

Sentinel LDK 8.3 with Sentinel LDK-EMS

RELEASE NOTES



Revision History

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CONTENTS

Sentinel LDK 8.3 with Sentinel LDK-EMS - Release Notes	6
Service Pack: 8.3.100 December 2021	6
Service Pack: 8.3.002 December 2021	6
Service Pack: 8.3.001 November 2021	6
Release: 8.3 October 2021	6
Patch: 7/2021: EMS and Vendor Suite (KB0024494) July 2021	7
Product Overview	8
Sentinel Vendor Keys	9
New Features, Enhancements, and Changes	10
Service Pack: 8.3.100 December 2021	10
Enhancements to Sentinel LDK Envelope	10
Enhancement to Sentinel Licensing API	11
Resolve log4j Security Vulnerability	11
Service Pack: 8.3.002 December 2021	11
Address the CVE-2021-44228 Vulnerability	11
Service Pack: 8.3.001 November 2021	12
Issue with Vendor-Specific APIs and the Vendor Library 8.31 has Been Resolved	12
Documentation Has Been Updated	12
Release: 8.3 October 2021	13
Support for High Availability for Cloud Licensing	13
Release of Sentinel LDK with Sentinel EMS	14
Sentinel License Manager Service Supports Kubernetes Environment	14
Envelope Now Provides Class-Level Protection for Java Applications Under Linux	14
Sentinel LDK Envelope Now Supports AppOnChip for .NET	14
Support for Oracle Java 11 and Open JDK 16	15
Envelope Now Supports Intel CET	15
Improved Performance for Envelope for Linux	15
Customized RTE Installers Now Generated By Master Wizard	15
Dropped Support for Business Studio Server	16
Maximum Expiration Date for the Expiration Date License Type has been Extended	16
Sentinel LDK Envelope Protects AutoCAD Plugin	16
"Aggressive Search" Setting Removed from Admin Control Center	16
Patch: 7/2021: Sentinel LDK-EMS and Vendor Suite (KB0024494) July 2021	17
Detaching Seats With Concurrency	17
Simplified SL Key Creation and Updates in Sentinel EMS for Vendor-Hosted Cloud Licenses Now Available Using Web Services	18
Support for Rosetta 2 Emulation in Envelope for Mac	19

Planned Changes in Upcoming Sentinel LDK Releases	21
Installation and Upgrades	22
Service Pack: 8.3.100 December 2021	22
For Windows	22
Release: 8.3 October 2021	22
Installing Linux and Mac Packages	23
Upgrading from an Earlier Version of Sentinel LDK	23
Security Updates	24
Reporting a Security Vulnerability	24
Service Pack: 8.3.100 December 2021	24
Service Pack: 8.3.002 December 2021	24
Release: 8.3 November 2021	24
Supported Platforms	25
Release: 8.3	25
Sentinel LDK Run-time Environment and Protected Applications for End Users	25
Web Browsers for Sentinel Admin Control Center	29
Sentinel LDK-EMS Service	30
Sentinel LDK-EMS Database	30
Web Browsers for Sentinel LDK-EMS	30
Sentinel LDK Vendor Tools	31
Vendor Library Version Dependency	32
Supported Platforms for Code Samples	34
Tested Compilers for Code Samples	35
Current Firmware Version	37
Dropped Support	38
Documentation	39
Online Documentation	39
Locally Installed Documentation	39
Getting Started Guides	41
Linux	41
macOS	41
Android	41
Help Systems - Sentinel LDK and Sentinel LDK-EMS User Interfaces	41
Help Systems – Sentinel LDK APIs	42
Resolved Issues	43
Service Pack: 8.3.100 December 2021	43
Service Pack: 8.3.002 December 2021	44
Service Pack: 8.3.001 November 2021	45
Release: 8.3 October 2021	45
Patch: 7/2021: Sentinel LDK-EMS and Vendor Suite (KB0024494) July 2021	46
Known Issues and Workarounds	48

Changes to This Section 48

Sentinel LDK Installation and Software Manager 48

Sentinel LDK-EMS 49

End Users, Sentinel LDK Run-time Environment, License Manager, and Customer Tools 49

Sentinel LDK Envelope and Data Encryption for Windows Platforms 52

Sentinel LDK Envelope and Data Encryption for Linux 56

Sentinel LDK Envelope, Data Encryption, and Licensing API for macOS 57

Sentinel LDK Envelope for Android 58

Sentinel LDK 8.3 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 this location:

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

Service Pack: **8.3.100** | December 2021

- > ["New Features, Enhancements, and Changes" on page 10](#)
- > ["Installation and Upgrades" on page 22](#)
- > ["Security Updates" on page 24](#)
- > ["Resolved Issues" on page 43](#)
- > ["Known Issues and Workarounds" on page 48](#)

Service Pack: **8.3.002** | December 2021

- > ["New Features, Enhancements, and Changes" on page 10](#)
- > ["Security Updates" on page 24](#)
- > ["Resolved Issues" on page 43](#)

Service Pack: **8.3.001** | November 2021

- > ["New Features, Enhancements, and Changes" on page 10](#)
- > ["Resolved Issues" on page 43](#)

Release: **8.3** | October 2021

- > [New Features, Enhancements, and Changes](#)
- > [Planned Changes in Upcoming Sentinel LDK Releases](#)
- > [Installation and Upgrades](#)

- > ["Security Updates" on page 24](#)
- > [Supported Platforms](#)
- > ["Documentation" on page 39](#)
- > [Resolved Issues](#)

The following corrections were added to the Sentinel LDK 8.3 release notes:

- > [Added change: "Aggressive Search" setting in Admin Control Center](#)
- > [Added known issue related to Software Manager notifications](#)

Patch: **7/2021**: EMS and Vendor Suite (KB0024494) | July 2021

- > [New Features, Enhancements, and Changes](#)
- > [Installation and Upgrades](#)
- > [Resolved Issues](#)

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

- > ["Service Pack: 8.3.100 | December 2021" below](#)
- > ["Service Pack: 8.3.002 | December 2021" on the next page](#)
- > ["Service Pack: 8.3.001 | November 2021" on page 12](#)
- > ["Release: 8.3 | October 2021" on page 13](#)
- > ["Patch: 7/2021: Sentinel LDK-EMS and Vendor Suite \(KB0024494\) | July 2021" on page 17](#)

NOTE The Sentinel LDK 8.3 release includes all features and enhancements from earlier releases. Details on patches that were released between Sentinel LDK 8.2 and Sentinel LDK 8.3 are also included in this document.

If you are upgrading from a version of Sentinel LDK that is earlier than 8.2, 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.

Service Pack: 8.3.100 | December 2021

In this section:

- > ["Enhancements to Sentinel LDK Envelope" below](#)
- > ["Enhancement to Sentinel Licensing API" on the next page](#)
- > ["Resolve log4j Security Vulnerability" on the next page](#)

Enhancements to Sentinel LDK Envelope

> **Support for .NET 6**

Sentinel LDK Envelope can now be used to protect .NET 6 applications.

> **Releasing an Identity-based License**

The enhancement describe below applies to:

- .NET applications
- Applications protected using the Windows default engine

Users now have the option to release their license for an application in a remote session and apply the license to an application in a local session.

An end user who is assigned an identity-based license is typically granted the right to access that license from two or more machines, but only from a single machine at any given time.

The user may face a situation in which they access their license from one machine (for example, their office machine) but fail to close the application's session. If they later attempt to access their license from a different machine (for example, their home machine), the login to the license would fail.

An application protected with Envelope now gives the user the option to release their license from the original session and assign it to the new session. Until now, this option was only available programmatically using Sentinel Licensing API. However, after installing this service pack, for applications protected with Envelope, this functionality is now provided automatically. No coding is required by the developer.

> Disabling the anti-debugging feature with Windows V3 engine

The protection parameter **User Debugger Detection** is now supported by the Windows V3 engine. As a result, you can now disable the anti-debugging feature when you protect an application using the Windows V3 engine.

Enhancement to Sentinel Licensing API

Sentinel Licensing API is now compatible with .NET 6 applications.

Resolve log4j Security Vulnerability

This service pack resolves an Apache log4j security vulnerability. For details, see ["SM-113525" on page 44](#).

Service Pack: 8.3.002 | December 2021

Address the CVE-2021-44228 Vulnerability

This service pack addresses a critical security vulnerability. For details, see [Resolved Issues: Service Pack: 8.3.002](#) and ["Security Updates" on page 24](#).

Due to the severity of this vulnerability, Thales highly recommends that you apply the updates provided by this service pack as soon as possible.

This service pack is cumulative and also installs Service Pack 8.3.001 (if not yet installed).

NOTE Service Pack 8.3.002 is referred to in some documents as Patch 8.3.002.

Service Pack: 8.3.001 | November 2021

In this section:

- > ["Issue with Vendor-Specific APIs and the Vendor Library 8.31 has Been Resolved" below](#)
- > ["Documentation Has Been Updated" below](#)

Issue with Vendor-Specific APIs and the Vendor Library 8.31 has Been Resolved

The issue below was discovered shortly after the release of Sentinel LDK 8.3.

After the vendor used the Master Wizard to download vendor-specific APIs and the vendor library version 8.31, updates to SL licenses were reapplied to the license each time the License Manager Service (for SL Admin-mode) or the protected application (for SL User-mode) was started. As a result, each time the License Manager Service or the protected application was restarted:

- > If the license update contained a number of executions, the execution counter in the license was reset to the value in the license update.
- > If the license update contained a value to write to the license memory, the memory content was restored to the value introduced in the license update, overwriting any subsequent changes to the license memory.

Resolution:

All issues have now been fully resolved. An updated version (8.32) of the vendor-specific APIs and the vendor library are available for download using the Master Wizard.

Important!

You should:

1. Reintroduce your Master or Developer key using the Master Wizard to generate the updated DLL and vendor library and install this service pack (the order is not important).
2. Protect your applications again using Envelope.

Be sure to use this updated version when you distribute your vendor library (haspvlib.dll) and your protected applications.

Documentation Has Been Updated

- > A new version of the [Sentinel LDK Software Protection and Licensing Guide](#) is now available. This version has been updated to include differences between Sentinel LDK-EMS hosted by Thales and Sentinel LDK-EMS installed on-premises. The guide also provides an appendix with an improved description of the differences between Sentinel EMS and Sentinel LDK-EMS.

- > A new version of the [Sentinel LDK Installation Guide](#) with minor improvements is provided, including a security checklist for installing Sentinel LDK-EMS on-premises.
-

Release: 8.3 | October 2021

In this section:

- > ["Support for High Availability for Cloud Licensing" below](#)
- > ["Release of Sentinel LDK with Sentinel EMS" on the next page](#)
- > ["Sentinel License Manager Service Supports Kubernetes Environment" on the next page](#)
- > ["Envelope Now Provides Class-Level Protection for Java Applications Under Linux" on the next page](#)
- > ["Sentinel LDK Envelope Now Supports AppOnChip for .NET" on the next page](#)
- > ["Support for Oracle Java 11 and Open JDK 16" on page 15](#)
- > ["Envelope Now Supports Intel CET" on page 15](#)
- > ["Improved Performance for Envelope for Linux" on page 15](#)
- > ["Customized RTE Installers Now Generated By Master Wizard" on page 15](#)
- > ["Dropped Support for Business Studio Server" on page 16](#)
- > ["Maximum Expiration Date for the Expiration Date License Type has been Extended" on page 16](#)
- > ["Sentinel LDK Envelope Protects AutoCAD Plugin" on page 16](#)
- > [""Aggressive Search" Setting Removed from Admin Control Center" on page 16](#)

Support for High Availability for Cloud Licensing

Sentinel LDK now supports configuring a vendor-hosted cloud license server for high availability.

Sentinel LDK License Managers in the vendor's data center can be configured to store licenses in a common external trusted license storage (a MySQL database cluster).

You can set up License Managers on two license server machines (active and passive). In the event the active License Manager stops responding, an application manager can handle failover from the active License Manager to the passive one. Only one License Manager will serve licenses at any point in time.

For information on setting up high availability for cloud licensing, see the [Sentinel LDK High Availability for Cloud Licensing Configuration Guide](#).

Release of Sentinel LDK with Sentinel EMS

Until now, Sentinel LDK has always been integrated and released with a dedicated version of Sentinel EMS (now referred to as *Sentinel LDK-EMS*). Sentinel LDK-EMS is available either for installation on the vendor's server (on-premises) or as a service (hosted on a Thales server).

Starting with this release, Sentinel LDK is available for integration with a new, enterprise-level version of Sentinel EMS, hosted on Thales servers. This improved version of Sentinel EMS provides an advanced user interface and REST API to manage resources. Sentinel EMS supports multiple methods of enforcement, including custom and third-party enforcement types.

For this edition of Sentinel LDK, only Sentinel LDK Vendor Suite is installed on the vendor's machine. The advanced version Sentinel EMS is hosted on Thales servers, where it is enhanced continuously with improvements and updates.

For vendors who are currently using Sentinel LDK and Sentinel LDK-EMS, the differences between Sentinel EMS and Sentinel LDK-EMS are summarized in the appendix "Comparison Between Sentinel EMS and Sentinel LDK-EMS" in the [Sentinel LDK Software Protection and Licensing Guide](#).

NOTE For this release of Sentinel LDK, the *Sentinel LDK Software Protection and Licensing Guide* has not yet been updated to reflect the differences between Sentinel EMS and Sentinel LDK-EMS. An updated version of the guide will be released soon.

Sentinel License Manager Service Supports Kubernetes Environment

A Docker image is now available for vendors to host cloud licensing. Hosting of cloud licenses in Kubernetes environments with the Docker image has been tested.

For more information, see the [Sentinel LDK High Availability for Cloud Licensing Configuration Guide](#).

Envelope Now Provides Class-Level Protection for Java Applications Under Linux

You can now use Sentinel LDK Envelope under Windows to provide class-level protection for Java applications that run on a 64-bit Linux Intel machine. (Class-level protection for Java applications that run on a Windows machine was introduced in Sentinel LDK 8.2.)

To provide class-level protection (or class-level *and* method level protection) for a Java application, protect the application using Envelope on a Windows machine. Envelope generates runtime files for both Windows and Linux machines to the specified output folder.

Copy the entire output folder to the target location (whether Windows or Linux).

Sentinel LDK Envelope Now Supports AppOnChip for .NET

Sentinel LDK Envelope now supports the use of AppOnChip to protect .NET applications. The applications must be protected using **Method level** or **Method level & Windows Shell** as the protection type.

For this release of Envelope, the support for AppOnChip for .NET does not include the integrated performance profiling mode that is provided when protecting a native Windows application with AppOnChip. Performance profiling must be performed using an external 3rd-party utility. Thales plans to include an integrated performance profiler in one of the coming releases.

The AppOnChip module for the Sentinel LDK Master license is not required for applications that are licensed using Sentinel HL Max, Time, NetTime, Net, and Drive keys. For applications that are licensed using Sentinel HL Basic keys or Sentinel HL Pro keys, an annual or perpetual AppOnChip module must be obtained from Thales.

For more information regarding AppOnChip protection for .NET applications, see the Envelope help system.

Support for Oracle Java 11 and Open JDK 16

Sentinel LDK Envelope under Windows now supports the protection of Oracle JDK 11 and Open JDK 16 applications for Windows, Linux, and Mac. This includes applications that use the Java Platform Module System (JPMS).

As part of the protection process, Envelope generates files that contain the command required to execute module-based applications on different platforms. You must modify these files before using them to execute the protected application.

For details, see the help system for Sentinel LDK Envelope.

Envelope Now Supports Intel CET

Sentinel LDK Envelope for Linux now support ELF binaries that are compiled with Intel Control-Flow Enforcement Technology enabled.

Improved Performance for Envelope for Linux

The performance of Envelope for Linux applications has been significantly improved. Envelope now require much less time to protect applications that have a large number of relocations.

Customized RTE Installers Now Generated By Master Wizard

The Master Wizard can now be used to generate customized Run-time Environment installers for Windows, Linux, and Mac. The Master Wizard downloads the latest Run-time Environment installer for each platform and inserts the current Vendor library into each installer. The installer for Windows is also configured to insert the URL for accessing Sentinel LDK-EMS. For more information, see the description of introducing Vendor keys in the [Sentinel LDK Installation Guide](#).

In the current version of Sentinel LDK-EMS, the same Run-time Environment installers can be downloaded from the Developer page (RTE Installer tab). However, this capability is planned to be discontinued in Sentinel LDK-EMS 8.4.

Dropped Support for Business Studio Server

Sentinel LDK 8.3 no longer supports Sentinel HASP Business Studio Server (BSS) or the Business Studio user interface.

As a result:

- > The Sentinel LDK installer no longer checks for the presence of the Business Studio Server.
- > The Business Studio Server option has been removed from the Master Wizard.
- > The Sentinel HASP Business Studio Server API (BSS API) is no longer supported.
- > The Sentinel HASP Business Studio Server API for Sentinel EMS is no longer supported.
- > HASPClient and SOAPWS have been removed from Sentinel LDK-EMS.
- > Legacy Business Studio Server folders and files are no longer installed with Sentinel LDK.
- > Legacy Activation API and samples are no longer installed with Sentinel LDK.
- > References to Business Studio Server have been removed from the Sentinel LDK 8.3 documentation.
- > The Business Studio Server migration tool is no longer provided with Sentinel LDK 8.3.

Vendors who want to migrate from Sentinel HASP Business Studio Server to Sentinel LDK can do so by installing and migrating to Sentinel LDK 8.2, and then upgrading to the current version of Sentinel LDK. Sentinel LDK 8.2 will continue to be available for download until further notice.

The guide for migrating from Sentinel HASP Business Studio Server to Sentinel LDK 8.2 will continue to be available from <https://docs.sentinel.thalesgroup.com/ldk/migration.htm>

Maximum Expiration Date for the Expiration Date License Type has been Extended

The maximum allowed expiration date for a license with the Expiration Date license type has been extended from 2038 to 2091.

Sentinel LDK Envelope Protects AutoCAD Plugin

Sentinel LDK Envelope can now protect an AutoCAD plugin (versions 2020, 2021, and 2022).

To protect an AutoCAD plugin, you must select the engine option **Use Windows V3 engine** on the **Advanced** tab in the Sentinel LDK Envelope Settings window. After you change the selected engine, stop and then restart Envelope before you continue working.

"Aggressive Search" Setting Removed from Admin Control Center

The setting **Aggressive Search for Remote Licenses** has been removed from Admin Control Center. The aggressive search functionality is now always enabled, as this provides benefit with no negative impact.

Patch: 7/2021: Sentinel LDK-EMS and Vendor Suite (KB0024494) | July 2021

NOTE In parallel with this patch, Sentinel LDK Run-time Environment 8.23 is being released. You must install this version of the Run-time Environment on all vendor and customer machines in order to support all new functionality provided by this patch.

In this section:

- > ["Detaching Seats With Concurrency" below](#)
- > ["Simplified SL Key Creation and Updates in Sentinel EMS for Vendor-Hosted Cloud Licenses Now Available Using Web Services" on the next page](#)
- > ["Support for Cloud Licensing in Admin API Has Been Enhanced" on the next page](#)
- > ["Support for Rosetta 2 Emulation in Envelope for Mac" on page 19](#)
- > ["Relative Paths Are Now Supported in the Envelope Project File" on page 19](#)
- > ["Envelope Can Now Protect a Launcher App for Android" on page 20](#)
- > ["Automatic Firmware Upgrade for Sentinel HL Keys" on page 20](#)
- > ["New Features, Enhancements, and Changes" on page 10](#)
- > ["V2CP Format Is Now Available for Sentinel SL Product Keys and Protection Key Updates " on page 20](#)

Detaching Seats With Concurrency

When detaching a license from a cloud license server machine, you have the option of specifying that the detached license should contain one or more network seats. These seats can be accessed concurrently on the machine that receives the detached license.

A detached license with concurrency can be used to:

- > Set up second-level license servers. These can be used to provide greater control over the distribution of network seats within an organization and to minimize the overhead of license administration. For more information, see the [Sentinel LDK Software Protection and Licensing Guide](#).
- > Control the number of local hardware resources used by an application. For example, a customer can limit a protected application to use 4 out of 8 CPUs. This requires a detached license with 4 seats, where access to each CPU is granted after the application logs in to the license. In this example, the fifth login will be denied, ensuring that only 4 CPUs are in use.

Sentinel LDK Run-time Environment 8.23 must be installed both on the license server machine and the machine to which seats are detached.

Simplified SL Key Creation and Updates in Sentinel EMS for Vendor-Hosted Cloud Licenses Now Available Using Web Services

You can now use Sentinel EMS Web Services to produce an entitlement and push an SL key or license update to your cloud license server in a single operation.

This simplifies the process and removes several steps that otherwise need to be performed manually. For a Product Key, this results in a new SL key on the license server. For a Protection Key update for a single key, this updates the selected key on the license server.

When you create an entitlement, you define the XML to include specific definitions. Then you insert the entID in the new pushActivation web service call.

For configuration details, see the cloud licensing options in the Administration Console and other locations, as described in the [Sentinel LDK–EMS Configuration Guide](#).

For usage details, see the sections on producing and pushing a license for a Sentinel SL key in the [Sentinel LDK–EMS Web Services Guide](#).

Support for Cloud Licensing in Admin API Has Been Enhanced

Sentinel Admin API has been enhanced to support cloud licensing as described in this section.

Retrieving Identity Status

When using Admin API to retrieve an individual client identity, the retrieved information now includes the identity status and the identity creation date. For example:

```
<identity>
    <identity_code>V3FODP3</identity_code>
    <identity_secret>oBWAAQCBEFDgoU5T2jAw3uo0ExljSZQ</identity_secret>
    <issued_to>123</issued_to>
    <allow_remote_login_access>1</allow_remote_login_access>
    <allow_remote_detach_access>0</allow_remote_detach_access>
    <allow_network_detach_access>0</allow_network_detach_access>
    <limit_to_key_id></limit_to_key_id>
    <creation_date>1621497648</creation_date>
    <disabled>0</disabled>
    <maximum_number_of_auto_registered_machines>1</maximum_number_of_auto_registere
    <registered_machines></registered_machines>
</identity>
```

Creating a Client Identity That Supports Detaching Seats With Concurrency

When using Admin API to create a client identity, you can include the following tag to allow the user to detach seats with concurrency from a cloud license server:

```
<element allow_network_detach_access="1"/>
```

Identifying Cloud Information When Retrieving SL Key Data

When using Admin API to retrieve all data regarding an SL key, the tag `<cloud-based>` indicates whether the SL key is not identity-based, local and identity-based, or remote and obtained using an identity.

Support for Rosetta 2 Emulation in Envelope for Mac

The following enhancements have been implemented for Sentinel LDK Envelope running with the Rosetta 2 emulator:

- > Envelope can be used on an Apple-Silicon Mac machine.
- > Envelope no longer supports 32-bit Intel binaries.

If a binary contains 32-bit Intel code (for example, as part of a universal binary), Envelope strips the 32-bit code from the resulting binary.

- > 64-bit Intel binaries protected by Envelope can be executed on an Apple-Silicon Mac machine using the Rosetta 2 emulation.

Code written for native Apple-Silicon cannot be protected. If the binary contains native code for Apple-Silicon (for example, as part of a universal binary), Envelope strips the native Apple-Silicon code from the resulting binary.

- > If a binary does not contain code for the 64-bit Intel architecture, Envelope reports an error.

This can occur when the binary contains only 32-bit Intel code or only Apple-Silicon code.

In these situations, earlier versions of Envelope would create a binary with no code.

- > Newer versions of Xcode/Clang may generate code with embedded data. At runtime, the contents of the code section are both executed and read from. When dump protection is enabled in Envelope, this situation could cause "bad access" exceptions (EXC_BAD_ACCESS). These exceptions would either:
 - cause the process to fail, OR
 - cause the exception alert to be displayed, and the user would have to abort the process.

Envelope now detects access to the code section from the code section itself and handles these cases gracefully.

For more information, see the description of Rosetta support in the help system for Sentinel LDK Envelope for Mac.

Relative Paths Are Now Supported in the Envelope Project File

(For Windows and Mac projects) When protecting an application using Sentinel LDK Envelope, you can now use relative paths in the project file in the INPUT_FILE, OUTPUT_FILE, and the BUNDLE fields.

For example:

```
<INPUT_FILE>../Deploy/Thales/Sample Desktop-devel.exe</INPUT_FILE>
```

Envelope Can Now Protect a Launcher App for Android

Sentinel LDK Envelope can now be used to protect a launcher app for Android. The protected APK can run whether it is started from the launcher or from the system (by pressing on the home button).

Automatic Firmware Upgrade for Sentinel HL Keys

When you upgrade a Sentinel HL key to the Driverless configuration, the Firmware on the key may be automatically upgraded. Until now, the automatic upgrade would occur only if the Firmware on the key version was version 4.23.

After installing this patch, when you upgrade a Sentinel HL key to the Driverless configuration, the Firmware is upgraded to version 4.60 if the current version is earlier than 4.60.

Automatic Firmware upgrade is not relevant for Sentinel HL Drive microSD keys.

Sentinel EMS UI Branding Changes

Footer logo customization was removed from the UI Branding section in the Administration Console.

V2CP Format Is Now Available for Sentinel SL Product Keys and Protection Key Updates

In Sentinel EMS, you can now set the default file format for licenses to V2CP (Vendor-to-Customer Package) instead of V2C (Vendor-to-Customer). This enables Sentinel EMS to deliver multiple updates to end customers in a single package. The License Manager subdivides V2CP files into their component V2C files and then applies each update in sequence.

End users can continue to activate licenses seamlessly, regardless of the file format type.

For details on managing the default file format setting, see the section on using the V2CP file format in [Sentinel LDK–EMS Configuration Guide](#).

Planned Changes in Upcoming Sentinel LDK Releases

The following changes are planned for upcoming Sentinel LDK releases. If you have any feedback or questions, feel free to contact Thales Support.

- > The default locking type for new Products will be changed from "HL" to "HL or SL (AdminMode or UserMode)." This change will not affect existing Products.
- > The **RTE Installer** tab on the Developer page of Sentinel LDK-EMS will be removed in an upcoming release. The same functionality is now provided by the Sentinel LDK Master Wizard.

Installation and Upgrades

- > ["Service Pack: 8.3.100 | December 2021" below](#)
- > ["Release: 8.3 | October 2021" below](#)

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

Service Pack: 8.3.100 | December 2021

For Windows

The Software Manager for Sentinel LDK will deliver this service pack to vendors who are currently using Sentinel LDK 8.3. The service pack is delivered to each Windows machine which is online and on which Sentinel Vendor Suite or Sentinel LDK-EMS is installed.

NOTE Service packs are cumulative. Installing this service pack automatically includes all earlier service packs for Sentinel LDK 8.3.

To install the service pack:

1. Click the **Install** button in the notification screen that is automatically displayed on the Windows machine where Sentinel LDK is installed. The updated product components and documentation are automatically installed.
2. If you do not see the notification screen, monitor the [Sentinel LDK download page](#) and see when updates are published. Open the update for Service Pack 8.3.100 and click the link provided for installing the service pack.

After installing the service pack, you must restart the machine or (for Sentinel LDK-EMS on-premises) restart the Sentinel LDK-EMS Service.

Release: 8.3 | October 2021

In this section:

- > ["Installing Linux and Mac Packages" on the next page](#)
- > ["Upgrading from an Earlier Version of Sentinel LDK" on the next page](#)

Installing Linux and Mac 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=1d6107451b05d050f12064606e4bcb0&sysparm_article=KB0021880
- > Mac: https://supportportal.thalesgroup.com/csm?id=kb_article_view&sys_kb_id=fc624f891b05d050f12064606e4bcb4e&sysparm_article=KB0021881

Upgrading from 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 8.3 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 8.3.

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 EMS.

- > The procedure for upgrading to Sentinel LDK 8.3 has been tested only for Sentinel LDK v.7.10 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 EMS, or both.)

Security Updates

- > ["Service Pack: 8.3.100 | December 2021" below](#)
- > ["Service Pack: 8.3.002 | December 2021" below](#)
- > ["Release: 8.3 | November 2021" below](#)

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>

Service Pack: 8.3.100 | December 2021

The Sentinel LDK 8.3.100 service pack upgrades the Apache Log4j module to version 2.17.0. This resolves several security vulnerabilities which are not applicable to any Sentinel LDK component.

Service Pack: 8.3.002 | December 2021

The vulnerability listed below affects Sentinel LDK components. This vulnerability is resolved in Sentinel LDK Service Pack 8.3.002 and later.

- > CVE-2021-44228 is a remote code execution vulnerability in Apache Log4j 2.12.0. This vulnerability is remotely exploitable without authentication. It can be exploited over a network without the use of a username and password. For more information, see <https://nvd.nist.gov/vuln/detail/CVE-2021-44228>.

The Apache Log4j module is used by Sentinel LDK in Sentinel LDK-EMS and in the Sentinel LDK Activation sample for Java. (As a client-side application, the Activation sample for Java is not affected by this vulnerability.) The Sentinel LDK 8.3.002 service pack upgrades the Apache Log4j module to version 2.15.0, which resolves the vulnerability.

Release: 8.3 | November 2021

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: 8.3

In this section:

- > ["Sentinel LDK Run-time Environment and Protected Applications for End Users" below](#)
- > ["Web Browsers for Sentinel Admin Control Center" on page 29](#)
- > ["Sentinel LDK-EMS Service" on page 30](#)
- > ["Sentinel LDK-EMS Database" on page 30](#)
- > ["Web Browsers for Sentinel LDK-EMS" on page 30](#)
- > ["Sentinel LDK Vendor Tools " on page 31](#)
- > ["Vendor Library Version Dependency" on page 32](#)
- > ["Supported Platforms for Code Samples" on page 34](#)
- > ["Tested Compilers for Code Samples" on page 35](#)
- > ["Current Firmware Version" on page 37](#)
- > ["Dropped Support" on page 38](#)

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

Sentinel LDK Run-Time Environment version 8.31 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.)
- > Upgrading Sentinel LDK Run-time Environment to version 8.21 or later migrates existing SL AdminMode licenses to a new secure storage. Once this occurs, you cannot downgrade the Run-time Environment to an earlier version. Downgrading the Run-time Environment 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.8.31 - version-restricted option:**

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

> **When using customized vendor API libraries v.8.31 - 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 Run-time Environment, and protected applications (with or without the Run-time Environment), 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"> > .NET Framework: v2.0 - v4.8 > .NET Standard: v2.1 > .NET Core: v2.1, v3.1 > .NET 5: v5.0 > .NET 6: v6.0 <p>Protected applications that use the supported .NET frameworks are supported on the following platforms:</p> <ul style="list-style-type: none"> > Windows (Win32 and x64) > Linux Intel (x86_64) > Linux ARMHF > Linux ARM64 <div> <p>NOTE 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"> > Windows 8.1 SP1 > Windows Server 2012 R2 > Windows Server 2016 > Windows Server 2019 > Windows Server 2022 > Windows 10 IoT Enterprise 2019 LTSC > Windows 10 21H2 > Windows 11 <p>Note: Windows Insider Preview builds are not supported.</p> <p>The latest service packs and security updates must be installed.</p>
Mac	<ul style="list-style-type: none"> > macOS 10.15 Catalina > macOS 11.0 Big Sur > macOS 12.0 Monterey <p>Note: 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>

System	Supported Versions	
Linux	Linux Intel (x86-64)	<ul style="list-style-type: none"> > OpenSUSE Leap 15.3 > Red Hat EL 8.4 > Ubuntu Server 20.04 > Ubuntu Desktop 20.04 > Debian 11 > CentOS 8.4 <p>The latest service packs and security updates must be installed.</p>
	Linux ARM 32-bit (armel and armhf)	<p>The following hardware/boards have been validated:</p> <ul style="list-style-type: none"> > BeagleBone Black > Raspberry Pi-4 > NI cRIO-9068
	Linux ARM 64-bit (arm64)	<p>The following hardware/board has been validated:</p> <ul style="list-style-type: none"> > Qualcomm DragonBoard 410c
	Wine	<p>Sentinel LDK Run-time Environment was tested on Linux platforms with Wine 6.0</p>

System	Supported Versions	
Android	Android ARM (32-bit and 64-bit)	Android 9.x, 10.x, 11 Note: For Android 10.x and 11, APKs compiled with API level 29 and later only support Java protection. If you require native code protection for Android 10.x and later, contact Thales support.
	Android Architecture	The following architectures are supported: <ul style="list-style-type: none"> > armv7 > armv7a > arm64
	Android ABI	Sentinel LDK Envelope supports Android applications designed for the following Android application binary interfaces: <ul style="list-style-type: none"> > armeabi > armeabi-v7a > arm64-v8a
	Note: Data file protection is not supported for Android 7.x and later.	
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"> > Parallels Desktop 17 for Mac > VMware Workstation 16 > VMware ESXi 6.7, 7.0 > Hyper-V Server 2019 (SL only) > Xen Project 4.15 > KVM (RHEL 8.4, Ubuntu 20.04 server, Debian 11) > Microsoft Azure > VirtualBox 6.1.x > Docker (Linux) containers, including under Kubernetes > LXC containers 	

Web Browsers for Sentinel Admin Control Center

- > Microsoft Edge - latest version
- > Mozilla Firefox - latest version

- > Google Chrome - latest version
- > Safari - latest version

Sentinel LDK-EMS Service

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"> > Windows Server 2016 > Windows Server 2019 > Windows Server 2022 > Windows 10 21H2 > Windows 11 <p>Note: Windows Insider Preview builds are not supported. 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"> > Microsoft SQL Server 2016 > Microsoft SQL Server 2017 Express > Microsoft SQL Server 2019 Express <p>Note: 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

Supported Browser	HTTPS	HTTP
Google Chrome	✓	✓
Mozilla Firefox	✓	✓
Microsoft Edge	✓	✓

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

Sentinel LDK Vendor Tools

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

System	Supported Versions
Windows	<p>x64 versions of the following:</p> <ul style="list-style-type: none"> > Windows Server 2016 > Windows Server 2019 > Windows Server 2022 > Windows 10 21H2 > Windows 11 <p>Note: Windows Insider Preview builds are not supported.</p> <p>The latest service packs and security updates must be installed.</p> <p>Display: Requires a minimum screen resolution of 1280 by 1024 pixels with 24-bit color quality.</p> <p>Note for Sentinel LDK Envelope: 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>
Mac	<ul style="list-style-type: none"> > macOS 11.5 Big Sur > macOS 12.0 Monterey <p>Applications built on the Cocoa framework are supported.</p> <p>Web Browsers for Sentinel Vendor Tools Help Systems:</p> <ul style="list-style-type: none"> > Mozilla Firefox > Mac Safari with configuration option Cross-Origin Restriction disabled. (This option can be accessed from the Developer menu.)

System	Supported Versions
Linux Intel	<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"> > OpenSUSE Leap 15.3 > Red Hat EL 8.4 > Ubuntu Server 20.04 (64-bit only) > Ubuntu Desktop 20.04 (64-bit only) > Debian 11 > CentOS 8.4 <p>The latest service packs and security updates must be installed.</p>
Linux ARM	<ul style="list-style-type: none"> > ARM 32-bit > ARM 64-bit <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>
Android	Android ARM platforms
Java	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 Run-time Environment 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	8.31 or later

NOTE A given version of the Vendor library is compatible with newer versions of the Run-time Environment . However, to support the enhancements in a given version of the Run-time Environment, 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	26.0

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 31](#).

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 2015, 2017, 2019 C++ Builder Developer Studio 2006
	Visual Basic .NET	Microsoft Visual Studio 2017, 2019
	C#	Microsoft Visual Studio 2017, 2019
	C++	Microsoft Visual Studio 2015, 2017, 2019 C++ Builder Developer Studio 2006 GCC
	Delphi	Delphi XE3
	Java	Oracle Java Developer Kit 1.8 Oracle Java Developer Kit 16 Open JDK 16
	C# - .NET Core	.NET Core 3.1
	C# - .NET	.NET 5 .NET 6: v6.0
		Note: An application linked with libhasp_windows_bcc_vendorld.lib always requires Sentinel LDK Run-time Environment on the machine.
Licensing API for macOS	Java	Oracle Java Developer Kit 1.8 Oracle Java Developer Kit 16 Open JDK 16
	C	Clang 9.0.0 or later Xcode 9.0 or later

API	Programming Language	Tested Compilers
Licensing API for Linux	Java	Oracle Java Developer Kit 1.8 Oracle Java Developer Kit 16 Open JDK 16
	C	GCC
	C++	GCC
	C# - .NET Core	.NET Core 3.1 .NET 5 .NET 6: v6.0
Licensing API for Android	Java	Oracle Java Developer Kit 1.8
License Generation API for Windows	C, C#, Visual Basic .NET	Microsoft Visual Studio 2017, 2019
	Java	Oracle Java Developer Kit 1.8 Oracle Java Developer Kit 16 Open JDK 16
License Generation API for Linux	C	GCC
Activation Sample Calling Web Services for Windows	C	Microsoft Visual Studio 2015, 2017, 2019 You may need to convert the provided workspace for the VS version used.
	Java	Oracle Java Developer Kit 1.8 Oracle Java Developer Kit 16 Open JDK 16
Activation Sample Calling Web Services for macOS	Java	Oracle Java Developer Kit 1.8 Oracle Java Developer Kit 16 Open JDK 16
Activation Sample Calling Web Services for Linux	Java	Oracle Java Developer Kit 1.8 Oracle Java Developer Kit 16 Open JDK 16

API	Programming Language	Tested Compilers
Runtime Environment Installer	C	Microsoft Visual Studio 2015, 2017, 2019
	MSI	InstallShield 12 InstallShield 2013 or later
Admin API for Windows	Java	Oracle Java Developer Kit 1.8 Oracle Java Developer Kit 16 Open JDK 16
	C, C#, C++, Visual Basic .NET	Microsoft Visual Studio 2017, 2019
Admin API for Linux	C	GCC
Admin API for macOS	C	Clang 9.0.0 or later Xcode 9.0 or later
Envelope .NET Runtime API	C#	Microsoft Visual Studio 2015, 2017, 2019
Java Envelope Configuration API	Java	Oracle Java Developer Kit 1.8 Oracle Java Developer Kit 16 Open JDK 16
Android Envelope	Java	Oracle Java Developer Kit 1.7, 1.8 Android Studio 3.6

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
8.2, 8.3	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

Sentinel LDK Version	Firmware Version on...		
	Sentinel HL (Driverless Configuration) Keys	Sentinel HL (HASP Configuration) Keys	(Legacy) Sentinel HASP Keys
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 Run-time Environment 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).

Dropped Support

This section lists platforms and compilers that were supported in the past, but have not been tested with (or are no longer supported by) Sentinel LDK 8.3. Thales will continue to accept queries for issues related to these platforms and compilers, and will attempt to provide information to resolve related issues.

Dropped Support for Internet Explorer

The Microsoft Internet Explorer Web browser is no longer supported for Sentinel LDK-EMS (Vendor Portal or Customer Portal) or for Sentinel Admin Control Center.

Dropped Support for Windows 7

Windows 7 is no longer supported for protected applications and for Vendor Tools.

Documentation

- > ["Online Documentation" below](#)
- > ["Locally Installed Documentation" below](#)

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), and the Run-time Environment.
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.

Document	Description
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"> > The Demo Kit tutorial is for vendors that want to evaluate Sentinel LDK. > The Starter Kit tutorial is for vendors that have already purchased Sentinel LDK. <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 Quick Start Guides	Provides 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 EMS user interface.)
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**

Help Systems - 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.

Online Help System	Description
Sentinel LDK 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.
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.

Online Help System	Description
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.

Help Systems – 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-EMS Web Services	Provides the developer with an interface for integrating Sentinel LDK-EMS functionality into the vendor's existing back-office systems. (Documentation is available from the index.html menu under %ProgramFiles(x86)%\Thales\Sentinel LDK-EMS\EMSServer\webapps\ems\Docs\
License Generation API Reference	Provides access to the power and flexibility of Sentinel protection keys without the need to employ the full Sentinel LDK-EMS system. 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

- > ["Service Pack: 8.3.100 | December 2021" below](#)
- > ["Service Pack: 8.3.002 | December 2021" on the next page](#)
- > ["Service Pack: 8.3.001 | November 2021" on page 45](#)
- > ["Release: 8.3 | October 2021" on page 45](#)
- > ["Patch: 7/2021: Sentinel LDK-EMS and Vendor Suite \(KB0024494\) | July 2021" on page 46](#)

The following issues that were reported by vendors are resolved in this release of Sentinel LDK.

Service Pack: 8.3.100 | December 2021

Reference	Resolved Issue	Components
SM-111408	The Envelope grace option would not work correctly when the network connection to the license was incomplete.	Sentinel LDK Envelope
SM-112703	Envelope would fail during protection when the vendor added a .NET Core application with dependencies that use a lower version than already existed in the project.	Sentinel LDK Envelope
SM-112663	<p>Given the following circumstances:</p> <ol style="list-style-type: none"> 1. Envelope is installed under Windows 10 21H1, Chinese version. 2. The developer defines custom messages in Envelope using Chinese characters. 3. The developer protects an application and saves the Envelope project. 4. The developer closes Envelope. 5. The developer starts Envelope. 6. The developer attempts to reopen the Envelope project saved earlier. <p>Envelope would display an error message and was not able to open the project.</p>	Sentinel LDK Envelope

Reference	Resolved Issue	Components
SM-111486	<p>Activating an entitlement by passing a C2V file for an existing protection would result in the error "Unable to retrieve protection key for Key ID <specifiedKey>".</p> <p>For an existing SL or HL key that was never checked in with Sentinel LDK-EMS, the activation or update now succeeds.</p>	Sentinel LDK-EMS
SM-113525	<p>Log4j has been upgraded to 2.17.0. This resolves the issue identified in security vulnerabilities CVE-2021-45046 and CVE-2021-45105. (Note that Sentinel LDK-EMS is not affected by these vulnerabilities.)</p>	Sentinel LDK-EMS

Service Pack: 8.3.002 | December 2021

The following issues that were reported are resolved in this release of Sentinel LDK.

Reference	Resolved Issue	Components
SM-113197	<p>CVE-2021-44228 is a remote code execution vulnerability in Apache Log4j 2.12.0. This vulnerability is remotely exploitable without authentication. It can be exploited over a network without the use of a username and password.</p> <p>The Apache Log4j module is used by Sentinel LDK in Sentinel LDK-EMS and in the Sentinel LDK Activation sample for Java. (As a client-side application, the Activation sample for Java is not affected by this vulnerability.) This service pack upgrades the Apache Log4j module to version 2.15.0, which resolves the vulnerability.</p> <p>Note that this is a critical vulnerability that must be patched using Sentinel LDK Service Pack 8.3.002 or later. For more information regarding this and any older security issues, see: https://cpl.thalesgroup.com/software-monetization/security-updates</p>	Sentinel LDK-EMS, Sentinel LDK samples

Service Pack: 8.3.001 | November 2021

The following issues that were reported by vendors are resolved in this release of Sentinel LDK.

Reference	Resolved Issue	Components
SM-111464	See "Issue with Vendor-Specific APIs and the Vendor Library 8.31 has Been Resolved" on page 12	Vendor-specific Licensing API DLLs
SM-111405	After copying an entitlement, it was not possible to edit the Feature details in the entitlement.	Sentinel LDK-EMS
SM-111803	For an application protected using: <ul style="list-style-type: none"> > Java Class-Level protection > the V3 Engine > SL UserMode locking type The application could not be accessed unless hasp_rt.exe is present. The error "No matching Feature found (E0050)" was displayed.	Sentinel LDK Envelope

Release: 8.3 | October 2021

The following issues that were reported by vendors were resolved in the Sentinel LDK 8.3 release.

Reference	Resolved Issue	Components
SM-84417	Documentation regarding extending a time-period-based license has been clarified. Documentation now states that a license with an Expiration Date license type can be extended. The expiration date for a license with the Time Period license type cannot be modified. For details, see the Sentinel LDK Software Protection and Licensing Guide .	Documentation
SM-103456	When available activations were increased by editing the Product key, Sentinel LDK-EMS also increased the value of Previous Activations by the same amount. As a result, Remaining Activations would remain 0.	LDK-EMS
SM-108144	Under certain circumstances, when more than 15 dynamic memory files were defined, it was not possible to add more dynamic memory files when creating product.	LDK-EMS

Reference	Resolved Issue	Components
SM-106179	When generating a license that contains dynamic memory files with maximum size 65,535, an error would be returned.	License Generation API
SM-105804	When deploying licenses on an Android device, an error message similar to the following was sometimes returned: "Could not generate the license because: The host machine fingerprint is invalid."	Licensing API

Patch: 7/2021: Sentinel LDK-EMS and Vendor Suite (KB0024494) | July 2021

The following issues that were reported by vendors were resolved in Sentinel LDK Patch 7/2021: EMS and Vendor Suite (KB0024494).

Reference	Resolved Issue	Components
SM-101263	Documentation for Java exception handling and class-level protection has been improved.	Documentation
SM-102028	The documentation for Sentinel Licensing API (for C and for Java) has been corrected as follows: The return status HASP_INV_ACTION (59) has been changed to to HASP_INV_DETACH_ACTION (59).	Documentation
SM-102724	The description of "Specifying an HTTPS Certificate – XML Scope" in Admin API documentation now indicates that the certificate referred to is a public certificate.	Documentation
SM-99967	In Sentinel EMS 8.2, copying an existing entitlement of type "Protection Key Updates" would generate the error: "An internal error occurred. Contact the system administrator for assistance."	Sentinel LDK-EMS
SM-101036	Fixed an issue that prevented the smooth upgrade of HL keys from HASP configuration to Driverless configuration.	Sentinel LDK-EMS
SM-101439	After upgrading Sentinel EMS from 8.0 to 8.2, it was not possible to use the EMS Web Services PUT request to create new entitlements.	Sentinel LDK-EMS

Reference	Resolved Issue	Components
SM-99684	In a virtual machine, certain protected applications would repeatedly start child processes at startup until the CPU was 100% occupied. The application would fail with: "Internal error 0x7103 occurred!"	Envelope
SM-100285	An application that was protected with a patched version of Envelope for Mac would fail at seemingly random intervals due to an EXC_BAD_ACCESS exception.	Envelope
SM-101818	Envelope would fail when a .NET DLL file was added to the project.	Envelope
SM-103047	A protected Unity 3D application would fail when loading the RenderDoc plugin.	Envelope

Known Issues and Workarounds

The known issues in Sentinel LDK 8.3 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](#).

Changes to This Section

The table that follows indicates changes to this section since the release of Sentinel LDK 8.3:

Release	Affected Component	Changes to the Component
8.3.100	Sentinel LDK-EMS	Added: SM-111256

Sentinel LDK Installation and Software Manager

Ref	Issue
EMSLDK-5860	<p>Installation of Sentinel LDK on a virtual machine may hang before completion of the installation process.</p> <p>Workaround: Interrupt and then restart the installation. If the problem occurs again, interrupt the installation. Enable 3D acceleration and increase the video memory of the virtual machine. Rerun the installation.</p>
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 EMS are converted to the English locale.</p> <p>Note: 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 EMS.</p> <p>Workaround: A solution for this issue is provided in the technical note available here.</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>Workaround: Monitor the Sentinel LDK download page and see when updates are published.</p> <p>You can also subscribe to this page (article KB0021845) to receive notifications: https://supportportal.gemalto.com/csm?id=kb_article_view&sys_kb_id=c2241c1d1bb41890f12064606e4bcb3e&sysparm_article=KB0021845</p>

Sentinel LDK-EMS

Ref	Issue
SM-111256 *NEW*	<p>After you upgrade to the latest version of Chrome or to Microsoft Edge version 95 or later, functionality related to protection keys is blocked if you access Sentinel LDK-EMS using HTTP mode. This applies to both the vendor portal and the customer portal.</p> <p>Workaround: Access Sentinel LDK-EMS using HTTPS mode.</p>
SM-12832	<p>When a user clicks the link provided in an email (that is sent by Sentinel 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>Workaround: In the etc/host file on the user's machine, add an entry that contains the hostname and IP address of the Sentinel 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 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>Workaround: If the Channel Partner user cannot create the required customer in Sentinel 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 EMS, the customer does not receive the entitlement certificate email if the customer contact locale is not specified.</p> <p>Workaround: 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 in this release.</p> <p>Workaround: To obtain a fingerprint, use Sentinel Admin Control Center.</p>

Ref	Issue
SM-94994	<p>Given the following circumstances:</p> <ul style="list-style-type: none"> > An RTE without legacy drivers is installed on a new machine. > An RTE with legacy drivers is installed afterward on the machine. <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>Workaround: 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"> > When the current state of an SL key is decoded (using SL License Generation API), the status of the container is shown as Secure Storage Id Mismatch in the Key ID column. > The key contains a Product that is rehostable or detachable OR the Product license type is Executions or Expiration Date. <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 Cloned and become unusable. In any other situation, the status Secure Storage Id Mismatch has no significance and can be ignored.</p>
SM-76660	<p>Given the following circumstances:</p> <ol style="list-style-type: none"> 1. Windows is installed on a Mac machine with Boot Camp. 2. An SL license is installed in the Windows system. <p>The Secure Storage ID may change and cause Feature ID 0 to be flagged as "cloned".</p> <p>Workaround: 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>Workaround: 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 libhasp_windows_bcc_vendorId.lib requires Sentinel LDK Run-time Environment on the machine.</p>

Ref	Issue
SM-10843	<p>The FLV player (flvplayer.swf) under %ProgramFiles(x86)%\Thales\Sentinel LDK\VendorTools\VendorSuite\samples\DataProtection\flv\local no longer plays local FLV files in Microsoft Internet Explorer with Adobe Flash Player version 23 and later. The player can be used:</p> <ul style="list-style-type: none"> > to play local FLV files in IE with Adobe Flash Player version 22 and earlier. > to play network FLV files in IE with all versions of Adobe Flash player. > to play local FLV files in all versions of desktop Adobe Flash player software.
SM-546	<p>Given the following circumstances:</p> <ul style="list-style-type: none"> > A protected application was created using Visual Studio 2015 > Control Flow Guard is explicitly enabled in Visual Studio. > The application links statically or dynamically with Sentinel Licensing API. > The External License Manager (hasp_rt.exe) is not used. > The application is run under Windows 10, or Windows 8.1 Update (KB3000850). (Not all Windows 8.1, only recent ones) <p>The protected application may fail.</p> <p>Workaround: 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"> > One machine has Run-time Environment version 7.51. > A second machine has a version of Run-time Environment that is earlier than v.7.51. > The customer performs rehost of a license repeatedly between the two machines. > An update is applied to the license on either of these machines. <p>A rehost operation may fail with the message HASP_REHOST_ALREADY_APPLIED.</p> <p>Workaround: 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>
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>Workaround: When you protect the application using Envelope, disable User debugger detection for the application. (Note that disabling debugger detection reduces the overall security of the application.)</p>

Ref	Issue
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. This issue has been reported to Razer.</p>
LDK-9044	<p>Given the following circumstances:</p> <p>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>Workaround: Switch the USB controller to USB 2.0 mode.</p>
LDK-8480	<p>With some new USB chipsets, it is possible that the hasp_update() 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>Workaround: 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>Workaround: Implement debugger detection mechanism in the application code, and use Envelope to protect the methods that call these functions.</p>
LDK-11191	<p>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.</p>
LDK-6695	<p>When a "Debugger Detected" error is generated, it is not possible for the protected application to determine which process is regarded as a debugger.</p>

Ref	Issue
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"> 1. Install SL AdminMode licenses on your local machine. 2. Run IObit Advanced SystemCare Ultimate 12 to clean and optimize your machine. 3. Restart your machine. <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>Workaround: 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 hasp_rt.exe is not present in the protected folder.</p> <p>Workaround: Ensure that hasp_rt.exe 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>Workaround: If this error occurs, protect the Java application using either of the following techniques:</p> <ul style="list-style-type: none"> > 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. > 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.

Ref	Issue
LDK-11418	<p>For a Java 7 or 8 application that is protected with Envelope, the end user must use the following command line syntax to launch the protected application:</p> <ul style="list-style-type: none"> > Java 7: Specify <code>java -UseSplitVerifier -jar ProtectedJar.jar</code> > Java 8 and later: Specify <code>java -noverify -jar ProtectedJar.jar</code> <p>If the appropriate flag is not specified, the application may throw java.verifyerror when launched.</p>
SM-10890	<p>Given the following circumstances:</p> <ul style="list-style-type: none"> > An Envelope project was created with Envelope version 7.3 or earlier. > The project contains settings for a Java application. > On the Protection Settings tabbed page for the Java application, you select the option to overwrite default protection settings. <p>The Allows grace period after failed license check check box should be modifiable. However, the check box cannot be changed.</p> <p>Workaround: On the Advanced 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 Allows grace period after failed license check check box modifiable.</p> <p>Note: 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 (Abort/Retry/Ignore) 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, CultureInfo.CurrentCulture and CultureInfo.CurrentUICulture are stored in a thread's ExecutionContext, which flows across asynchronous operations. As a result, changes to the CultureInfo.CurrentCulture and CultureInfo.CurrentUICulture 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>Workaround:</p> <p>Do the following:</p> <ol style="list-style-type: none"> 1. Use .NET Framework 4.5. 2. Use <pre>CultureInfo.DefaultThreadCurrentCulture = new CultureInfo(...)</pre> instead of <pre>Thread.CurrentThread.CurrentCulture = new CultureInfo(...).</pre>
SM-25875	<p>Given the following circumstances:</p> <ol style="list-style-type: none"> 1. A .NET application is protected with Envelope. 2. The protection type includes Windows Shell (with or without the method level). 3. The application attempts to get a module handle using the following method: <pre>IntPtr hMod = Marshal.GetHINSTANCE (Assembly.GetExecutingAssembly().GetModules()[0])</pre> <p>The handle returned may not be correct, and as a result, an error will be generated.</p> <p>Workaround: 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 ExitEventArgs such as "e.ApplicationExitCode = 1" when the application exits, the exit code cannot be retrieved by an external process.</p> <p>Workaround: Call "Environment.Exit(1)" to exit the process.</p>

Android

Ref	Issue
SM-38233	Data File Protection is not currently supported for Android 7 and later devices.
SM-96242	Envelope does not support command line executables on an ADB shell. This is because the license is installed in the application sandbox and permissions are elevated in androidmanifest file.

Sentinel LDK Envelope and Data Encryption for Linux

Ref	Issue
SM-28403	<p>Given the following circumstances:</p> <ul style="list-style-type: none"> > A Linux application is protected with Envelope, with protection against debugging. > The application calls the wait(&status) system call. This is equivalent to: <pre>waitpid(-1, &status, 0)</pre> <p>The application may hang.</p> <p>Workaround 1: Call waitpid for a specific child process pid (pid > 0).</p> <p>Workaround 2: Disable the anti-debugging feature in Envelope. Note: This workaround significantly reduces the security of the protected application. Thales recommends that you consult with Technical Support before choosing this workaround.</p>

Ref	Issue
SM-69080	<p>A protected application may not handle signals properly when:</p> <ul style="list-style-type: none"> > Background check is enabled, and > Signal handlers are registered by a thread created by the application. <p>Workaround: Do one of the following:</p> <ul style="list-style-type: none"> > Disable both background check and anti-debugging. (You can do this by specifying the following line command flags: <code>-b:0 --debug --memdump</code>) > (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"> • A function passed to <code>pthread_create</code> as <code>start_routine</code> • A function called from <code>start_routine</code>.

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

Ref	Issue
LDK-11655	<ul style="list-style-type: none"> > 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. > 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.
SM-57838	The command line Envelope tool (<code>envelope_darwin</code>) now only works if <code>Envelope.app</code> (UI bundle) is in the same folder. To use the command line tool, copy <code>Envelope.app</code> 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 in August 2019 that describes this issue and the option to disable these enhancements in favor of higher performance.</p>

Sentinel LDK Envelope for Android

Ref	Issue
SM-57733	<p>An Android application that is protected using both Envelope and Licensing API fails on an Android gaming console. Envelope embeds the RUS utility in the application. Using the Licensing API also adds the RUS utility. This results in two RUS utility calls in the protected application and duplicate symbol names.</p> <p>Workaround: Thales recommends that you not protect an Android application with both Envelope and Licensing API. If you want to use both tools to protect an application, do the following:</p> <ol style="list-style-type: none">1. Protect the application using Licensing API.2. Remove RUS from the APK file.3. Protect the application with Envelope.