



## Available Licenses

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## Information About Available Licenses

This section provides information about the licenses that are available on Cisco Catalyst 9600 Series Switches running Cisco IOS-XE software. The information applies to all models in the series, unless indicated otherwise.

### Base and Add-On Licenses

The software features available on the switch fall under base or add-on license levels.

A base license is a perpetually valid, or permanent license. There is no expiration date for such a license.

An add-on license provides Cisco innovations on the switch, and on the Cisco Digital Network Architecture Center (Cisco DNA Center). An add-on license is valid only until a certain date. You can purchase an add-on license for a three, five, or seven year subscription period.

The following base and add-on licenses are available:

#### **Base Licenses**

Network Advantage

#### **Add-On Licenses**

DNA Advantage

#### **Guidelines for Using Base and Add-On Licenses**

- A base license (Network-Advantage) is ordered and fulfilled only with a perpetual or permanent license type.
- An add-on license (DNA Advantage) is ordered and fulfilled only with a subscription or term license type.

- An add-on license level is included when you choose a network license level. If you use DNA features, renew the license before term expiry, to continue using it. If you don't want to continue using DNA features, deactivate the add-on license and then reload the switch to continue operating with the base license capabilities.
- To know which license level a feature is available with, use Cisco Feature Navigator. To access Cisco Feature Navigator, go to <https://cfng.cisco.com>. An account on cisco.com is not required.

## Export Control Key for High Security

Products and features that provide cryptographic functionality are within the purview of U.S. export control laws<sup>1</sup>. The Export Control Key for High Security (HSECK9 key) is an export-controlled license, which authorizes the use of cryptographic functionality.

This subsection provides information about the Cisco Catalyst 9600 Series Switches that support the HSECK9 key, the cryptographic features that require the HSECK9 key, what to consider when ordering it, prerequisites, and how to configure it on supported platforms.

### Supported Platforms and Releases

The HSECK9 key is supported on the Cisco Catalyst 9600 Series 40-Port 50G, 2-Port 200G, 2-Port 400G Line Card (C9600-LC-40YL4CD), starting with Cisco IOS XE Cupertino 17.8.1. This line card is compatible only with Cisco Catalyst 9600 Series Supervisor Engine 2 (C9600X-SUP-2).

For more information about the line card and compatibility, see [Cisco Catalyst 9600 Series Line Card Installation Note](#) and [Cisco Catalyst 9600 Series Switches Hardware Installation Guide](#).

### When an HSECK9 Key Is Required

An HSECK9 key is required only if you want to use certain cryptographic features that are restricted by U.S. export control laws. You cannot enable restricted cryptographic features without it.

The WAN MACsec feature requires an HSECK9 key. More specifically, the HSECK9 key is required on *customer edge devices* in a point-to-point (P2P) and point-to-multipoint (P2MP) network where the WAN MACsec feature is configured.

### Prerequisites for Using an HSECK9 Key

Ensure you meet the following requirements:

- The device is one that supports the HSECK9 key. See [Supported Platforms and Releases, on page 2](#).
- You have configured the DNA Advantage license on the device. You cannot use an HSECK9 key without DNA Advantage configured.
- You have the required number of HSECK9 keys in the applicable Smart Account and Virtual Account in Cisco Smart Software Manager (CSSM).

The HSECK9 key is tied to the *chassis*. Each *chassis* UDI where you want to use a cryptographic feature requires one HSECK9 key. To understand this requirement in the context of a High Availability setup, see [High Availability Considerations, on page 3](#).

<sup>1</sup> the U.S. Government Encryption and Export Administration Regulations (EAR)

- You have implemented one of the supported Smart Licensing Using Policy topologies. This enables you to install a Smart Licensing Authorization Code (SLAC) for each HSECK9 key you want to use.

An HSECK9 key requires authorization *before* use, because it is restricted by U.S. trade-control laws (export-controlled). A SLAC provides this authorization and allows activation and continued use of an export-controlled license. A SLAC is generated in and obtained from CSSM. There are multiple ways in which a device can be connected to CSSM, to obtain a SLAC. Each way of connecting to CSSM is called a topology. The configuration section shows you how to obtain a SLAC with each topology ([Installing SLAC for an HSECK9 Key, on page 7](#)).



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**Note** To obtain and install SLAC on supported platforms that are within the scope of this document ([Supported Platforms and Releases, on page 2](#)), refer to the configuration section in *this* document. There are differences in the configuration process when compared to other Cisco products.

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- You configure the cryptographic feature only after you have installed SLAC. If not, you have to reconfigure the cryptographic feature after installing SLAC.
- The interface on which you configure the cryptographic feature must correspond with a linecard slot where a line card supporting the cryptographic feature is installed.

## Ordering Considerations

This section covers important ordering considerations for an HSECK9 key.

The HSECK9 key is tied to the chassis UDI. Regardless of whether you have a single or dual supervisor set-up, and regardless of the number of linecards where the cryptographic feature is configured, only one license is required for a chassis. A separate HSECK9 key is required for each *chassis* UDI where you want to use a cryptographic feature.

If you plan to use cryptographic functionality on new hardware that you are ordering (supported platforms), provide your Smart Account and Virtual Account information with the order. This enables Cisco to factory-install SLAC.

For information about ordering the key, see the [Cisco Catalyst 9600 Series Switches Ordering Guide](#).

## High Availability Considerations

This section covers the High Availability considerations that apply *when using the HSECK9 key*.

- Supported High Availability setups:

A dual-supervisor setup, where two supervisor modules are installed in a chassis, one being the active and the other, the standby.

All licensing information, such as trust codes, SLAC, RUM reports, are stored on the active supervisor (active product instance) and synchronised with the standby.



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**Note** You cannot use the HSECK9 key in any other High Availability setup. For example, it is not supported in a Cisco Staskwise Virtual setup and in a Quad-Supervisor setup (Quad-Supervisor with Route Processor Redundancy).

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- The number of HSECK9 keys required in a High Availability setup:

The HSECK9 key is tied to the chassis UDI and regardless of the number of supervisors installed, only one HSECK9 key is required for each chassis UDI. The following sample output shows you how the chassis UDI is displayed. The same chassis UDI is also displayed for the active and standby:

```
Device# show license udi
UDI: PID:C9606R,SN:FXS241201WP <<< chassis UDI

HA UDI List:
  Active:PID:C9606R,SN:FXS241201WP
  Standby:PID:C9606R,SN:FXS241201WP
```

- The number of SLACs required in a High Availability setup:

Each HSECK9 key requires one SLAC. The following sample output shows you how SLAC information is displayed. Note how the same SLAC installation timestamp and confirmation code are displayed for all connected devices, because they have the same UDI. Also note the `Total available count`, for HSECK9 key - only one is required for each chassis.

```
Device# show license authorization
Overall status:
  Active: PID:C9606R,SN:FXS241201WP
    Status: SMART AUTHORIZATION INSTALLED on Dec 13 05:18:07 2021 UTC
    Last Confirmation code: 7cf1f54a
  Standby: PID:C9606R,SN:FXS241201WP
    Status: SMART AUTHORIZATION INSTALLED on Dec 13 05:18:07 2021 UTC
    Last Confirmation code: 7cf1f54a

Authorizations:
  C9K HSEC (Cat9K HSEC):
    Description: HSEC Key for Export Compliance on Cat9K Series Switches
    Total available count: 1
```

<output truncated>

- Behavior in the event of a switchover:

The system continues uninterrupted operation of the cryptographic feature in case of a switchover.

Because the HSECK9 key is tied to the *chassis* UDI and not a supervisor module, and because licensing information on the active is synchronized with the standby, a switchover can never result in an interruption in the operation of the cryptographic feature.

- Removal and replacement considerations in a High Availability setup:

See [Hardware Removal and Replacement, on page 4](#).

## Hardware Removal and Replacement

The following constitutes the basis of what you must consider when removing and replacing a supervisor module or linecard

- The HSECK9 key is tied to the chassis.
- Licensing information is saved on the active product instance (active supervisor module). In a High Availability setup, licensing information is synchronized with the standby.
- The cryptographic feature is configured in interface configuration mode. It corresponds with the line card slot where a linecard supporting the cryptographic feature is installed.

The above principles have the following implications when you remove and replace a supervisor module or a linecard:

- In a single supervisor set-up, if you remove the active supervisor and replace it with another one, you have to install SLAC again.
- In a dual supervisor set-up, you can remove and replace either the active or the standby. As long as you are removing and replacing only one supervisor module at-a-time, the system continues operation of the cryptographic functionality, without any interruptions. It is only if you remove both supervisor modules simultaneously that you must install SLAC again, because removing both supervisor modules means that required licensing information is no longer available on the device.
- You can remove and replace a linecard without any interruptions in the operation of the cryptographic functionality, as long as the replacement line card is installed in the *same line card slot*.

If you remove a linecard where cryptographic functionality is configured and install the replacement linecard in a different slot, you may have to reconfigure the cryptographic feature.

For information about the removal and replacement procedures, refer to the [Cisco Catalyst 9600 Series Supervisor Engine Installation Note](#) and [Cisco Catalyst 9600 Series Line Card Installation Note](#) as required.

## How to Configure Available Licenses

This section provides information about how to configure available licenses.

### Configuring Base and Add-On Licenses

After you order and purchase a base or add-on license, you must configure the license on the device before you can use it.

This task sets a license level and requires a reload before the configured changes are effective. You can use this task to

- Change the current license.
- Add another license. For example, if you are currently using Network Advantage and you also want to use features available with the corresponding Digital Networking Architecture (DNA) Advantage license.
- Remove a license.

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode.  Enter your password, if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 3</b>	<p><b>license boot level { network-advantage [ addon dna-advantage ]   network-essentials [ addon dna-essentials ] }</b></p> <p><b>Example:</b></p> <pre>Device(config)# license boot level network-advantage add-on dna-advantage</pre>	<p>Activates the configured license on the product instance.</p> <ul style="list-style-type: none"> <li>• <b>network-advantage [ addon dna-advantage ]</b>: Configures the Network Advantage license. Optionally, you can also configure the Digital Networking Architecture (DNA) Advantage license.</li> <li>• <b>network-advantage [ addon dna-advantage ]</b>: Configures the Network Essentials license. Optionally, you can also configure the Digital Networking Architecture (DNA) Essentials license.</li> </ul> <p>In the accompanying example, the DNA Advantage license will be activated on the product instance after reload.</p>
<b>Step 4</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Device(config)# exit</pre>	Returns to the privileged EXEC mode.
<b>Step 5</b>	<p><b>copy running-config startup-config</b></p> <p><b>Example:</b></p> <pre>Device# copy running-config startup-config</pre>	Saves changes in the configuration file.
<b>Step 6</b>	<p><b>show version</b></p> <p><b>Example:</b></p> <pre>Device# show version</pre> <p>&lt;output truncated&gt; Technology Package License Information:</p> <hr/> <pre>Technology-package     Technology-package Current          Type     Next reboot</pre> <hr/> <pre>network-advantage  Smart License network-advantage     Subscription Smart License dna-advantage</pre> <p>&lt;output truncated&gt;</p>	<p>Shows currently configured license information and the license that is applicable after reload.</p> <p>The “Technology-package Next reboot” column displays the change in the configured license that is effective after reload, only if you save the configuration change.</p> <p>In the accompanying example, the current license level is Network Advantage. Because the configuration change was saved, the “Technology-package Next reboot” column shows that the DNA Advantage license will be activated after reload.</p>
<b>Step 7</b>	<p><b>reload</b></p> <p><b>Example:</b></p> <pre>Device# reload</pre>	Reloads the device.

	Command or Action	Purpose
<b>Step 8</b>	<p><b>show version</b></p> <p><b>Example:</b></p> <pre>Device# show version  &lt;output truncated&gt; Technology Package License Information: ----- Technology-package       Technology-package Current      Type       Next reboot  network-advantage  Smart License       network-advantage dna-advantage      Subscription Smart License dna-advantage  &lt;output truncated&gt;</pre>	Shows currently configured license information and the license that is applicable after reload.

### What to do next

After you configure a license level, the change is effective after a reload. To know if reporting is required, you can wait for a system message or refer to the policy-using show commands.

- The system message, which indicates that reporting is required: %SMART\_LIC-6-REPORTING\_REQUIRED:  
A Usage report acknowledgment will be required in [dec] days.  
[dec] is the amount of time (in days) left to meet reporting requirements.
- If using **show** commands, refer to the output of the **show license status** privileged EXEC command and check the `Next ACK deadline` field. This means a RUM report must be sent and the ACK must be installed by this date.

The method that you can use to send the RUM report, depends on the topology you have implemented. Refer to the workflow for the applicable topology in the [How to Configure Smart Licensing Using Policy: Workflows by Topology](#) section of the *Smart Licensing Using Policy* chapter in this guide.

## Installing SLAC for an HSECK9 Key

This section shows you the various methods of installing SLAC for an HSECK9 key. Each method corresponds with a particular topology in the Smart Licensing Using Policy environment.

For information about all the supported topologies, see the [Supported Topologies](#) section of the *Smart Licensing Using Policy* chapter in this guide.



**Note** The only topology that you *cannot* implement if you want to use an HSECK9 key, is *Connected to CSSM Through a Controller*. The "controller" here is Cisco DNA Center. The Cisco DNA Center GUI does not provide an option to generate a SLAC for Cisco Catalyst switches that support HSECK9.

## Installing SLAC: Connected Directly to CSSM

This task shows you how to request and install SLAC when the device (product instance), is directly connected to CSSM.

### Before you begin

- Ensure that the device is one that supports HSECK9. See [Supported Platforms and Releases, on page 2](#).
- Ensure you have the required number of HSECK9 keys in the applicable Smart Account and Virtual Account in CSSM.
- Ensure that you have completed Steps from 1 through 3 of the *Connected Directly to CSSM* topology. See [Workflow for Topology: Connected Directly to CSSM](#).

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>license smart authorization request {add   replace} feature_name {all   local}</b> <b>Example:</b> Device# license smart authorization request add hseck9 local	Requests a SLAC from CSSM or CSLU or SSM On-Prem. <ul style="list-style-type: none"> <li>• Specify if you want to add to or replace an existing SLAC:               <ul style="list-style-type: none"> <li>• <b>add</b>: This adds the requested key to an existing SLAC. The new SLAC will contain all the keys of the existing SLAC, and the requested key.</li> <li>• <b>replace</b>: This replaces the existing SLAC. The new SLAC will contain only the requested key. All HSECK9 keys in the existing SLAC are returned. When you enter this keyword, the product instance checks if these existing keys are in-use. If they are, an error message is displayed, telling you to first disable the corresponding cryptographic feature.</li> </ul> </li> <li>• <i>feature_name</i>: Enter the name of the export-controlled license for which you want to request an addition or a replacement of the SLAC. Enter "hseck9"</li> </ul>



	Command or Action	Purpose
		<p>to request and install SLAC for the HSECK9 key.</p> <ul style="list-style-type: none"> <li>Specify the device by entering one of these options: <ul style="list-style-type: none"> <li><b>all:</b> Gets the authorization code for <i>all</i> devices in a High Availability and stacking set-up.</li> </ul> </li> </ul> <p><b>Note</b> For stacking scenarios only: If you have added a device (where SLAC is not installed) to an existing stack where SLAC is already installed, use the <b>replace</b> and <b>all</b> options. This requests SLAC for all the devices in the stack. You cannot request SLAC for a particular member. Your only options are: either the active, or the entire stack.</p> <ul style="list-style-type: none"> <li><b>local:</b> Gets the authorization code for the <i>active</i> device in a High Availability and stacking set-up. This is the default option.</li> </ul>
<b>Step 3</b>	<p>(Optional) <b>license smart sync {all   local}</b></p> <p><b>Example:</b></p> <pre>Device# license smart sync local</pre>	<p>Triggers the product instance to synchronize with CSSM, or CSLU, or SSM On-Prem, to send and receive any pending data.</p> <p>This step is optional and applies only to scenarios where the product instance is connected to CSSM, or CSLU or SSM On-Prem, and where the product instance initiates communication. The corresponding topologies are: <i>Connected Directly to CSSM</i>, <i>Connected to CSSM Through CSLU</i> (product instance-initiated), and SSM On-Prem Deployment (product instance-initiated communication).</p> <p>Here, the command manually triggers synchronization and completes the SLAC installation process. Otherwise SLAC is applied to the product instance the next time the product instance contacts CSLU or SSM On-Prem.</p>

**What to do next**

[Required Tasks After Installing SLAC, on page 19](#)

**Installing SLAC: No Connectivity to CSSM and No CSLU**

This task shows you how to request and install SLAC in an air-gapped network, where a device (product instance) cannot communicate online, with anything outside its network.

Here you generate and save the SLAC request to a file, upload it to the CSSM Web UI, download the SLAC code from the CSSM Web UI, and finally, install it on the product instance.

**Before you begin**

- Ensure that the device is one that supports HSECK9. See [Supported Platforms and Releases, on page 2](#).
- Ensure you have the required number of HSECK9 keys in the applicable Smart Account and Virtual Account in CSSM.
- Ensure that you have completed Step 1 of the *No Connectivity to CSSM and No CSLU* topology. See [Workflow for Topology: No Connectivity to CSSM and No CSLU](#).

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>license smart authorization request {add   replace} feature_name {all  local}</b> <b>Example:</b> Device# <b>license smart authorization request add hseck9 local</b>	Generates a SLAC request with the required HSECK9 key and UDI details. Specify if you want to add to or replace an existing SLAC: <ul style="list-style-type: none"> <li>• <b>add</b>: Adds the requested key to an existing SLAC. The new authorization code will contain all the keys of the existing SLAC, and the requested license.</li> <li>• <b>replace</b>: Replaces the existing SLAC. The new SLAC will contain only the requested HSECK9 key. All keys in the existing SLAC are returned. When you enter this keyword, the product instance checks if these existing keys are in-use. If they are, an error message is displayed, telling you to first disable the corresponding feature.</li> </ul> For <i>feature_name</i> , enter the name of the export-controlled license for which you want to request an addition or a replacement of the

	Command or Action	Purpose
		<p>SLAC. Enter "hseck9" to request and install SLAC for the HSECK9 key.</p> <p>Specify the device by entering one of these options:</p> <ul style="list-style-type: none"> <li>• <b>all</b>: Gets the SLAC for <i>all</i> devices in a High Availability set-up</li> </ul> <p><b>Note</b> If you have added a device (where SLAC is not installed), to an existing stack where SLAC is already installed, use the <b>replace</b> and <b>all</b> options. This requests SLAC for all the devices in the stack. You cannot request SLAC for a particular member. Your only options are: either the active, or the entire stack.</p> <ul style="list-style-type: none"> <li>• <b>local</b>: Gets the SLAC for the <i>active</i> device in a High Availability set-up. This is the default option.</li> </ul>
<b>Step 3</b>	<p><b>license smart authorization request save</b><i>path</i></p> <p><b>Example:</b></p> <pre>Device# license smart authorization request save bootflash:slac.txt</pre>	Saves the required UDI and HSECK9 key details for the SLAC request in a .txt file, in the specified location.
<b>Step 4</b>	<p><a href="#">Uploading Data or Requests to CSSM and Downloading a File</a></p>	<p>This task is performed on the CSSM Web UI.</p> <p><b>Note</b> This provision to upload a SLAC <i>request</i> file and to then download a SLAC file is supported starting with Cisco IOS XE Cupertino 17.7.1 only. With earlier releases, you have to enter the required information in the CSSM Web UI, generate a SLAC code in the CSSM Web UI, and then download and install it. The older method continues to be available, but the new method is prone to fewer manual errors and is the recommended way for this topology.</p>
<b>Step 5</b>	<p><b>copy source filename bootflash:</b></p> <p><b>Example:</b></p> <pre>Device# copy tftp://10.8.0.6/user01/example.txt bootflash:</pre>	(Optional) Copies the file from its source location or directory to the flash memory of the product instance. You can also import the file <i>directly</i> from a remote location and install it on the product instance (next step).

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>source:</b> This is the source location of file. The source can be either local or remote.</li> <li>• <b>bootflash:</b> This is the destination for boot flash memory.</li> </ul>
<b>Step 6</b>	<b>license smart import</b> <i>filepath_filename</i> <b>Example:</b> Device# <b>license smart import</b> <b>bootflash:example.txt</b>	Imports and installs the file on the product instance. For <i>filepath_filename</i> , specify the location, including the filename. After installation, a system message displays the type of file you installed.

**What to do next**

[Required Tasks After Installing SLAC, on page 19](#)

**Installing SLAC: Connected to CSSM Through CSLU (Product Instance-Initiated)**

This task shows you how to request and install SLAC when the device (product instance) is connected to CSSM through CSLU and where the product instance initiates communication, that is, the product instance is configured to *push* the required information to CSLU.

**Before you begin**

- Ensure that the device is one that supports HSECK9. See [Supported Platforms and Releases, on page 2](#).
- Ensure you have the required number of HSECK9 keys in the applicable Smart Account and Virtual Account in CSSM.
- Ensure that you have completed Steps 1 through 3 of the *Connected to CSSM Through CSLU (Product Instance-Initiated Communication)* topology. See [Workflow for Topology: Connected to CSSM Through CSLU → Tasks for Product Instance-Initiated Communication](#).

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>license smart authorization request</b> { <b>add</b>   <b>replace</b> } <i>feature_name</i> { <b>all</b>   <b>local</b> } <b>Example:</b> Device# <b>license smart authorization</b> <b>request add hseck9 local</b>	Requests a SLAC from CSSM or CSLU or SSM On-Prem. <ul style="list-style-type: none"> <li>• Specify if you want to add to or replace an existing SLAC:</li> <li>• <b>add:</b> This adds the requested key to an existing SLAC. The new SLAC will contain all the keys of the</li> </ul>

	Command or Action	Purpose
		<p>existing SLAC, and the requested key.</p> <ul style="list-style-type: none"> <li>• <b>replace</b>: This replaces the existing SLAC. The new SLAC will contain only the requested key. All HSECK9 keys in the existing SLAC are returned. When you enter this keyword, the product instance checks if these existing keys are in-use. If they are, an error message is displayed, telling you to first disable the corresponding cryptographic feature.</li> <li>• <i>feature_name</i>: Enter the name of the export-controlled license for which you want to request an addition or a replacement of the SLAC. Enter "hseck9" to request and install SLAC for the HSECK9 key.</li> <li>• Specify the device by entering one of these options: <ul style="list-style-type: none"> <li>• <b>all</b>: Gets the authorization code for <i>all</i> devices in a High Availability and stacking set-up.</li> </ul> </li> </ul> <p><b>Note</b> For stacking scenarios only: If you have added a device (where SLAC is not installed) to an existing stack where SLAC is already installed, use the <b>replace</b> and <b>all</b> options. This requests SLAC for all the devices in the stack. You cannot request SLAC for a particular member. Your only options are: either the active, or the entire stack.</p> <ul style="list-style-type: none"> <li>• <b>local</b>: Gets the authorization code for the <i>active</i> device in a High Availability and stacking set-up. This is the default option.</li> </ul>

	Command or Action	Purpose
<b>Step 3</b>	(Optional) <code>license smart sync {all   local}</code> <b>Example:</b> <pre>Device# license smart sync local</pre>	<p>Triggers the product instance to synchronize with CSSM, or CSLU, or SSM On-Prem, to send and receive any pending data.</p> <p>This step is optional and applies only to scenarios where the product instance is connected to CSSM, or CSLU or SSM On-Prem, and where the product instance initiates communication. The corresponding topologies are: <i>Connected Directly to CSSM</i>, <i>Connected to CSSM Through CSLU</i> (product instance-initiated), and SSM On-Prem Deployment (product instance-initiated communication).</p> <p>Here, the command manually triggers synchronization and completes the SLAC installation process. Otherwise SLAC is applied to the product instance the next time the product instance contacts CSLU or SSM On-Prem.</p>

**What to do next**

[Required Tasks After Installing SLAC, on page 19](#)

**Installing SLAC: Connected to CSSM Through CSLU (CSLU-Initiated)**

This task shows you how to request and install SLAC when the device (product instance) is connected to CSSM through CSLU and where CSLU initiates communication, that is, CSLU is configured to *pull* the required information from the product instance.

This task requires you to configure certain commands on the product instance, certain tasks in the CSSM Web UI, and certain tasks in the CSLU interface.

**Before you begin**

- Ensure that the device is one that supports HSECK9. See [Supported Platforms and Releases, on page 2](#).
- Ensure you have the required number of HSECK9 keys in the applicable Smart Account and Virtual Account in CSSM.
- Ensure that you have completed Steps 1 through 3 of the *Connected to CSSM Through CSLU* (Product Instance-Initiated Communication) topology. See [Workflow for Topology: Connected to CSSM Through CSLU → Tasks for CSLU-Initiated Communication](#).

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>license smart authorization request {add   replace} <i>feature_name</i> {all   local}</b> <b>Example:</b> Device# license smart authorization request add hseck9 local	Requests a SLAC from CSSM or CSLU or SSM On-Prem. <ul style="list-style-type: none"> <li>• Specify if you want to add to or replace an existing SLAC:               <ul style="list-style-type: none"> <li>• <b>add</b>: This adds the requested key to an existing SLAC. The new SLAC will contain all the keys of the existing SLAC, and the requested key.</li> <li>• <b>replace</b>: This replaces the existing SLAC. The new SLAC will contain only the requested key. All HSECK9 keys in the existing SLAC are returned. When you enter this keyword, the product instance checks if these existing keys are in-use. If they are, an error message is displayed, telling you to first disable the corresponding cryptographic feature.</li> </ul> </li> <li>• <i>feature_name</i>: Enter the name of the export-controlled license for which you want to request an addition or a replacement of the SLAC. Enter "hseck9" to request and install SLAC for the HSECK9 key.</li> <li>• Specify the device by entering one of these options:               <ul style="list-style-type: none"> <li>• <b>all</b>: Gets the authorization code for <i>all</i> devices in a High Availability and stacking set-up.</li> </ul> </li> </ul>

	Command or Action	Purpose
		<p><b>Note</b> For stacking scenarios only: If you have added a device (where SLAC is not installed) to an existing stack where SLAC is already installed, use the <b>replace</b> and <b>all</b> options. This requests SLAC for all the devices in the stack. You cannot request SLAC for a particular member. Your only options are: either the active, or the entire stack.</p> <ul style="list-style-type: none"> <li>• <b>local</b>: Gets the authorization code for the <i>active</i> device in a High Availability and stacking set-up. This is the default option.</li> </ul>
<b>Step 3</b>	<a href="#">Requesting SLAC for One or More Product Instance (CSLU Interface)</a>	This task is performed on the CSLU interface.
<b>Step 4</b>	<a href="#">Generating and Downloading SLAC from CSSM to a File</a>	This task is performed on the CSSM Web UI.
<b>Step 5</b>	<a href="#">Import from CSSM (CSLU Interface)</a>	This task is performed on the CSLU interface. After you have completed it, the uploaded codes are applied to the product instances the next time CSLU runs an update.

**What to do next**

[Required Tasks After Installing SLAC, on page 19](#)

**Installing SLAC: SSM On-Prem Deployment (Product Instance-Initiated)**

This task shows you how to request and install SLAC when the device (product instance) is connected to SSM On-Prem and where the product instance initiates communication, that is, the product instance is configured to *push* the required information to SSM On-Prem.

Here you first create a request file in SSM On-Prem, upload the request in the CSSM Web UI, generate SLAC, import the SLAC into the SSM On-Prem server. Finally configure the commands on the product instance to request and install SLAC.

**Before you begin**

- Ensure that the device is one that supports HSECK9. See [Supported Platforms and Releases, on page 2](#).
- Ensure you have the required number of HSECK9 keys in the applicable Smart Account and Virtual Account in CSSM.



- Ensure that you have completed Steps 1 through 3 c. of the *SSM On-Prem Deployment* (Product Instance-Initiated) topology. See [Workflow for Topology: SSM On-Prem Deployment](#) → [Tasks for Product Instance-Initiated Communication](#).

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<a href="#">Submitting an Authorization Code Request (SSM On-Prem UI)</a>	This task is performed on the SSM On-Prem UI.
<b>Step 2</b>	<a href="#">Generating and Downloading SLAC from CSSM to a File</a>	This task is performed on the CSSM Web UI.
<b>Step 3</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 4</b>	<b>license smart authorization request {add   replace} <i>feature_name</i> {all   local}</b> <b>Example:</b> Device# license smart authorization request add hseck9 local	Requests a SLAC from CSSM or CSLU or SSM On-Prem. <ul style="list-style-type: none"> <li>• Specify if you want to add to or replace an existing SLAC:               <ul style="list-style-type: none"> <li>• <b>add</b>: This adds the requested key to an existing SLAC. The new SLAC will contain all the keys of the existing SLAC, and the requested key.</li> <li>• <b>replace</b>: This replaces the existing SLAC. The new SLAC will contain only the requested key. All HSECK9 keys in the existing SLAC are returned. When you enter this keyword, the product instance checks if these existing keys are in-use. If they are, an error message is displayed, telling you to first disable the corresponding cryptographic feature.</li> </ul> </li> <li>• <i>feature_name</i>: Enter the name of the export-controlled license for which you want to request an addition or a replacement of the SLAC. Enter "hseck9" to request and install SLAC for the HSECK9 key.</li> <li>• Specify the device by entering one of these options:</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>all</b>: Gets the authorization code for <i>all</i> devices in a High Availability and stacking set-up.</li> </ul> <p><b>Note</b> For stacking scenarios only: If you have added a device (where SLAC is not installed) to an existing stack where SLAC is already installed, use the <b>replace</b> and <b>all</b> options. This requests SLAC for all the devices in the stack. You cannot request SLAC for a particular member. Your only options are: either the active, or the entire stack.</p> <ul style="list-style-type: none"> <li>• <b>local</b>: Gets the authorization code for the <i>active</i> device in a High Availability and stacking set-up. This is the default option.</li> </ul>
<b>Step 5</b>	(Optional) <code>license smart sync {all   local}</code> <b>Example:</b> <code>Device# license smart sync local</code>	<p>Triggers the product instance to synchronize with CSSM, or CSLU, or SSM On-Prem, to send and receive any pending data.</p> <p>This step is optional and applies only to scenarios where the product instance is connected to CSSM, or CSLU or SSM On-Prem, and where the product instance initiates communication. The corresponding topologies are: <i>Connected Directly to CSSM</i>, <i>Connected to CSSM Through CSLU</i> (product instance-initiated), and SSM On-Prem Deployment (product instance-initiated communication).</p> <p>Here, the command manually triggers synchronization and completes the SLAC installation process. Otherwise SLAC is applied to the product instance the next time the product instance contacts CSLU or SSM On-Prem.</p>

**What to do next**

[Required Tasks After Installing SLAC, on page 19](#)

## Installing SLAC: SSM On-Prem Deployment (SSM On-Prem-Initiated)

This task shows you how to request and install SLAC when the device (product instance), is connected to SSM On-Prem and where SSM On-Prem initiates communication, that is, SSM On-Prem is configured to *pull* the required information from the product instance.

Here you create a request file in SSM On-Prem, upload the request in the CSSM Web UI, generate SLAC, import it into the SSM On-Prem server. Finally, synchronize SSM On-Prem with the product instance.

### Before you begin

- Ensure that the device is one that supports HSECK9. See [Supported Platforms and Releases, on page 2](#).
- Ensure you have the required number of HSECK9 keys in the applicable Smart Account and Virtual Account in CSSM.
- Ensure that you have completed Steps 1 through 3 a. of the *SSM On-Prem Deployment (Product Instance-Initiated)* topology. See [Workflow for Topology: SSM On-Prem Deployment → Tasks for SSM On-Prem Instance-Initiated Communication](#).

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<a href="#">Submitting an Authorization Code Request (SSM On-Prem UI)</a> .	This task is performed in the SSM On-Prem UI.
<b>Step 2</b>	In the SSM On-Prem UI, navigate to <b>Reports &gt; Synchronisation pull schedule with the devices &gt; Synchronise now with the device</b> .	This step is optional. If you don't synchronize immediately after importing the codes, the uploaded codes are applied to the product instances the next time SSM On-Prem runs an update.

### What to do next

[Required Tasks After Installing SLAC, on page 19](#)

## Required Tasks After Installing SLAC

This task shows you the activities that you must complete after installing SLAC. The information here applies to all methods of installing SLAC.

### Procedure

- Step 1** Verify SLAC installation and HSECK9 key usage.
- Check that the output of the **show license authorization** privileged EXEC command displays a timestamp and a last confirmation code.
- In the `Overall Status` section of the output, look for `Status: SMART AUTHORIZATION INSTALLED on <timestamp>` and `Last Confirmation code: <code>`. This means SLAC is installed.

If you have installed SLAC in a High Availability setup, note that the same SLAC installation timestamp and last confirmation code is displayed for all connected devices. In the sample output below, SLAC is installed in a High Availability setup.

- Check that the *usage* count and status in the output of the **show license summary** privileged EXEC command displays 0 and NOT IN USE respectively. This means that the HSECK9 key is available but is not in-use yet.
- The following system messages are displayed after SLAC installation:
  - Error Message %SMART\_LIC-6-AUTHORIZATION\_INSTALL\_SUCCESS: A new licensing authorization code was successfully installed on: [chars].  
[chars] is the UDI where the SLAC was installed.
  - %SMART\_LIC-6-EXPORT\_CONTROLLED: Usage of export controlled features is allowed for feature hseck9.

### Example:

```
Device# show license authorization
Overall status:
  Active: PID:C9606R,SN:FXS241201WP
          Status: SMART AUTHORIZATION INSTALLED on Dec 13 05:18:07 2021 UTC
          Last Confirmation code: 7cf1f54a
  Standby: PID:C9606R,SN:FXS241201WP
          Status: SMART AUTHORIZATION INSTALLED on Dec 13 05:18:07 2021 UTC
          Last Confirmation code: 7cf1f54a

Authorizations:
  C9K HSEC (Cat9K HSEC):
    Description: HSEC Key for Export Compliance on Cat9K Series Switches
    Total available count: 1
    Enforcement type: EXPORT RESTRICTED
    Term information:
      Active: PID:C9606R,SN:FXS241201WP
              Authorization type: SMART AUTHORIZATION INSTALLED
              License type: PERPETUAL
              Term Count: 1
      Standby: PID:C9606R,SN:FXS241201WP
              Authorization type: SMART AUTHORIZATION INSTALLED
              License type: PERPETUAL
              Term Count: 1

Purchased Licenses:
  No Purchase Information Available

Device# show license summary
Account Information:
  Smart Account: Eg-SA As of Oct 07 05:13:33 2021 UTC
  Virtual Account: Eg-VA

License Usage:
  License                               Entitlement Tag                Count Status
  -----
  network-advantage                     (C9600-NW-A)                   2 IN USE
  dna-advantage                          (C9600-DNA-A)                   1 IN USE
  C9K HSEC                               (Cat9K HSEC)                    0 NOT IN USE
```

## Step 2 Configure the cryptographic feature.

The following WAN MACsec configuration is for example purposes only. For information about configuring the feature, see the *MACsec Encryption* chapter of the *Security Configuration Guide, Cisco IOS XE <applicable release number> (Catalyst 9600 Switches)*

### Example:

```
Device# show module
Chassis Type: C9606R

Mod Ports Card Type                               Model                Serial No.
---+-----+-----+-----+-----+-----+-----+-----+-----+-----+
2   24   24-Port 40GE / 100GE                        C9600-LC-24C         FDO24300SBD
3    0   Supervisor 2 Module                            C9600X-SUP-2         FDO24410996
4    0   Supervisor 2 Module                            C9600X-SUP-2         FDO2441090F
5   44   40x10/25/50GE + 2x200GE + 2x400GE             C9600-LC-40YL4CD     FDO245106QU

<output truncated>

Device# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Device(config)# interface FourHundredGigE5/0/44
Device(config-if)# macsec dot1q-in-clear 1
Device(config-if)#
*Dec 13 05:20:04.221: %SMART_LIC-6-EXPORT_CONTROLLED: Usage of export controlled features
is allowed for feature hseck9
Device(config-if)#

Device# show running-config interface FourHundredGigE5/0/44
Building configuration...

Current configuration : 160 bytes
!
interface FourHundredGigE5/0/44
 no switchport
 no ip address
 macsec dot1q-in-clear 1
 eapol destination-address broadcast-address
 eapol eth-type 876F
end
```

### Step 3

Again check HSECK9 key usage.

After you configure the cryptographic feature, the usage count and status in the output of the **show license summary** privileged EXEC command changes to 1 and IN USE, respectively.

### Example:

```
Device# show license summary
Account Information:
  Smart Account: Eg-SA As of Oct 07 05:13:33 2021 UTC
  Virtual Account: Eg-VA

License Usage:
License                               Entitlement Tag       Count Status
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
network-advantage                     (C9600-NW-A)         2 IN USE
dna-advantage                          (C9600-DNA-A)         1 IN USE
C9K HSEC                             (Cat9K HSEC)         1 IN USE
```

### Step 4

Check if reporting is required. The method that you can use to send the RUM report, depends on the topology you have implemented. Refer to the workflow for the applicable topology in the [How to Configure Smart Licensing Using Policy: Workflows by Topology](#) section of the *Smart Licensing Using Policy* chapter in this guide.

To know if reporting is required, you can wait for a system message or refer to the policy using show commands.

- The system message, which indicates that reporting is required: `%SMART_LIC-6-REPORTING_REQUIRED:`  
A Usage report acknowledgement will be required in [dec] days.  
[dec] is the amount of time (in days) left to meet reporting requirements.
- If using **show** commands, refer to the output of the **show license status** privileged EXEC command. Check the `Next ACK deadline` field. You must send the RUM report and ensure that the ACK is installed by this date.

## Returning a SLAC

This task shows you how to return a SLAC and return the HSECK9 key to your license pool in CSSM. You can use this task with all topologies.

You may want to return a SLAC and HSECK9 key under these circumstances:

- You no longer want to use the cryptographic feature, which requires an HSECK9 key.
- You want to return the device for Return Material Authorization (RMA), or decommission it permanently. When you return a device to Cisco, you have to configure the **licence smart factory reset** privileged EXEC command, which removes all licensing information (except the licenses in-use) from the product instance, including any authorization codes, RUM reports and so on. *Before* you perform a factory reset, return the SLAC code. We also recommend that you send a RUM report to CSSM before removing licensing information from the product instance.

### Before you begin

Disable or unconfigure the cryptographic feature for which you used the HSECK9 key.

When the cryptographic feature you are disabling is the WAN MACsec feature, note the following: Even after disabling the cryptographic feature, the output of the **show license summary** command displays the usage count and status for the HSECK9 key as 1 and `IN USE`. This is as expected. The steps in this task show you how to *release* the key, which changes the count and status to 0 and `NOT IN USE`. But you must disable the WAN MACsec feature before you try to release the HSECK9 key.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode. Enter your password, if prompted.
<b>Step 2</b>	<b>show license summary</b> <b>Example:</b> Device# <b>show license summary</b> Account Information: Smart Account: Eg-SA As of Oct 07 05:13:33 2021 UTC	(Optional) Displays license usage summary. This step applies only if you are returning a SLAC.  If the status of the HSECK9 key is displayed as <code>NOT IN USE</code> skip to Step 5.

	Command or Action	Purpose
	<pre>Virtual Account: Eg-VA  License Usage: License           Entitlement Tag              Count Status  network-advantage (C9600-NW-A)                   2 IN USE dna-advantage     (C9600-DNA-A)                   1 IN USE <b>C9K HSEC</b>        (<b>Cat9K HSEC</b>)                   1 IN USE</pre>	<p>If the status of the HSECK9 key is displayed as <code>IN USE</code> even after the cryptographic feature is disabled, then perform the next step. This is the case in the accompanying example.</p>
<b>Step 3</b>	<p><b>platform wanmacsec hsec-license-release</b></p> <p><b>Example:</b></p> <pre>Device# configure terminal Device(config)# platform wanmacsec hsec-license-release HSEC license is released Device(config)# exit</pre>	<p>Enters the global configuration mode, releases the HSECK9 license, and returns to privileged EXEC mode.</p>
<b>Step 4</b>	<p><b>show license summary</b></p> <p><b>Example:</b></p> <pre>Device# show license summary Account Information:   Smart Account: Eg-SA As of Oct 07 05:13:33 2021 UTC   Virtual Account: Eg-VA  License Usage: License           Entitlement Tag              Count Status  network-advantage (C9600-NW-A)                   2 IN USE dna-advantage     (C9600-DNA-A)                   1 IN USE C9K HSEC          (Cat9K HSEC)                   0 NOT IN USE</pre>	<p>(Optional) Displays license usage summary. This step applies only if you are returning a SLAC.</p> <p>Ensure that the status of the license that you want to return is <code>NOT IN USE</code>.</p>
<b>Step 5</b>	<p><b>license smart authorization return {all local} {offline [path]  online}</b></p> <p><b>Example:</b></p> <pre>Device# license smart authorization return all online  OR  Device# license smart authorization return all offline Enter this return code in Cisco Smart Software Manager portal:</pre>	<p>Returns an authorization code back to the license pool in CSSM. A return code is displayed after you enter this command.</p> <p>Specify the product instance:</p> <ul style="list-style-type: none"> <li>• <b>all:</b> Performs the action for all connected product instances in a High Availability or stacking set-up.</li> <li>• <b>local:</b> Performs the action for the active product instance. This is the default option.</li> </ul>

	Command or Action	Purpose
	<pre> UDI: PID:C9606R,SN:FXS241201WP Return code: Cr9JHx-Llx5Rj-ftwzgl-h9QZAU-LE5DT1-babWeL-FABPt9- Wr1Dn7-Rp7  OR Device# license smart authorization return all offline bootflash:return-code.txt </pre>	<p>Specify if you are connected to CSSM or not:</p> <ul style="list-style-type: none"> <li>• If connected to CSSM, or if you have implemented a topology where the product instance-initiates communication (CSLU or SSM On-Prem), enter <b>online</b>. The code is automatically returned to CSSM and a confirmation is returned and installed on the product instance. If you choose this option, the return code is automatically submitted to CSSM.</li> <li>• If not connected to CSSM, or if you have implemented a topology with CSLU-initiated or SSM On-Prem initiated communication, enter <b>offline</b> [<i>filepath_filename</i>]. <ul style="list-style-type: none"> <li>• If you enter only the <b>offline</b> keyword, copy the return code that is displayed on the CLI and enter it in the CSSM Web UI.</li> </ul> <p>Complete this task to enter the return code in the CSSM Web UI: <a href="#">Entering a SLAC Return Code in CSSM and Removing a Product Instance</a>.</p> <li>• If you save the return code to a file, upload the file to CSSM Web UI.</li> </li></ul> <p>For example: Device# <b>license smart authorization return local offline bootflash:return-code.txt</b></p> <p><b>Note</b> This method of returning SLAC is supported starting with Cisco IOS XE Cupertino 17.7.1 only.</p> <p>Complete this task to upload the return request in the CSSM Web UI: <a href="#">Uploading Data or Requests to CSSM and Downloading a File</a>.</p>
<b>Step 6</b>	<p><b>show license authorization</b></p> <p><b>Example:</b></p> <pre> Device# show license authorization Overall status:   Active: PID:C9606R,SN:FXS241201WP   Status: NOT INSTALLED </pre>	<p>Displays licensing information. Check under the License Authorizations header in the output. If the return process is completed correctly, the Last return code: field displays the return code.</p>



	Command or Action	Purpose
	<pre> Last return code: Cr9JHx-Llx5Rj-ftwzgl-h9QZAU-LE5DT1- babWeL-FABPt9-Wr1Dn7-Rp7   Standby: PID:C9606R,SN:FXS241201WP   Status: NOT INSTALLED   Last return code: Cr9JHx-Llx5Rj-ftwzgl-h9QZAU-LE5DT1- babWeL-FABPt9-Wr1Dn7-Rp7  &lt;output truncated&gt; </pre>	

## Feature History for Available Licenses

This table provides release and related information for the features explained in this module.

These features are available in all the releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature	Feature Information
Cisco IOS XE Gibraltar 16.11.1	Base and Add-On Licenses	<p>This feature was introduced.</p> <p>The software features available on Cisco Catalyst 9600 Series Switches fall under base and add-on license levels.</p> <p>See <a href="#">Base and Add-On Licenses, on page 1</a> and <a href="#">Configuring Base and Add-On Licenses, on page 5</a>.</p>
Cisco IOS XE Cupertino 17.7.1	Base and Add-On Licenses	<p>With the introduction of Cisco Catalyst 9600 Series Supervisor Engine 2 (C9600X-SUP-2) in this release, this feature is supported on C9600X-SUP-2.</p> <p>See <a href="#">Base and Add-On Licenses, on page 1</a> and <a href="#">Configuring Base and Add-On Licenses, on page 5</a>.</p>
Cisco IOS XE Cupertino 17.8.1	Export Control Key for High Security (HSECK9)	<p>Support for the HSECK9 key was introduced on the Cisco Catalyst 9600 Series Supervisor Engine 2 (C9600X-SUP-2) and associated line cards.</p> <p>The HSECK9 key is an export-controlled license, which authorizes the use of cryptographic features that are restricted by U.S. export control laws. If you want to use a restricted cryptographic feature, an HSECK9 key is required.</p> <p>See <a href="#">Export Control Key for High Security, on page 2</a> and <a href="#">Installing SLAC for an HSECK9 Key, on page 7</a>.</p>

Use the Cisco Feature Navigator to find information about platform and software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>.

