823
	CVE-2022-22824
	CVE-2022-22825
	CVE-2022-22826
	CVE-2022-22827
	CVE-2022-23852
	CVE-2022-23990
	CVE-2022-25235
	CVE-2022-25236
	CVE-2022-25313
	CVE-2022-25314
	CVE-2022-25315
ffmpeg:	CVE-2018-12458
	CVE-2018-12459

Resolved Issue	Issue ID
	CVE-2018-12460
	CVE-2018-13300
	CVE-2018-13301
	CVE-2018-13302
	CVE-2018-13303
	CVE-2018-13304
	CVE-2018-14394
	CVE-2018-14395
	CVE-2018-15822
	CVE-2019-1000016
	CVE-2019-11338
	CVE-2019-11339
	CVE-2019-12730
	CVE-2019-13312
	CVE-2019-17539
	CVE-2019-17542
	CVE-2019-9718
	CVE-2019-9721
	CVE-2020-12284
	CVE-2020-13904
file:	CVE-2018-10360
	CVE-2019-18218
	CVE-2019-8904
	CVE-2019-8905
	CVE-2019-8906
	CVE-2019-8907
freerdp2:	CVE-2020-11097
	CVE-2020-15103
	CVE-2020-4030

Resolved Issue	Issue ID
freetype:	CVE-2018-6942
	CVE-2020-15999
fuse:	CVE-2018-10906
gettext:	CVE-2018-18751
glib2.0:	CVE-2012-3524
	CVE-2019-12450
	CVE-2020-6750
	CVE-2021-2721
	CVE-2021-27218
	CVE-2021-27219
	CVE-2021-28153
glibc:	CVE-2016-10228
	CVE-2016-10739
	CVE-2018-11236
	CVE-2018-11237
	CVE-2018-19591
	CVE-2019-19126
	CVE-2019-25013
	CVE-2019-6488
	CVE-2019-7309
	CVE-2019-9169
	CVE-2020-27618
	CVE-2020-29562
	CVE-2020-6096
	CVE-2021-27645
	CVE-2021-3326
	CVE-2021-35942
	CVE-2021-3999
CVE-2022-23218	

Resolved Issue	Issue ID
	CVE-2022-23219
gnupg2:	CVE-2018-12020
gnutls28:	CVE-2019-3829
	CVE-2019-3836
	CVE-2020-13777
	CVE-2020-24659
	CVE-2021-20231
	CVE-2021-20232
graphite2:	CVE-2016-1977
	CVE-2016-2790
	CVE-2016-2791
	CVE-2016-2792
grub2:	CVE-2020-10713
	CVE-2020-14308
	CVE-2020-14309
	CVE-2020-14310
	CVE-2020-14311
	CVE-2020-15705
	CVE-2020-15706
	CVE-2020-15707
gzip:	CVE-2022-1271
heimdal:	CVE-2018-16860
	CVE-2019-12098
	CVE-2019-14870
icu:	CVE-2018-18928
	CVE-2020-10531
	CVE-2021-30535
isc-dhcp:	CVE-2017-3144
	CVE-2018-5732

Resolved Issue	Issue ID
	CVE-2018-5733
	CVE-2021-25217
jinja2:	CVE-2019-10906
json-c:	CVE-2020-12762
klibc:	CVE-2021-31870
	CVE-2021-31871
	CVE-2021-31872
	CVE-2021-31873
krb5:	CVE-2007-0956
	CVE-2007-1216
	CVE-2014-9422
	CVE-2018-20217
	CVE-2018-5729
	CVE-2018-5730
	CVE-2020-28196
lcms2:	CVE-2018-16435
ldb:	CVE-2019-3824
	CVE-2020-25718
	CVE-2020-27840
	CVE-2021-20277
libdbi-perl:	CVE-2014-10402
libgcrypt20:	CVE-2018-0495
	CVE-2019-13627
	CVE-2021-33560
	CVE-2021-40528
libgd2:	CVE-2017-6363
	CVE-2018-1000222
	CVE-2018-14553
	CVE-2018-5711

Resolved Issue	Issue ID
	CVE-2019-11038
	CVE-2019-6977
	CVE-2019-6978
	CVE-2021-38115
	CVE-2021-40145
libinput:	CVE-2022-1215
libjpeg-turbo:	CVE-2018-19664
	CVE-2018-20330
	CVE-2020-13790
libmspack:	CVE-2018-14679
	CVE-2018-14680
	CVE-2018-14681
	CVE-2018-14682
	CVE-2018-18584
	CVE-2018-18585
	CVE-2018-18586
libonig:	CVE-2019-13224
	CVE-2019-13225
	CVE-2019-16163
	CVE-2019-19012
	CVE-2019-19203
	CVE-2019-19204
	CVE-2019-19246
libpcap:	CVE-2018-16301
	CVE-2019-15165
libpng1.6:	CVE-2014-0333
	CVE-2018-13785
	CVE-2019-7317
librabbitmq:	CVE-2019-18609

Resolved Issue	Issue ID
libseccomp:	CVE-2019-9893
libsepol:	CVE-2021-36084
	CVE-2021-36085
	CVE-2021-36086
	CVE-2021-36087
libssh2:	CVE-2019-3855
	CVE-2019-3856
	CVE-2019-3857
	CVE-2019-3858
	CVE-2019-3859
	CVE-2019-3860
	CVE-2019-3861
	CVE-2019-3862
	CVE-2019-3863
	libtasn1-6:
libtirpc:	CVE-2016-4429
	CVE-2018-14622
libwebp:	CVE-2018-25009
	CVE-2018-25010
	CVE-2018-25011
	CVE-2018-25012
	CVE-2018-25013
	CVE-2018-25014
	CVE-2020-36328
	CVE-2020-36329
	CVE-2020-36330
	CVE-2020-36331
	CVE-2020-36332
	libx11:

Resolved Issue	Issue ID
	CVE-2018-14599
	CVE-2018-14600
	CVE-2020-14344
	CVE-2020-14363
	CVE-2021-31535
libxkbcommon:	CVE-2018-15853
	CVE-2018-15854
	CVE-2018-15855
	CVE-2018-15856
	CVE-2018-15857
	CVE-2018-15858
	CVE-2018-15859
	CVE-2018-15861
	CVE-2018-15862
	CVE-2018-15863
	CVE-2018-15864
libxml2:	CVE-2016-9318
	CVE-2017-16932
	CVE-2017-18258
	CVE-2018-14404
	CVE-2018-14567
	CVE-2018-9251
	CVE-2019-19956
	CVE-2019-20388
	CVE-2020-24977
	CVE-2020-7595
	CVE-2021-3516
	CVE-2021-3517
	CVE-2021-3518

Resolved Issue	Issue ID
	CVE-2021-3537
	CVE-2021-3541
	CVE-2022-23308
	CVE-2022-29824
libxslt:	CVE-2019-11068
	CVE-2019-13117
	CVE-2019-13118
	CVE-2019-18197
libzstd:	CVE-2021-24031
	CVE-2021-24032
linux:	CVE-2017-5715
	CVE-2018-6559
	CVE-2018-9363
	CVE-2019-12614
	CVE-2019-14895
	CVE-2019-14896
	CVE-2019-14897
	CVE-2019-14901
	CVE-2019-15098
	CVE-2019-15791
	CVE-2019-15792
	CVE-2019-15793
	CVE-2019-15794
	CVE-2019-16089
	CVE-2019-17052
	CVE-2019-17053
	CVE-2019-17054
	CVE-2019-17055
	CVE-2019-17056

Resolved Issue**Issue ID**

CVE-2019-17666

CVE-2019-19050

CVE-2019-19076

CVE-2019-19078

CVE-2019-19332

CVE-2019-19449

CVE-2019-19642

CVE-2019-19770

CVE-2019-3016

CVE-2019-3460

CVE-2019-3874

CVE-2019-9857

CVE-2020-0543

CVE-2020-11494

CVE-2020-11884

CVE-2020-11935

CVE-2020-12351

CVE-2020-12352

CVE-2020-12888

CVE-2020-13143

CVE-2020-14351

CVE-2020-14386

CVE-2020-16119

CVE-2020-16120

CVE-2020-24490

CVE-2020-24586

CVE-2020-24587

CVE-2020-24588

CVE-2020-26139

Resolved Issue**Issue ID**

CVE-2020-26141

CVE-2020-26145

CVE-2020-26147

CVE-2020-26541

CVE-2020-27170

CVE-2020-27171

CVE-2020-27777

CVE-2020-27820

CVE-2020-28374

CVE-2020-29372

CVE-2020-36385

CVE-2020-4788

CVE-2020-8694

CVE-2020-8835

CVE-2021-1052

CVE-2021-1053

CVE-2021-26401

CVE-2021-27363

CVE-2021-27364

CVE-2021-27365

CVE-2021-29154

CVE-2021-29650

CVE-2021-33200

CVE-2021-33909

CVE-2021-3428

CVE-2021-3444

CVE-2021-3492

CVE-2021-3653

CVE-2021-3656

Resolved Issue	Issue ID
	CVE-2021-3759
	CVE-2021-4002
	CVE-2021-40490
	CVE-2021-4083
	CVE-2021-4155
	CVE-2022-0001
	CVE-2022-0185
	CVE-2022-0330
	CVE-2022-0435
	CVE-2022-0492
	CVE-2022-0516
	CVE-2022-0847
	CVE-2022-1016
	CVE-2022-1055
	CVE-2022-1116
	CVE-2022-22942
	CVE-2022-23960
	CVE-2022-25636
	CVE-2022-26490
	CVE-2022-27223
	CVE-2022-27666
	CVE-2022-29581
lxml:	CVE-2020-27783
	CVE-2021-28957
	CVE-2021-43818
lz4:	CVE-2019-17543
	CVE-2021-3520
mysql-5.7:	CVE-2016-9843
	CVE-2018-0739

Resolved Issue**Issue ID**

CVE-2018-2755

CVE-2018-2758

CVE-2018-2759

CVE-2018-2761

CVE-2018-2762

CVE-2018-2766

CVE-2018-2767

CVE-2018-2769

CVE-2018-2771

CVE-2018-2773

CVE-2018-2775

CVE-2018-2776

CVE-2018-2777

CVE-2018-2778

CVE-2018-2779

CVE-2018-2780

CVE-2018-2781

CVE-2018-2782

CVE-2018-2784

CVE-2018-2786

CVE-2018-2787

CVE-2018-2810

CVE-2018-2812

CVE-2018-2813

CVE-2018-2816

CVE-2018-2817

CVE-2018-2818

CVE-2018-2819

CVE-2018-2839

Resolved Issue**Issue ID**

CVE-2018-2846

CVE-2018-3054

CVE-2018-3056

CVE-2018-3058

CVE-2018-3060

CVE-2018-3061

CVE-2018-3062

CVE-2018-3064

CVE-2018-3065

CVE-2018-3066

CVE-2018-3070

CVE-2018-3071

CVE-2018-3077

CVE-2018-3081

CVE-2018-3133

CVE-2018-3143

CVE-2018-3144

CVE-2018-3155

CVE-2018-3156

CVE-2018-3161

CVE-2018-3162

CVE-2018-3171

CVE-2018-3173

CVE-2018-3174

CVE-2018-3185

CVE-2018-3187

CVE-2018-3200

CVE-2018-3247

CVE-2018-3251

Resolved Issue**Issue ID**

CVE-2018-3276

CVE-2018-3277

CVE-2018-3278

CVE-2018-3282

CVE-2018-3283

CVE-2018-3284

CVE-2019-14775

CVE-2019-2911

CVE-2019-2914

CVE-2019-2920

CVE-2019-2922

CVE-2019-2923

CVE-2019-2924

CVE-2019-2938

CVE-2019-2946

CVE-2019-2948

CVE-2019-2950

CVE-2019-2957

CVE-2019-2960

CVE-2019-2963

CVE-2019-2966

CVE-2019-2967

CVE-2019-2968

CVE-2019-2969

CVE-2019-2974

CVE-2019-2982

CVE-2019-2991

CVE-2019-2993

CVE-2019-2997

Resolved Issue**Issue ID**

CVE-2019-2998

CVE-2019-3003

CVE-2019-3004

CVE-2019-3009

CVE-2019-3011

CVE-2019-3018

CVE-2020-14539

CVE-2020-14540

CVE-2020-14547

CVE-2020-14550

CVE-2020-14553

CVE-2020-14559

CVE-2020-14568

CVE-2020-14575

CVE-2020-14576

CVE-2020-14586

CVE-2020-14591

CVE-2020-14597

CVE-2020-14619

CVE-2020-14620

CVE-2020-14623

CVE-2020-14624

CVE-2020-14631

CVE-2020-14632

CVE-2020-14633

CVE-2020-14634

CVE-2020-14641

CVE-2020-14643

CVE-2020-14651

Resolved Issue**Issue ID**

CVE-2020-14654

CVE-2020-14656

CVE-2020-14663

CVE-2020-14672

CVE-2020-14678

CVE-2020-14680

CVE-2020-14697

CVE-2020-14702

CVE-2020-14765

CVE-2020-14769

CVE-2020-14771

CVE-2020-14773

CVE-2020-14775

CVE-2020-14776

CVE-2020-14777

CVE-2020-14785

CVE-2020-14786

CVE-2020-14789

CVE-2020-14790

CVE-2020-14791

CVE-2020-14793

CVE-2020-14794

CVE-2020-14800

CVE-2020-14804

CVE-2020-14809

CVE-2020-14812

CVE-2020-14814

CVE-2020-14821

CVE-2020-14827

Resolved Issue**Issue ID**

CVE-2020-14828

CVE-2020-14829

CVE-2020-14830

CVE-2020-14836

CVE-2020-14837

CVE-2020-14838

CVE-2020-14839

CVE-2020-14844

CVE-2020-14845

CVE-2020-14846

CVE-2020-14848

CVE-2020-14852

CVE-2020-14853

CVE-2020-14860

CVE-2020-14861

CVE-2020-14866

CVE-2020-14867

CVE-2020-14868

CVE-2020-14869

CVE-2020-14870

CVE-2020-14873

CVE-2020-14878

CVE-2020-14888

CVE-2020-14891

CVE-2020-14893

CVE-2020-2570

CVE-2020-2572

CVE-2020-2573

CVE-2020-2574

Resolved Issue**Issue ID**

CVE-2020-2577

CVE-2020-2579

CVE-2020-2584

CVE-2020-2588

CVE-2020-2589

CVE-2020-2627

CVE-2020-2660

CVE-2020-2679

CVE-2020-2686

CVE-2020-2694

CVE-2020-2759

CVE-2020-2760

CVE-2020-2762

CVE-2020-2763

CVE-2020-2765

CVE-2020-2780

CVE-2020-2804

CVE-2020-2812

CVE-2020-2892

CVE-2020-2893

CVE-2020-2895

CVE-2020-2896

CVE-2020-2897

CVE-2020-2898

CVE-2020-2901

CVE-2020-2903

CVE-2020-2904

CVE-2020-2921

CVE-2020-2923

Resolved Issue**Issue ID**

CVE-2020-2924

CVE-2020-2925

CVE-2020-2926

CVE-2020-2928

CVE-2020-2930

CVE-2021-2002

CVE-2021-2010

CVE-2021-2011

CVE-2021-2021

CVE-2021-2022

CVE-2021-2024

CVE-2021-2031

CVE-2021-2032

CVE-2021-2036

CVE-2021-2038

CVE-2021-2046

CVE-2021-2048

CVE-2021-2056

CVE-2021-2058

CVE-2021-2060

CVE-2021-2061

CVE-2021-2065

CVE-2021-2070

CVE-2021-2072

CVE-2021-2076

CVE-2021-2081

CVE-2021-2087

CVE-2021-2088

CVE-2021-2122

Resolved Issue**Issue ID**

CVE-2021-2146

CVE-2021-2162

CVE-2021-2164

CVE-2021-2166

CVE-2021-2169

CVE-2021-2170

CVE-2021-2171

CVE-2021-2172

CVE-2021-2179

CVE-2021-2180

CVE-2021-2193

CVE-2021-2194

CVE-2021-2196

CVE-2021-2201

CVE-2021-2203

CVE-2021-2208

CVE-2021-2212

CVE-2021-2215

CVE-2021-2217

CVE-2021-2226

CVE-2021-2230

CVE-2021-2232

CVE-2021-2278

CVE-2021-2293

CVE-2021-2298

CVE-2021-2299

CVE-2021-2300

CVE-2021-2301

CVE-2021-2304

Resolved Issue**Issue ID**

CVE-2021-2305

CVE-2021-2307

CVE-2021-2308

CVE-2021-2339

CVE-2021-2340

CVE-2021-2342

CVE-2021-2352

CVE-2021-2354

CVE-2021-2356

CVE-2021-2357

CVE-2021-2367

CVE-2021-2370

CVE-2021-2372

CVE-2021-2374

CVE-2021-2383

CVE-2021-2384

CVE-2021-2385

CVE-2021-2387

CVE-2021-2389

CVE-2021-2390

CVE-2021-2399

CVE-2021-2402

CVE-2021-2410

CVE-2021-2417

CVE-2021-2418

CVE-2021-2422

CVE-2021-2424

CVE-2021-2425

CVE-2021-2426

Resolved Issue**Issue ID**

CVE-2021-2427

CVE-2021-2429

CVE-2021-2437

CVE-2021-2440

CVE-2021-2441

CVE-2021-2478

CVE-2021-2479

CVE-2021-2481

CVE-2021-35546

CVE-2021-35575

CVE-2021-35577

CVE-2021-35584

CVE-2021-35591

CVE-2021-35596

CVE-2021-35597

CVE-2021-35602

CVE-2021-35604

CVE-2021-35607

CVE-2021-35608

CVE-2021-35610

CVE-2021-35612

CVE-2021-35613

CVE-2021-35622

CVE-2021-35623

CVE-2021-35624

CVE-2021-35625

CVE-2021-35626

CVE-2021-35627

CVE-2021-35628

Resolved Issue**Issue ID**

CVE-2021-35630

CVE-2021-35631

CVE-2021-35632

CVE-2021-35633

CVE-2021-35634

CVE-2021-35635

CVE-2021-35636

CVE-2021-35637

CVE-2021-35638

CVE-2021-35639

CVE-2021-35640

CVE-2021-35641

CVE-2021-35642

CVE-2021-35643

CVE-2021-35644

CVE-2021-35645

CVE-2021-35646

CVE-2021-35647

CVE-2021-35648

CVE-2022-21245

CVE-2022-21249

CVE-2022-21253

CVE-2022-21254

CVE-2022-21256

CVE-2022-21264

CVE-2022-21265

CVE-2022-21270

CVE-2022-21301

CVE-2022-21302

Resolved Issue**Issue ID**

CVE-2022-21303

CVE-2022-21304

CVE-2022-21339

CVE-2022-21342

CVE-2022-21344

CVE-2022-21348

CVE-2022-21351

CVE-2022-21358

CVE-2022-21362

CVE-2022-21367

CVE-2022-21368

CVE-2022-21370

CVE-2022-21372

CVE-2022-21374

CVE-2022-21378

CVE-2022-21379

CVE-2022-21412

CVE-2022-21413

CVE-2022-21414

CVE-2022-21415

CVE-2022-21417

CVE-2022-21418

CVE-2022-21423

CVE-2022-21425

CVE-2022-21427

CVE-2022-21435

CVE-2022-21436

CVE-2022-21437

CVE-2022-21438

Resolved Issue	Issue ID
	CVE-2022-21440
	CVE-2022-21444
	CVE-2022-21451
	CVE-2022-21452
	CVE-2022-21454
	CVE-2022-21457
	CVE-2022-21459
	CVE-2022-21460
	CVE-2022-21462
	CVE-2022-21478
ncurses:	CVE-2019-17594
	CVE-2019-17595
net-snmp:	CVE-2018-18065
	CVE-2019-20892
	CVE-2020-15861
	CVE-2020-15862
nettle:	CVE-2021-20305
	CVE-2021-3580
nfs-utils:	CVE-2019-3689
nghttp2:	CVE-2018-1000168
nginx:	CVE-2019-9511
	CVE-2019-9513
	CVE-2019-9516
	CVE-2020-11724
	CVE-2020-36309
	CVE-2021-23017
	CVE-2021-3618
nss:	CVE-2018-12384
	CVE-2018-18508

Resolved Issue	Issue ID
	CVE-2019-11719
	CVE-2019-11727
	CVE-2019-11745
	CVE-2019-17023
	CVE-2020-12399
	CVE-2020-12400
	CVE-2020-12401
	CVE-2020-12402
	CVE-2020-12403
	CVE-2020-25648
	CVE-2020-6829
	CVE-2021-43527
ntp:	CVE-2016-1549
	CVE-2018-7170
	CVE-2018-7182
	CVE-2018-7183
	CVE-2018-7184
	CVE-2018-7185
	CVE-2019-8936
opencv:	CVE-2016-1516
	CVE-2016-1517
	CVE-2017-1000450
	CVE-2017-12597
	CVE-2017-12598
	CVE-2017-12599
	CVE-2017-12600
	CVE-2017-12601
	CVE-2017-12602
	CVE-2017-12603

Resolved Issue	Issue ID
	CVE-2017-12604
	CVE-2017-12605
	CVE-2017-12606
	CVE-2017-12862
	CVE-2017-12863
	CVE-2017-12864
	CVE-2017-14136
	CVE-2017-17760
	CVE-2017-18009
	CVE-2018-5268
	CVE-2018-5269
openldap:	CVE-2019-13057
	CVE-2019-13565
	CVE-2020-12243
	CVE-2020-25692
	CVE-2020-25709
	CVE-2020-25710
	CVE-2020-36221
	CVE-2020-36222
	CVE-2020-36223
	CVE-2020-36224
	CVE-2020-36225
	CVE-2020-36226
	CVE-2020-36227
	CVE-2020-36228
	CVE-2020-36229
	CVE-2020-36230
	CVE-2021-27212
	CVE-2022-29155

Resolved Issue	Issue ID
openssh:	CVE-2018-15473
	CVE-2018-20685
	CVE-2019-6109
	CVE-2019-6111
	CVE-2021-28041
openssl:	CVE-2018-0732
	CVE-2018-0734
	CVE-2018-0735
	CVE-2018-0737
	CVE-2019-1543
	CVE-2019-1547
	CVE-2019-1549
	CVE-2019-1551
	CVE-2019-1563
	CVE-2020-1967
	CVE-2020-1971
	CVE-2021-23840
	CVE-2021-23841
	CVE-2021-3449
	CVE-2021-3711
	CVE-2021-3712
CVE-2022-0778	
CVE-2022-1292	
p11-kit:	CVE-2020-29361
	CVE-2020-29362
	CVE-2020-29363
pam:	CVE-2009-0887
pango1.0:	CVE-2011-0020
	CVE-2011-0064

Resolved Issue	Issue ID
	CVE-2019-1010238
patch:	CVE-2018-1000156
	CVE-2019-13636
	CVE-2019-13638
pcre3:	CVE-2019-20838
	CVE-2020-14155
perl:	CVE-2018-12015
	CVE-2018-18311
	CVE-2018-18312
	CVE-2020-10543
	CVE-2020-10878
	CVE-2020-12723
php-pear:	CVE-2020-2894
	CVE-2020-28948
	CVE-2020-28949
	CVE-2020-36193
	CVE-2021-32610
postgresql-10:	CVE-2018-1058
	CVE-2020-14349
	CVE-2020-14350
	CVE-2020-1720
	CVE-2020-25694
	CVE-2020-25695
	CVE-2020-25696
	CVE-2021-23214
	CVE-2021-23222
	CVE-2021-32027
	CVE-2021-32028
CVE-2021-32029	

Resolved Issue	Issue ID
	CVE-2021-3393
	CVE-2021-3449
	CVE-2022-1552
postgresql-common:	CVE-2019-3466
procps:	CVE-2017-18078
	CVE-2018-1123
	CVE-2018-1124
	CVE-2018-1125
	CVE-2018-1126
python-babel:	CVE-2021-20095
python-crypto:	CVE-2018-6594
python-cryptography:	CVE-2018-10903
	CVE-2020-25659
python-urllib3:	CVE-2019-11236
	CVE-2020-26137
python2.7:	CVE-2013-1752
	CVE-2018-1000802
	CVE-2018-14647
	CVE-2019-16056
	CVE-2019-17514
	CVE-2019-18348
	CVE-2019-20907
	CVE-2019-5010
	CVE-2019-9636
	CVE-2019-9674
	CVE-2019-9948
	CVE-2020-26116
	CVE-2020-8492
	CVE-2021-3177

Resolved Issue	Issue ID
pyyaml:	CVE-2020-14343
	CVE-2020-1747
qtbasesource-opensource-src:	CVE-2015-9541
	CVE-2018-15518
	CVE-2018-19870
	CVE-2018-19873
	CVE-2020-0569
	CVE-2020-0570
	CVE-2021-38593
rabbitmq-server:	CVE-2016-9877
	CVE-2017-4965
	CVE-2017-4966
	CVE-2017-4967
	CVE-2021-22116
redis:	CVE-2018-11218
	CVE-2018-11219
	CVE-2022-0543
requests:	CVE-2018-18074
rpcbind:	CVE-2015-7236
	CVE-2017-8779
rsync:	CVE-2018-25032
	CVE-2018-5764
samba:	CVE-2016-2124
	CVE-2018-1050
	CVE-2018-1057
	CVE-2018-10858
	CVE-2018-10918
	CVE-2018-10919
	CVE-2018-1139

Resolved Issue**Issue ID**

CVE-2018-1140

CVE-2018-14629

CVE-2018-16841

CVE-2018-16851

CVE-2018-16852

CVE-2018-16853

CVE-2018-16857

CVE-2018-16860

CVE-2019-10197

CVE-2019-10218

CVE-2019-12435

CVE-2019-12436

CVE-2019-14833

CVE-2019-14861

CVE-2019-14870

CVE-2019-14902

CVE-2019-14907

CVE-2019-19344

CVE-2019-3870

CVE-2019-3880

CVE-2020-10700

CVE-2020-10704

CVE-2020-10730

CVE-2020-10745

CVE-2020-10760

CVE-2020-14303

CVE-2020-14318

CVE-2020-14323

CVE-2020-14383

Resolved Issue	Issue ID
	CVE-2020-1472
	CVE-2020-25717
	CVE-2020-25718
	CVE-2020-25719
	CVE-2020-25721
	CVE-2020-25722
	CVE-2021-20254
	CVE-2021-23192
	CVE-2021-3738
	CVE-2021-43566
	CVE-2021-44142
	CVE-2022-0336
screen:	CVE-2021-26937
smarty3:	CVE-2009-5052
	CVE-2009-5053
	CVE-2017-1000480
	CVE-2018-16831
sqlite3:	CVE-2018-8740
	CVE-2019-19242
	CVE-2019-19244
	CVE-2019-19603
	CVE-2019-19645
	CVE-2019-19880
	CVE-2019-19923
	CVE-2019-19924
	CVE-2019-19925
	CVE-2019-5018
	CVE-2019-5827
	CVE-2019-8457

Resolved Issue	Issue ID
	CVE-2019-9936
	CVE-2019-9937
	CVE-2020-11655
	CVE-2020-13434
	CVE-2020-13435
	CVE-2020-13630
	CVE-2020-13631
	CVE-2020-13632
	CVE-2020-15358
	CVE-2020-9327
	CVE-2021-36690
strongswan:	CVE-2014-9221
	CVE-2015-8023
	CVE-2018-10811
	CVE-2018-16151
	CVE-2018-16152
	CVE-2018-17540
	CVE-2018-5388
	CVE-2021-41990
	CVE-2021-41991
	CVE-2021-45079
sudo:	CVE-2019-14287
	CVE-2021-23239
	CVE-2021-3156
sysstat:	CVE-2018-19416
	CVE-2018-19517
	CVE-2019-16167
	CVE-2019-19725
systemd:	CVE-2018-15686

Resolved Issue	Issue ID
	CVE-2018-15687
	CVE-2018-15688
	CVE-2018-16864
	CVE-2018-16865
	CVE-2018-20839
	CVE-2018-6954
	CVE-2019-15718
	CVE-2019-3842
	CVE-2019-3843
	CVE-2019-3844
	CVE-2019-6454
	CVE-2020-13529
	CVE-2020-1712
	CVE-2021-33910
	CVE-2021-3997
tar:	CVE-2018-20482
	CVE-2019-9923
	CVE-2021-20193
tcpdump:	CVE-2017-16808
	CVE-2018-16301
	CVE-2020-8037
tiff:	CVE-2018-10963
	CVE-2018-12900
	CVE-2018-17000
	CVE-2018-17100
	CVE-2018-17101
	CVE-2018-18557
	CVE-2018-18661
	CVE-2018-19210

Resolved Issue	Issue ID
	CVE-2018-8905
	CVE-2019-14973
	CVE-2019-6128
	CVE-2020-19143
	CVE-2020-35522
	CVE-2020-35523
	CVE-2020-35524
	CVE-2022-0561
	CVE-2022-0562
	CVE-2022-0865
	CVE-2022-0891
util-linux:	CVE-2018-7738
	CVE-2021-3995
	CVE-2021-3996
vim:	CVE-2019-12735
	CVE-2021-3770
	CVE-2021-3778
	CVE-2021-3796
	CVE-2021-3872
	CVE-2021-3903
	CVE-2021-3927
	CVE-2021-3928
	CVE-2021-3974
	CVE-2021-3984
	CVE-2021-4019
	CVE-2021-4069
walinuxagent:	CVE-2019-0804
wget:	CVE-2018-0494
	CVE-2018-20483

Resolved Issue	Issue ID
	CVE-2019-5953
xfsprogs:	CVE-2012-2150
xz-utils:	CVE-2022-1271
zlib:	CVE-2018-25032

Known issues

The following is a list of issues, including those attributed to third-party products, known to exist at the time of release.

Table 4: General known issues

Known Issue
<p>⚠ CAUTION:</p> <p>After upgrading to version 7.0 LTS, SPS requires a new license. To avoid possible downtimes due to certain features not being available, before starting the upgrade, ensure that you have a valid SPS license for 7.0 LTS.</p> <p>Upgrade as follows:</p> <ol style="list-style-type: none"> 1. Perform the upgrade to 7.0 LTS with your current license. 2. Update your SPS license to 7.0 LTS. <p>For a new SPS license for 7.0 LTS, contact our Licensing Team.</p>

TLS version 1.3 is not supported when using the inWebo, Okta or One Identity Starling 2FA plugins. To ensure that TLS 1.2 is used by SPS during negotiation, specify the minimum and maximum TLS version as follows:

- For the minimum TLS version, select TLS version 1.2.
- For the maximum TLS version, select TLS version 1.3.

For more information, see "[Verifying certificates with Certificate Authorities using trust stores](#)" in the Administration Guide.

The accuracy of replaying audit trails in Asian languages (Traditional Chinese, Korean) has been enhanced. Due to this change, when upgrading SPS to version 6.11.0, all your sessions will be reindexed, and while reindexing is in progress, your sessions on the Search interface are incomplete. For this reason, plan your upgrade to SPS 6.11.0 accordingly.

Report generation may fail if a report subchapter references a connection policy that has

Known Issue

been deleted previously.

SPS can create reports giving detailed information about connections of every connection policy. For this, the user can add connection subchapters in the **Report Configuration Wizard**, under **Reporting > Create & Manage Reports**.

For a successful report generation, the referenced connection policy must exist on the appliance. However, when deleting a connection policy that is referenced as a connection subchapter, the user is not warned that the report subchapter must be removed, otherwise the subsequent report generation will fail.

This affects scheduled report generation as well.

System requirements

Before installing SPS 7.0 LTS, ensure that your system meets the following minimum hardware and software requirements.

The One Identity Safeguard for Privileged Sessions Appliance is built specifically for use only with the One Identity Safeguard for Privileged Sessions 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.

For the requirements about installing One Identity Safeguard for Privileged Sessions as a virtual appliance, see one of the following documents:

NOTE: 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. Please consult [One Identity's Product Support Policies](#) for more information on environment virtualization.

Supported web browsers and operating systems

⚠ CAUTION:

From version 6.13.0, SPS does not support Internet Explorer 11 (IE11) anymore. SPS version 6.12.0 and previous versions continue to support IE11.

From SPS version 6.10, the Google WebM Video for Microsoft Internet Explorer plugin is not required for replaying audit trails in your browser. The supported browsers are:

- Google Chrome
- Firefox
- Safari
- Internet Explorer 11 (IE11) - supported until SPS version 6.12.0

For SPS version 6.9 and earlier versions, even though the One Identity Safeguard for Privileged Sessions (SPS) web interface supports Internet Explorer and Microsoft Edge in general, to replay audit trails, you need to use Internet Explorer 11, and install the [Google WebM Video for Microsoft Internet Explorer plugin](#).

If you cannot install Internet Explorer 11 or another supported browser on your computer, use the the Safeguard Desktop Player application. For details, see "[Replaying audit trails in your browser](#)" in the [Administration Guide](#) and [Safeguard Desktop Player User Guide](#).

⚠ CAUTION:

SPS version 4 F3 and later versions do not support Internet Explorer 9 (IE9) and Internet Explorer 10 (IE10), as the official support of IE9 and IE10 ended in January, 2016.

NOTE: SPS displays a warning message if your browser is not supported or JavaScript is disabled.

NOTE: The minimum recommended screen resolution for viewing One Identity Safeguard for Privileged Sessions's (SPS's) web interface is 1366 x 768 pixels on a 14-inch widescreen (standard 16:9 ratio) laptop screen. Screen sizes and screen resolutions that are equal to or are above these values will guarantee an optimal display of the web interface.

Supported browsers

The following browsers are supported:

- Mozilla Firefox (the latest version)
- Google Chrome
- Microsoft Edge (Microsoft Edge Legacy is not supported)

The browser must support TLS-encrypted HTTPS connections, JavaScript, and cookies. Make sure that both JavaScript and cookies are enabled.

The SPS web interface can be accessed only using TLS-encryption and strong cipher algorithms.

Opening the web interface in multiple browser windows or tabs is not supported.

Supported operating systems

The following operating systems are supported:

- Windows 2008 Server
- Windows 2012 Server
- Windows 2012 R2 Server
- Windows 2016
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10
- Linux

Safeguard Desktop Player system requirements

The Safeguard Desktop Player application supports the following operating systems:

- **Microsoft Windows:**

64-bit version of Windows 7 or newer. Install the appropriate driver for your graphic card.

- **Linux:**

RHEL 7, CentOS 7, or newer. The Safeguard Desktop Player application will probably run on other distributions as well that have at least libc6 version 2.17 installed.

Depending on the distribution, you will need to install the following packages:

- On Debian-based GNU/Linux:
 - libxcb-render-util0
 - libxcb-keysyms1
 - libxcb-image0
 - libxcb-randr0

- libxcb-xkb1
- libxcb-xinerama0
- libxcb-icccm4
- On CentOS/Red Hat:
 - xcb-util-renderutil
 - xcb-util-keysyms
 - xcb-util-image
- **Mac:**
 - macOS Catalina 10.15, or newer.

To install the Safeguard Desktop Player application, you need about 200MB disk space, and a temporarily used disk space to store the audit trails that are replayed. The size of the temporary files depends on the size of the replayed audit trails.

You can install the Safeguard Desktop Player application with user privileges.

Hardware specifications

One Identity Safeguard for Privileged Sessions appliances are built on high performance, energy efficient, and reliable hardware that are easily mounted into standard rack mounts.

Table 5: Hardware specifications

Product	Redundant PSU	Processor	Memory	Capacity	RAID	IPMI
SPS T-1	No	1x Intel Xeon X3430 2.40GHz	2 x 4 GB	2 x 1 TB	Software RAID	Yes
SPS T-4	Yes	1x Intel Xeon E3-1275 v2 3.50GHz	2 x 4 GB	4 x 2 TB	LSI MegaRAID SAS 9271-4i SGL	Yes
SPS T-10	Yes	2 x Intel Xeon E5-2630 v2 2.6GHz	8 x 4 GB	13 x 1 TB	LSI 2208 (1GB cache)	Yes
Safeguard Sessions Appliance 3000	Yes	1x Intel Xeon E3-1275 v6 3.80GHz	2 x 16 GB	4x2 TB NLSAS	LSI MegaRAID SAS 9361-4i Single	Yes

Product	Redundant PSU	Processor	Memory	Capacity	RAID	IPMI
Safeguard Sessions Appliance 3500	Yes	2x Intel Xeon Silver 4110 2.1GHz	8 x 8 GB	9x2 TB NLSAS	1 x Broadcom MegaRAID SAS 9361-16i + LSI Avago CacheVault Power Module 02 (CVPM02) Kit	Yes

The Safeguard Sessions Appliance 3500 is equipped with a dual-port 10Gbit interface. This interface has SFP+ connectors (not RJ-45) labeled A and B, and can be found right of the Label 1 and 2 Ethernet interfaces. If you want faster communication, for example, in case of high data load, you can connect up to two 10Gbit network cards. These cards are not shipped with the original package and have to be purchased separately.

Product licensing

To enable a trial license

1. Visit the [Download Trials page](#), and navigate to **One Identity Safeguard for Privileged Sessions > Download Free trial**.
2. Complete the registration form, and click **Download Trial**.
3. You will receive the details on how to access your license key and the download the ISO files in email.

To enable a purchased commercial license

1. Navigate to **My Account > My License Assets** on the [support portal](#).
2. To access your license key, click **Retrieve Key** next to your product.
3. Once you have the license keys, navigate to **My Account > My Products** and click **Download** next to your product. The **Download Software** page is displayed.
4. Download the ISO image (install cdrom) of your product.

If you need help with accessing your license, navigate to the [Licensing Assistance](#) page, and follow the instructions on screen.

Upgrade and installation instructions

The One Identity Safeguard for Privileged Sessions appliance is built specifically for use only with the One Identity Safeguard for Privileged Sessions software that is already installed and ready for immediate use.

To upgrade to One Identity Safeguard for Privileged Sessions 7.0 LTS

For step-by-step instructions on upgrading to SPS 7.0 LTS, see [Upgrade Guide](#).

NOTE: Due to legal reasons, installation packages of the external indexer application will be available only from the SPS web interface. After SPS versions 6.4 and 6.0.3 are released, the installation packages will be removed from our website.

CAUTION:

Starting from 6.10.0, SPS (SPS) has changed to hardened SSL settings. As a result, during TLS session establishment, the following items are not considered secure:

- **Private keys and X.509 certificates having RSA or DSA keys shorter than 2048 bits, or ECC keys shorter than 224 bits.**
- **Certificates (other than Root CA certificates) with signatures that use the SHA-1 or the MD5 hashing algorithm.**

With the hardened SSL settings, SPS will not connect to remote systems that are protected with weak certificates.

You cannot upgrade SPS if your configuration contains insecure certificates, keys or certificate chains in any of the following sections:

- **SPS web interface**
- **internal CA certificate**
- **connection policy TLS settings**
- **client X.509 credentials for external LDAP, SMTP or Syslog connections**
- **server X.509 certificates for external SMTP or Splunk servers**
- **external indexer credentials (only writable over the REST API)**
- **CA certificates in Trusted CA Lists and Trust Stores**

Note that the certificates and keys that are used for signing, timestamping, encryption or decryption are not affected by this change.

About LTS releases

This is a long-term-supported (LTS) release.

For more information on the product support, see [Product Support - One Identity Safeguard for Privileged Sessions](#).

For a full description of long-term-supported and feature releases, see [Product Life Cycle & Policies - One Identity Safeguard for Privileged Sessions](#).

If you have a physical appliance based on MBX hardware

One Identity recommends you to upgrade to SPS 7.0 LTS, if you are not running SPS on Pyramid hardware and any of the following is true:

NOTE: If you do not know the type of your hardware, see [If you have a physical appliance based on Pyramid hardware](#).

- You wish to take advantage of any of the new features.
- You are running a previous feature release.
- You are running a previous long-term-supported release.

If you have a physical appliance based on Pyramid hardware

Do NOT upgrade to SPS 7.0 LTS if you are running SPS on Pyramid hardware:

Verify successful installation

Navigate to **Basic Settings > System > Version details** and verify that SPS is running version 7.0 LTS of the firmware. If not, it means that the upgrade process did not complete properly and SPS performed a rollback to revert to the earlier firmware version. In this case, complete the following steps:

1. Navigate to **Basic Settings > Troubleshooting > Create support bundle** and click **Create support bundle**.
2. Save the resulting ZIP file.
3. [contact our Support Team](#) and send them the file. They will analyze its contents to determine why the upgrade was not completed and assist you in solving the problem.

More resources

To obtain more information, read the technical documentation or consult the community:

- [One Identity Safeguard for Privileged Sessions - Technical Documentation](#)
- [One Identity Community](#)

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. In this release, all product components should be configured to use the same or compatible character encodings and should be installed to use the same locale and regional options. 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).

This release has the following known capabilities or limitations: OCR is limited to Nuance supported languages. No support for RTL languages.

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
- Engage in community discussions
- Chat with support engineers online
- View services to assist you with your product

Third-party contributions

This appendix includes the open source licenses and attributions applicable to One Identity Safeguard for Privileged Sessions.

GNU General Public License

Version 2, June 1991

1989, 1991 Free Software Foundation, Inc.

Free Software Foundation, Inc. 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Version 2, June 1991

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software - to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps:

1. copyright the software, and
2. offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

Section 0

This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

Section 1

You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

Section 2

You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of [Section 1](#) above, provided that you also meet all of these conditions:

- a. You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
- b. You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.
- c. If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user

how to view a copy of this License. (Exception: If the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

Section 3

You may copy and distribute the Program (or a work based on it, under [Section 2](#) in object code or executable form under the terms of [Section 1](#) and [Section 2](#) above provided that you also do one of the following:

- a. Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- b. Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- c. Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

Section 4

You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

Section 5

You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

Section 6

Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

Section 7

If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

Section 8

If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

Section 9

The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

Section 10

If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY Section 11

BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

Section 12

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE

WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the program's name and a brief idea of what it does.> Copyright (C) <year> <name of author>

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

Gnomovision version 69, Copyright (C) year name of author Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type "show w". This is free software, and you are welcome to redistribute it under certain conditions; type "show c" for details.

The hypothetical commands "show w" and "show c" should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than "show w" and "show c" ; they could even be mouse-clicks or menu items-- whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program "Gnomovision" (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989 Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.

GNU Lesser General Public License

Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.

Free Software Foundation, Inc. 51 Franklin Street, Fifth Floor Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method:

1. we copyright the library, and
2. we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the Lesser General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

Section 0

This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed

under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

Section 1

You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

Section 2

You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of [Section 1](#) above, provided that you also meet all of these conditions:

- a. The modified work must itself be a software library.
- b. You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c. You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d. If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still

operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, [Subsection 2d](#) requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

Section 3

You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

Section 4

You may copy and distribute the Library (or a portion or derivative of it, under [Section 2](#)) in object code or executable form under the terms of [Section 1](#) and [Section 2](#) above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of [Section 1](#) and [Section 2](#) above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

Section 5

A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. [Section 6](#) states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under [Section 6](#).)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of [Section 6](#). Any executables containing that work also fall under [Section 6](#), whether or not they are linked directly with the Library itself.

Section 6

As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

- a. Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under [Section 1](#) and [Section 2](#) above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)
- b. Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on

the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

- c. Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in [Subsection 6a](#), above, for a charge no more than the cost of performing this distribution.
- d. If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.
- e. Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

Section 7

You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

- a. Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.
- b. Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

Section 8

You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

Section 9

You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

Section 10

Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

Section 11

If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

Section 12

If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

Section 13

The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

Section 14

If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY Section 15

BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

NO WARRANTY Section 16

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change.

You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the library's name and a brief idea of what it does.> Copyright (C) <year>
<name of author>

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Lesser General Public License as published by the Free Software Foundation; either version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public License along with this library; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library `Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990 Ty Coon, President of Vice

That's all there is to it!

License attributions

OpenSSL

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<https://www.openssl.org/>). This product includes cryptographic software written by Eric Young (eay@cryptsoft.com)

Botan cryptographic library license

Botan <http://botan.randombit.net/> is distributed under these terms:

Copyright

1999-2013,2014 Jack Lloyd

2001 Peter J Jones

2004-2007 Justin Karneges

2004 Vaclav Ovsik
2005 Matthew Gregan
2005-2006 Matt Johnston
2006 Luca Piccarreta
2007 Yves Jerschow
2007-2008 FlexSecure GmbH
2007-2008 Technische Universitat Darmstadt
2007-2008 Falko Strenzke
2007-2008 Martin Doering
2007 Manuel Hartl
2007 Christoph Ludwig
2007 Patrick Sona
2010 Olivier de Gaalon
2012 Vojtech Kral
2012-2014 Markus Wanner
2013 Joel Low

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions, and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions, and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Copyright 2022 One Identity LLC.

ALL RIGHTS RESERVED.

This guide contains proprietary information protected by copyright. The software described in this guide is furnished under a software license or nondisclosure agreement. This software may be used or copied only in accordance with the terms of the applicable agreement. No part of this guide may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording for any purpose other than the purchaser's personal use without the written permission of One Identity LLC .

The information in this document is provided in connection with One Identity products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of One Identity LLC products. EXCEPT AS SET FORTH IN THE TERMS AND CONDITIONS AS SPECIFIED IN THE LICENSE AGREEMENT FOR THIS PRODUCT, ONE IDENTITY ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ONE IDENTITY BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ONE IDENTITY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. One Identity makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. One Identity does not make any commitment to update the information contained in this document.

If you have any questions regarding your potential use of this material, contact:

One Identity LLC.
Attn: LEGAL Dept
4 Polaris Way
Aliso Viejo, CA 92656

Refer to our Web site (<http://www.OneIdentity.com>) for regional and international office information.

Patents

One Identity is proud of our advanced technology. Patents and pending patents may apply to this product. For the most current information about applicable patents for this product, please visit our website at <http://www.OneIdentity.com/legal/patents.aspx>.

Trademarks

One Identity and the One Identity logo are trademarks and registered trademarks of One Identity LLC. in the U.S.A. and other countries. For a complete list of One Identity trademarks, please visit our website at www.OneIdentity.com/legal. All other trademarks are the property of their respective owners.

Legend

-  **WARNING:** A WARNING icon highlights a potential risk of bodily injury or property damage, for which industry-standard safety precautions are advised. This icon is often associated with electrical hazards related to hardware.
-  **CAUTION:** A CAUTION icon indicates potential damage to hardware or loss of data if instructions are not followed.