

# Sentinel LDK

Software Protection and Licensing Tutorial:  
Starter Kit

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January 2018 Version 7.8 Build 1712-1 SK-EMS

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# Which Tutorial is Right for Me?

A number of tutorials for learning about Sentinel LDK are available. We recommend that you review the information below to ensure that you choose the tutorial that is most appropriate for your requirements.

All the tutorials are included in the Sentinel LDK Demo kit and Starter kit.

## Software Protection and Licensing Tutorial – Sentinel SL (Software-based) Keys

This tutorial demonstrates how to protect and license an application with Sentinel SL (software) protection keys.

**Requirements:** Download the free Sentinel LDK Demo Kit. *No hardware keys are required to perform this tutorial.*



The remaining tutorials described below demonstrate how to protect and license an application with either Sentinel SL (software) or Sentinel HL (hardware) protection keys.

## Software Protection and Licensing Tutorial – “Demo Kit” or “Starter Kit”

Sentinel EMS (*Entitlement Management System*) is used as the back office system to manage definition of Features and Products and to generate and track customer entitlements.

- The **Demo Kit** tutorial uses a provided demonstration hardware key.

**Requirements:** Obtain the free physical Sentinel LDK Demo Kit from your Gemalto sales representative or from the Gemalto web site.

- The **Starter Kit** tutorial uses your own Sentinel Developer key and Sentinel HL key to protect and license an application.

**Requirements:** Purchase the Sentinel LDK Starter kit and Sentinel HL protection keys from your Gemalto sales representative.

## Software Protection and Licensing API Tutorial – “Demo Kit” or “Starter Kit”

These tutorials demonstrate how you can use Sentinel LDK APIs to generate and update licenses. It is assumed that you would use your own back office systems to handle all ERP functionality.

A **Demo Kit** tutorial and a **Starter Kit** tutorial are available as described above.



# Introduction

Thank you for choosing Sentinel License Development Kit (*Sentinel LDK*) as the method to protect and license your software against unauthorized use. In this Tutorial, you use the Sentinel LDK system to protect, license, and distribute software.

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

- *Protect Once—Deliver Many—Evolve Often™*: the concept of separating the software engineering and business processes
- *Cross-Locking*: the technology that supports the *Protect Once—Deliver Many—Evolve Often* concept, enabling a protected application to work with a Sentinel HL (hardware) or a Sentinel SL (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 (trial/grace), pay-per-use, and more, enabling you to focus on revenue growth.

## Sentinel Keys

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You will use the following Sentinel keys to perform the lessons in this tutorial:

- Sentinel Developer key (yellow), used to protect your programs
- Sentinel Master key (blue), used for license production.  
The Sentinel Master key must stay connected to the Sentinel EMS Server machine.



The Sentinel Developer key and Sentinel Master key are included in the Starter Kit. These keys are referred to as *Sentinel Vendor Keys*.

- One or more end-user Sentinel HL keys, used to run the protected program (color depends on key type). Sentinel HL keys were ordered separately and are provided in a separate package.

This tutorial is only partially applicable for Sentinel HL Basic keys. Sentinel HL Basic keys can be used only to protect your programs, and not to set licensing terms.

## Roles

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The Sentinel LDK system is role-based, and the tasks you can perform depend on the user roles assigned to you by the Sentinel LDK Administrator.

In order to enable you to experience the broad functionality of the Sentinel LDK system in this tutorial, you will have access to all roles. The roles you assume in the various lessons include:

- **Product Manager** role  
The person, usually a product manager, who determines the product components to be protected (called *Features* in Sentinel LDK), how these components are used to define Products, and the license structure for the Products.
- **Development** role  
The person, usually a software engineer, who protects the software using Sentinel LDK Envelope or the Sentinel Licensing API, and performs other development-related tasks, such as generating the Sentinel Run-time Environment Installer.
- **Customer Services** role  
The person responsible for performing manual Product activations.
- **Entitlement Manager** role  
The person responsible for defining and managing customer entitlements (orders).
- **Production** role  
The person responsible for producing customer entitlements.

In addition, you will assume the role of an end user in order to test, use, and update the products licensed using Sentinel LDK.

## Conventions

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Each of the lessons in this tutorial begins with a focused breakdown of the lesson, similar to the following:

<b>Objective</b>	A short description of the lesson objective
<b>Role in this lesson</b>	The role or roles that you assume during the lesson
<b>Applications used</b>	Sentinel LDK applications you use in the lesson

## Lessons in This Tutorial

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This tutorial is based on a Windows operating system and includes the following lessons:

- **"Lesson 1: Preliminary Preparation" on page 11**  
In this lesson, you install the Sentinel LDK system and learn how to launch Sentinel Vendor Suite. You then introduce your Sentinel Master key and Sentinel Developer key into the Sentinel LDK system.



- **"Lesson 2: Defining Features" on page 15**

In this lesson, you use Sentinel EMS to define two programs as Features, which you will later license and protect.

- **"Lesson 3: Protect Once" on page 17**

In this lesson, you use Sentinel LDK Envelope to apply protection to your software.

- **"Lesson 4: Defining Products" on page 21**

In this lesson, you use Sentinel EMS to define your offering by defining Products based on the Features you already defined and protected.

- **"Lesson 5: Defining an Unlocked Trialware Product" on page 25**

In this lesson, you use Sentinel EMS to define an Unlocked Trialware Product based on one of the Products you defined, enabling you to distribute a trial version of your software later.

- **"Lesson 6: Creating and Distributing an Entitlement for Sentinel SL-protected Software" on page 29**

In this lesson, you lock your protected software to a Sentinel SL key for later distribution. You will create an entitlement, define a customer, code the Sentinel SL key, and use the software as an end user. You will also learn how to activate a license, in order to convert the trial version of a program to a full-featured program.

- **"Lesson 7: Creating and Distributing an Entitlement for Sentinel HL-protected Software" on page 35**

In this lesson, you lock your protected software to a Sentinel HL key for later distribution. You will create an entitlement, define a customer, code the Sentinel HL key, and use the software as an end user. You will also learn how to create a license update for a deployed Product that has its license locked to a Sentinel HL key.

- **"Lesson 8: Using Sentinel Licensing API" on page 41**

In this lesson, you learn how to program the memory on Sentinel protection keys.

We recommend that you follow the lessons sequentially to familiarize yourself with the Sentinel LDK system and to gain a clear understanding of the strength of the *Protect Once—Deliver Many—Evolve Often* model, and the flexibility it provides.

## Additional Resources

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You can use the following resources to help you learn about the Sentinel LDK system:

- **Sentinel LDK Software Protection and Licensing Guide**

This book describes Sentinel LDK licensing concepts and provides a detailed overview of the system.

- **Sentinel LDK Release Notes**

The Release Notes provide information about the current release, including:

- latest enhancements
- supported platforms
- available documentation
- known issues

- **Instructional videos**

A library of instructional videos for Sentinel LDK is available at:

<http://sentinelvideos.gemalto.com/>

## Obtaining Support

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You can contact us using any of the following options:

**Business Contacts** - To find the nearest office or distributor, use the following URL:

<https://sentinel.gemalto.com/contact-us-sm/>

### Technical Support

To obtain assistance in using Gemalto products, feel free to contact our Technical Support team:

- **Customer Support Portal** (preferred):  
<https://supportportal.gemalto.com/csm?id=sentinel>
  - **Support Essentials** (Contact details, support plans, and policies):  
[https://supportportal.gemalto.com/csm?id=support\\_essentials](https://supportportal.gemalto.com/csm?id=support_essentials)
  - **For Issues Related to Using the Portal:** [customerportalsupport@gemalto.com](mailto:customerportalsupport@gemalto.com)
  - **Phone:**
    - AMER: 800-545-6608 (US toll free)
    - International: +1-410-931-7520
    - EMEA/APAC: <https://supportportal.gemalto.com/csm?id=sentinel>
- ➔ Click **Contact Us**
- **E-mail** (Use if you cannot submit the technical issue via the portal):  
[technical.support@gemalto.com](mailto:technical.support@gemalto.com)

### Downloads

You can download installers and other updated components here:

<https://sentinelcustomer.gemalto.com/sentineldownloads/>

# Preliminary Preparation

<b>Objective</b>	Prepare your computer and Sentinel LDK for the tutorial
<b>Applications used</b>	<ul style="list-style-type: none"><li>■ Sentinel LDK Installation Drive</li><li>■ Sentinel Master Wizard</li><li>■ Sentinel Vendor Suite</li></ul>

The procedures in this lesson are required in order for you to be able to implement the processes outlined in subsequent lessons of this tutorial. They include:

- Instructions for installing the Sentinel LDK software, including Sentinel EMS Server
- Instructions for launching Sentinel Vendor Suite
- Instructions for introducing the Sentinel Vendor keys to the Sentinel LDK system

## Installing the Sentinel LDK Software

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Before proceeding with this tutorial, install the Sentinel LDK software and the Sentinel EMS Server on your computer.

### **WARNING**

Do not connect any of your Sentinel keys before installing the Sentinel LDK software!

For instructions on how to install Sentinel EMS and Sentinel LDK Vendor Tools, refer to the chapter “Installing Sentinel LDK for Windows” in the *Sentinel LDK Installation Guide*.

During the installation procedure, you can accept all defaults. When prompted to choose a setup type for Sentinel EMS, click the **Express** option.

After the installation has completed, select **All Programs > Gemalto Sentinel > Sentinel LDK > Check for Updates** from the Start menu. The Software Manager window will indicate to you if a later version of any of the Sentinel LDK software is available from Gemalto servers. If a later version is available, select the option to install it.

## Launching Sentinel Vendor Suite

*After completing the installation, launch Sentinel Vendor Suite as follows:*

1. If you are not certain that the Tomcat service is active: From the **Start** menu, select **Programs > Gemalto Sentinel > Sentinel EMS > Start EMS Service**.
2. From the **Start** menu, select **Programs > Gemalto Sentinel > Sentinel LDK > Vendor Suite**. The Sentinel Vendor Suite program selection screen is displayed. You can access the primary Vendor Suite applications from this screen.

## Introducing the Sentinel Vendor Keys

Sentinel Vendor keys (Sentinel Master key and Sentinel Developer key) enable you to apply Sentinel LDK protection to your software and data files, to program the Sentinel protection keys that you send to your end users, and to specify the license terms under which your software can be used.

The Sentinel Developer key is used by your software engineers in conjunction with the Sentinel LDK protection applications to protect your software and data files. The Sentinel Master key is connected to the Sentinel EMS Server computer and used in conjunction with Sentinel EMS for defining Features and Products, applying license terms, and producing entitlements.

In order to complete this tutorial, you need to introduce your Sentinel Vendor keys to the Sentinel LDK system.

*To introduce your Sentinel Vendor keys:*

1. After starting the EMS (Tomcat) service, connect your Sentinel Developer key and your Sentinel Master key to a USB port. (Ensure that the Sentinel Master key is connected to the Sentinel EMS Server machine).
2. Start Sentinel Master Wizard as follows:
  - From the Start menu, select: **Programs > Gemalto Sentinel > Sentinel LDK > Tools > Sentinel Master Wizard**



If you open either Sentinel LDK Envelope or Sentinel LDK ToolBox, and the application detects a new Sentinel Vendor key, the Master Wizard will launch automatically.

3. In the **User Name** and **Password** fields, type **admin**; then click **OK**.
4. Accept all defaults through the completion of the wizard.



The first time the Master wizard is run for a specific Master key, Gemalto servers generate and download your customized API libraries. This process typically require about 20 minutes to complete. However, if there is a backlog, the generation process may require up to several hours to complete.

The generated APIs are located in the following directory, under the appropriate subdirectory:

`%HomePath%\Documents\Gemalto\Sentinel LDK 7.8\API\Runtime\`

5. Click **Finish** to close the wizard. This process introduces the data in your key to the Sentinel LDK system and extracts your company's unique confidential Vendor Code.

For additional information on Vendor Codes, see *Understanding Sentinel LDK Software Protection and Licensing* in the *Sentinel LDK Software Protection and Licensing Guide*.

You are now ready to start the tutorial.

Sentinel EMS provides a notification facility for your Master key. This facility can send automatic e-mail reminders when:



- any of the license modules on the Master key are about to expire.
- the pool of new SL keys or network seats on the Master key falls below a certain threshold.

Gemalto highly recommends that you configure the notification facility to send reminders as necessary. In the Sentinel EMS screen, on the main menu, click **Administration > Master**. Follow the instructions to configure e-mail reminders.



## Defining Features

<b>Objective</b>	Learn how to define Features
<b>Role in this lesson</b>	Product Manager
<b>Applications used</b>	Sentinel EMS



This lesson is not applicable for Sentinel HL Basic keys.

A Feature is an identifiable functionality of a software application that can be independently protected or licensed. In Sentinel LDK, a Feature may be an entire application, a module, or a specific functionality such as Print, Save, or Draw.

Features are typically defined by the Product Manager based on business decisions, and are then implemented by the company's software engineers.

In this lesson, you assume the Product Manager role and use Sentinel EMS to define two Features for use in subsequent lessons.

### *To launch Sentinel EMS:*

1. From the **Start** menu, select **Programs > Gemalto Sentinel > Sentinel EMS > Launch Sentinel EMS**. Sentinel EMS is launched in a Web browser. The Sentinel EMS Login screen is displayed.
2. In the **User ID** and **Password** fields, type `admin`.
3. Click **Login**. The Sentinel EMS Home screen is displayed. Click the **Catalog** tab to see a typical web screen.

Sentinel EMS web screens typically includes the following:

- Function bars, in which you select the function to perform
- Main pane, in which you view and select items
- Details pane, in which you view details of the item selected in the Main pane
- Task buttons, which you use to perform actions

## Defining a Feature for the Sample Bouncing Ball Program

In this section, you define a Feature for an existing program, the Bouncing Ball sample program supplied with Sentinel LDK.

**To define the Bounce Feature:**

1. From the function bar of the Sentinel EMS screen, click **Catalog > Features**. The Features screen is displayed. This screen shows the list of Features defined and displays details of the current Feature. The right side of the screen contains task buttons for the tasks that can be performed in this screen.
2. Click **New Feature**. The Create Feature screen is displayed.
3. In the **Feature Name** field, type **Bounce**.
4. In the **Feature ID** field, erase the default value and type **50**.
5. Click **Save**. The Create Feature screen closes and the “Bounce” Feature you defined is displayed in the main pane of the Features screen.

## Defining a Feature for the MyNotepad Program

In this section, you define a Feature for the MyNotepad program. You will create the MyNotepad program in [Lesson 3: Protect Once](#).

**To define the MyNotepad Feature:**

1. In the Sentinel EMS screen, display the Features screen.
2. Click **New Feature**. The Create Feature screen is displayed.
3. In the **Feature Name** field, type **MyNotepad**.
4. In the **Feature ID** field, erase the default value and type **10**.



If a message is displayed informing you that this Feature ID is not available, **do not** use a different Feature ID number. Close the Add Feature screen, and in the main pane of the Features screen, identify Feature 10 and note its name. For the remainder of this tutorial, continue to use Feature ID 10, with the name you noted (instead of MyNotepad).

5. Click **Save**. The Create Feature screen closes and the MyNotepad Feature you defined is displayed in the main pane of the Features screen.
6. Close the Sentinel EMS browser window.



## Protect Once

<b>Objective</b>	Learn how to apply Sentinel LDK automatic protection functionality
<b>Role in this lesson</b>	Development
<b>Applications used</b>	Sentinel LDK Envelope

In this lesson, you use Sentinel LDK Envelope to define protection parameters for two programs, using the two Features you defined earlier.

Sentinel LDK Envelope is an innovative, advanced solution for protecting software against illegal or unauthorized use. The solution deters illegal access and execution of protected applications.

A deployed Sentinel LDK-protected program requires access to a Sentinel protection key in order to run. The protected program queries the Sentinel protection key for predefined information. If the Sentinel protection key is not present, or the information returned is incorrect, the program does not execute, or stops functioning.

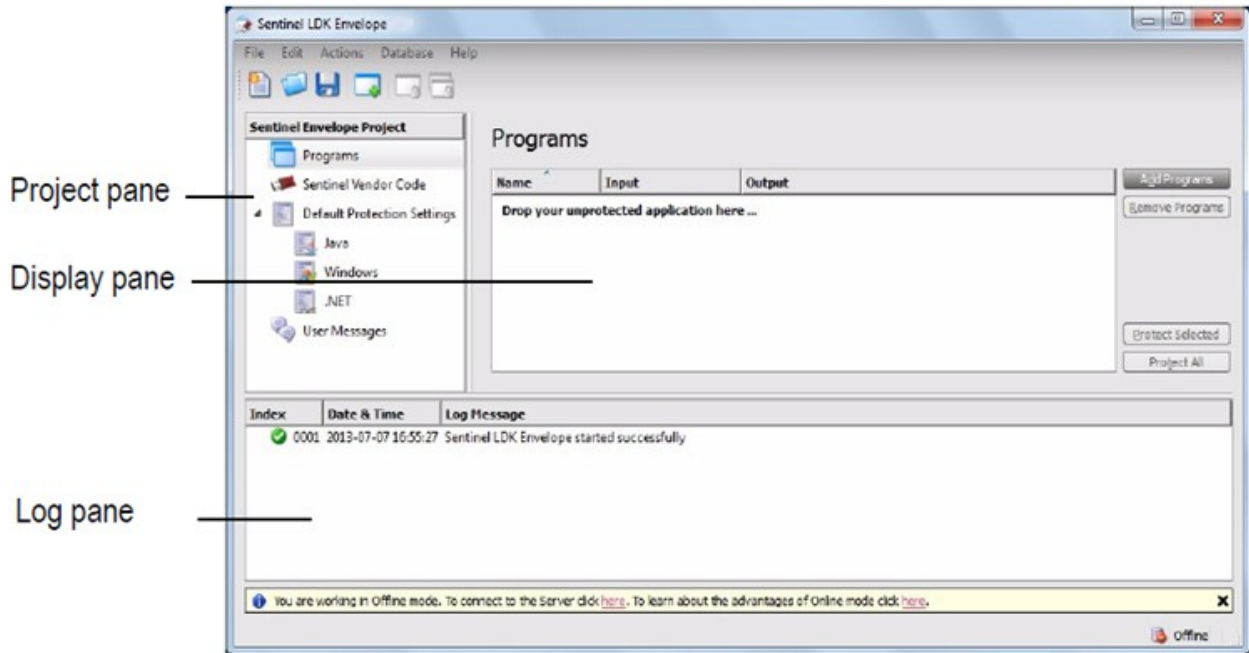
### Protecting the Sample Bouncing Ball Program

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In this section, you launch Sentinel LDK Envelope and identify the Vendor Code with which you will protect the software. You then define an end-user error message. Finally, you protect the Bouncing Ball program.

The Sentinel LDK Envelope window includes the following:

- Project pane, in which you select the function to perform
- Display pane, in which you select items and perform actions. The name of the pane changes to reflect the function you selected in the Project pane—for example, in the screen below, the Display pane has the title **Programs**.
- Log pane, in which Sentinel LDK Envelope messages are displayed



### To prepare for protection:

1. Connect the Sentinel Developer key.
2. From the **Start** menu, select **Programs > Gemalto Sentinel > Sentinel LDK > Vendor Suite**. The Sentinel Vendor Suite program selection window is displayed.
3. Click **Envelope** to launch Sentinel LDK Envelope. The Sentinel LDK Envelope main window is displayed.
4. Before protecting an application, Sentinel LDK Envelope must identify the correct Vendor Code. In the Sentinel LDK Envelope Project pane, select **Sentinel Vendor Code**.
5. In the right pane of the Sentinel Vendor Code window, click **Toggle connection with the Server**. The Log In to Sentinel EMS screen is displayed.
6. Enter the user name and password to log in to Sentinel EMS; then click **OK**. (The default user name and password are **admin – admin**.) The available Vendor Codes are displayed in the Sentinel Vendor Codes pane.
7. Select **Use Vendor Code from Database**, and then select the relevant Vendor Code.



Your Vendor Code file is named according to the Batch Code labeled on your Sentinel keys. For example, if your keys are labeled with the Batch Code ABCDE, your Vendor Code file is called ABCDE.hvc.

**To protect the Bouncing Ball program:**

1. In the Sentinel LDK Envelope Project pane, select **Programs**.
2. Click **Add Programs** in the top right of the Programs pane.

The Add Programs window is displayed, showing the contents of the `\VendorSuite\samples` folder.

If a different folder is displayed, browse to:

`%ProgramFiles(x86)%\Gemalto Sentinel\Sentinel LDK\VendorTools\VendorSuite\samples\`

3. Select **Win32\_Bounce.exe** and click **Open**. Win32\_Bounce is now listed in the Programs pane.
4. In the Project pane, under **Programs**, select **Win32\_Bounce**. The Display pane lists the Protection Details.
5. In the **Name** field (to the right of the **Feature ID** field), select **Bounce** from the drop-down list (the Feature that you defined for the Bounce program in *Lesson 2: Defining Features*).



If you are using a Sentinel HL Basic key, select **0** in the **Feature ID** field.

6. In the Project pane, under **Default Protection Settings**, select **Windows**. The Display pane now displays **Windows - Default Protection Settings**.
7. In the Windows - Default Protection Settings pane, decrease the number of **Periodic background checks** from the default value to **5** seconds. This means that during run-time, the protected program will check every 5 seconds to ensure that the required Sentinel HL key is connected.
8. In the Project pane, under **Programs**, select **Win32\_Bounce**, then in the Display pane, click **Protect Selected**. A message informs you that the protection process is running.
9. Click **Close** when Sentinel LDK Envelope notifies you that the protection process has completed.

The protected Bouncing Ball program is saved in this folder:

`%HomePath%\Documents\Gemalto\Sentinel LDK 7.8\VendorTools\VendorSuite\Protected`

## Protecting the MyNotepad Program

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In this section, you create a copy of the Gemalto text viewer sample application, define protection parameters for protecting it using the MyNotepad Feature, and protect the program.



This section is not applicable for Sentinel HL Basic keys.

**To protect the MyNotepad program:**

1. Locate the Gemalto text viewer application (`textviewer.exe`). This utility can be found under:  
`%ProgramFiles(x86)%\Gemalto Sentinel\Sentinel LDK\VendorTools\VendorSuite\samples\`
2. Create a copy of the text viewer application and rename it **MyNotepad.exe**.

3. Verify that your Sentinel Developer key is connected to your computer.
4. If it is not already open, launch Sentinel LDK Envelope. The Sentinel LDK Envelope main window is displayed.
5. Select the program to protect:
  - a. In the Sentinel LDK Envelope Project pane, select **Programs**.
  - b. Click **Add Programs** in the top right of the Programs pane. The Add Programs window is displayed.
  - c. Navigate to the folder where MyNotepad.exe is located. Select the file and click **Open**. Note that a new **MyNotepad** entry is displayed in the Project pane under **Programs**.
6. Protect the selected program:
  - a. In the Project pane, under **Programs**, select **MyNotepad**. The Display pane lists the Protection Details.
  - b. In the **Feature ID** field, type **10** (the Feature defined for the MyNotepad program in *Lesson 2: Defining Features*).
  - c. In the Project pane, under **Default Protection Settings**, select **Windows**. The Display pane now displays **Windows - Default Protection Settings**.
  - d. In the Windows - Default Protection Settings pane, ensure that **Periodic background checks** is set to **5** seconds.
  - e. In the Project pane, under **Programs**, select **MyNotepad**, then in the Display pane, click **Protect**. A message informs you that the protection process is running.
  - f. Click **Close** when Sentinel LDK Envelope notifies you that the protection process has completed. The protected MyNotepad program is saved in this folder:  

```
%HomePath%\Documents\Gemalto\Sentinel LDK  
7.8\VendorTools\VendorSuite\Protected
```
7. Close Sentinel LDK Envelope. You are prompted to save the changes to the current project.
8. Click **Save**. The Save As dialog box is displayed.
9. In the **File Name** field, type **Tutoria1** and click **Save**. The dialog box closes and the project is saved.

## Defining Products

<b>Objective</b>	Learn how to define the Products you want to license
<b>Role in this lesson</b>	Product Manager
<b>Applications used</b>	Sentinel EMS



This lesson is not applicable for Sentinel HL Basic keys.

A *Product* is a licensing entity that represents one of the vendor’s marketable software products. The Product is coded into the memory of a Sentinel key and contains one or more Features. License terms are defined for each Feature in a Product.

Like Features, Products are defined using Sentinel EMS. Typically, this function is performed by the Product Manager, and implemented by the software engineer. In a true production environment, a number of Products might be defined and held in readiness for inclusion in customer entitlements. However, you can define new Products—mixing and matching Features—at any time.

In this lesson, you define a number of Products. The Products will include license terms for the Bounce and MyNotepad Features you defined in *Lesson 2: Defining Features*. The Products that you define now will be included in the entitlements you define in later lessons.

In this lesson, you define the following Products:

- “Bounce\_Lite”—A “rental” Product, in which the license expires after three executions
- “Bounce\_Full”—A “full-featured” Product, in which the license enables unrestricted access to all the Features in the program. This Product will be created by duplicating the “rental” Product and modifying the license terms.
- “MyNotepad\_Full”— A “full-featured” Product that enables unrestricted access to all the Features in the program



In *Lesson 6: Creating and Distributing an Entitlement for Sentinel SL-protected Software*, and *Lesson 7: Creating and Distributing an Entitlement for Sentinel HL-protected Software* you will assume the role of an end user, and will install licenses and run these Products.

## Defining a Product With an Execution-based License

In this lesson, you define a Product based on the Bounce Feature (**ID 50**), with a license that enables the program to be launched three times. Following the third execution, the license must be updated to enable further use of the program.

### To define a Product:

1. Launch Sentinel EMS.
2. From the function bar in the Sentinel EMS screen, select **Catalog > Products**. The Products screen is displayed.
3. Click **New Product**. The Create Product screen is displayed.
4. In the **Name** field, type **Bounce\_Lite**.
5. In the **Locking Type** field, select **HL or SL (AdminMode or UserMode)**. This option enables the protection type to be determined at the time when each entitlement is defined.
6. On the **Product Features** tabbed page, click **Add Features**.
7. On the Add Features to Product screen, select the check box next to the **Bounce** Feature and click **Add Features to Product**.
8. On the **Product Features** tabbed page, click **Configure** on the **Bounce** Feature line to specify the license terms for the Feature. The Configure License Terms screen is displayed.
9. In the **License Type** field, select **Execution Count**.
10. Under **License Terms**:
  - a. Clear the check box for **Specify at entitlement time**.
  - b. In the **Executions** field, type 3.
11. Click **Save**. The Configure License Terms screen closes and the license terms are displayed in the **License Terms** column.
12. Click **Save as Complete**. The new Bounce\_Lite Product is displayed in the Products screen. The status for the Product is listed as **Complete**. This indicates that the Product is available for distribution.

## Defining Products With Full-Featured Licenses

In this section, you duplicate existing Products in order to define two additional Products:

- A Product based on the Bounce Feature (ID 50), with a perpetual license that will allow the end user unlimited access to the program. This Product will later be used to update the

limited, execution-based Bounce\_Lite Product to a full-featured license.

- A Product based on the MyNotepad Feature (ID 10), with a perpetual license that will allow the end user unlimited access to the program. In *Lesson 5: Defining an Unlocked Trialware Product*, you will define an evaluation MyNotepad Product. The MyNotepad\_Full Product you define in this lesson will later be used to update the evaluation license to a full-featured license.

#### **To define the Bounce\_Full Product:**

1. From the function bar in the Sentinel EMS screen, select **Catalog > Products**. The Products screen is displayed.
2. Click **New Product**. The Create Product screen is displayed.
3. In the **Name** field, type **Bounce\_Full**.
4. In the **Locking Type** field, select **HL or SL (AdminMode or UserMode)**. This option enables the protection type to be determined at the time when each entitlement is defined.
5. On the **Product Feature** tabbed page, click **Add Features**.
6. On the **Add Features to Product** screen, select the check box next to the **Bounce** Feature and click **Add Features to Product**.
7. On the **Product Features** tabbed page, note that the License Type for the Bounce Feature is **Perpetual** by default. Therefore, it is not necessary to perform any additional configuration for the Feature.
8. Click **Save as Complete**. There are now two items listed in the Products screen: Bounce\_Lite and Bounce\_Full. The status for the Bounce\_Full Product is listed as **Complete**.

#### **To define the MyNotepad\_Full Product:**

1. From the function bar in the Sentinel EMS screen, select **Catalog > Products**. The Products screen is displayed.
2. Click **New Product**. The Create Product screen is displayed.
3. In the **Name** field, type **MyNotepad\_Full**.
4. In the **Locking Type** field, select **HL or SL (AdminMode or UserMode)**. This option enables the protection type to be determined at the time when each entitlement is defined.
5. On the **Product Feature** tabbed page, click **Add Features**.
6. On the **Add Features to Product** screen, select the check box next to the **MyNotepad** Feature and click **Add Features to Product**.
7. To define memory data, click the **Memory** tab (next to the **Product Features** tab), and then do the following:
  - a. Click **New**. The New Memory Segment screen is displayed.
  - b. In the **Offset** field, type **0**. (Afterward, this will change automatically to **0x0000**).
  - c. In the **Length** field, type **16**.

- d. In the **Text** field, type **He11o wor1d**.
  - e. Click **Save**. The screen closes. In the Memory Map at the bottom of the Memory tabbed page, the content of the memory is displayed.
8. Click **Save as Complete**. The Create Product screen closes. The main pane of the Products screen now contains the three Products that you defined in this lesson: `Bounce_Lite`, `Bounce_Full`, and `MyNotepad_Full`.



## Defining an Unlocked Trialware Product

<b>Objective</b>	Learn how to define an Unlocked Trialware Product that can be supplied as a trial product
<b>Role in this lesson</b>	Product Manager, Development
<b>Applications used</b>	Sentinel EMS



This lesson is not applicable for Sentinel HL Basic keys.

In this lesson, still in the Production Management role, you define the “MyNotepad\_Evaluation” Product as a trial version of the “MyNotepad\_Full” Product you defined in *Lesson 4: Defining Products*. You then assume the Development role to prepare the Product for distribution by creating a customized Sentinel Run-time Environment Installer executable file.

An Unlocked Trialware Product is typically used for evaluation purposes, to enable the provision of a grace period, or for super-distribution. An Unlocked Trialware Product can be used on any computer for a limited time period. After the allotted period expires, the software no longer runs, until it is activated with a Sentinel protection key.

### Defining an Unlocked Trialware Product

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In this section, in the Production Management role, you define the “MyNotepad\_Evaluation” Product—an Unlocked Trialware Product that is a trial version of the “MyNotepad\_Full” Product, with a license that expires 60 days after the application is first used.

**To define an Unlocked Trialware Product:**

1. From the function bar in the Sentinel EMS screen, select **Catalog > Products**. The Products screen is displayed.
2. In the list of Products, select the **MyNotepad\_Full** Product.

3. From the task buttons, select **Actions > Unlocked**. The Create Unlocked Product screen is displayed.
4. In the **Name** field, type **MyNotepad\_Evaluation**. Note that:
  - The **Base Product** field displays **MyNotepad\_Full**.
  - The MyNotepad Feature you defined in *Lesson 2: Defining Features* is included in the Product with the **Unlocked (Time Period)** license type. For an Unlocked Trialware license, the user is granted a usage period of 30 days by default.
5. On the **Product Features** page, click **Configure** for the **MyNotepad** Feature.
6. In the Configure License Terms screen, change the value for **Number of Days** from **30** to **60**.
7. Click **Save**. The Configure License Terms screen closes.
8. Click **Save as Complete**.

## Defining a Bundle of Unlocked Trialware Products

In this section, you assume the Development role. You bundle the “MyNotepad\_Evaluation” Unlocked Trialware Product that was defined by the Product Manager. You then create a Sentinel LDK Run-time Environment Installer executable file. (In a true production environment, you would embed this file in your own application installer.)

*To define a bundle of Unlocked Trialware Products:*

1. From the function bar in the Sentinel EMS screen, select **Developer > Bundle Unlocked Products**. The Bundle Unlocked Products screen is displayed.
2. Verify that the correct Batch Code is displayed in the **Batch Code** field.
3. Select the task **Actions > Add**. The Products screen is displayed.
4. Select the **MyNotepad\_Evaluation** entry and click **OK**. The Products screen closes and the MyNotepad\_Evaluation Product is displayed in the Bundle Unlocked Products screen.



An Unlocked Products bundle can contain any number of Unlocked Trialware Products. In this procedure, you are only adding a single Unlocked Trialware Product—MyNotepad\_Evaluation—to the Unlocked Products bundle.

5. In the **Product Details** pane, select the check box for the MyNotepad\_Evaluation Product.
6. Click **Produce V2C**. The V2C file is generated.
7. Choose the option to save the file. The file is saved to:

`%HomePath%\Documents\Downloads\`



The location to which the file is saved may vary depending on your operating system and web browser. For the remainder of the lessons in this tutorial, this location is referred to as the *Download location*.

## Creating a Sentinel Run-time Environment Installer

Remaining in the Development role, you now create a Sentinel Run-time Environment Installer executable that includes the V2C file you created. The Run-time Environment may be required on the end user's computer in order for your Sentinel LDK protected and licensed program to function correctly. (This depends on the type of protection key that you will be providing. For this tutorial, you will install the Run-time Environment.)

You need only embed the installer in your software setup to create a ready-to-run Sentinel LDK protected and licensed program. In this scenario, you have already specified that the MyNotepad program will run in Trial mode for a maximum of 60 days.

### **To generate a Sentinel Run-time Environment Installer executable:**

1. From the function bar in the Sentinel EMS screen, select **Developer > RTE Installer**. The RTE Installer screen is displayed.
2. Verify that the correct Batch Code is displayed in the **Batch Code** field.
3. Select the **Include V2C for Bundle of Unlocked Products** check box.
4. In the **V2C File Location** field, click the browse button.  
In the Choose File to Upload dialog box, browse to the Download location (described on [page 26](#)) where you saved the V2C file.
5. Select the v2c file displayed in this location and click **Open**. The selected file is displayed in the **V2C File Location** field of the RTE Installer screen.
6. In the **Installer Type** field, ensure that the **Application (EXE)** option is selected.
7. Click **Generate**. The message RTE file is being created is briefly displayed.
8. Choose the option to save the file. The file haspdinst.exe is saved to the Download location (described on [page 26](#)).



Do not execute the generated file at this time! You will install this bundle in [Lesson 6: Creating and Distributing an Entitlement for Sentinel SL-protected Software](#).

You are now ready to ship your Product with its license locked to either:

- a Sentinel SL key, as described in [Lesson 6: Creating and Distributing an Entitlement for Sentinel SL-protected Software](#), or
- a Sentinel HL key, as described in [Lesson 7: Creating and Distributing an Entitlement for Sentinel HL-protected Software](#)



# Creating and Distributing an Entitlement for Sentinel SL-protected Software

<b>Objective</b>	<ul style="list-style-type: none"> <li>■ Learn how to define an entitlement locked to a Sentinel SL key, specify the customer for the entitlement, and produce the entitlement.</li> <li>■ Simulate a variety of end-user interactions with programs protected by Sentinel protection keys.</li> </ul>
<b>Role in this lesson</b>	<ul style="list-style-type: none"> <li>■ Entitlement Manager</li> <li>■ Production</li> <li>■ End User</li> </ul>
<b>Applications used</b>	<ul style="list-style-type: none"> <li>■ Sentinel EMS</li> <li>■ Sentinel EMS Customer Portal</li> <li>■ Admin Control Center</li> </ul>



This lesson is not applicable for Sentinel HL Basic keys.

In this lesson, you assume the Entitlement Manager role and define an entitlement. For the order process, you also define the customer and produce the entitlement so that it is ready for shipment.

The entitlement you define is based on the “MyNotepad\_Full” Product that you defined in *Lesson 4: Defining Products*. The license is locked to a Sentinel SL key that will be activated on the end-user’s machine to convert the trial MyNotepad software to a full-featured product.

When you defined the Products, you specified the license terms for the Features included within those Products at that time. Note that instead of specifying the license terms when you defined the Product, you could have enabled the functionality for specifying the license terms at this stage as part of order processing.

In this lesson, you will also assume the end-user role to install and use the Product. You will then use the Sentinel SL Product Key received from the vendor to convert a trial version of the software to a full-featured program.



When a customer wants to purchase additional Features or to extend the current license for a Product that has its license locked to a Sentinel SL key, you can update the deployed license, as described in "[Creating an Update for a License in the Field](#)" on page 38.

## Defining a Perpetual License With a Product Key

In this section, you create an entitlement for the "MyNotepad\_Full" Product that you defined in [Lesson 4: Defining Products](#), locked to a Sentinel SL key. This license will then be used to convert the trial MyNotepad\_Evaluation Product you defined in [Lesson 5: Defining an Unlocked Trialware Product](#) to a full-featured product.

*To define an entitlement with a perpetual license:*

1. From the function bar in the Sentinel EMS screen, select **Customers**. The Customers screen is displayed.
2. Click **New Customer**. The Create Customer screen is displayed.
3. Ensure that the type **Company** is selected.
4. In the **Company Name** field, type **Bob Doe Ltd.**
5. In the **Contact Information** pane, enter your own (or any other) name and e-mail information.
6. Click **Save**. The new customer is listed in the Customer screen.
7. From the function bar in the Sentinel EMS screen, select **Entitlements**. The Entitlements screen is displayed.
8. Click **New Entitlement**. The Create New Entitlement screen is displayed.
9. In the **Customer** field, type **Bob**.
10. Select **Bob Doe Ltd.** from the list of customers that appears. The full name of the customer is displayed.
11. In the Product Details pane, click **Add Product**.
12. In the Product Selection screen, select the check box for **MyNotepad\_Full** and click **Add Product to Entitlement**. The MyNotepad\_Full Product is added to the Product list.
13. Select the check box for **MyNotepad\_Full**.
14. For **Entitlement Type**, ensure that **Product Key** is selected. Accept all other default values.
15. Click **Produce**. The Download Product Keys screen is displayed.
16. Click **Download**.
17. Choose the option to save the file. The file is saved to the Download location (described on [page 26](#)).

In the Entitlements screen, the new entitlement is displayed with the status **Product Keys Generated**.

## Installing a Trial Product

In this section, you simulate the experience of the end user when installing and running your MyNotepad “trial” software program.

Although in a true production environment your software engineer would typically embed the Run-time Environment installation which includes the trialware license (for trial use) into your software installation so that it executes as part of the installation process, in this tutorial you perform several installation and simulation steps.

*To install the Sentinel Run-time Environment and trialware license on an end-user machine:*

1. From the **Start** menu, select **Run**.
2. Click **Browse** and navigate to the Download location (described on [page 26](#)) that contains the RTE Installer (**haspdinst.exe**) that you created earlier.
3. Select the **haspdinst.exe** file and click **Open**. The browse window closes and the file path is displayed in the **Open** field.
4. In the **Open** field, type a space followed by **-i** at the end of the file path.

For example:

```
"C:\Users\Thomas\Downloads\haspdinst.exe" -i
```

5. Click **OK**. The Sentinel Run-time Environment is installed and a success message is displayed.

*To confirm the license status of the trial Product:*

1. Navigate to the following folder:  
`%HomePath%\Documents\Gemalto\Sentinel LDK 7.8\VendorTools\VendorSuite\Protected`
2. Double-click **MyNotepad.exe**.
3. While the application is running, from the **Start** menu, select **All Programs > Gemalto Sentinel > Sentinel LDK > Tools > Admin Control Center**. (The Admin Control Center is part of the Run-time Environment.)
4. In the Options pane, select **Sentinel Keys**. All the Sentinel protection keys that are accessible on the Sentinel License Manager are displayed.

#	Location	Vendor	Key ID	Key Type	Version	Sessions	Actions
0	Local	Demo MB	1058355007411405208	SL-AdminMode	2.00	-	Products   Features   Sessions   Certificates
1	Local	Master	840659384	Master	3.25	-	Features   Sessions   Blink on
2	Local	Master	1720199720	Developer	3.25	-	Features   Sessions   Blink on

5. Locate the entry for your key and click the **Features** button in the **Actions** column. The Features that are licensed in your key are displayed. Note that the **Logins** field shows that

there is currently one login to MyNotepad\_Evaluation and that the **Restrictions** field for Feature ID 10 indicates that the 60-day trial has begun.

6. Close the MyNotepad program.

## Notifying the Customer

Sentinel EMS can be configured so that when you produce an entitlement, Sentinel EMS automatically sends an email notification to the customer. This email contains the Product Key and a link to the Sentinel EMS *Customer Portal*.

The *Customer Portal* is a web portal in your installation of Sentinel EMS that your customers access to activate the licenses for their full-featured Products.

A typical email notification looks like this:

Dear Bob Doe,

Congratulations! An entitlement has been created for you with the following details:

Entitlement Details		
Start Date:	05/03/2012	End Date:
Customer:	Bob Doe Ltd (E-mail: BobDoe@safenet-inc.com)	
Channel Partner:		
Product key:	02572219-68f6-4ff7-9420-a8fd64bdf2aa	Quantity (per product key):
Products		
Name	Lock Type	
MyNotepad_Full	SL-AdminMode	

Now, follow the steps given below to activate and manage your entitlement(s):

1. Access the Entitlement Management System at <http://localhost:8080/ems/customerLogin.html>.
2. Log on using product key given above.

This notification provides all the information that the customer needs to activate the Product.

To simplify this tutorial, we did not configure Sentinel EMS to send email notifications, so we will simulate the end-user experience.

## Activating a License With a Product Key

In this section, still in the role of the end user, you assume that you have purchased the MyNotepad\_Full program and received an email notification from the vendor. You use the Product Key to convert the trial version of the software to a full-featured program that is locked to your machine.

**To activate the protected program:**

1. To access the Customer Portal, the customer would click a link provided in the email notification.



To simulate this action, click the link below or enter the URL in your Web browser address field:

<http://localhost:8080/ems/customerLogin.html>

The Sentinel EMS Product Key Login screen is displayed.

2. The customer would copy the Product Key from the email notification and paste it into the **Product Key** field in the login screen. To simulate this action, open the .txt file that contains the Product Key you generated earlier in this lesson in "Defining a Perpetual License With a Product Key" on page 30. This file can be found in the Download location described on [page 26](#).

Copy the Product Key from the file and paste it into the **Product Key** field in the login screen. Click **Login**.

The Sentinel EMS Activation screen is displayed. This screen contains information about the entitlement. If the entitlement allows multiple activation, this screen indicates how many activations remain.

The customer can choose to perform online activation or offline activation.

*Offline activation* can be used if the license will be installed on a machine from which it is not possible to access the Customer Portal. This includes downloading a utility from Sentinel EMS and transferring files manually to and from the target machine.

Most customers will prefer to use online activation.

3. Click **Online Activation**. A progress indicator is displayed for a few seconds, followed by the message **Activation installed successfully**.
4. This marks the end of the activation process. Click **Close** to dismiss the notice.
5. Open Sentinel Admin Control Center to see that you now have a **Perpetual** license for Feature ID 10.



# Creating and Distributing an Entitlement for Sentinel HL-protected Software

<b>Objective</b>	<ul style="list-style-type: none"> <li>■ Learn how to define an entitlement locked to Sentinel HL keys, specify the customer for the entitlement, and produce the entitlement</li> <li>■ Simulate a variety of end-user interactions with programs protected by Sentinel protection keys</li> <li>■ Learn how to update a license in the field</li> </ul>
<b>Role in this lesson</b>	<ul style="list-style-type: none"> <li>■ Entitlement Manager</li> <li>■ Production</li> <li>■ End User</li> </ul>
<b>Applications used</b>	<ul style="list-style-type: none"> <li>■ Sentinel EMS</li> <li>■ Admin Control Center</li> </ul>



This lesson is not applicable for Sentinel HL Basic keys.

In this lesson, you assume the Entitlement Manager role and define two different customer orders. For the order process, you define an entitlement, define a new customer, and produce the entitlement so that it is ready for shipment. You also assume the end-user role to test different types of Sentinel protection keys and licenses.

When a customer wants to purchase additional Features, or to extend the current license for your protected program, you can update the deployed license without having to recall or redeploy keys.

In this lesson, you will also assume the Entitlement Manager role and learn how to update the deployed license.

The entitlements that you define are based on the Products that you defined in *Lesson 4: Defining Products*, and include:

- An entitlement for the Bounce\_Lite Product.
- An entitlement for the Bounce\_Full Product. This entitlement will be used to update the license on the Sentinel HL key provided to the end user with the Bounce\_Lite Product. You will learn how to convert its functionality from Bounce\_Lite to Bounce\_Full in the field.

When you defined the Products, you specified the license terms for the Features included within those Products at that time. Note that instead of specifying the license terms when you defined the Product, you could have enabled the functionality for specifying the license terms at this stage as part of order processing.

## Defining a “Rental” Product Entitlement With Sentinel HL Locking

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In this section, you define an entitlement for the Bounce\_Lite Product, with its license locked to a Sentinel HL key.

*To produce a Sentinel HL key-based entitlement for a customer:*

1. From the function bar in the Sentinel EMS screen, select **Customers**. The Customers screen is displayed.
2. In the **Batch Code** field, ensure that your Batch Code is selected.
3. Click **New Customer**. The Create Customer screen is displayed.
4. Ensure that the type **Company** is selected.
5. In the **Company Name** field, type **John Smith Ltd.**
6. In the **Contact Information** pane, enter your own (or any other) name and e-mail information.
7. Click **Save**. The new customer is listed in the Customer screen.
8. From the function bar in the Sentinel EMS screen, select **Entitlements**. The Entitlements screen is displayed.
9. Click **New Entitlement**. The Create New Entitlement screen is displayed.
10. In the **Customer** field, type **John**.
11. Select **John Smith Ltd.** from the list of customers that appears. The full name of the customer is displayed.
12. In the Product Details pane, click **Add Product**.
13. In the Product Selection screen, select the check box for **Bounce\_Lite** and click **Add Product to Entitlement**. The Bounce\_Lite Product is added to the Product list.
14. Select the check box for **Bounce\_Lite**.

15. For **Entitlement Type**, select **Hardware Key**.
16. In the **Number of keys** field, type **1**.



At this point, you can “queue” the entitlement. The procedure that follows could then be performed by a person in the Production role, who is authorized to use Sentinel EMS only for the purpose of burning licenses to HL keys and does not have access to other functions.

#### To lock the license to a Sentinel HL key:

1. Connect the Sentinel HL key to which you want to burn the entitlement to your computer.
2. Click **Produce**. The Produce Sentinel HL Key screen is displayed.
3. In the list of keys, select the check box for your Sentinel HL key.
4. Click **Burn**. A graphical display indicates that the burn is taking place. Upon completion, a success message is displayed.
5. Close the Update Physical Key screen.

## Using an Application With a Sentinel HL Key

When a customer receives an application that you protected with a Sentinel HL key, the actual key must be accessible by the application in order to run the program. In the following procedure, you assume the end-user role to test Bounce, with a Bounce\_Lite license locked to a Sentinel HL key.

In this part of the lesson, you use Sentinel Admin Control Center to manage the use of your licensed software. In a true production environment, a system administrator in your customer’s organization uses this Web-based application to manage network licenses for your software.

#### To operate a Product protected with a Sentinel HL key:

1. Connect the Sentinel HL key on which you burned the entitlement to your computer. The required licensing information for Bounce\_Lite is contained, in encrypted format, in the key. As long as the license is valid, the protected application can run.
2. (Optional) Examine the license on the HL key as follows:
  - a. From the **Start** menu, select **All Programs > Gemalto Sentinel > Sentinel LDK > Tools > Admin Control Center**. Sentinel Admin Control Center is displayed. This interface enables customers to track the status and usage of their Sentinel licenses.
  - b. In the Options pane, select **Sentinel Keys**. All the Sentinel protection keys that are accessible on the Sentinel License Manager are displayed.

#	Location	Vendor	Key ID	Key Type	Version	Sessions	Actions
0	Local	Demo MB	1058355007411405208	SL-AdminMode	2.00	-	Products   Features   Sessions   Certificates
1	Local	Master	840659384	Master	3.25	-	Features   Sessions   Blink on
2	Local	Demo MB	2136683878	HL NetTime 250+	3.25	-	Features   Sessions   Blink on

- c. Locate the entry for your Sentinel HL key and click the **Features** button in the **Actions** column. The Features that are licensed in your key are displayed.

Note that the **Restrictions** field for Feature ID 50 displays **Executions 3 left**, indicating that the remaining number of logins permitted by the license is **3**.

3. Navigate to the following folder:

`%HomePath%\Documents\Gemalto\Sentinel LDK 7.8\VendorTools\VendorSuite\Protected`

4. Double-click `win32_Bounce.exe`. The Bouncing Ball program launches.
5. Close the Bounce software.
6. Repeat step 4 and step 5 two more times, to consume all the permitted executions.
7. Repeat step 4. Bounce fails to open and a message is displayed indicating that the Feature has expired.
8. In Sentinel Admin Control Center, in the Options pane, select **Sentinel Keys**. All the Sentinel protection keys that are accessible on the Sentinel License Manager are displayed.
9. Locate the entry for your Sentinel HL key and click the **Features** button in the **Actions** column.



If you are not sure which entry relates to your specific key, click the **Blink on** button and identify the key on which the LED is blinking.

Note that the **Restrictions** field for Feature ID 50 displays **Expired**, meaning that the number of allowed logins defined in the license has been exhausted.

## Creating an Update for a License in the Field

John Smith requested a license upgrade—from `Bounce_Lite` to `Bounce_Full`. In this part of the lesson, you will assume the Order Management role to create an update for the deployed license, and the Production role to produce the entitlement for the updated license. You will then assume the role of the end user (John Smith) to activate the license update.

**To produce an entitlement for a license update:**

1. From the function bar in the Sentinel EMS screen, select **Entitlements**. The Entitlements screen is displayed.
2. Click **New Entitlement**. The New Entitlement screen is displayed.
3. In the **Customer** field, type `John`.
4. Select `John Smith Ltd.` from the list of customers that appears. The full name of the customer is displayed.
5. In the Product Details pane, click **Add Product**.
6. In the Product Selection screen, select the check box for **Bounce\_Full** and click **Add Product to Entitlement**. The `Bounce_Full` Product is added to the Product list.
7. Select the check box for **Bounce\_Full**.

8. For the **Entitlement Type**, select the **Protection Key Update** option.
9. Click **Locate**. The Located Sentinel Keys screen is displayed.
10. Select Key ID, and then click **Locate**. The key information is displayed in the upper table.
11. In the list of protection keys, select the check box for John Smith's Sentinel HL key.
12. Click **Add To List**. The selected key is added to the **Sentinel Keys to Update** table.
13. In the **Sentinel Keys to Update** table, select the check box for John Smith's Sentinel HL key; then click **OK**. The Locate Sentinel Keys screen closes.
14. Click **Produce**. The Generate License screen is displayed.
15. In **License Output Type**, select the **V2C** option.
16. Click **Generate**. The message V2C generated successfully is displayed at the top of the screen.
17. In the Activation Details pane, click **Download V2C File**. Save the file to your desktop.  
  
The file saved is named [KeyID].v2c, where [KeyID] is Key ID of the Sentinel HL protection key for which the license was generated.
18. Click **Close**. The Generate License screen closes.

## Updating a License at the Customer's Site

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In this section, you retain the role of "John Smith Ltd." You have purchased a full-featured version (Bounce\_Full) of the program to replace the execution-based Bounce\_Lite version. You update your license using the Sentinel Admin Control Center and the HaspUpdate.v2c file you receive from the vendor.

### *To apply a license update:*

1. Ensure that the appropriate Sentinel HL key is connected to your computer.
2. Launch Sentinel Admin Control Center, as follows.  
  
From the **Start** menu, select **All Programs > Gemalto Sentinel > Sentinel LDK > Tools > Admin Control Center**. Sentinel Admin Control Center is displayed.
3. In the Options pane, select **Update/Attach**. The Update/Attach License window is displayed.
4. Click **Browse** and navigate to your desktop.
5. Select the [HASP KeyID].v2c file that you created when producing the entitlement for the license update in your Entitlement Manager role earlier, in step 17 on [page 39](#).
6. Click **Open**. The file path is displayed in the **Select a V2C... file** field.
7. Click **Apply File**. A message is displayed confirming that your update was applied successfully.
8. In the Options pane, select **Sentinel Keys**.

9. Locate the entry for your Sentinel HL key and click the **Features** button. The Features that are licensed in your key are displayed.

Note that an additional row is created for Feature ID 50. The **Restrictions** field in this row is **Perpetual**, indicating that the remaining number of logins permitted by the license is unlimited.

10. Navigate to the following folder:

*%HomePath%\Documents\Gemalto\Sentinel LDK 7.8\VendorTools\VendorSuite\Protected*

11. Double-click `Win32_Bounce.exe`. The Bouncing Ball program launches.
12. Close the Bouncing Ball program and disconnect the Sentinel HL key.

This lesson demonstrates using Sentinel Admin Control Center to examine licenses and to update a license at the customer's site.

Sentinel Admin Control Center is part of the Sentinel LDK Run-time Environment. The Run-time Environment was placed on your computer when you installed Sentinel LDK Vendor Tools. However, the Run-time Environment is not required for Sentinel HL Driverless keys.

If you have not included the Run-time Environment with your protected application, you can update licenses at the customer's site using other methods. For more information, see the description of the Sentinel Remote Update System in the *Sentinel LDK Software Protection and Licensing Guide*.



# Using Sentinel Licensing API

<b>Objective</b>	Learn how to implement Sentinel Licensing API functions using Sentinel LDK ToolBox
<b>Role in this lesson</b>	Development
<b>Applications used</b>	Sentinel LDK ToolBox

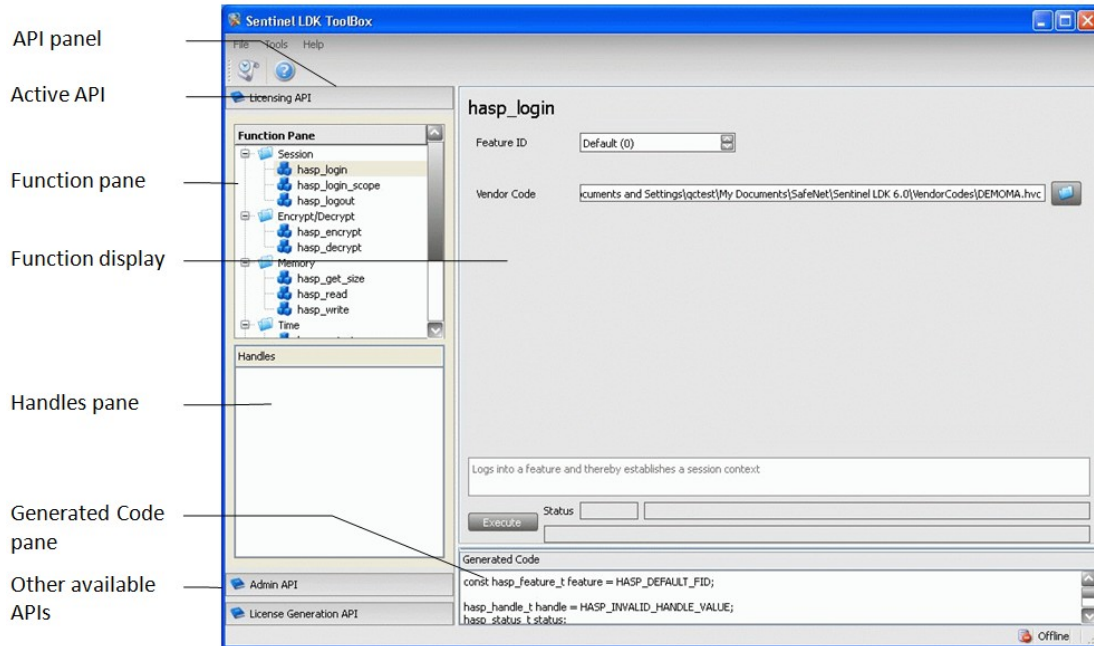
Now that you have completed the other lessons in this tutorial, you should have a good understanding of how Sentinel LDK works. This lesson builds on your accumulated knowledge and introduces you to the Sentinel Licensing API through Sentinel LDK ToolBox, which is an interactive GUI application that helps you familiarize yourself with various Sentinel APIs.

The Sentinel LDK system offers a rich variety of API calls to support customized protection of your program, as well as other operations on Sentinel protection keys.

You can also use Sentinel LDK ToolBox to generate source code that you can immediately copy and paste into your own application source code.

The Sentinel LDK ToolBox window contains these elements:

- API panel, in which you select the API to work with
- Function pane, in which you select the function to perform
- Display pane, in which you can view and edit the details of the function call you selected
- Generated Code pane, in which code is displayed. You can copy this code and paste it into your own files.
- Handles pane, in which the session handle is displayed



### To launch Sentinel LDK ToolBox:

1. From the **Start** menu, select **Programs > Gemalto Sentinel > Sentinel LDK > Vendor Suite**. The Vendor Suite program selection window is displayed.
2. Click **ToolBox** to launch the Sentinel LDK ToolBox application. The Sentinel LDK ToolBox main window is displayed.

The API panel on the left of the ToolBox window contains all the available APIs. For the selected API, the available functions are displayed.

3. Browse the list. You can select any API, and then select an available function for that API. After you select a function, the Display pane on the right of the ToolBox window displays the parameters that you must specify in order to execute the function call.

## Selecting Your Programming Language

Sentinel LDK ToolBox can generate code in several programming languages.

### To select your programming language:

1. From the **File** menu in Sentinel LDK ToolBox, select **Settings**. The Settings window is displayed.
2. Select the **ToolBox** tab.
3. From the **Programming language** drop-down list, select your preferred language.



For this tutorial, it is recommended that you select **C-API**. If C-API is not selected, select it and click **OK**. If C-API is already selected, click **Cancel**.

The Settings window closes with the programming language selected.

## Starting With Login

Each Sentinel Licensing API session typically begins with the `hasp_login` API call, which establishes a connection with a Sentinel protection key and enables access to its resources. For this lesson, you will connect a Sentinel HL key.



`hasp_get_info()` and `hasp_update()` are standalone functions. You do not have to log in before you call these functions.

### To log in to the Sentinel HL key:

1. Connect a Sentinel HL key.
2. In the Function pane, select `hasp_login`. The Display pane displays all the parameters with the default values that are appropriate for the login operation.
3. Specify the location of your stored Vendor Code file.

To locate your Vendor Code file, click the browse button.

By default, Vendor Codes are stored in:

`%HomePath%\Documents\Gemalto\Sentinel LDK 7.8\VendorCodes`

The file is named according to the label printed on your keys. For example, if the keys are labeled with Batch Code **ABCDE**, by default, your Vendor Code file is named **ABCDE.hvc**.

4. Select your Vendor Code file and click **Open**. The code is displayed in the **Vendor Code** field.
5. In the **Feature ID** field, type `50`.



You must specify a Feature ID that exists in the protection key. If you did not define Feature ID 50 earlier in the tutorial or if you are using a Sentinel HL Basic key, select **0** in the **Feature ID** field.

6. At the bottom left of the `hasp_login` pane, click **Execute**. The result of the executed login is summarized to the right of the **Execute** button in three **Status** fields—number, code and message.

## Encrypting Data and Writing to Memory

Now that you have established a session with the connected Sentinel protection key, you can access its resources through other API calls.

One of the most important and powerful resources available in a Sentinel protection key is its internal encryption engine. You can optimize protection by using this engine and the encryption facilities in Sentinel LDK as an additional method for verifying that the correct key is accessible when the protected program is running. To do this, proceed as follows:


- Encrypt a string using the Sentinel protection key
- Incorporate the encrypted string into the application source code

- Define your source code to send the encrypted string to the key for decryption and then to verify the result


In its encrypted form, the string prevents the program from running correctly. The protected program will run only if it can decrypt the string, and this can only be achieved if the Sentinel protection key is accessible. This section demonstrates how the key encrypts and decrypts a string.

**To encrypt a string:**

1. In the Function pane, select **hasp\_encrypt**. The Display pane displays parameters for the `hasp_encrypt` API call.
2. Specify the **Size** as **100**.
3. Click the first dot to the right of the memory editor, on the far right of the window, and type: **Gemalto, Inc.**
4. Click **Execute**. Note that the string has been encrypted by the Sentinel protection key and is now illegible.

 Sentinel LDK uses a unique encryption key for each encryption process, based on your unique Sentinel Vendor keys and the current Feature. Therefore, the string you type is encrypted differently from any other software vendor (and differently for each Feature)

5. In the Function pane, select **hasp\_decrypt**. The editor still displays the encrypted string.
6. Click **Execute**. The Sentinel protection key decrypts the string. **Gemalto, Inc.** is now displayed in the editor.

 If you are using a Sentinel HL Basic key, you have completed the tutorial. Proceed to *"What's Next?" on page 45.*

## Retrieving Sentinel Protection Key Information

Sentinel LDK ToolBox enables you to retrieve key-related information. In this section, you use the `hasp_get_sessioninfo` function to retrieve information relating to the identity and memory size of the Sentinel protection key.

**To retrieve Sentinel protection key information:**

1. In the Function pane, under **Management**, select **hasp\_get\_sessioninfo**. The Display pane displays parameters for the `hasp_get_sessioninfo` API call.
2. In the Display pane, from the **Format Template** drop-down list, select **HASP\_KEYINFO**. Note that a description of the Format definition is displayed in the gray box below the **Information** field.
3. Click **Execute**. The Information pane displays XML tags with information on the key, including:

- The unique ID number of the connected key
- The key Read/Write memory size
- The key Read-only memory size

## Reading and Programming Sentinel Protection Key Memory

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In this section, you log in to Feature ID 10 on the Sentinel SL key that you defined in *Lesson 4: Defining Products*. You write to and then read from the memory of the protection key.

### *To log in to the Sentinel protection key:*

- Follow the Sentinel HL key login procedure on [page 43](#), but this time, in step 5, type **10**.

### *To program the Sentinel protection key memory:*

1. In the Function pane, under **Memory**, select **hasp\_write**. The Display pane displays parameters for the **hasp\_write** API call and an editor for the Sentinel protection key memory.
2. In the memory editor, set the **Offset** field to **16** and the **Length** field to **24**.
3. On the right side of the pane, click the first “.” and type:  

```
The World says Hello
```
4. Click **Execute**. The string is stored in the protection key memory.

### *To read the Sentinel protection key memory:*

1. In the Function pane, under **Memory**, select **hasp\_read**. The Display pane displays parameters for the **hasp\_read** API call and an editor for the Sentinel protection key memory.
2. In the memory editor, set the **Offset** field to **0** and the **Length** field to **40**.
3. Click **Execute**. The memory editor now displays:
  - the string `Hello world`, which you stored in the key in [Lesson 4: Defining Products](#).
  - the string that you typed above, in step 3.

## What's Next?

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This concludes the Sentinel LDK tutorial. You are now ready to use Sentinel LDK applications to license your software and protect it against unauthorized use.

For additional information about the Sentinel LDK system, refer to the *Sentinel LDK Software Protection and Licensing Guide* and to the Help documentation available in the Sentinel LDK applications.