



Sentinel LDK

Product Overview

Contents

03 Sentinel Software Monetization Solutions

04 Software Monetization with Sentinel LDK

05 The Sentinel Design Philosophy

06 Protect-Once-Deliver-Many-Evolve-Often™ enables:

06 How it Works

- 06 I. Protect Once – Integrate Licensing APIs
- 07 II. Deliver Many – Product Bundling and Delivery
- 08 III. Evolve Often
- 08 The Industry's Most Secure Copy Protection Solution
- 08 Strong Intellectual Property Protection
- 08 Improved End-User Experience

09 License Lifecycle Management

- 09 Centralized License Management
- 09 License Fulfillment & Delivery Automation
- 09 Business Intelligence
- 09 Software Developer Tools
- 10 Sentinel Cloud Licensing

11 The Thales Sentinel family comprises the following products:

- 11 Sentinel LDK
- 11 Sentinel EMS
- 11 Sentinel RMS
- 11 Software Licensing Professional Services

Sentinel Software Monetization Solutions

Sentinel is the most trusted brand in the software industry for secure, flexible, and future-proof software monetization solutions. The robust portfolio of products and services address each and every aspect of the software monetization lifecycle – from copy and intellectual property (IP) protection to product catalog management and ongoing end-user experience improvement. Thales is the first and only vendor to offer a complete portfolio of software licensing and entitlement management solutions to enable monetization of any type of software – installed, embedded, or cloud services – using any combination of business models via any sales channel to any end-user device.



Software Monetization with Sentinel LDK

Sentinel License Development Kit (LDK) is a comprehensive software monetization solution that pairs the award-winning security, licensing flexibility, and ease-of-use features of the Sentinel license enforcement solutions with the licensing operations management features of Sentinel Entitlement Management System (EMS) in one out-of-the-box solution.

Software Copy and Ip Protection

Maximize profitability by preventing unauthorized use and distribution of software, and by securing competitive IP

Flexible Software Catalog Management

Easily introduce innovative, flexible, and customercentric offerings into new markets

Consolidate and Automate Licensing Operations

Eliminate manual operational tasks associated with licensing to save time, minimize errors, and reduce costs

End-User License Management Tools

Increase end-user transparency and reduce licensing support costs while improving customer satisfaction

Detailed Tracking and Reporting

Gain insight into how, when, and by whom your software is being activated and used to improve product and business decision-making capabilities

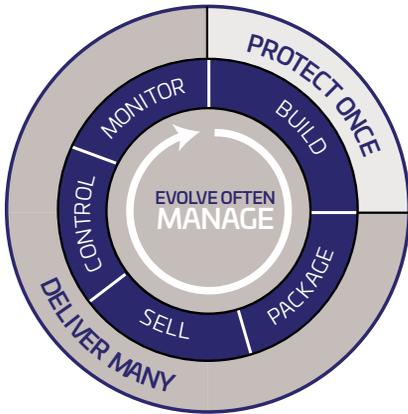
Embedded Platform Support

Leverage the security and license portability of a hardware key, available in a reduced footprint variant specifically for hardware device manufacturers and software vendors selling into the embedded market



The Sentinel Design Philosophy

Fully aligned with the entire software monetization lifecycle, the unique Protect Once, Deliver Many, Evolve Often™ design philosophy of all Sentinel licensing products and services enables software publishers to fully separate their business and engineering processes. Developers integrate, product managers define, fulfillment delivers, and business leaders evolve the offering pricing and packaging strategies on an ongoing basis—all in distinct independent processes. This design feature enables software publishers to maximize product versatility and business agility while ensuring optimum use of employee time and core competencies, resulting in faster time to market and a quicker response to changing market needs.



The Software Monetization Lifecycle

1 Protect Once

Integrate Sentinel software licensing APIs into your application.



2 Deliver Many

Distribute, track, and manage entitlements using any combination of hardware, software, or cloud service enforcement and delivery methods.

3 Evolve Often

Track entitlement activations, renewals, upgrades, returns, and product usage to improve sales strategy and drive roadmap prioritization.



Protect-Once-Deliver-Many-Evolve-Often™ enables:

Business Agility

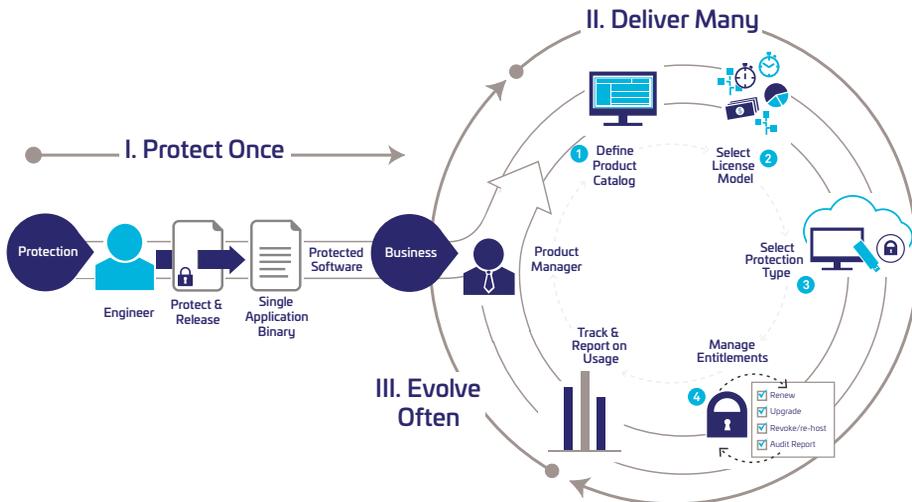
Updated offerings are immediately available, decreasing time to market

Reduced Cost

Bundling features sold as part of an offering has no impact or distraction on the R&D processes. The R&D team integrates once and requires no implementation changes based on which features are sold

Business Intelligence

Activation history and feature usage information helps drive business decisions



How it Works

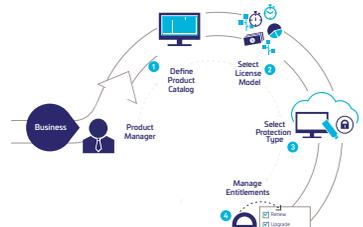
I. Protect Once – Integrate Licensing APIs

The first step to software monetization is to identify which features of your application you want to license and sell separately, and integrate Sentinel LDK's Licensing API (or Envelope) accordingly. At this stage, you don't need to decide how features will be bundled as part of your offering. Once this step is completed, your software is ready to be sold using any of the various license models.



II. Deliver Many – Product Bundling and Delivery

Once the protected application is ready for release, your product management team has full flexibility in packaging the offering using various business and licensing models. Once sold, operations fulfill the required product based on the pre-defined distribution model and protection mechanism. There are several steps to delivering the right offering to every customer the right way every time:



1 Defining your offering Sentinel LDK allows for a quick and simple process in which software vendors can create and manage product catalogs, feature bundles, and licensing models on the fly. Having the required building blocks to easily create and maintain a sophisticated product offering without engineering involvement allows software vendors to easily and efficiently bundle their applications in a variety of ways to reach a range of unique market segments.



2 Choosing a license model Sentinel LDK provides the industry's widest and most sophisticated licensing models, which can be mixed and matched to meet a variety of market demands.

Sentinel Licensing Models

- Perpetual
- Feature Based
- Super-Distribution
- Trialware
- Subscription
- Pay-Per-Use
- Rental
- Floating/Network
- Commuter
- Volume License
- Capacity
- User
- Grace

3 Choosing a protection type Whether you ship physical boxes, embed your software into hightech devices, offer electronic delivery, or deliver your product as a service in the cloud, our various protection types have you covered. Featuring Thales's innovative and unique Cross-Locking™ technology, Sentinel LDK enables you to leverage any combination of hardware or software or cloud license delivery and locking options. Each protection type has its own unique benefits:



Hardware-based Licensing with Sentinel HL – Sentinel HL family of keys offers the highest level of copy and IP protection available. Offered in a wide variety of types and form factors, the Sentinel HL keys protect software by allowing access and execution of the application only when the key is physically connected. Sentinel HL keys are ideal for software publishers whose primary concern is security. They are ideal for scenarios where the protected application runs on a device that supports USB or ExpressCard, with additional options for embedding directly on circuit boards.



Software-based Licensing with Sentinel SL – Sentinel SL keys are virtual softwarebased keys built on the Sentinel HL protection technology and residing in the secure storage of your end-user's machine. The use of Sentinel SL eliminates the need to ship a physical product, enabling end users to quickly install and start using the application. Sentinel SL is ideal for software publishers whose end users require more flexible license delivery methods.



Cloud-based Licensing with Sentinel Cloud Licensing is a software protection type that is provided as a solution in the cloud. Integration of Sentinel Cloud Licensing into your software products allows for user-centric licensing, letting users access your software from any of their devices and Virtual Machines. This protection type is ideal for software publishers who want to enjoy benefits like full license mobility with the ability to consume licenses from anywhere, a VM solution that's secure and fully agnostic, and full ISV control of their end-users licenses.



Managing end-user entitlements Sentinel EMS, the industry-proven entitlement management engine of Sentinel LDK, enables software publishers and their customers to track the delivery and activation status of end-user entitlements and then easily manage the terms of each entitlement. You can configure the system to notify you or your end-user when trials are coming to an end, when subscriptions are up for renewal, or when a service is not being used. But knowledge is only half the battle, Sentinel LDK also enables remote entitlement activation, renewal, re-host to another machine, upgrade, and much more to be performed by either the software publisher or the end-user. The Sentinel EMS component of Sentinel LDK easily integrates into the industry's most common ERP, CRM, Billing, and Marketing Automation systems through a standard Web Services interface. This allows you to easily manage the entire lifecycle of your customer contracts in a fully automated way. This in turn allows for increased efficiency whilst reducing operational costs and providing a scalable licensing platform.

III. Evolve Often

Adapting Product Catalog With Sentinel LDK, software publishers have the ability to track when, how, and by whom their software is being consumed. This information can be generated into reports and used to make decisions on how to alter product roadmap, marketing, and packaging strategies. With Sentinel LDK, engineering and business processes are separated. Product management and marketing teams are free to change license models and packaging decisions without ever having to re-engineer a line of code. Knowledge is power, and Sentinel LDK arms software publishers with the information they need to make intelligent decisions, and the ability to easily evolve their business on the fly.



The Industry's Most Secure Copy Protection Solution

For software publishers delivering physical or electronic copies of their application to end users, the ability to prevent unauthorized use or redistribution is critical for maximizing profitability.

To ensure that software vendors get paid for every software copy being used, Sentinel LDK employs the industry standard 128-bit AES encryption algorithm. This creates a robust link between the software application and the Sentinel Protection Key— preventing software piracy and ensuring that use of the application is authorized.

- **Copy protection with Sentinel HL hardware-based licensing.** Sentinel LDK's patented LicenseOnChip™ technology is embedded in the Sentinel HL keys to ensure that licenses are hardware secured and tamper resistant. At runtime, the protected application utilizes the Sentinel HL key to decrypt critical data used by its algorithms and required for proper execution. This creates a highly secure bond between the protected application and the Sentinel HL key.
- **Copy protection with Sentinel SL software-based licensing.** Sentinel SL is a virtual protection key that is installed and stored on the end-user device. Sentinel SL creates a hardware fingerprint from the end user's hardware to bind the license to the specific device and prevent piracy.
- **Copy protection with Sentinel Cloud Licensing.** Sentinel Cloud Licensing is an extension of a cloud accessible SL, which is hosted on and consumed from the cloud. Sentinel CL uses an identity string to bind the license to the consumer of the license and utilizes an encrypted communication channel, where licenses are stored on a server, virtually inaccessible for tampering by attackers.

Sentinel LDK also leverages White-Box cryptography, ensuring that the communication channel between the protected application and the protection key cannot be replayed, and, therefore, omitted from the overall protection scheme. White-Box cryptography takes into consideration that the potential attacker can trace the protected application and the runtime in search of the encryption key. With this assumption as part of the design, the AES algorithms and encryption keys are replaced with special vendor-specific libraries that implement the same encryption but embed the encryption key as part of the algorithm in a way that ensures it is never present in the memory and cannot be extracted by an attacker.

Strong Intellectual Property Protection

In an increasingly competitive software industry, the ability to protect your software code from prying eyes, manipulation, and theft is critical to ongoing financial success and competitive positioning. Beyond the encryption that binds the protected application and the Sentinel protection key, Sentinel LDK offers additional means of wrapping and protecting your application executables and DLLs in a virtually impenetrable shield known as the Sentinel Envelope. Sentinel Envelope provides robust Intellectual Property (IP) protection against reverse engineering through the use of file encryption, code obfuscation, user and system-level anti-debugging. For each file it protects, the Envelope integrates many layers of protection. Randomness is an important part of the process, ensuring that the protected files are never identical after the protection is applied. This technology makes it extremely complex and timeconsuming for hackers to remove the protection. Sentinel Envelope also offers an even greater level of protection with AppOnChip. The ApponChip feature facilitates a virtually inseparable binding of the Sentinel hardware key to the application. This fully automated process presents software vendors with a list of functions from their application that contain code blocks that are compatible with AppOnChip. The protected blocks can then be loaded and executed, encrypted and signed, on the hardware key itself. This additional security measure makes it the most secure software licensing implementation available in the market.

Improved End-User Experience

Focusing on an improved end-user experience and transparency, Sentinel LDK introduces the following features:

- **3-Step License Re-host** – Enables end users to transfer an SL key from one computer to another in three simple steps, without the need to contact the ISV and without Internet connectivity.
- **User mode runtime** – Standalone Sentinel SL keys can be distributed without run-time, removing the need for administrative privileges.
- **Driverless** – Sentinel HL Driverless keys do not require device drivers to run the protected application.
- **Admin API** – Enables ISVs to integrate the end user's administrative license operations into their application, fully customizing the experience.
- **Certificate-based Licensing** – Allows storing a human-readable V2C (license file) stored on the end user's machine for simplified troubleshooting.

License Lifecycle Management

Centralized License Management

Sentinel EMS, a component of Sentinel LDK, is a centralized web-based platform that provides software publishers access to all license and entitlement management functions, a simple interface to their back office systems, and a variety of data collection and reporting tools. Using the Role-based Vendor Portal, software publishers can easily create, implement, and manage their product catalog, customers, and end-user entitlements. As the standard entitlement management engine for all Sentinel products and designed for easy integration with any commercial or homegrown license systems, Sentinel EMS provides you with an easy way to centralize all licensing activities company-wide.

License Fulfillment & Delivery Automation

The automation of licensing and entitlement management functions enables you to minimize manual, time-consuming data entry processes to eliminate errors, while saving time and reducing fulfillment costs. The automation of licensing also has a direct positive effect on customer satisfaction by enabling end users to purchase, activate, renew, upgrade, and re-host without needing to contact your customer support team. Sentinel EMS, a component of Sentinel LDK, easily integrates into the industry's most common ERP, CRM, Billing, and Marketing Automation systems through a standard Web Services interface. In addition, Thales offers a variety of professional service packages designed to ease the integration of Sentinel EMS into any custom homegrown back office system that a software publisher may have deployed.

Business Intelligence

With Sentinel LDK, software publishers have full visibility into their existing customer base from start to finish. Beginning with the on boarding of a new customer, this centralized platform provides an easy and intuitive automated process for delivering entitlements and registering products while collecting and storing customer demographic, product activation, and feature usage information. Once this data is captured, Sentinel LDK enables you to create customized reports around activations, feature popularity and much more. Its automated notification feature also makes it possible to notify on upcoming renewals and updates.

With Sentinel LDK, your organization can plan accordingly for future roadmaps and capitalize on cross-selling opportunities in the following ways:

- **Compliance Reporting** – Providing entitlement tracking and reporting tools that enable end users to easily ensure they are not inadvertently exceeding paid license usage.
- **End-User Insight** – An end-user registration step enables you to identify and gain direct access to every individual who activates a copy of the application.
- **Software Packaging Optimization** – Product Management and Engineering can discontinue bloatware and create software packages containing the most popular features that customers and prospects want.
- **Usage Trend Analysis** – Marketing and Sales can utilize customized reports to analyze what, when, and how products are being used, and leverage this invaluable data to plan, launch, and execute more effective sales and marketing activities.

Software Developer Tools

Constantly striving to provide tools to make licensing implementation and management quick and easy for the software publisher, Sentinel LDK offers a variety of software developer tools including, but not limited to, the following:

- **Sentinel Toolbox** - A GUI-based application designed to facilitate developer use of various Sentinel LDK APIs and source code generators. The Sentinel ToolBox allows software developers to execute API functions, observe the behavior on these functions, and then copy the relevant source code into their own application.
- **LicGen API** - A stand-alone licensing interface for sites that already have a licensing infrastructure in place or that prefer implementing an alternative to Sentinel EMS. The LicGen API provides the functionality required to generate and manage Sentinel protection keys.

The Thales Sentinel family comprises the following products:

Sentinel LDK

Out-of-the-box Software Protection, Licensing, and Entitlement Management System

Sentinel License Development Kit (LDK), industry's most versatile software monetization solution, provides hardware, software, and cloud-based license delivery, locking, and management option in a single solution. Paired with the Sentinel product family's dedicated commitment to ongoing enhancements around usability, end-user transparency, integration, and security guarantees our customers that when they choose Sentinel, they choose the tools required to deploy a licensing and entitlement management framework right for their business objectives today, tomorrow, and beyond.

Sentinel EMS

Enterprise Software License & Entitlement Management Solution

A web-based enterprise entitlement management solution focused on flexibility, simple integration, and usability. Sentinel EMS simplifies the entire licensing lifecycle by providing a centralized license management interface, a simple interface to back office systems, and increased product visibility through advanced data collection and reporting for installed, embedded, or cloud applications. Sentinel EMS is the industry's only SAP certified license and entitlement management system.

The Sentinel HL keys are used in conjunction with Sentinel LDK to provide the highest level of copy and IP protection. For detailed information on the Sentinel HL keys, see the Sentinel HL Data Sheet.

Sentinel RMS

Flexible Toolkit for Enterprise Software Licensing

Designed with customization in mind, this robust license enablement and enforcement solution provides software and technology vendors with complete control and visibility into how their applications are deployed and used. Focused on scalable and flexible license management, Sentinel RMS is ideal for applications deployed in medium to large scale enterprise organizations and complex embedded environments.

Software Licensing Professional Services

Software Licensing Consulting and Implementation Services

A full suite of consulting and implementation services to help you define, align, and deliver a licensing strategy that meets the business objectives and operational processes unique to your organization regardless of where you are at in the lifecycle of your licensing project. Thales' team of consultants have been trusted by the world's largest software and technology vendors to define, design, and deliver some of the industry's most sophisticated licensing ecosystems.

For more information on Thales' complete portfolio of Software Monetization Solutions for installed, embedded, and cloud applications, or to download a free evaluation of our award-winning products, visit <https://sentinel.gemalto.com>.

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