

Sentinel[®]LDK

Sentinel LDK v.7.3
Release Notes



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Sentinel LDK v.7.3 - Release Notes

About This Document

This document contains information about the latest release of the Sentinel LDK product, including new features, changes to the product, documentation, and known issues and workarounds.



These release notes are subject to change. If you are reading the release notes that were installed with the product, SafeNet recommends that you check the release notes available from the Sentinel Community web site to see if any information was added or changed.

You can access the latest release notes from this location:

http://sentinelcustomer.safenet-inc.com/API_Documentation_Information.aspx

Product Overview

Sentinel LDK (*Sentinel License Development Kit*) provides software publishers with strong anti-piracy and intellectual property protection solutions, offering unmatched flexibility in assisting you to protect your revenue and increase sales. The Sentinel system prevents unauthorized use of software, protects software copyrights and intellectual property, and offers multiple licensing models.

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, provisional (trial/grace), 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 Master key and the Sentinel Developer 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 used in conjunction with Sentinel LDK and is attached to the Sentinel EMS Server. The 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.

Every Sentinel EMS Server computer must have a Sentinel Master key connected.

Important: Keep these keys safe and only allow trusted personnel to use them. The Master key is especially valuable because it allows the generation of 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.

Obtaining Support

You can contact us using any of the following options:

- **Business Contacts** - To find the nearest office or distributor, use the following URL:
<http://www.safenet-inc.com/contact-us/>
- **Technical Support** - To obtain assistance in using SafeNet products, feel free to contact our Technical Support team:
 - Phone: 800-545-6608 (US toll free), +1-410-931-7520 (International)
 - E-mail: support@safenet-inc.com
 - URL: <http://sentinelcustomer.safenet-inc.com/sentinelsupport/>
- **Downloads** - You can download installers and other updated components using this URL:
www.sentinelcustomer.safenet-inc.com/sentineldownloads/

Help Us to Improve Sentinel LDK

You can make a difference! We invite you to send us your ideas and opinions, and tell us what you like (and don't like) about Sentinel LDK. Your input can help shape future versions of the product.

Feedback on Sentinel LDK can be sent to: ldkfeedback@safenet-inc.com

What's New in Sentinel LDK v.7.3?

This section describes the main features and enhancements that are introduced in this release of Sentinel LDK.

Support for Android (ARM)

Application for Android operating systems on ARM-based devices can be protected and licensed using Sentinel LDK. Supported keys include both Sentinel HL (Driverless configuration) keys and SL (User-mode) keys. Supported integration options include both Licensing API and Sentinel LDK Envelope automatic protection.

For more information, see *Sentinel LDK for Android_Getting Started.html*, at:

`%WINDIR%\Program Files (x86)\SafeNet Sentinel\Sentinel LDK\Additional Platforms\Android\`

Support for Network Licenses on Standalone Sentinel HL Keys

You can now update standalone (non-Net) Sentinel HL (Driverless configuration) keys with network concurrency licenses. (This feature is not supported for HL Basic keys.) The pool of network seats on the Master key is used to enforce generation of network licenses, using logic similar to network seats updated in SL keys. (For more information, see the description of Network seats in Appendix A of the *Sentinel LDK Software Protection and Licensing Guide*.)

As a result, it is no longer necessary to maintain a separate inventory of Sentinel HL Net and NetTime keys. The firmware on existing Sentinel HL (Driverless configuration) keys is automatically upgraded to support network seats when you added concurrency to a license.



To issue licenses for Network seats when your customer has a standalone Sentinel HL key, you must purchase Network seats for the pool of Network seats on your Master key.

Performance Profiling for AppOnChip in Sentinel LDK Envelope

Sentinel LDK Envelope now provides a tool to help you optimize your use of AppOnChip protection for your applications. The new *Performance Profiling mode* helps you determine the impact on performance for the list of functions that you select to be protected using AppOnChip.

When you protect your application with this mode enabled, your protected application contains a facility that will accumulate information regarding the usage of the functions that were selected to be protected using AppOnChip. While operating in a test environment, the application accumulates information regarding each function. (The Performance Profiling mode is not intended for use in the version of your application that you distribute to your customers.) You can examine the accumulated information to determine which functions can be protected using AppOnChip without an adverse impact on performance.

After you fine-tune the list of functions to be selected for AppOnChip protection, you disable Performance Profiling and re-protect your application to generate the distribution version of the application. In this manner, you can obtain an optimum balance between level of protection and level of performance in the application.

Additional Enhancements to Sentinel LDK Envelope

Sentinel LDK Envelope now obfuscates and encrypts properties in .NET binaries.

.NET assembly search paths can now be modified for individual .NET binaries.

Integrated Translation for User Interfaces and End-User Documentation

Sentinel LDK now contains integrated translations for Sentinel EMS and Vendor Suite user interfaces and end-user documentation as part of the installed product.

- The user interfaces for Sentinel EMS Vendor Portal and Sentinel LDK Vendor Suite will be available in Simplified Chinese, German, and Japanese.
- The user interface and online help for Sentinel EMS Customer Portal will be available in Simplified Chinese, French, German, Italian, Japanese, Russian, and Spanish.
- The language packs (for the seven languages above) for Admin Control Center user interface and online help will be available for download immediately after the Run-time Environment is installed.

Translations for the remaining help systems and documentation will be made available on an accelerated schedule.

Enhancements to Logging Facility for Sentinel License Manager

The template for customizing entries for the Access log in Sentinel License Manager has been enhanced.

- A new log element (functionparams2) is available.
- Tags for special characters that could not be used in the template until now are provided.
- Existing elements (sessioncount, logincount, loginlimit) that did not provide reliable results have been corrected.
- The following events are now logged correctly: session timeout, orphaned session logout, manual disconnect, AdminAPI disconnect.

In addition, the template is now used for log entries generated by Embedded License Managers and External License Managers.

For information on the log template, see the Edit Log Parameters screen and related help screen in Admin Control Center. (Click the **Edit Log Parameters** button from the Configuration - Basic Settings screen.)

What's New in Sentinel LDK v.7.2?

This section describes the main features and enhancements that were introduced in the Sentinel LDK 7.2 patch and are incorporated in Sentinel LDK v.7.3.

Support for V-Clock in Sentinel EMS

In the past, the use of a virtual clock for time-based licenses was only available for applications protected with a Sentinel SL key. Sentinel LDK v.7.1 introduced support for the use of a virtual clock (V-Clock) for applications that are protected using Sentinel HL (Driverless configuration) keys. However, support was only available using Sentinel License Generation API or the ToolBox utility interactive simulation of this API.

Support for V-Clock is now provided in Sentinel EMS. The following functions are provided:

- A protected application may become disabled if the application detects that the system time has been changed to an earlier time date. If this occurs, you can use the Check In C2V screen from the Entitlements page to generate a V2C file that clears the Time Tamper state in the protected application.
- You can now use Sentinel EMS to create and manage time-based licenses for a Sentinel HL (Driverless configuration) keys that do not have a onboard real-time clock. The license is based on V-Clock. For information on the differences between V-Clock and the real-time clock in Sentinel HL Time keys and Sentinel HL NetTime keys, see the *Sentinel LDK Software Protection and Licensing Guide*.
- When you check in a C2V file in Sentinel EMS, you can now view the state of V-Clock on the user's machine.
- When you view Master Key information in Sentinel EMS, you can now see the state of the V-Clock license on the key.

Additional Enhancements to Sentinel EMS

The following functional enhancements have been implemented in Sentinel EMS:

- You now have the option of hiding non-excludable Features when you create an entitlement. This simplifies the display for Products that have a large number of such Features.
- In the Sentinel EMS Entitlements screen you can now search for activated entitlements based on Key ID.
- It is now possible in Sentinel EMS to select a clone protection scheme, including the FQDN protection scheme.
- You can now select multiple C2V files to be checked in as a single operation in Sentinel EMS.



For Internet Explorer, this operation is only supported in version 10 and later.

Enhancements to Sentinel Cloud Licensing

- In Sentinel EMS, a new field has been added for on-premise entitlement-level caching – **Max Registration Count**. The software vendor can use this field to specify the maximum number of machines that can be registered for a specific entitlement at any one time.
- In Sentinel EMS (both Vendor Portal and Customer Portal), a vendor or customer can now see the user name or machine name of users who are using an on-premise entitlement-level license. This enables the management of situations where additional licenses are required but are not available.

Enhanced Documentation for Sentinel Licensing API and Sentinel Admin API

The reference guides provided for Sentinel Licensing API and Sentinel Admin API now document the C, .NET and Java interfaces for these APIs.

What's Changed in This Release?

This section describes significant changes to existing functionality that have occurred in this release of Sentinel LDK.

AccessCode Parameter Removed From Envelope Command-line Documentation

The parameter `--accesscode` has been removed from the table of command-line options for Sentinel LDK Envelope in the *Sentinel LDK Software Protection and Licensing Guide*. This parameter is not supported for Sentinel LDK.

Changes to Installation Documentation for Sentinel EMS

The Sentinel LDK Installation Guide has been corrected to contain the following requirement for installing Sentinel EMS:

Sentinel EMS Service must be installed on a machine whose computer name does not exceed 15 characters.

Supported Platforms for Sentinel LDK - End Users and Vendors

Supported Platforms for End Users

Sentinel LDK Run-time Environment, Protected Applications

The following Sentinel LDK Run-time Environments are provided with this release of Sentinel LDK:

System	Run-time Environment Version
Windows	Version 6.65 Sentinel LDK Run-time Environment has been certified by Microsoft as “Compatible with Windows 8” (x86 and x64).
Mac	Version 7.3
Linux	Version 2.5.1



To support all the latest enhancements in Sentinel LDK 7.1, end users should be provided with the latest Run-time Environment. However, for all pre-existing functionality in Sentinel LDK, respective earlier versions of Sentinel Run-time Environment are supported.

The 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
Windows	<ul style="list-style-type: none"> ■ Windows (x86) XP SP3 ■ Windows (x64) XP SP2 ■ Windows Vista SP2 ■ Windows 7 SP1 ■ Windows 8.1 SP1 ■ Windows Server 2003 SP2 ■ Windows Server 2008 SP2 ■ Windows Server 2008 R2 SP1 ■ Windows Server 2012 R2 <p>The latest service packs and security updates must be installed.</p>
Windows Embedded	<ul style="list-style-type: none"> ■ (x86 only) Windows XP Embedded standard ■ (x86 only) Windows 7 SP1 Embedded standard
Mac	<ul style="list-style-type: none"> ■ Mac OS X 10.6.8 (32-bit and 64-bit) ■ Mac OS X 10.7.5 ■ Mac OS X 10.8.5 ■ Mac OS X 10.9.5 ■ Mac OS X 10.10

System	Supported Versions
Linux	<ul style="list-style-type: none"> ■ OpenSUSE 12.3 (x86 and x86_64) ■ Red Hat EL 5.10, 6.5, 7.0 (x86 and x86_64) ■ Ubuntu Server 12.04.3, 14.04 (x86 and x86_64) ■ Ubuntu Desktop 12.04.3 (x86 and x86_64) ■ Debian 6.0.10 (x86 and x86_64) ■ CentOS 6.5 (x86 and x86_64) <p>The latest service packs and security updates must be installed.</p>
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"> ■ Virtual Box 4.3.16 ■ Parallel Desktop 9 for Mac ■ VMware Player 6.0.3 ■ Hyper-V Server 2012 R2 (SL only) ■ VMware Workstation 10 ■ VMware ESXi 5.5 ■ XEN 4.3 ■ KVM (RHEL 7.0, Ubuntu 14.04 server, Debian 6.x)
Wine	Sentinel LDK Run-time Environment was tested on Linux platforms with Wine 1.7.28.
Linux ARM	<p>Sentinel LDK Embedded supports the Linux ARM platform. Visit the SafeNet website to learn more and to download a free trial:</p> <p>http://www.safenet-inc.com/software-monetization/sentinel-embedded-solutions/</p>
Android ARM	Android 4.1.1, 4.2.2, 4.3, 4.4.2

Web Browsers for Sentinel Admin Control Center


- Microsoft Internet Explorer (32-bit) versions 8, 9, 10
- Mozilla Firefox (32-bit) version 22
- Google Chrome (32-bit) version 23 or later
- (Mac) Safari 5.0, 6.0

Supported Platforms for Vendors

Sentinel EMS Service

System	Supported Versions
Windows	See supported Windows platforms for Sentinel LDK Run-time Environment (above).

Sentinel EMS Database


System	Supported Database Server Software
Windows	<ul style="list-style-type: none"> ■ Microsoft SQL Server 2005 x86/x64 ■ Microsoft, SQL Server 2005 Express Edition (must be enabled for remote connections) x86/x64 ■ Microsoft SQL Enterprise 2008 x86/x64 ■ Microsoft SQL Enterprise 2008 R2 x86/x64 <div>  <p>Microsoft SQL Server 2008 R2 Express Edition can be installed automatically by the Sentinel EMS Installation wizard. The installer for this version of Microsoft SQL Server is also available on the Sentinel LDK installation DVD.</p> </div>

Web Browsers for Sentinel EMS

- Microsoft Internet Explorer versions 8, 9, 10
- Mozilla Firefox (32-bit) version 22
- Google Chrome (32-bit) version 23 or later


You must use a 32-bit Web browser for any action in Sentinel EMS that accesses a protection key (such as burn, recycle, check in key, or online activation). You can perform all other actions in Sentinel EMS using a 32-bit or 64-bit Web browser.

Sentinel LDK Vendor Tools

System	Supported Versions
Windows	<ul style="list-style-type: none"> ■ See supported Windows platforms for Sentinel LDK Run-time Environment (above). <p>Requires screen resolution 1280 by 1024 pixels with 24-bit color quality</p> <div>  <p>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> </div>
Mac	<ul style="list-style-type: none"> ■ Mac OS X 10.6.8 (32-bit and 64-bit) ■ Mac OS X 10.7.5 ■ Mac OS X 10.8.5 ■ Mac OS X 10.9.5 ■ Mac OS X 10.10

System	Supported Versions
Linux	<ul style="list-style-type: none">■ OpenSUSE 12.3 (x86 and x86_64)■ Red Hat EL 5.10, 6.5, 7.0 (x86 and x86_64)■ Ubuntu Server 12.04.3, 14.04 (x86 and x86_64)■ Ubuntu Desktop 12.04.3 (x86 and x86_64)■ Debian 6.0.10 (x86 and x86_64)■ CentOS 6.5 (x86 and x86_64) <p>The latest service packs and security updates must be installed.</p>
Android	<p>Sentinel Envelope supports Android applications designed for the following versions: 4.1.1, 4.2.2, 4.3, 4.4.2</p> <p>Only the Android ARM platform is supported. (x86 and MIPS platforms are not supported.)</p>

Code Samples

Sample	Support Considerations	
Sentinel Licensing API Sample	Programming Language	Tested Compilers
	AutoCAD	AutoCAD 2014 AutoCAD 2010 AutoCAD 2009
	C	Visual Studio 2013 Visual Studio 2008 Visual Studio 2005 C++ Builder Developer Studio 2006
	C++	Visual Studio 2013 Visual Studio 2010 Visual Studio 2008 Visual Studio 2005 C++ Builder Developer Studio 2006 <div> To compile the 64-bit samples using VS 2008, ensure that the 64-bit compiler package is installed when you install VS.</div>
	C#	Visual Studio 2013 Visual Studio 2010 Visual Studio 2008, Visual Studio 2005
	Delphi	Delphi 2007 Developer Studio 2006
	Java	Java Developer Kit 1.8 Java Developer Kit 1.7 Java Developer Kit 1.6 Java Developer Kit 1.5
	Visual Basic .NET	Visual Studio 2013 Visual Studio 2010 Visual Studio 2008 Visual Studio 2005
	4D	4D v11 for Mac OS and Windows

Sample	Support Considerations	
Sentinel Licensing API – C Sample for Mac OS X	Operating Systems supported: <ul style="list-style-type: none"> ■ Mac OS X 10.6.8 ■ Mac OS X 10.7.5 ■ Mac OS X 10.8.5 ■ Mac OS X 10.9.5 ■ Mac OS X 10.10 	
Sentinel Licensing API – Sample for Android	Operating Systems supported: <ul style="list-style-type: none"> ■ Android 4.1.1 ■ Android 4.2.2 ■ Android 4.3 ■ Android 4.4.2 	
Sentinel LDK Run-time Environment Installer API Sample	Programming Language	Tested Compilers
	MSC	Visual Studio 2008, Visual Studio 2005, Visual Studio 2010, Visual Studio 2012
	MSI	Wise Installer 7, Wise Installer 6.2 InstallShield 12 InstallShield 2013 Spring Note: The provided solution can only be used with InstallShield 2013 Spring or later.
Sentinel Activation API Sample	Programming Language	Tested Compilers
	C	Visual Studio 2003, Visual Studio 2005, Visual Studio 2008, Visual Studio 2010, Visual Studio 2012 Provided workspace may need to be converted for the VS version used.
Sentinel LDK Run-time Environment Installer for Mac OS X	Operating Systems supported: <ul style="list-style-type: none"> ■ Mac OS X 10.6.8 (32-bit and 64-bit) ■ Mac OS X 10.7.5 ■ Mac OS X 10.8.5 ■ Mac OS X 10.9.5 ■ Mac OS X 10.10 	
Sentinel LDK Licensing API – 4D Sample for Mac OS X	Operating Systems supported: <ul style="list-style-type: none"> ■ Mac OS X 10.6.8 (32-bit and 64-bit) ■ Mac OS X 10.7.5 ■ Mac OS X 10.8.5 Version of 4D supported: <ul style="list-style-type: none"> ■ 4D v11 SQL 	

Sample	Support Considerations
Sentinel LDK Licensing API – 4D Sample for Windows	Version of 4D supported: <ul style="list-style-type: none">■ 4D v11 SQL
Sentinel Activation API	Operating Systems supported: <ul style="list-style-type: none">■ Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7 (32-bit and 64-bit)■ Windows 2000 (32-bit)
Sentinel Activation API for Mac	Operating Systems supported: <ul style="list-style-type: none">■ Mac OS X 10.6.8 (32-bit and 64-bit)■ Mac OS X 10.7.5■ Mac OS X 10.8.5
Sentinel Activation Sample for Java	Java version supported: JDK 1.6

Supported Versions for Windows CE

The Sentinel LDK Run-time Environment (version 5.95) and Envelope deliverables are supported for Windows CE versions 5.0 and 6.0.

Supported Platforms for Sentinel Cloud Licensing

Sentinel Cloud Run-time has been tested on the following platforms:

Run-time	Run-time Interface	Platforms Tested	Run-time Environment	Web Server
Cloud	Java	Windows <ul style="list-style-type: none"> ■ Windows 7 Embedded ■ Windows 7 ■ Windows Server 2008 ■ Windows XP Linux <ul style="list-style-type: none"> ■ Ubuntu 12.04 ■ CentOS 5.4 ■ Red Hat Enterprise Linux (RHEL) 6.3 ■ SLES 11 	JRE 6	Tomcat 7
	.NET	<ul style="list-style-type: none"> ■ Windows 7 Embedded ■ Windows 7 ■ Windows Server 2008 ■ Windows XP 	.NET Framework 2.0 and 3.5	IIS 6.0 and 7.0
	C	Windows (32-bit and 64-bit) <ul style="list-style-type: none"> ■ Windows 7 Embedded ■ Windows 7 ■ Windows Server 2008 ■ Windows XP Linux (32-bit and 64-bit) <ul style="list-style-type: none"> ■ Ubuntu 12.04 ■ CentOS 5.4 ■ Red Hat Enterprise Linux (RHEL) 6.3 ■ SLES 11 	-	-

Run-time	Run-time Interface	Platforms Tested	Run-time Environment	Web Server
On-premise	Java	Windows <ul style="list-style-type: none"> ■ Windows 7 Embedded ■ Windows 7 ■ Windows Server 2008 ■ Windows XP Linux <ul style="list-style-type: none"> ■ Red Hat Enterprise Linux (RHEL) 6.3 ■ SLES 11 	JRE 6	Tomcat 7
	.NET	<ul style="list-style-type: none"> ■ Windows 7 Embedded ■ Windows 7 ■ Windows Server 2008 ■ Windows XP 	.NET Framework 2.0 and 3.5	IIS 6.0 and 7.0
	C (32-bit and 64-bit)	Windows (32-bit and 64-bit) <ul style="list-style-type: none"> ■ Windows 7 Embedded ■ Windows 7 ■ Windows Server 2008 ■ Windows XP Linux (32-bit and 64-bit) <ul style="list-style-type: none"> ■ Red Hat Enterprise Linux (RHEL) 6.3 ■ SLES 11 	-	-

Web Browsers Supported for Sentinel Cloud Licensing

Sentinel Cloud EMS GUI is best viewed with the following Web browsers:

Browser	Version
Internet Explorer	9.x, 11.x
Mozilla FireFox	29.x
Google Chrome	35.0

Sentinel LDK Documentation

The documents and online help systems described below are provided in this release of Sentinel LDK.

Documents

Sentinel LDK documents (PDF files) can be found:

- on the (physical) Sentinel LDK Installation DVD, under: **\Windows\Installed\Docs**
- where Sentinel LDK is installed, under:
%WINDIR%\Program Files (x86)\SafeNet Sentinel\Sentinel LDK\Docs
- where Sentinel EMS is installed, under:
**%WINDIR%\Program Files (x86)\SafeNet
Sentinel\Sentinel EMS\EMSServer\webapps\ems\Docs**

(For Win32, under: **%WINDIR%\Program Files\...**)

Document	Description
Sentinel LDK Installation Guide	Details the prerequisites and procedures for installing Sentinel LDK Vendor Tools, Sentinel EMS Server, 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.
Sentinel LDK Software Protection and Licensing Tutorials	<p>Guide you through the basic procedures of Sentinel LDK to familiarize you with the applications and their functionality.</p> <ul style="list-style-type: none"> • The Demo Kit tutorial is for vendors who wish to evaluate Sentinel LDK. • The Starter Kit tutorial is for vendors who have just purchased Sentinel LDK. <p>Two versions of each tutorial are provided – one for working with Sentinel 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.

Document	Description
Sentinel HL Drive Flash Partitioning Utility – User Guide	Describes how to use the Sentinel HL Drive partitioning utility and API to load your Sentinel LDK-protected applications and data onto the CD-ROM partition of a Sentinel HL Drive, and ship it to your customers. Your customers can save files to Sentinel HL Drive or load additional software on it, and thus utilize the convenience of USB flash drive functionality.
Migration Guide: Sentinel HASP to Sentinel LDK	Describes how to migrate from Sentinel HASP to Sentinel LDK. Describes how to migrate your Business Studio Server database to a Sentinel EMS database. This guide also describes the Business Studio Server API for Sentinel EMS.
Additional Guides for Migrating to Sentinel LDK	These guides describe how to migrate to Sentinel LDK from: <ul style="list-style-type: none"> - Hardlock - SmartKey - Sentinel SuperPro - HASP HL - HASP4 - Sentinel Hardware Keys
Integrating Sentinel 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 EMS Server.
Sentinel EMS Configuration Guide	Provides information on setting up and configuring Sentinel EMS to satisfy the requirements of your organization.
Sentinel EMS User Guide	Provides the Sentinel 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 EMS Web Services Guide	Provides the developer with an interface for integrating Sentinel EMS functionality into the vendor's existing back-office systems.

Sentinel Cloud Licensing Documents

The documentation in the table that follows describes how to work with Sentinel Cloud Licensing. This documentation is provided with the Sentinel Cloud Licensing installer.

Document	Description
Sentinel Cloud Run-time Guide	Sentinel Cloud Run-time API reference (Java, .NET, and C)
Sentinel Cloud - Quick Start Guide	Document to help you quickly start with Sentinel Cloud
Sentinel Cloud Services Installation Guide	Describes how to install Sentinel Cloud Services
Sentinel Cloud Connect Web Services Guide	Reference for using the Sentinel Cloud Connect Web services
Sentinel Cloud Run-time Java Demo Application ReadMe	Explains how to use the Sentinel Cloud Services Demo Application
Sentinel Cloud Run-time .NET Reference Application ReadMe	Sample for using the Cloud Runtime APIs written in .NET
Sentinel Cloud Run-time C Reference Application ReadMe	Sample for using the Cloud Runtime APIs written in C
Sentinel Cloud Connect Web Services Python Sample ReadMe	Sample for integrating Sentinel Cloud Connect Web services in Python application

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 on the Sentinel LDK Installation DVD, under: **\Linux**

MacOS

The *Getting Started Guide for MacOS* can be found in the Mac download or on the Sentinel LDK Installation DVD, under: **\MacOS**

Android

The *Getting Started Guide for Android* can be found:

- on the Sentinel LDK Installation DVD, under: **\Android**
- where Sentinel LDK is installed, under:
%WINDIR%\Program Files (x86)\SafeNet Sentinel\Sentinel LDK\Additional Platforms\Android

(For Win32, under: **%WINDIR%\Program Files\...**)

Help Systems - Sentinel LDK and Sentinel 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 EMS	Provides the Sentinel 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.

Online Help Systems - Sentinel LDK APIs

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

- on the Sentinel LDK Installation DVD, under: **\Windows\Installed\API**
- where Sentinel LDK is installed, under:
%WINDIR%\Program Files (x86)\SafeNet Sentinel\Sentinel LDK\API

(For Win32, under: **%WINDIR%\Program Files\...**)

Sentinel LDK API	Description
Activation API Reference	Together with various Licensing API functions, this API assists the developer in communicating with the Sentinel EMS Server.

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 COM API	Provides the developer with access to Sentinel HASP Run-time Environment functionality, through an interface written for the Microsoft Component Object Model (COM).
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 EMS Web Services	Provides the developer with an interface for integrating Sentinel EMS functionality into the vendor's existing back-office systems. (Documentation is available from the index.html menu under ...\Program Files (x86)\SafeNet Sentinel\Sentinel EMS\EMSServer\webapps\ems\Docs\ (For Win32, under \Program Files\...)
License Generation API Reference	Provides access to the power and flexibility of Sentinel protection keys without the need to employ the full Sentinel 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.

Software and Documentation Updates

SafeNet recommends that you frequently visit the [Sentinel downloads page](#) to ensure that you have the most recent versions of Sentinel LDK software and documentation, and for documentation in other languages.

Known Issues and Workarounds

The known issues in Sentinel LDK v.7.3 that are likely to have the most significant impact on users are listed below, according to component.

Sentinel LDK Installation

Ref	Issue
133240	<p>When Installing Sentinel Vendor Suite under Windows 2003, the installation may fail with an internal error or with error messages similar to the following:</p> <p style="padding-left: 40px;">Error 1718. File <i>fileName</i> was rejected by digital signature policy. Installation ended prematurely because of an error.</p> <p>This problem is caused by a known issue in Windows 2003. To resolve this problem, go the following Microsoft URL: http://support.microsoft.com/kb/925336</p>
171812	<p>In a machine with an Nvidia graphics card and AMD64 processor, installation of Sentinel EMS may stop responding after the installer displays the "installed successfully" screen. At this point, installation of Sentinel EMS has succeeded, but the Finish button is not displayed, and the installer cannot continue with the installation of Sentinel Vendor Suite (if you requested to install it).</p> <p>Workaround: Perform the installation using a remote desktop. Alternatively, cancel the installation wizard when the "installed successfully" screen is displayed, and then run the installation wizard a second time and select only the Vendor Suite for installation.</p>
172141	<p>On a machine with a localized operating system, installation of Sentinel EMS in a directory whose name contains localized characters fails with "Error 1324".</p> <p>Workaround: Install Sentinel EMS in a directory whose name does not contain localized characters.</p>
180267 180270	<p>When Sentinel LDK is installed on a machine that connects to the Internet using a proxy, the update download may fail or may show incorrectly that updates are not available. This issue should resolve itself when the Software Manager application is automatically updated. Until this occurs, SafeNet recommends that you periodically check Sentinel Customer Community website for information on new available downloads.</p>
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>

Sentinel EMS

Ref	Issue
EMSLDK-87 143768	<p>If Sentinel EMS is configured to work with a remote database that uses a password that contains non-English letters, Sentinel EMS Service fails to log in successfully to the remote database.</p> <p>Workaround: Change the password for the database so that it does not contain non-English letters.</p>
167309	<p>In the RUS Branding screen, the list field for selecting the font does not work correctly in the Google Chrome browser.</p> <p>Workaround: Use a different browser to edit the RUS Branding screen.</p>
182566	<p>If you are viewing previous activations for “Protection Key Update Entitlement” and attempt to download V2C files for all the activations in that entitlement, the download will not succeed if more than 1,000 V2C files must be downloaded.</p>
EMSLDK-4265	<p>On MAC machines with default settings, the Run-time Environment (RTE) Installer generated from Sentinel EMS does not work.</p> <p>Workaround:</p> <ul style="list-style-type: none"> ■ The end user needs to reduce the overall security of the MAC machine before using this RTE installer. <p>OR</p> <ul style="list-style-type: none"> ■ Sign the RTE installer (see ‘Signing the RTE Installer’ in the <i>Sentinel EMS User’s Guide</i>).
EMSLDK-5168	<p>When packaging a Run-time Environment installer with a V2C file for one or more Products in Sentinel EMS, you cannot include a Product that only has the locking type SL-UserMode. An attempt to install such a package will fail with the message “V2C unknown HASP API 49 Error”. Sentinel EMS does not currently prevent you from creating such a package.</p> <p>Workaround: When generating the RTE installer in Sentinel EMS, use the locking type SL-AdminMode for Products.</p>

Sentinel Cloud Licensing

Ref	Issue
EMSLDK-5193	<p>For on-premise deployment: If a user accesses an application that uses Entitlement Level caching, that user cannot access any additional applications that also use Entitlement Level caching from the same computer.</p>
EMSLDK-5934	<p>Entitlement-level Caching: Sentinel Cloud Licensing is unable to consume a license if the end user machine contains multiple hard disk drives. Error 1021 is generated.</p>

Installer

Ref	Issue
	When you upgrade to a higher version of Cloud Services, the installer uninstalls the SDK from the custom location and does the installation at the default location. SafeNet recommends that you uninstall the earlier versions before you install a latest version of Cloud Services.

Billing

Ref	Issue
	The billing data provided in the customer login is the partially processed data. This data is used to produce the final bill, and should not be considered as the final bill.
	Any exception encountered while retrieving billing details are logged in the Billing.xml file, but not displayed in Sentinel Cloud EMS GUI.

Sentinel LDK Master Wizard

Ref	Issue
139726	<p>Under some versions of OpenSUSE Linux, when the Master Wizard is run as root, the application hangs with the following output:</p> <pre>qctest@linux-g09j:~/Desktop/Linux/VendorTools/VendorSuite> su Password: linux-g09j:/home/qctest/Desktop/Linux/VendorTools/VendorSuite # ./masterhasp ** Glib-GIO:ERROR:gdbusconnection.c:2279:initable_init: assertion failed: (connection->initialization_error == NULL) Aborted</pre> <p>This appears to be the result of a known issue in OpenSUSE.</p> <p>Workaround:</p> <p>Enter the following commands to run the Master Wizard:</p> <pre>su - ./masterhasp</pre> <p>(Note the syntax: "su -")</p>
172697	<p>When the Master Wizard is run from the console under Debian 6.0, the following warning is displayed:</p> <pre>Qt: Session management error: None of the authentication protocols specified are supported</pre> <p>This message can be ignored. The Master Wizard performs its function correctly.</p>

Sentinel LDK Runtime Environment, License Manager and Customer Tools

Ref	Issue
12506	Sentinel LDK communicates via TCP and UDP on port 1947. This port is IANA-registered exclusively for this purpose. At the end user site, the firewall must be configured so that communication via this port is not blocked.
140898	Under the Linux operating system, Sentinel License Manager does not support the IPV6 network protocol.
180256	When a computer names contains UTF-16 characters, Admin Control Center displays the short name for the computer (similar to Windows Explorer). Similarly, the sntl_admin_get function in Admin API returns the short name.
182646	<p>After Windows 7 is upgraded to Windows 8, the user may not be able to use existing SL licenses or to install new SL licenses.</p> <p>Workaround:</p> <p>After you upgrade from Windows 7 to Windows 8, reinstall the Run-time Environment</p>
LDK-2471	<p>Sentinel Licensing API: On a computer with the Nvidia chip set GeForce 7025/nForce 630a, and where the CPU is AMD Athlon 64 X2, the hasp_read and hasp_encrypt functions may fail with error 39, HASP_BROKEN_SESSION. This problem only exists with Sentinel HL keys with Firmware version 3.25.</p> <p>Workaround 1: On the computer described above, when error 39 is returned, call the hasp_read or hasp_encrypt function again. It is not necessary to call hasp_login again.</p> <p>Workaround 2: Use Sentinel HL keys with Firmware version 4.2x.</p>
LDK-4782	<p><writeconfig> in Sentinel Admin API automatically writes values for many parameters to the INI file that are not relevant for the Integrated License Manager. When the Integrated License Manager processes the INI file, it rejects these parameters and creates an error log for each irrelevant entry.</p> <p>Workaround: These errors are normal and should be ignored.</p>

Ref	Issue
LDK-4867	<p>Given the following circumstances:</p> <ul style="list-style-type: none"> ◦ A Sentinel HL (Driverless configuration) key is connected to one of the following: <ul style="list-style-type: none"> ■ a USB host controller in USB 3.0 compatibility mode on a VMware Workstation 9.0.2 or 10.0.1 platform ■ a USB host controller in "xHCI" mode on a VMware ESXI 5.1 platform ◦ A protected application is started on the VMware platform. <p>The protected application does not execute, and an error message is displayed.</p> <ul style="list-style-type: none"> ◦ If the Run-time Environment is present on the VMware platform, the error message "Sentinel Session is broken (H0039)" is displayed. ◦ If the Run-time Environment is not present on the VMware platform, the error message "Feature not found" is displayed. <p>In either case, the HID key is shown as "USB Input Device" in the Device Manager (under "Human Interface Devices").</p> <p>Workaround:</p> <ul style="list-style-type: none"> ◦ For VMware Workstation 9.0.2 or 10.0.1: Switch the USB controller to USB 2.0 compatibility mode. ◦ For VMware ESXI 5.1: Switch the USB controller to "EHCI+UHCI" mode.
LDK-5798	<p>A warning message is displayed when you attempt to open the haspds.msm merge module in Wise 7.0 SP2 or Wise Installation Studio 7.0. The message states: This merge module does not meet the Windows Installer SDK merge module naming convention. Do you want to fix it automatically? (Yes or No)</p> <p>Workaround: Do one of the following:</p> <ul style="list-style-type: none"> ◦ Dismiss the warning by selecting the "No" option. ◦ Avoid the warning. Build the haspds.msm file using the haspds.wsm project that is available on the Installation DVD.
LDK-8480	<p>With some new USB chipsets, it is possible that the API <code>hasp_update()</code> call, used to update the firmware of Sentinel HL keys to version 3.25, will generate the <code>HASP_BROKEN_SESSION</code> 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 <code>hasp_update()</code>.</p>
LDK-2827	<p>(Linux) Under OpenSUSE, it may be necessary to manually install the <code>libpng</code> library in order to run the <code>linux_bounce</code> sample application.</p>

Ref	Issue
10055	<p>(Linux) When launching the C binary sample: If an error message is displayed, stating that shared libraries are not found, copy the HASP .so library to <code>usr/lib</code> or <code>usr/local/lib</code>. Alternatively, force the search for the library in the current directory when you run the sample, by using the command: <code>LD_LIBRARY_PATH=. ./hasp_demo</code></p> <p>Note: When using the command above, ensure that you insert a space between <code>LD_LIBRARY_PATH=.</code> and <code>./hasp_demo</code></p>
10109	<p>(Linux) When running the Master wizard in Red Hat EL 5.1: If the wizard displays an error message stating that libssl.so.0.9.8 was not found, create the following symbolic links:</p> <pre>ln /usr/lib/libssl.so /usr/lib/libssl.0.9.8 ln /usr/lib/libcrypto.so /usr/lib/libcrypto.0.9.8</pre>
10309	<p>(Linux) When using Sentinel LDK Envelope, ELF executables that contain a GNU_RELRO segment cannot be protected unless the executable is linked using the linker switch: <code>-z norelro</code></p>
11138	<p>(Linux) If the application to be protected uses <code>wprintf</code> for its output, the Envelope switch <code>--wchar (console_configuration=2)</code> must be used.</p>
142107	<p>(Linux) The Linux activation demo fails to run under Red Hat EL 5.4 x86_64.</p>

Sentinel LDK ToolBox

Ref	Issue
183073	<p>In the current release, Sentinel LDK ToolBox does not support the new <code>sntl_admin_context_new_scope()</code> function in the Admin API. However, the function appears in the Help system for Sentinel LDK ToolBox, and the function is supported by the Admin API.</p>

Sentinel LDK Envelope for Windows Platforms

General

Ref	Issue
92503	<p>If you move an Envelope project file from its original location to a different location, then the next time you open the project, Envelope displays an incorrect path for the output (protected) file.</p> <p>You can use either of these workarounds to move an Envelope project file to a new location:</p> <ul style="list-style-type: none"> ■ Use the Save As option from the Envelope File menu to save the project to the new location. (You can afterwards delete the original project file.). ■ Copy the directory structure containing both the project file and the related unprotected binary to the new location.

Ref	Issue
93877	(For Windows Vista and Windows 7) In the event that the error “Serious internal engine error (65535)” is displayed, make sure that you have write permission for the specified output directories and that the output directory is not protected by Windows UAC.
178432	<p>If the installation path for the Vendor Suite contains GB 18030 or Unicode characters, then the help file for Envelope, ToolBox, or Data Encryption utility does not open.</p> <p>This is Microsoft limitation. See the related article link: http://support.microsoft.com/kb/2606439</p> <p>Workaround: Manually open the help files after copying them from \Windows\Installed\VendorTools\VendorSuite\translations\6.4 on the DVD to a location on your local hard drive whose path name does not contain GB 18030 or Unicode characters.</p> <p><i>OR</i></p> <p>Install the Vendor Suite in a location whose path name does not contain GB 18030 or Unicode characters.</p>
182883	<p>If the logon user name for Envelope contains multibyte UTF-8 characters: When the user attempts to protect an application, the error “Undefined engine error (1)” is generated.</p> <p>Workaround: Do not use multibytes UTF-8 characters in the logon user name.</p> <p><i>OR</i></p> <p>In the Envelope Settings screen (Advanced tab), select the option to use Legacy Envelope engines.</p>
183967	<p>If an Envelope project name contains Unicode characters, then while launching Data Encryption from Envelope, the message "Could not open project" is displayed.</p> <p>Workaround: Do not include Unicode characters in the Envelope project name.</p> <p><i>OR</i></p> <p>Do not launch Data Encryption from within Envelope. Instead, start the Data Encryption utility (datahasp.exe). In the Data Encryption utility, click New project and provide the path of the Envelope project.</p>
185624	<p>In the Protection Settings for a Windows DLL, you cannot select the option User debugger detection.</p> <p>Workaround:</p> <ol style="list-style-type: none"> Select the option Overwrite default protection settings. Save the project and close Envelope. Restart Envelope. <p>You can now select the option User debugger detection.</p>

Java

Ref	Issue
11043	To protect JAR files using Sentinel LDK Envelope on Windows 2008 Server 64-bit computers, you must have the Win32 Java Run-time Environment (JRE) installed, even if you already have the Windows x64 JRE installed. Alternatively, ensure that the path to the Windows x64 JRE is included in the system path variables.
91963 (CASE 20)	<p>When a (vendor) developer attempts to create a shared object file that links to the Sentinel LDK shared object file libhasp_linux_batchCode.so, error messages similar to the following are displayed:</p> <pre> user@host:~/Desktop/API/Runtime/Java/source> ./build_linux_x64.sh Building HASP Java native library /usr/lib64/gcc/x86_64-suse-linux/4.3/../../../../x86_64-suse-linux/bin/ld: HASPJava.o: relocation R_X86_64_32 against `a local symbol' can not be used when making a shared object; recompile with -fPIC HASPJava.o: could not read symbols: Bad value collect2: ld returned 1 exit status </pre> <p>This problem occurs because the Sentinel Licensing (Run-time) API was not compiled to allow position-independent code generation (using the -fPIC flag).</p> <p>Workaround: You can obtain a version of the Sentinel Licensing API that was compiled with the -fPIC flag. For more information, contact Technical Support.</p>
93464	<p>Envelope v.5.10 and Envelope v.6.0 both provide extensive enhancements for protection of Java programs. As a result, projects for Java programs that were created before the release of this version of Envelope must be updated using the Sentinel LDK Envelope GUI. (Make sure that you update existing Envelope projects as described below before you attempt to use the current Envelope command-line utility with these projects.)</p> <p>To update an existing Envelope project (v.5.10 or earlier) to v.6.0 or later:</p> <ol style="list-style-type: none"> 1. Open the project in the Sentinel LDK Envelope v.6.0 GUI and click the application in the Project pane. Envelope fills in the class/method list. By default, some methods are preselected. This is equivalent to the results expected when adding a new project. 2. Review the selection of methods that were selected by default for protection. For more information, see “Optimizing Protection Settings for Performance and Security” in the Sentinel LDK Envelope online help. 3. Save the project.

Ref	Issue
94373	One of the optional behaviors in Envelope for protecting JEE applications is to halt the thread if the protected JEE application fails to detect a Sentinel protection key. This behavior is controlled by the advanced protection property <code>SUSPEND_THREADS</code> . However, the protection mechanism also halts all threads from all third-party application running in the same Java Virtual Machine instance (JVM) on the Tomcat server. (Note that each Tomcat server only starts a single JVM instance.) Therefore, when protecting JEE applications in Envelope, the default value for the <code>SUSPEND_THREADS</code> property is currently set to False (although the documentation states that it is set to True). If you attempt to set the value for this property to True , a warning message is displayed.
95269	The current release of Sentinel LDK Envelope does not support protection of Java paint methods, but it allows you to select them in the user interface. As a result, the protected program may cause a deadlock when it executes a protected paint method at runtime with no Sentinel key connected. To prevent this issue from occurring, you can deselect all paint methods. Note that paint methods do not usually contain application logic; therefore, deselecting them typically has no impact on security. As an alternative, you can select console output for messages by enabling stderr output instead of windows in the Advanced settings panel.
95491	<p>The current release of Sentinel LDK Envelope does not support protecting instance methods that call instance methods of the super class. Note that such methods are not detected by the Envelope and may be selected for protection by default. As a result, the protected application may trigger an <i>IllegalAccessError</i> exception during runtime.</p> <p>To prevent such exceptions, you can disable the protection of methods that contain calls to super class methods. Note that this reduces the level of protection.</p> <p>As an alternative, you can create a new class with a method that contains only the code leading up to (but not including) the call to the super instance method. You can protect this method instead of protecting the original method that contains the super instance method call.</p>
104163 (99869)	<p>A protected JAR/WAR archive that contains Unicode characters in its path or name will not operate under the native operating system. Although there is small chance that the archive will run (depending on the type of Unicode characters that are used), in most cases the application will not run and will display an error message. (This problem does not occur on systems that use MUI for localization.)</p> <p>Workaround: Install the Tomcat server in a path whose name contains only ASCII characters. Ensure that the name of the WAR archive contains only ASCII characters.</p>
104179	<p>The number of instances of a protected application that can run in a network environment may exceed the number of concurrent instances allowed by the license terms.</p> <p>Workaround: In the protected application, call a Run-time API function to open a permanent session to the Feature for which concurrency is restricted.</p>
179821	The Java Envelope does not support unicode.

Ref	Issue
180073	When a protected Java application is executed, the execution counter is decremented once, and then decremented for each protected method. Therefore protected Java applications should not be licensed based on execution count.
180733	The current release of Envelope supports only one protected war file in a given JBOSS 7 Server.
181673	Legacy Envelope engines for Windows x86 and Windows x64 programs are not supported under Windows 8 (32-bit and 64-bit) or Windows 2012 Server.
LDK-2490	<p>If the protected application contains code similar to this:</p> <pre>List<User> function_name (Parameter) { ... }</pre> <p>After this method is protected with Java Envelope, Envelope will return a List variable that is not typecasted to the <User> type. This <User> type is another defined class in the same scope.</p>
LDK-2891	<p>The protected Java application directory should be set in the environment variable, or the classpath entry should be in the Manifest file of the original application.</p> <p>In fact, Java Envelope adds an entry for run-time required JAR files in the protected application Manifest file under the classpath tag. If the classpath tag did not exist in the original Manifest file, then these entry will not work. At run time, the protected Java application will search for run-time JAR files from the classpath environment variable. If the application does not find these run-time JAR files, it will throw “Class Not Exception” for these files.</p> <p>Workaround 1: Add the current directory path to the classpath environment variable.</p> <p>Workaround 2: Modify the Manifest file to add the classpath tag.</p>
None	If protected JEE applications from multiple vendors are deployed on a single Tomcat server, the applications will not operate.
LDK-4683	<p>Sentinel LDK Envelope for Java cannot be used to protect applications that use the ModelMap data type.</p> <p>Workaround: To protect such applications, change ModelMap data types to a less strict data type.</p>

.NET

Ref	Issue
89873	If a base class is selected to be obfuscated and a derived class is not set to be obfuscated, the derived class will not find the base class. Therefore, if you select a base class for obfuscation, you must also select any derived class for obfuscation.

Sentinel LDK Envelope for Linux

Ref	Issue
LDK-4545	Applications that do not link any object dynamically cannot be protected.
LDK-6686	<p>The 64-bit "Bounce" sample program provided with Envelope does not work under Ubuntu 14.04 x86_64.</p> <p>Workaround: Use the 32-bit Bounce sample program or use Ubuntu 12.04.</p>

Sentinel LDK Envelope and Data Encryption for Mac OS X

Ref	Issue
11416	In certain instances, a protected Mach-O binary may have a different owner and permissions than it had prior to protection with Envelope. This is caused because Envelope designates the current user (that is, the user applying the protection) as the owner of the newly-created files.
132292	<p>Applications that use deprecated functions or classes (for example: NSQuickDrawView used by SDL, deprecated since OS X 10.4.x) might fail to run under Mac OS X 10.7.x after protection. This is the case even if the unprotected application executes correctly or if the protected application executes correctly under versions of Mac OS X prior to 10.7.x</p> <p>Workaround: Do not use SDL or any other Library/Framework that relies on deprecated System Frameworks.</p>
151020	<p>Given the following situation:</p> <ul style="list-style-type: none"> ■ An application is protected using Envelope with the Data Encryption facility enabled. ■ The protected application is operated under OS X 10.6.x or later with Versions feature enabled. <p>Encrypted files may become corrupted, resulting in data loss.</p> <p>Workaround: Handle data encryption/decryption manually without using the Data Encryption facility. You can use the <code>hasp_encrypt</code> and <code>hasp_decrypt</code> functions in the Sentinel Licensing API. For examples that use these functions, see the Runtime samples provided for Mac. Check the SafeNet website periodically for an updated version of the Envelope that resolves this issue.</p>

Ref	Issue
175314	<p>When protecting a Mac application, the following error message may be displayed: "Insufficient GAP for protection. Processing aborted"</p> <p>If this occurs, do one of the following:</p> <p>For Realbasic applications:</p> <p>Use a newer version of Realbasic. In laboratory tests at SafeNet, the problem did not occur when working with Real Studio 2012 Release 2.</p> <p>For other applications:</p> <p>Pass suitable values to the -headerpad argument to ld, the static linker. For more details, refer to the documentation for ld, gcc or clang. You can add the option in the Other Linker Flags in the Linking section of the build settings in Xcode.</p> <p>The headerpad option requires a size value in hexadecimal notation. For example, for one VM page, specify 0x4000. For more information, see the manpages ("man ld") description of headerpad size.</p> <p>To add the headerpad argument in the project settings in Xcode, enter the following string under Other Linker Flags, for both Debug and Release builds:</p> <p>-Wl,-headerpad,size</p> <p>Notes:</p> <ul style="list-style-type: none"> ■ In the string above, "Wl" is capital "W", lowercase "l". ■ Some projects do not use ld directly, but link the application via gcc or clang.
177241	<p>Applications that implement the symbols malloc, calloc, free, realloc, dlopen, dlerror, dlsym or dlclose cannot be protected. However, application can use any of these standard library functions.</p>
183388	<p>An application may fail to run if it has been built with LDK static libraries using the Dead Code Stripping linking option.</p> <p>Workaround: Do not use the Dead Code Stripping option in linking.</p>

Ref	Issue
LDK-7921	<p>The Sentinel LDK Data Encryption facility that is used in protected applications contains the following limitation: The facility encrypts/decrypts the data in place (at the original memory location). If the data is located in a memory region that does not have write permissions, an EXC_BAD_ACCESS error occurs. For example, the following code causes the error:</p> <pre> int main(int argc, char *argv[]) { char string_constant[] = "Hello World"; // Other activities, including opening of the file. result = write(file,string_constant,strlen(string_constant)); // Failure occurs while writing to a file that matches a Data Encryption file mask. //... } </pre> <p>Workaround: Copy the data to a storage location that has write permissions: For example:</p> <pre> int main(int argc, char *argv[]) { char string_constant[] = "Hello World"; char *copy_of_string_constant; // Other activities, including opening of the file. // The line that follows allocates a memory block in heap and copies the string to the destination. copy_of_string_constant = strdup(string_constant); // Verification and error handling for strdup() should be added here. result = write(file,copy_of_string_constant,strlen(string_constant)); free(copy_of_string_constant); // The failure does not occur because the memory block has write permissions. //... } </pre>

Sentinel LDK Envelope and Support for ARC in Mac OS X

ARC ("Automatic Reference Counting") is completely implemented by Apple in OS X as combination of:

- Special features of the clang compiler (ARC adds the code that had to be added by developers in the past).
- Certain extensions to the Objective-C Runtime libraries.

Sentinel LDK Envelope for Mac sees an application using ARC as a standard application (since the missing code is created at compile time) interacting with an evolved backend (which is part of the operating system). As a result, Envelope supports applications that use ARC.

However, limitations exist as described in the explanation that follows.

Apple introduced ARC with OS X 10.7, so ARC is enabled in Xcode for OS X 10.7 (includes 10.7 SDK and clang supporting ARC). ARC is only available for 64-bit Mac applications. Apple also introduced a workaround to run ARC application under OS X 10.6.

The workaround is called *ARCLite*, as not all features are supported. ARCLite is a small static library that is linked to the developer application by default, at the time that the application is built with Xcode. This library basically extends the Objective-C runtime available under OS X 10.6 with the ARC feature.

In order to "inject" the ARC feature into pre-ARC Objective-C runtime, the ARCLite library (*libarclite*) contains code that is executed during initialization of the process *before* the original entry point is executed. Envelope cannot intercept this call. As the entry point has not been called, the code of libarclite (together with the application code) is still encrypted. As a result, the protected application fails.

Apple now uses ARCLite to extend older Objective-C runtime versions with new language features (new literals, indexed accessors in arrays and dictionaries) introduced as "modern Objective-C" in 10.8, even though these are unrelated to ARC.

Some applications that are linked with ARCLite fail after protection with Envelope, while others operate successfully. SafeNet is currently investigating this issue in order to obtain a clearer understanding of the problem.

Workaround

If an application that is linked with ARC fails after protection (especially when the application is started under the targeted OS X version, and not under the version under which the application was built), you can circumvent the issue by telling Xcode not to link ARCLite to the application. (As a result, certain new features possibly cannot be used on older platforms.)

To prevent Xcode from linking ARCLite, you must change the project/target settings. In the Xcode project settings pane, set the parameter **Implicitly Link Objective-C Runtime** to "NO".

This workaround generally prevents the protected application from failing. However, the workaround may cause issues when the application (with or without protection) is launched under older versions of OS X.