

# Sentinel LDK 8.5 with Sentinel LDK-EMS

## RELEASE NOTES



## Revision History

Part number 007-000667-005, Revision A, 2210-1

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# Sentinel LDK 8.5 with Sentinel LDK-EMS Release Notes

These release notes are subject to change. If you are reading the release notes that were installed with the product, Thales recommends that you check the release notes available online to see if any information was added or changed. You can access the latest release notes from: [Sentinel LDK Release Notes](#)

## Translations coming soon!

[View the previous version](#) in English of the release notes.

[Download a .zip file](#) in English with all Sentinel LDK release notes.

These release notes have been changed since the initial release of Sentinel LDK 8.5 as follows:

- > The topic "[Dropping Support for HASP HL 1.x API and HASP4 API](#)" on [page 10](#) has been added.

## Release: 8.5 | October 2022

- > ["New Features, Enhancements, and Changes"](#) on [page 7](#)
- > ["Installation and Upgrades"](#) on [page 11](#)
- > ["Security Updates"](#) on [page 13](#)
- > ["Supported Platforms"](#) on [page 14](#)
- > ["Documentation"](#) on [page 27](#)
- > ["Resolved Issues"](#) on [page 32](#)
- > ["Known Issues and Workarounds"](#) on [page 34](#)

# Product Overview

Sentinel LDK is Thales's industry-leading software protection and licensing solution. It provides cutting edge security technologies for the utmost in copy protection, a range of license models and entitlement fulfillment options, and out-of-the-box tools which facilitate quick integration and deployment. Sentinel LDK supports hardware-based, software-based and cloud-based licensing and includes a range of APIs to allow software vendors to automate and tailor the implementation to their unique business requirements.

The strength, uniqueness, and flexibility of Sentinel LDK are based on two primary principles:

- > *Protect Once—Deliver Many—Evolve Often™* — this unique design philosophy enables you to fully separate your business and protection (engineering) processes in order to maximize business agility while ensuring optimum use of your employee time and core competencies, resulting in faster time to market.
- > *Cross-Locking™* — the technology that supports the *Protect Once—Deliver Many—Evolve Often* concept, enabling a protected application to work with a Sentinel hardware key or a Sentinel License Certificate (software key).

All commercial decisions, package creation and license definitions are executed by product or marketing managers after the protection has been implemented.

This workflow model provides you with greater flexibility and freedom when defining new sales and licensing models, including feature-based and component licensing, evaluation, rental, floating, subscription, trialware, pay-per-use, and more, enabling you to focus on revenue growth.

## Sentinel Vendor Keys

When you purchase Sentinel LDK, you are provided with two Sentinel Vendor keys—the Sentinel Developer key and the Sentinel Master key.

The Sentinel Developer key is used by your software engineers in conjunction with the Sentinel LDK protection tools to protect your software and data files.

The Sentinel Master key is only required if you install Sentinel LDK-EMS on premises. It is used in conjunction with Sentinel LDK and is attached to the Sentinel LDK-EMS Server. This key is used by your production staff to create licenses and lock them to Sentinel protection keys, to write specific data to the memory of a Sentinel protection key, and to update licenses already deployed in the field.

**Important:** The Master key is especially valuable because it is used to generate licenses. Both Vendor keys contain secrets and enable the use of tools and API libraries which can access the memory of user keys and use of the cryptographic functionalities.

# New Features, Enhancements, and Changes

> ["Release: 8.5 " below](#)

**NOTE** If you are upgrading from a version of Sentinel LDK that is earlier than 8.4, be sure to review the release notes for all intervening versions. Significant enhancements and changes are introduced in each version of Sentinel LDK. You can [download a .zip file](#) that contains all Sentinel LDK release notes.

## Release: 8.5

*In this section:*

- > ["New Sentinel LDK Cloud Portal" below](#)
- > ["Simplified Installation of an Identity String on End Users' Machines for Cloud Licensing" on the next page](#)
- > ["Enhancements to Sentinel LDK Envelope" on the next page](#)
- > ["Protected Applications in Linux Docker Containers on a Windows Host" on page 9](#)
- > ["Change to Label in Sentinel LDK-EMS for Clone Protection" on page 9](#)
- > ["Java and .NET Licensing APIs Can Now Reserve and Release Executions" on page 9](#)
- > ["Customized RTE Installer Supports Installing External Unlocked Licenses " on page 10](#)
- > ["Vendors Can Now Include Their Logo in Sentinel LDK-EMS Email Templates" on page 10](#)
- > ["Dynamic Memory File Size for SL Keys Is Now the Same as HL Keys" on page 10](#)
- > ["Sentinel Admin Control Center Help is Now Available Online" on page 10](#)
- > ["Dropping Support for HASP HL 1.x API and HASP4 API" on page 10](#)

## New Sentinel LDK Cloud Portal

This release of Sentinel LDK introduces the Sentinel LDK Cloud Portal.

Sentinel LDK Cloud Portal is a web-based application for software vendors who want to host cloud licenses (CL keys) on their own servers. Sentinel LDK Cloud Portal transfers the management of client identities from Sentinel Admin Control Center to a new, streamlined web-based application. Sentinel LDK Cloud Portal simplifies setting up and distributing client identities to licensed users located anywhere, granting them access to the protected applications running on their own machines.

Each client identity can be granted a license to all products in specific CL keys, or the license can be limited to specific products in the CL key.

Sentinel LDK Cloud Portal enables the software vendor to optionally offload the responsibility of managing client identities to designated users in each customer's organization. The designated users can log in to Sentinel LDK Cloud Portal to easily generate and deliver client identities, set and modify licensed user permissions, and revoke or restore access. Alternatively, software vendors can continue to manage client identities themselves on behalf of customer organizations or for direct individual customers.

For more information, see:

- > [Sentinel LDK Installation Guide](#)
- > [Sentinel LDK Software Protection and Licensing Guide](#)
- > [Sentinel LDK Cloud Portal Guide for Vendors](#)
- > [Sentinel LDK Cloud Portal Guide for Customers](#)

## Simplified Installation of an Identity String on End Users' Machines for Cloud Licensing

The Sentinel LDK Run-time Environment now supports simplified installation of an identity string on an end user's machine. For vendors who are using Sentinel Admin Control Center to manage client identities, this makes implementation of cloud licensing faster and easier. (This feature is also utilized by Sentinel LDK Cloud Portal.) Using Sentinel Admin Control Center on the cloud license server machine, you can generate a custom URL for each client identity. The URL should be provided to the relevant person or entity. When the recipient accesses the URL on their machine, the required identity string is automatically installed.

## Enhancements to Sentinel LDK Envelope

Sentinel LDK Envelope now supports the following functionality:

### > Key Disabling

The following enhancements to key disabling have been implemented:

- Key disabling for the Windows V3 engine

When protecting an application with the Windows V3 engine, you can now select the **Disable keys for attempted tampering** protection parameter. This instructs the Envelope run-time to disable the license for a protected application when attempted tampering is detected.

- Key disabling for CL keys

Previously, key disabling was only supported for HL keys. Now, applications protected using Sentinel LDK Envelope (Default, V3 or .NET engine) and licensed using a CL key can also be configured to disable the key when tampering is detected at runtime. To support this functionality for CL keys, Sentinel LDK Run-time Environment 8.51 or later is required on the user's machine.

### > Import protection



The Windows V3 engine now enables you to protect the import of an application or DLL for your application. This helps to prevent reconstruction of the protected executable from a memory dump. This option is controlled by the `IMPORT_PROTECTION_V3` parameter on the **Advanced** tab of the Settings page for the Windows V3 engine. This option is enabled by default.

#### > Data file protection

The following enhancements to data file protection have been implemented:

- Windows applications protected with the Envelope V3 engine can now work with data files that are protected with **Version 2** data file protection.
- For all Envelope engines that support data file protection, the **Advanced Data File Protection** module is no longer required in your Sentinel LDK Master license. This feature is free to use for all Sentinel LDK users. Any references in the documentation to the requirement for the **Advanced Data File Protection** module can be ignored.

#### > .NET Applications Protected With AppOnChip Are Now Supported by the Performance Profiler

Sentinel LDK Envelope can now insert performance counters in a .NET application and add the counter values and locations into a profiler log.

Envelope processes this information to understand how frequently and in what timespan specific methods or code gadgets are executed. Envelope uses the results of this process to recommend which functions should be disabled for protection using AppOnChip to avoid any significant performance impact.

## Protected Applications in Linux Docker Containers on a Windows Host

Thales has tested the scenario in which a protected application runs in a Docker Linux container on either a Linux or Windows host. The Run-time Environment and SL or CL key can reside outside of the Docker container on the host machine or a remote machine.

## Change to Label in Sentinel LDK-EMS for Clone Protection

When you create a product in Sentinel LDK-EMS and choose a clone protection scheme from the list, the **Disable** option has been renamed to **No Clone Protection**. This label was changed to prevent misunderstandings regarding the intention of the **Disable** label. (The related Sentinel LDK-EMS web service still uses the **Disable** label.)

## Java and .NET Licensing APIs Can Now Reserve and Release Executions

The functionality of reserving and releasing executions for Features that are licensed with the **Execution Count** license type was previously only available when using C-language function calls.

This functionality has now been extended to the Java and .NET Licensing API.

This functionality is only available with SL keys. For the Java and .NET Licensing API, the function requires Run-time Environment 8.51 or later.

## Customized RTE Installer Supports Installing External Unlocked Licenses

The customized RTE installers generated by the Sentinel Master Wizard now supports installing external unlocked licenses together with installation of the customized RTE. This replaces the functionality that was removed from Sentinel LDK-EMS 8.4.

## Vendors Can Now Include Their Logo in Sentinel LDK-EMS Email Templates

Vendors can now customize emails sent by Sentinel LDK-EMS by including their logo in the email template.

## Dynamic Memory File Size for SL Keys Is Now the Same as HL Keys

The size of a new dynamic memory file for an SL key is limited to 65 K. This is the same as the maximum size of a dynamic memory file for an HL key.

## Sentinel Admin Control Center Help is Now Available Online

You can now access the help for the latest version of Sentinel Admin Control Center from the Sentinel LDK documentation site.

You can search for specific topics in the help using either the integrated search facility or using Google.

## Dropping Support for HASP HL 1.x API and HASP4 API

HASP HL 1.x API and HASP4 API are no longer supported with RTE 8.41 or later.

If your application requires either of these APIs, then to resolve this issue, do either of the following:

- > Rebuild the protected application with the latest Sentinel Licensing API.
- > On the end user's machine, first install RTE 8.31, and then upgrade to the latest RTE.

# Installation and Upgrades

Visit the [Sentinel LDK download page](#) for the most recent versions of Sentinel LDK software and embedded documentation.

## Release: 8.5

*In this section:*

- > ["Installing Linux and Macs Packages" below](#)
- > ["Upgrading an Earlier Version of Sentinel LDK" below](#)

### Installing Linux and Macs Packages

Sentinel LDK files required for Linux and Mac platforms are available on the machine where Sentinel LDK for Windows is installed, under the following path:

`%ProgramFiles(x86)%\Thales\Sentinel LDK\Additional Platforms\`

Alternatively, you can download the relevant packages directly from the Thales website:

- > Linux: [https://supportportal.thalesgroup.com/csm?id=kb\\_article\\_view&sys\\_kb\\_id=1d6107451b05d050f12064606e4bcbb0&sysparm\\_article=KB0021880](https://supportportal.thalesgroup.com/csm?id=kb_article_view&sys_kb_id=1d6107451b05d050f12064606e4bcbb0&sysparm_article=KB0021880)
- > Mac: [https://supportportal.thalesgroup.com/csm?id=kb\\_article\\_view&sys\\_kb\\_id=fc624f891b05d050f12064606e4bcb4e&sysparm\\_article=KB0021881](https://supportportal.thalesgroup.com/csm?id=kb_article_view&sys_kb_id=fc624f891b05d050f12064606e4bcb4e&sysparm_article=KB0021881)

### Upgrading an Earlier Version of Sentinel LDK

Instructions for upgrading from earlier versions of Sentinel LDK can be found in the [Sentinel LDK Installation Guide](#).

Considerations when upgrading Sentinel LDK:

- > When upgrading to Sentinel LDK 8.5 from Sentinel LDK v.7.3 through v.7.8, all non-English locales of Customer contacts and Channel Partner contacts in Sentinel LDK-EMS are converted to the English locale. If this issue is applicable to your installation of Sentinel LDK-EMS, make sure to read [this technical note](#) before upgrading to Sentinel LDK 8.5.

**NOTE** You can ignore this issue if all of your Customer contacts and Channel Partner Contacts are set up to use the English locale or if you are not upgrading Sentinel LDK-EMS.

- > The procedure for upgrading to Sentinel LDK 8.5 has been tested only for Sentinel LDK v.8.2 and later.

If you plan to upgrade from an earlier version of Sentinel LDK, please contact Technical Support to validate the upgrade scenario. (This applies whether you are upgrading Sentinel LDK Vendor Tools, Sentinel LDK-EMS, or both.)

# Security Updates

For the latest information regarding any older or newly-discovered issues, see:

<https://cpl.thalesgroup.com/software-monetization/security-updates>

## Reporting a Security Vulnerability

If you think you have found a security vulnerability, please report it to Thales using the links in:

<https://cpl.thalesgroup.com/software-monetization/security-updates>

## Release: 8.5

There are no known security issues at the time of this release, and this release does not resolve any known security issues relating to Sentinel products.

# Supported Platforms

The operating system versions listed in this section were tested by Thales and verified to be fully compatible with Sentinel LDK. Older operating system versions are likely to be compatible as well, but are not guaranteed. For reasons of compatibility and security, Thales recommends that you always keep your operating system up to date with the latest fixes and service packs.

## Release: 8.5

*In this section:*

- > ["Sentinel LDK Run-time Environment and Protected Applications for End Users" below](#)
- > ["Web Browsers for Sentinel Admin Control Center" on page 18](#)
- > ["Sentinel LDK-EMS Service" on page 19](#)
- > ["Sentinel LDK-EMS Database" on page 19](#)
- > ["Web Browsers for Sentinel LDK-EMS" on page 19](#)
- > ["Sentinel LDK Vendor Tools " on page 20](#)
- > ["Vendor Library Version Dependency" on page 21](#)
- > ["Supported Platforms for Code Samples" on page 23](#)
- > ["Tested Compilers for Code Samples" on page 23](#)
- > ["Current Firmware Version" on page 26](#)

### Sentinel LDK Run-time Environment and Protected Applications for End Users

**Sentinel LDK Run-Time Environment version 8.51** is provided for Windows, Mac, and Linux (Intel and ARM) systems.

To support all of the latest enhancements in Sentinel LDK, and to provide the best security and reliability, end users should receive the latest Run-time Environment (*RTE*).

**NOTE**

- > When working with cloud licensing, Thales highly recommends that you always install the latest version of the RTE on the license server machine. (This is applicable for both vendors and customers who are hosting cloud licenses on their license server machine.)  
If you downgrade the Run-time Environment after implementing cloud licensing, client identities or licenses may become unavailable. To resolve such issues, upgrade to the previously-installed RTE version or later.
- > Upgrading Sentinel LDK RTE to version 8.21 or later migrates existing SL AdminMode licenses to a new secure storage. Once this occurs, you cannot downgrade the RTE to an earlier version. Downgrading the RTE will make existing SL AdminMode licenses invalid.

For all pre-existing functionality in Sentinel LDK, earlier versions of the RTE are supported as follows:

> **When using customized vendor API libraries v.8.51 - version-restricted option:**

Whenever the RTE is required, Sentinel LDK RTE v.8.15 or later must be provided.

> **When using customized vendor API libraries v.8.51 - version-unrestricted option:**

The protected application does not check the version number of the RTE. Whenever the RTE is required, the RTE must be from a version of Sentinel LDK that supports the features that you are using to protect and license your applications.

For details, see "Required Version of the Run-time Environment" in the [Sentinel LDK Software Protection and Licensing Guide](#).

Sentinel LDK RTE, and protected applications (with or without the RTE), can be installed under the following systems:

System	Supported Versions
.NET	<p>Sentinel LDK provides support for the following target frameworks:</p> <ul style="list-style-type: none"> <li>&gt; .NET Framework: v2.0 - v4.8</li> <li>&gt; .NET Standard: v2.1</li> <li>&gt; .NET Core: v2.1, v3.1</li> <li>&gt; .NET 5: v5.0</li> <li>&gt; .NET 6: v6.0</li> </ul> <p>Protected applications that use the supported .NET frameworks are supported on the following platforms:</p> <ul style="list-style-type: none"> <li>&gt; Windows (Win32 and x64)</li> <li>&gt; Linux Intel (x86_64)</li> <li>&gt; Linux ARMHF</li> <li>&gt; Linux ARM64</li> <li>&gt; Mac (only protected with Licensing API)</li> </ul> <div> <p><b>NOTE</b> When protected with Envelope: .NET Core applications with platform-specific functionality such as Windows Forms and Windows Presentation Foundation (WPF) work only on Windows platforms.</p> </div>
Windows	<p>x86 and x64 versions of the following:</p> <ul style="list-style-type: none"> <li>&gt; Windows Server 2016</li> <li>&gt; Windows Server 2019</li> <li>&gt; Windows Server IoT 2019</li> <li>&gt; Windows Server 2022</li> <li>&gt; Windows Server IoT 2022</li> <li>&gt; Windows 10 IoT Enterprise 2019 LTSC</li> <li>&gt; Windows 10 IoT Enterprise 2021 LTSC</li> <li>&gt; Windows 10 21H2</li> <li>&gt; Windows 11 22H2</li> </ul> <p><b>Note:</b> Windows Insider Preview builds are not supported.</p> <p>The latest service packs and security updates must be installed.</p>



System	Supported Versions								
Mac	<ul style="list-style-type: none"><li>&gt; macOS 11.6 Big Sur</li><li>&gt; macOS 12.5 Monterey</li><li>&gt; macOS 13.0 Ventura</li></ul> <div><p>Support on Mac machines with the ARM64-based processor:</p><ul style="list-style-type: none"><li>&gt; Sentinel LDK is supported via Rosetta 2.</li><li>&gt; Sentinel Licensing API version 8.41 and later is supported natively.</li></ul></div> <p><b>Note:</b> The Sentinel Remote Update System (RUS utility) is not supported for Mac systems in this release. To obtain a fingerprint, use Sentinel Admin Control Center.</p>								
	Linux	<table><tr><td><b>Linux Intel (x86-64)</b></td><td><ul style="list-style-type: none"><li>&gt; OpenSUSE Leap 15.4</li><li>&gt; Red Hat EL 9</li><li>&gt; Ubuntu Server 22.04</li><li>&gt; Ubuntu Desktop 22.04</li><li>&gt; Debian 11.4</li><li>&gt; CentOS Stream 9</li></ul><p>The latest service packs and security updates must be installed.</p></td></tr><tr><td><b>Linux ARM 32-bit (armel and armhf)</b></td><td><p>The following hardware/boards have been validated:</p><ul style="list-style-type: none"><li>&gt; BeagleBone Black</li><li>&gt; Raspberry Pi-4</li><li>&gt; NI cRIO-9068</li></ul></td></tr><tr><td><b>Linux ARM 64-bit (arm64)</b></td><td><p>The following hardware/board has been validated:</p><ul style="list-style-type: none"><li>&gt; Qualcomm DragonBoard 410c</li></ul></td></tr><tr><td><b>Wine</b></td><td>Sentinel LDK RTE was tested on Linux platforms with Wine 7.0</td></tr></table>	<b>Linux Intel (x86-64)</b>	<ul style="list-style-type: none"><li>&gt; OpenSUSE Leap 15.4</li><li>&gt; Red Hat EL 9</li><li>&gt; Ubuntu Server 22.04</li><li>&gt; Ubuntu Desktop 22.04</li><li>&gt; Debian 11.4</li><li>&gt; CentOS Stream 9</li></ul> <p>The latest service packs and security updates must be installed.</p>	<b>Linux ARM 32-bit (armel and armhf)</b>	<p>The following hardware/boards have been validated:</p> <ul style="list-style-type: none"><li>&gt; BeagleBone Black</li><li>&gt; Raspberry Pi-4</li><li>&gt; NI cRIO-9068</li></ul>	<b>Linux ARM 64-bit (arm64)</b>	<p>The following hardware/board has been validated:</p> <ul style="list-style-type: none"><li>&gt; Qualcomm DragonBoard 410c</li></ul>	<b>Wine</b>
<b>Linux Intel (x86-64)</b>	<ul style="list-style-type: none"><li>&gt; OpenSUSE Leap 15.4</li><li>&gt; Red Hat EL 9</li><li>&gt; Ubuntu Server 22.04</li><li>&gt; Ubuntu Desktop 22.04</li><li>&gt; Debian 11.4</li><li>&gt; CentOS Stream 9</li></ul> <p>The latest service packs and security updates must be installed.</p>								
<b>Linux ARM 32-bit (armel and armhf)</b>	<p>The following hardware/boards have been validated:</p> <ul style="list-style-type: none"><li>&gt; BeagleBone Black</li><li>&gt; Raspberry Pi-4</li><li>&gt; NI cRIO-9068</li></ul>								
<b>Linux ARM 64-bit (arm64)</b>	<p>The following hardware/board has been validated:</p> <ul style="list-style-type: none"><li>&gt; Qualcomm DragonBoard 410c</li></ul>								
<b>Wine</b>	Sentinel LDK RTE was tested on Linux platforms with Wine 7.0								

System	Supported Versions	
Android	Android ARM (64-bit)	Android 11.x, 12.x, 13.x
	Android Architecture	The following architectures are supported: <ul style="list-style-type: none"> <li>&gt; armv7</li> <li>&gt; armv7a</li> <li>&gt; arm64</li> </ul>
	Android ABI	Sentinel LDK supports Android applications designed for the following Android application binary interfaces: <ul style="list-style-type: none"> <li>&gt; armeabi</li> <li>&gt; armeabi-v7a</li> <li>&gt; arm64-v8a</li> </ul>
Virtual Machines	<p>The VM detection and VM fingerprinting capabilities provided by Sentinel LDK have been validated on the following technologies:</p> <ul style="list-style-type: none"> <li>&gt; Parallels Desktop 18 for Mac</li> <li>&gt; VMware Workstation 16</li> <li>&gt; VMware ESXi 6.7, 7.0</li> <li>&gt; Hyper-V Server 2019 (SL only)</li> <li>&gt; Xen Project 4.16</li> <li>&gt; KVM (RHEL 9, Ubuntu 22.04 server, Debian 11.4)</li> <li>&gt; Microsoft Azure</li> <li>&gt; VirtualBox 6.1.x</li> <li>&gt; Docker (Linux) containers, including under Kubernetes</li> <li>&gt; LXC containers</li> </ul>	

## Web Browsers for Sentinel Admin Control Center

The latest versions of the following Web browsers are supported:

- > Microsoft Edge
- > Mozilla Firefox
- > Google Chrome
- > Safari

## Sentinel LDK-EMS Service

This section describes requirements for Sentinel LDK.

### Operating Systems

When installed on premises, Sentinel LDK-EMS Service is supported under the following operating systems:

System	Supported Versions
Windows	<p>x64 versions of the following:</p> <ul style="list-style-type: none"><li>&gt; Windows Server 2016</li><li>&gt; Windows Server 2019</li><li>&gt; Windows Server 2022</li><li>&gt; Windows 10 21H2</li><li>&gt; Windows 11 22H2</li></ul> <p><b>Note:</b> Windows Insider Preview builds are not supported.</p> <p>The latest service packs and security updates must be installed.</p>

### Sentinel LDK-EMS Database

When installed on premises, the Sentinel LDK-EMS database is supported as follows:

System	Supported Database Server Software
Windows	<ul style="list-style-type: none"><li>&gt; Microsoft SQL Server 2016</li><li>&gt; Microsoft SQL Server 2017 Express</li><li>&gt; Microsoft SQL Server 2019 Express</li></ul> <p><b>Note:</b> Microsoft SQL Server 2019 Express Edition can be installed automatically by the Sentinel LDK-EMS Installation wizard. The installer for this version of Microsoft SQL Server is also available on the Sentinel LDK installation drive.</p>

### Web Browsers for Sentinel LDK-EMS

The latest versions of the following web browsers are supported with both HTTPS and HTTP:

- > Microsoft Edge
- > Mozilla Firefox
- > Google Chrome

**NOTE** The Mac Safari Web browser is *not* supported for Sentinel LDK-EMS (both Vendor Portal and Customer Portal).

## Tomcat and JRE for Sentinel LDK-EMS

When installed on-premises, Sentinel LDK-EMS is compatible with the following:

- > **Tomcat:** 9.0.67
- > **JRE:** OpenJDK 8.232

## Sentinel LDK Vendor Tools

**Important!** You must always install the latest version of the Sentinel RTE on the machines that you use to work with Sentinel LDK Vendor Tools and Sentinel LDK-EMS. (Under Windows, the RTE is installed automatically as part of the Sentinel LDK installation procedure.)

System	Supported Versions
<b>Windows</b>	<p>x64 versions of the following:</p> <ul style="list-style-type: none"> <li>&gt; Windows Server 2016</li> <li>&gt; Windows Server 2019</li> <li>&gt; Windows Server 2022</li> <li>&gt; Windows 10 21H2</li> <li>&gt; Windows 11 22H2</li> </ul> <p><b>Note:</b> Windows Insider Preview builds are not supported.</p> <p>The latest service packs and security updates must be installed.</p> <p><b>Display:</b> Requires a minimum screen resolution of 1280 by 1024 pixels with 24-bit color quality.</p> <p><b>Note for Sentinel LDK Envelope:</b> To protect and execute the provided .NET sample application under Windows 8.1 or Windows Server 2012 R2, you must install Microsoft .NET Framework 3.5.</p>
<b>Mac</b>	<ul style="list-style-type: none"> <li>&gt; macOS 12.5 Monterey</li> <li>&gt; macOS 13.0 Ventura</li> </ul> <div> <p>For Mac machines with the ARM64-based processor: Vendor Tools (Envelope, Data Protection utility) are supported using the Rosetta 2 emulator. For more information on support for Envelope, see <a href="#">Support for Rosetta 2 Emulation.Sentinel LDK Envelope for Mac</a></p> </div> <p>Applications built on the Cocoa framework are supported.</p> <p><b>Web Browsers for Sentinel Vendor Tools Help Systems:</b></p> <ul style="list-style-type: none"> <li>&gt; Mozilla Firefox</li> <li>&gt; Mac Safari with configuration option <b>Cross-Origin Restriction</b> disabled. (This option can be accessed from the <b>Developer</b> menu.)</li> </ul>

System	Supported Versions
<b>Linux Intel</b>	<p>Sentinel LDK Envelope for Linux and Master Wizard for Linux are supported on the x86-64 version of the following distributions of Linux:</p> <ul style="list-style-type: none"> <li>&gt; OpenSUSE Leap 15.4</li> <li>&gt; Red Hat EL 9</li> <li>&gt; Ubuntu Server 22.04</li> <li>&gt; Ubuntu Desktop 22.04</li> <li>&gt; Debian 11.4</li> <li>&gt; CentOS Stream 9</li> </ul> <p>The latest service packs and security updates must be installed.</p>
<b>Linux ARM</b>	<ul style="list-style-type: none"> <li>&gt; ARM 32-bit</li> <li>&gt; ARM 64-bit</li> </ul> <p>Sentinel LDK Envelope for Linux (on a Linux Intel platform) can protect applications that will run on ARM 32-bit and ARM 64-bit platforms.</p>
<b>Android</b>	Android ARM platforms
<b>Java</b>	Java 8

## Vendor Library Version Dependency

Your customized Vendor libraries (**haspplib\_<vendorID>.\***) are downloaded each time that you introduce your vendor keys to Sentinel LDK. You should re-introduce your vendor keys each time that you upgrade to a new version of Sentinel LDK.

This section describes dependencies for each version of the vendor libraries.

- > **When using the Admin License Manager:** The version of the RTE should be equal to or later than the version of the customized Vendor library. For example:

Vendor Library Version	Required Run-time Environment Version
7.100	7.100 or later
8.11	8.11 or later
8.13	8.13 or later
8.15	8.15 or later
8.21	8.21 or later

Vendor Library Version	Required Run-time Environment Version
8.23	8.23 or later
8.31, 8.32, 8.34	8.31 or later
8.41	8.41 or later
8.51	8.51 or later

**NOTE** A given version of the Vendor library is compatible with newer versions of the RTE. However, to support the enhancements in a given version of the RTE, the equivalent version of the Vendor library may be required.

- > **When using the External License Manager (hasp\_rt.exe):** The following table indicates the version dependency of the customized Vendor library:

Vendor Library Version	Required External License Manager Version
7.100	23.0
8.11	24.0
8.13	24.2
8.15	24.4
8.21	25.0
8.23	25.2
8.31, 8.32, 8.34	26.0
8.41	27.0
8.51	28.0

**NOTE** Make sure that the Vendor library and External License Manager versions are synchronized according to the table.

You can download the latest External License Manager from the **Sentinel LDK Runtime & Drivers** link at: <https://cpl.thalesgroup.com/software-monetization/sentinel-drivers>

- > **When using the Integrated License Manager:** Your customized Vendor library is not required, so there is no version dependency.

## Supported Platforms for Code Samples

The code samples are supported on the same platforms as listed for ["Sentinel LDK Vendor Tools " on page 20.](#)

**NOTE** The **hasp\_net\_windows.dll** provided in the Licensing API vb.net and C# samples for Windows has been compiled with .NET Framework 4.5.

To work with this DLL, .NET Framework 4.5 or later must be installed on your machine.

Prior to Sentinel LDK v.7.4, this DLL was compiled with .NET Framework 2.0, which is now known to contain security vulnerabilities. Because of these vulnerabilities, Thales highly recommends that you upgrade to .NET Framework 4.5 or later.

If you do not want to upgrade your old .NET Framework, you can obtain and use the **hasp\_net\_windows.dll** for Windows from a Sentinel LDK release earlier than v.7.4. To obtain an earlier version of Sentinel LDK, contact Technical Support.

## Tested Compilers for Code Samples

API	Programming Language	Tested Compilers
Licensing API for Windows	AutoCAD	AutoCAD 2020, 2021, 2022
	C	Microsoft Visual Studio 2019, 2022
	Visual Basic .NET	Microsoft Visual Studio 2019, 2022
	C#	Microsoft Visual Studio 2019, 2022
	C++	Microsoft Visual Studio 2019, 2022 GCC
	Delphi	Delphi 11.1
	Java	Oracle JDK 1.8 Oracle JDK 17 OpenJDK 17
	C# - .NET Core	.NET Core 3.1
	C# - .NET	.NET 6
		<b>Note:</b> An application linked with <b>libhasp_windows_bcc_vendorId.lib</b> always requires Sentinel LDK RTE on the machine.

API	Programming Language	Tested Compilers
Licensing API for macOS	Java	Oracle JDK 1.8 Oracle JDK 17 OpenJDK 17
	C	Clang 12.0.0 or later Xcode 12.0 or later
	C# - .NET	.NET 6
Licensing API for Linux	Java	Oracle JDK 1.8 Oracle JDK 17 OpenJDK 17
	C	GCC
	C++	GCC
	C# - .NET Core	.NET Core 3.1 .NET 6
Licensing API for Android	Java	Oracle JDK 1.8
License Generation API for Windows	C, C#, Visual Basic .NET	Microsoft Visual Studio 2019, 2022
	Java	Oracle JDK 1.8 Oracle JDK 17 OpenJDK 17
License Generation API for Linux	C	GCC
Activation Sample Calling Web Services for Windows	C	Microsoft Visual Studio 2019, 2022 You may need to convert the provided workspace for the VS version used.
	Java	Oracle JDK 1.8 Oracle JDK 17 OpenJDK 17



API	Programming Language	Tested Compilers
Activation Sample Calling Web Services for macOS	Java	Oracle JDK 1.8 Oracle JDK 17 OpenJDK 17
Activation Sample Calling Web Services for Linux	Java	Oracle JDK 1.8 Oracle JDK 17 OpenJDK 17
Runtime Environment Installer	C	Microsoft Visual Studio 2019, 2022
	MSI	InstallShield 12 InstallShield 2013 or later
Admin API for Windows	Java	Oracle JDK 1.8 Oracle JDK 17 OpenJDK 17
	C, C#, C++, Visual Basic .NET	Microsoft Visual Studio 2019, 2022
	C# - .NET Standard	.NET Core 3.1, .NET 6
Admin API for Linux	C	GCC
	C# - .NET Standard	.NET Core 3.1, .NET 6
Admin API for macOS	C	Clang 12.0.0 or later Xcode 12.0 or later
	C# - .NET	.NET 6
Envelope .NET Runtime API	C#	Microsoft Visual Studio 2019, 2022
Java Envelope Configuration API	Java	Oracle JDK 1.8 Oracle JDK 17 OpenJDK 17

## Current Firmware Version

The table that follows indicates the firmware version on Sentinel HL keys when Sentinel LDK was released.

Sentinel LDK Version	Firmware Version on...		
	Sentinel HL (Driverless Configuration) Keys	Sentinel HL (HASP Configuration) Keys	(Legacy) Sentinel HASP Keys
8.5	4.x Firmware keys: 4.60 or 4.70 4.x Firmware keys with microSD: 4.61 6.x Firmware keys: 6.09	4.x Firmware keys: 4.35 or 4.70 6.x Firmware keys: 6.09	3.25
8.2, 8.3, 8.4	4.x Firmware keys: 4.60 4.x Firmware keys with microSD: 4.61 6.x Firmware keys: 6.09	4.x Firmware keys: 4.35 6.x Firmware keys: 6.09	3.25
8.0	4.x Firmware keys: 4.60 4.x Firmware keys with microSD: 4.61 6.x Firmware keys: 6.08	4.x Firmware keys: 4.35 6.x Firmware keys: 6.08	3.25
7.8, 7.9, 7.10	4.54	4.33	3.25
7.6, 7.7	4.53	4.33	3.25
7.5	4.27	4.27	3.25

To determine the version of the firmware for any given Sentinel HL key, connect the key to a computer where Sentinel LDK RTE is installed. View the list of keys in Admin Control Center.

- > If the firmware version on a given Sentinel HL (HASP configuration) key is earlier than 4.60, the firmware is automatically upgraded when you upgrade the key to Sentinel HL (Driverless configuration). The firmware is upgraded to the latest version (based on the version of the License Generation libraries in use).

This upgrade affects the firmware only—Sentinel LDK functionality remains unchanged. This upgrade is not relevant for HL Drive microSD keys.

- > If the firmware on a Sentinel HL (Driverless configuration) key is earlier than 4.27, then the first time you assign concurrency to a license on the key, the firmware on the key is automatically upgraded to the latest version (based on the version of the License Generation libraries in use).

# Documentation

*In this section:*

- > "Online Documentation" below
- > "Locally Installed Documentation" below
- > "Getting Started Guides" on page 29
- > "Sentinel LDK and Sentinel LDK-EMS User Interfaces" on page 29
- > "Sentinel LDK APIs" on page 30

## Online Documentation

Most Sentinel LDK documentation can be found online at:

<https://docs.sentinel.thalesgroup.com/ldk/home.htm>

## Locally Installed Documentation

Sentinel LDK documents can be found:

- > where Sentinel LDK is installed, under:  
**%ProgramFiles(x86)%\Thales\Sentinel LDK\Docs\**
- > where Sentinel LDK-EMS is installed, under:  
**%ProgramFiles(x86)%\Thales\Sentinel LDK-EMS\EMSServer\webapps\ems\Docs\**

Document	Description
Sentinel LDK Installation Guide	Details the prerequisites and procedures for installing Sentinel LDK Vendor Tools, Sentinel LDK-EMS Server (only for Sentinel LDK-EMS on-premises), launchers for Sentinel LDK-EMS, and the Run-time Environment.

Document	Description
Sentinel LDK Software Protection and Licensing Guide	Provides in-depth information about the logic of the applications and best practices for maximizing your software protection and licensing strategies. Describes a wide range of licensing strategies and models that you can implement, and can serve as the basis for elaboration and for creating new, tailor-made licensing models.
Sentinel LDK Software Protection and Licensing Tutorials	<p>Familiarize you with the Sentinel LDK applications and their functionality.</p> <ul style="list-style-type: none"> <li>&gt; The Demo Kit tutorial is for vendors that want to evaluate Sentinel LDK.</li> <li>&gt; The Starter Kit tutorial is for vendors that have already purchased Sentinel LDK.</li> </ul> <p>Two versions of each tutorial are provided – one for working with Sentinel LDK-EMS as the back office system, and one for vendors who want to provide their own back office system and only use the Sentinel LDK APIs to handle licensing and protection.</p>
Sentinel LDK High Availability for Cloud Licensing Configuration Guide	Describes how to set up "high availability" support to serve cloud-based licensing.
Sentinel LDK: Choosing and Integrating Hardware-, Software-, and Cloud Licensing	Provides a description of the differences and advantages of SL and cloud-based protection keys versus HL keys.
Sentinel LDK Quick Start Guides	Provide a short and simple demonstration of how you can easily protect your software using Sentinel HL keys. Separate Demo Kit and Starter Kit guides are provided.
Sentinel LDK-EMS Configuration Guide	Provides information on setting up and configuring Sentinel LDK-EMS to satisfy the requirements of your organization.
Sentinel LDK-EMS User Guide	Provides the Sentinel LDK-EMS user with detailed directions on how to set up license entities and how to handle entitlements, production, and support for Sentinel HL and SL keys. (This information is also provided in online help for the Sentinel LDK-EMS user interface.)

Document	Description
Sentinel LDK-EMS Web Services Guide	Provides the developer with an interface for integrating Sentinel LDK-EMS functionality into the vendor's existing back-office systems.
Integrating Sentinel LDK-EMS Server Into Your Existing Back-Office Systems	Outlines the many ways that software vendors can maximize the potential of their existing back-office systems, such as ERP, CRM, and business intelligence systems, through seamless integration with Sentinel LDK-EMS Server.

## Getting Started Guides

Getting Started Guides for other operating systems can be found as follows:

### Linux

The *Getting Started Guide for Linux* can be found in the Linux download or where Sentinel LDK is installed, under: **%ProgramFiles(x86)%\Thales\Sentinel LDK\Additional Platforms\Linux\**

### macOS

The *Getting Started Guide for macOS* can be found in the Mac download or where Sentinel LDK is installed, under: **%ProgramFiles(x86)%\Thales\Sentinel LDK\Additional Platforms\MacOS\**

### Android

The *Getting Started Guide for Android* can be found where Sentinel LDK is installed, under: **%ProgramFiles(x86)%\Thales\Sentinel LDK\Additional Platforms\Android\**

## Sentinel LDK and Sentinel LDK-EMS User Interfaces

The documentation described in the table that follows can be accessed from the user interface for the relevant Sentinel LDK component.

Reference Document	Description
Sentinel Admin Control Center	Documentation for the end user, describing the Admin Control Center and providing instructions for performing the various functions such as updating or attaching licenses.

Reference Document	Description
Sentinel LDK-EMS	Provides the Sentinel LDK-EMS user with detailed directions on how to set up license entities and how to handle entitlements, production, and support for Sentinel HL and SL keys.
Sentinel LDK Data Encryption Utility (Separate versions for Windows and for Mac)	Provides the developer with a description of the Sentinel LDK Data Encryption utility (formerly DataHASP utility), used for protecting data files that are accessed by Sentinel LDK Envelope.
Sentinel LDK Envelope (Separate versions for Windows and for Mac)	Describes how to employ Sentinel LDK Envelope to automatically wrap your programs with a protective shield. The application provides advanced protection features to enhance the overall level of security of your software.
Sentinel LDK ToolBox	Describes how to work with the ToolBox user interface for the Licensing API, License Generation API, and Admin API. Using Sentinel LDK ToolBox, the developer can experiment with the individual functions that are available in each API and can generate programming code for insertion in the developer's own program. Provides full documentation for each of the included APIs.

## Sentinel LDK APIs

Documentation for the Sentinel LDK APIs described below can be found:

- > On the Sentinel Product Documentation web site:  
<https://docs.sentinel.thalesgroup.com/ldk/home.htm>
- > where Sentinel LDK is installed, under:  
**%ProgramFiles(x86)%\Thales\Sentinel LDK\API\**

Sentinel LDK API	Description
Licensing API Reference (formerly Run-time API)	Provides the developer with an interface to use the licensing and protection functionality available in the Sentinel LDK Run-time Environment.
Run-time Installer API	Provides the developer with an interface for integrating installation of the Run-time Environment into the installation of the vendor's protected application.

Sentinel LDK API	Description
Sentinel LDK-EMS Web Services	Provides the developer with an interface for integrating Sentinel LDK-EMS functionality into the vendor's existing back-office systems. Locally-installed documentation is available from the <b>index.html</b> menu under: <b>%ProgramFiles(x86)%\Thales\Sentinel LDK-EMS\EMSServer\webapps\ems\Docs\</b>
License Generation API Reference	Provides access to the power and flexibility of Sentinel protection keys without the need to use Sentinel LDK-EMS. The developer can call functions in this API to generate and update licenses for Sentinel protection keys.
Admin API Reference	Provides the functionality available in Admin Control Center and Sentinel License Manager in the form of callable API functions.

# Resolved Issues

## Release: 8.5

The following issues that were reported by vendors were resolved in this release.

Reference	Resolved Issue	Components
SM-11418	<p>For a Java 7 or 8 application that is protected with Envelope, the end user was required to use the following command line syntax to launch the protected application:</p> <ul style="list-style-type: none"> <li>&gt; Java 7: Specify <code>java -UseSplitVerifier -jar ProtectedJar.jar</code></li> <li>&gt; Java 8 and later: Specify <code>java -noverify -jar ProtectedJar.jar</code></li> </ul> <p>The related issue has been resolved, and the requirement for the use of the <code>-UseSplitVerifier</code> and <code>-noverify</code> flags has been eliminated.</p>	Envelope-Java
SM-126840	<p>While protecting the ARM64 Linux .so library, Linux Envelope 8.4, the following error was generated:</p> <p>linuxenv: fatal E0001: internal error (hint 0x000007D8)</p>	Envelope-Linux
SM-128407	<p>The GET all entitlement web service was not able to return the same entitlements shown on by the Sentinel LDK-EMS GUI if "createdBy" is not specified .</p>	LDK-EMS
SM-114004	<p>Certain reports generated in HTML/PDF format by Sentinel LDK-EMS were not able to display Chinese/Japanese characters correctly.</p>	LDK-EMS
SM-126766	<p>The "resent email" in Sentinel LDK-EMS 8.4 would fail when the email address contains more than 4 characters after the final period (for example: bob.smith@thalestest.<b>email</b>).</p>	LDK-EMS
SM-114641	<p>A protected application using the function <code>fork()</code> with Intel control flow would fail with a "Segmentation fault (core dumped)" error.</p>	Envelope-Linux



Reference	Resolved Issue	Components
SM-120110	With a protected mach-o file, the exception handler may catch subprocess exceptions.	Envelope-Mac
SM-123025	While running an application protected with LDK 8.3/8.4 envelope.com and specifying a project file that was generated with LDK 7.6 Envelope, a blank run-time message was displayed.	Envelope-.NET
SM-123140	After protected by Java class-level protection, a Springboot application would fail with the exception "java.lang.ExceptionInInitializerError".	Envelope-Java-Class
SM-124014	Under certain circumstances, a relocation handling error would cause a protected Windows application to fail.	Envelope-Windows
SM-124954	A Springboot application with version 2.2 would not work after protection with Java class-level protection.	Envelope-Java-Class
SM-126718	The AoC Java charset file was missing under non-English Windows.	Envelope-.NET
SM-127674	Under certain circumstances, Envelope would fail with an internal error 809 during file protection.	Envelope-Windows
SM-130586	Envelope 8.4 was not able to protect the .NET sample "Bounce" program.	Envelope-.NET
SM-131143	The .NET Runtime would hang with the debugger warning message box displayed.	Envelope-.NET

# Known Issues and Workarounds

The known issues in Sentinel LDK 8.5 that are likely to have the most significant impact on users are listed below, according to component.

Additional, less-common issues can be found [here](#).

*In this section:*

- > "Sentinel LDK Installation and Software Manager" below
- > "Sentinel LDK-EMS" on the next page
- > "End Users, Sentinel LDK Run-time Environment, License Manager, and Customer Tools" on the next page
- > "Sentinel LDK Envelope and Data Encryption for Windows Platforms" on page 38
- > "Sentinel LDK Envelope and Data Encryption for Linux" on page 42
- > "Sentinel LDK Envelope, Data Encryption, and Licensing API for macOS" on page 43

## Sentinel LDK Installation and Software Manager

Ref	Issue
SM-35287	<p>When upgrading from Sentinel LDK v.7.3 through v.7.8 to Sentinel LDK v.7.10, all non-English locales of Customer contacts and Channel Partner contacts in Sentinel LDK-EMS are converted to the English locale.</p> <p><b>Note:</b> You can ignore this issue if all of your Customer and Channel Partner contacts are set up to use the English locale or if you are not upgrading Sentinel LDK-EMS.</p> <p><b>Workaround:</b> A solution for this issue is provided in the technical note available <a href="#">here</a>.</p>
SM-109765	<p>Under Windows 11, notifications from Sentinel LDK regarding software updates are not being delivered to vendors by the software manager (Sentinel Up).</p> <p><b>Workaround:</b> Monitor the <a href="#">Sentinel LDK download page</a> and see when updates are published.</p> <p>You can also subscribe to this page (article KB0021845 ) to receive notifications:  <a href="https://supportportal.gemalto.com/csm?id=kb_article_view&amp;sys_kb_id=c2241c1d1bb41890f12064606e4bcb3e&amp;sysparm_article=KB0021845">https://supportportal.gemalto.com/csm?id=kb_article_view&amp;sys_kb_id=c2241c1d1bb41890f12064606e4bcb3e&amp;sysparm_article=KB0021845</a></p>

## Sentinel LDK-EMS

Ref	Issue
SM-119258	<p>Sentinel LDK-EMS Web Services does not support adding dynamic memory files to Products.</p> <p><b>Workaround:</b> Add dynamic memory files to Products using the Sentinel LDK-EMS graphical user interface.</p>
SM-12832	<p>When a user clicks the link provided in an email (that is sent by Sentinel LDK-EMS) to display a scheduled report, the report is not displayed when the DNS server cannot resolve the server hostname present in the link. Instead, the message "This page can't be displayed" is shown.</p> <p><b>Workaround:</b> In the <b>etc/host</b> file on the user's machine, add an entry that contains the hostname and IP address of the Sentinel LDK-EMS machine.</p>
SM-19045	<p>Customers who were associated with a channel partner prior to Sentinel LDK 7.7 will not be visible in Sentinel LDK-EMS to the relevant Channel Partner user. However, the Channel Partner user will not be able create a new entry for an existing customer with the same email address as already exists in the EMS database. In this situation, the Channel Partner user will not be able to fulfill an entitlement for the customer.</p> <p><b>Workaround:</b> If the Channel Partner user cannot create the required customer in Sentinel LDK-EMS, the software vendor should handle the fulfillment of the entitlement for the customer.</p>
SM-52262	<p>After you introduce or update a Master Key, you must notify all Sentinel LDK-EMS users to log off and log on again to get the latest changes.</p>
SM-68428	<p>When you generate a product key entitlement in Sentinel LDK-EMS, the customer does not receive the entitlement certificate email if the customer contact locale is not specified.</p> <p><b>Workaround:</b> Specify the locale for the customer.</p>

## End Users, Sentinel LDK Run-time Environment, License Manager, and Customer Tools

Ref	Issue
	<p>The Sentinel Remote Update System (RUS utility) is not supported for Mac systems.</p> <p><b>Workaround:</b> To obtain a fingerprint, use Sentinel Admin Control Center.</p>

Ref	Issue
SM-116811	<p>When installing a different version of Sentinel LDK Run-time Environment (RTE) over an existing version on a Linux platform, the newly-installed <b>hasplmd</b> daemon is typically started automatically. However, in the following instances, the <b>hasplmd</b> daemon is not started automatically:</p> <ul style="list-style-type: none"> <li>&gt; When upgrading RTE version 8.13 or earlier to RTE version 8.15 or later</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>&gt; When downgrading RTE version 8.15 or later to RTE version 8.13 or earlier</li> </ul> <p><b>Workaround:</b> After installing the desired version of the RTE, do either of the following:</p> <ul style="list-style-type: none"> <li>&gt; Install the desired version of the RTE a second time. After performing the second installation, the <b>hasplmd</b> daemon starts automatically.</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>&gt; Start the <b>hasplmd</b> daemon manually by entering the command: <b>systemctl start hasplmd</b></li> </ul>
SM-94994	<p>Given the following circumstances:</p> <ul style="list-style-type: none"> <li>&gt; An RTE without legacy drivers is installed on a new machine.</li> <li>&gt; An RTE with legacy drivers is installed afterward on the machine.</li> </ul> <p>An application that requires an RTE with legacy drivers will not operate successfully. During installation of the RTE with legacy drivers, no warning or error is generated.</p> <p><b>Workaround:</b> Using Admin Control Center, generate a diagnostic report, and contact Thales Technical Support.</p>
SM-82475	<p>Given the following situation:</p> <ul style="list-style-type: none"> <li>&gt; When the current state of an SL key is decoded (using SL License Generation API), the status of the container is shown as <b>Secure Storage Id Mismatch</b> in the <b>Key ID</b> column.</li> <li>&gt; The key contains a Product that is rehostable or detachable OR the Product license type is <b>Executions</b> or <b>Expiration Date</b>.</li> </ul> <p>If the SSID (secure storage ID) of the container changes (for example, the container becomes corrupted or is deleted), the Product will be marked as <b>Cloned</b> and become unusable. In any other situation, the status <b>Secure Storage Id Mismatch</b> has no significance and can be ignored.</p>

Ref	Issue
SM-76660	<p>Given the following circumstances:</p> <ol style="list-style-type: none"> <li>1. Windows is installed on a Mac machine with Boot Camp.</li> <li>2. An SL license is installed in the Windows system.</li> </ol> <p>The Secure Storage ID may change and cause Feature ID 0 to be flagged as "cloned".</p> <p><b>Workaround:</b> Do not install the SL license in the Windows system. Have your application consume a network seat from a cloud license.</p>
SM-70131	<p>The Sentinel LDK License Manager (process hasplms.exe) hangs intermittently and reaches a very high CPU utilization (approximately 1.9 GB).</p> <p><b>Workaround:</b> Protect the application using the latest API libraries and, if the RTE is required on the end user's machine, upgrade to the most recent RTE.</p>
SM-59868	<p>An application linked with <b>libhasp_windows_bcc_vendorld.lib</b> requires Sentinel LDK Run-time Environment on the machine.</p>
SM-546	<p>Given the following circumstances:</p> <ul style="list-style-type: none"> <li>&gt; A protected application was created using Visual Studio 2015</li> <li>&gt; Control Flow Guard is explicitly enabled in Visual Studio.</li> <li>&gt; The application links statically or dynamically with Sentinel Licensing API.</li> <li>&gt; The External License Manager (hasp_rt.exe) is not used.</li> <li>&gt; The application is run under Windows 10, or Windows 8.1 Update (KB3000850). (Not all Windows 8.1, only recent ones)</li> </ul> <p>The protected application may fail.</p> <p><b>Workaround:</b> Include the External License Manager (hasp_rt.exe) with the protected application.</p>
LDK-14971	<p>Given the following circumstances at a customer site:</p> <ul style="list-style-type: none"> <li>&gt; One machine has Run-time Environment version 7.51.</li> <li>&gt; A second machine has a version of Run-time Environment that is earlier than v.7.51.</li> <li>&gt; The customer performs rehost of a license repeatedly between the two machines.</li> <li>&gt; An update is applied to the license on either of these machines.</li> </ul> <p>A rehost operation may fail with the message <b>HASP_REHOST_ALREADY_APPLIED</b>.</p> <p><b>Workaround:</b> Obtain a new SL license from the software vendor for the protected application on the target machine. Before attempting any additional rehost procedure, install the latest Run-time Environment on both machines.</p>

Ref	Issue
LDK-12547	<p>Under Linux, if the user is running a Windows 64-bit protected application using Wine with default options, Linux may return a "debugger detected" error.</p> <p><b>Workaround:</b> When you protect the application using Envelope, disable <b>User debugger detection</b> for the application. (Note that disabling debugger detection reduces the overall security of the application.)</p>
LDK-10670	<p>After a user connects a Razer Abyssus mouse and installs Razer drivers on a computer, the device manager on the computer does not recognize a Sentinel HL key if the key is connected to the same USB port where the mouse was previously connected.</p> <p>This issue has been reported to Razer.</p>
LDK-9044	<p>Given the following circumstances:</p> <p style="padding-left: 40px;">A Sentinel HL (Driverless configuration) key is connected to a USB host controller in default mode on QEMU emulator version 2.0.0 and Virtual Machine Manager version 0.9.5.</p> <p>When the key is disconnected, the key continues to be displayed in Admin Control Center as a connected key. (However, a protected application whose license is located in the key does not execute after the key is disconnected.)</p> <p><b>Workaround:</b> Switch the USB controller to USB 2.0 mode.</p>
LDK-8480	<p>With some new USB chipsets, it is possible that the <b>hasp_update()</b> API call, used to update the firmware of Sentinel HL keys to version 3.25, will generate the HASP_BROKEN_SESSION return code, even if the firmware is correctly updated. (This issue does not occur with Sentinel HL Driverless keys with firmware version 4.x.)</p> <p><b>Workaround:</b> Install the latest Run-time Environment. The automatic firmware update feature of the License Manager will automatically update the firmware of the key the first time that the key is connected, without the need to call hasp_update().</p>

## Sentinel LDK Envelope and Data Encryption for Windows Platforms

### General

Ref	Issue
LDK-11727	<p>Debugger detection is not provided for .NET applications.</p> <p><b>Workaround:</b> Implement debugger detection mechanism in the application code, and use Envelope to protect the methods that call these functions.</p>

Ref	Issue
LDK-11191	When a protected application is run under Novell ZENworks Agent, the application may generate "Debugger Detected" errors and may fail to run. This is because ZENworks Agent attaches to the started application as a debugger in order to monitor different events.
LDK-6695	When a "Debugger Detected" error is generated, it is not possible for the protected application to determine which process is regarded as a debugger.
LDK-8850	When a protected application detects that a debugger is attached, the application may generate multiple "Debugger Detected" message windows.
SM-58676	<p>Given the following circumstances:</p> <ol style="list-style-type: none"> <li>1. Install SL AdminMode licenses on your local machine.</li> <li>2. Run IObit Advanced SystemCare Ultimate 12 to clean and optimize your machine.</li> <li>3. Restart your machine.</li> </ol> <p>Local SL AdminMode licenses may be missing or may be identified as cloned licenses. This is an issue with the IObit product. Thales has reported this issue to IObit and it is currently under investigation.</p> <p><b>Workaround:</b> Do not use the current version of the IObit product, <i>OR</i> do not use SL AdminMode licenses until this issue is resolved. (You can use SL UserMode licenses.)</p>
SM-65381	<p>Under Windows, execution of a Python application that is protected with DFP sometimes fails with the "Bad magic number" error if <b>hasp_rt.exe</b> is not present in the protected folder.</p> <p><b>Workaround:</b> Ensure that <b>hasp_rt.exe</b> is present in the protected folder.</p>

## Java

Ref	Issue
LDK-11195	<p>When protecting a Java application, Envelope fails with the message "Serious Internal Error (12)".</p> <p><b>Workaround:</b> If this error occurs, protect the Java application using either of the following techniques:</p> <ul style="list-style-type: none"> <li>&gt; If the application contains JARs within a JAR/WAR executable, remove those JARs when protecting the executable with Envelope. You can add the JARs to the JAR/WAR executable after protection is complete.</li> <li>&gt; Create a JAR/WAR executable using only those classes that you want to protect. After applying protection, you can add other classes or JARs, or any other dependencies in the protected JAR/WAR executable.</li> </ul>

Ref	Issue
SM-10890	<p>Given the following circumstances:</p> <ul style="list-style-type: none"><li>&gt; An Envelope project was created with Envelope version 7.3 or earlier.</li><li>&gt; The project contains settings for a Java application.</li><li>&gt; On the <b>Protection Settings</b> tabbed page for the Java application, you select the option to overwrite default protection settings.</li></ul> <p>The <b>Allows grace period after failed license check</b> check box should be modifiable. However, the check box cannot be changed.</p> <p><b>Workaround:</b> On the <b>Advanced</b> tabbed page, make any change to the MESSAGE_OUTPUT_MODE property, and then change it back. This forces Envelope to load an internal data structure that then makes the <b>Allows grace period after failed license check</b> check box modifiable.</p> <p><b>Note:</b> This grace period is not supported for Web applications.</p>
SM-10969	<p>Due to a known limitation in Java, if a background check thread becomes non-EDT, the background check (<b>Abort/Retry/Ignore</b>) dialog box may not appear. Envelope has been modified so that the error dialog prompted by the protected method in the protected application takes precedence. This has reduced the occurrence of the problem, but it has not eliminated the problem entirely.</p>
SM-98384	<p>A protected WAR does not run successfully on WildFly Server 23.</p>
SM-110174	<p>Java class level protection and Data File protection in Windows Envelope for 64-bit applications are not supported under Wine.</p>



**.NET**

Ref	Issue
SM-554	<p>For apps that target the .NET Framework version 4.6 and later, <b>CultureInfo.CurrentCulture</b> and <b>CultureInfo.CurrentUICulture</b> are stored in a thread's <b>ExecutionContext</b>, which flows across asynchronous operations. As a result, changes to the <b>CultureInfo.CurrentCulture</b> and <b>CultureInfo.CurrentUICulture</b> properties are reflected in asynchronous tasks that are launched subsequently.</p> <p>If the current culture or current UI culture differs from the system culture, the current culture crosses thread boundaries and becomes the current culture of the thread pool thread that is executing an asynchronous operation.</p> <p>When protecting a sample application implementing above behavior with protection type as "Dot Net Only", then the application behaves as expected. However, with protection type "Dot Net and Windows Shell" or "Windows Shell Only", the thread uses the system's culture to define behavior.</p> <p><b>Workaround:</b></p> <p>Do the following:</p> <ol style="list-style-type: none"> <li>1. Use .NET Framework 4.5.</li> <li>2. Use           <pre>CultureInfo.DefaultThreadCurrentCulture = new CultureInfo(...)</pre>           instead of           <pre>Thread.CurrentThread.CurrentCulture = new CultureInfo(...).</pre> </li> </ol>
SM-25875	<p>Given the following circumstances:</p> <ol style="list-style-type: none"> <li>1. A .NET application is protected with Envelope.</li> <li>2. The protection type includes Windows Shell (with or without the method level).</li> <li>3. The application attempts to get a module handle using the following method:           <pre>IntPtr hMod = Marshal.GetHINSTANCE(Assembly.GetExecutingAssembly().GetModules()[0])</pre> </li> </ol> <p>The handle returned may not be correct, and as a result, an error will be generated.</p> <p><b>Workaround:</b> You can call the GetModuleHandle system API of the Kernel32.dll to get the module handle.</p> <p>For example:</p> <pre>[DllImport("kernel32.dll", CallingConvention = CallingConvention.StdCall, CharSet = CharSet.Auto)] private static extern IntPtr GetModuleHandle(IntPtr lpModuleName); IntPtr hMod = GetModuleHandle(Process.GetCurrentProcess().MainModule.ModuleName);</pre>

Ref	Issue
SM-26578	<p>If a .NET application protected with Windows Shell sets the exit code to <b>ExitEventArgs</b> such as "e.ApplicationExitCode = 1" when the application exits, the exit code cannot be retrieved by an external process.</p> <p><b>Workaround:</b> Call "Environment.Exit(1)" to exit the process.</p>

## Sentinel LDK Envelope and Data Encryption for Linux

Ref	Issue
SM-28403	<p>Given the following circumstances:</p> <ul style="list-style-type: none"> <li>&gt; A Linux application is protected with Envelope, with protection against debugging.</li> <li>&gt; The application calls the wait(&amp;status) system call. This is equivalent to: <pre>waitpid(-1, &amp;status, 0)</pre> </li> </ul> <p>The application may hang.</p> <p><b>Workaround 1:</b> Call waitpid for a specific child process pid (pid &gt; 0).</p> <p><b>Workaround 2:</b> Disable the anti-debugging feature in Envelope. <b>Note:</b> This workaround significantly reduces the security of the protected application. Thales recommends that you consult with Technical Support before choosing this workaround.</p>
SM-69080	<p>A protected application may not handle signals properly when:</p> <ul style="list-style-type: none"> <li>&gt; Background check is enabled, and</li> <li>&gt; Signal handlers are registered by a thread created by the application.</li> </ul> <p><b>Workaround:</b> Do one of the following:</p> <ul style="list-style-type: none"> <li>&gt; Disable both background check and anti-debugging. (You can do this by specifying the following line command flags: <code>-b:0 --debug --memdump</code>)</li> <li>&gt; (Preferred workaround) Register the signal handler in a main thread instead of a thread function. Thread function is one of the following: <ul style="list-style-type: none"> <li>• A function passed to pthread_create as start_routine</li> <li>• A function called from start_routine.</li> </ul> </li> </ul>

## Sentinel LDK Envelope, Data Encryption, and Licensing API for macOS

Ref	Issue
LDK-11655	<ul style="list-style-type: none"><li>&gt; When running Envelope in a VMware Fusion 7.1.1 virtual machine on a Mac machine, if you save the protected application to an HGFS (Host Guest File System) volume, the application file is corrupted.</li><li>&gt; When you run a protected application on a VMware Fusion virtual machine from an HGFS share, if the application requires write access, the error "unable to write to file" is generated.</li></ul>
SM-57838	The command line Envelope tool (envelope_darwin) now only works if Envelope.app (UI bundle) is in the same folder. To use the command line tool, copy Envelope.app to the folder that contains the command line tool.
SM-57024	Dark Mode has been introduced by Apple in macOS 10.14 but is not supported yet by the Envelope GUI. You should disable Dark Mode to have a proper user experience.
SM-51456	<p>Due to reliability enhancements in Sentinel LDK under macOS, there is some performance impact in protected applications under macOS 10.13.</p> <p>A technical note will be issued that describes this issue and the option to disable these enhancements in favor of higher performance.</p>