

# Cisco IOS XRv 9000 Router Smart Licensing

Beginning with Cisco IOS XR Release 5.4, Cisco IOS XRv 9000 Router supports activation using Cisco Smart Licensing. Cisco Smart Licensing removes the requirement of having to install node locked licenses into Cisco IOS XRv 9000 instances.


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# Cisco Smart Licensing

Cisco Smart Licensing is a cloud-based, software license management solution that enables you to automate time-consuming, manual licensing tasks. The solution lets you to easily track the status of your license and software usage trends.

Cisco Smart Licensing helps simplify three core functions:

- Purchasing—The software that you have installed in your network can automatically self-register, without Product Activation Keys (PAKs).
- Management—You can automatically track activations against your license entitlements. Additionally, there is no need to install the license file on every node. You can create license pools (logical grouping of licenses) to reflect your organization structure. Smart Licensing offers you Cisco Smart Software Manager, a centralized portal that enables you to manage all your Cisco software licenses from one centralized website.
- Reporting—Through the portal, Cisco Smart Licensing offers an integrated view of the licenses you have purchased, and what has been actually deployed in your network. You can use this data to make better purchase decisions, based on your consumption.

Cisco IOS XRv 9000 Router only support activation using Cisco Smart Licensing. Cisco Smart Licensing removes the requirement of having to install node locked licenses into Cisco IOS XRv 9000 Router instances. Instead, the Cisco IOS XRv 9000 Router communicates to the Cisco Licensing Cloud (directly, through a

proxy, or through a Smart Licensing Satellite) to provide a report of which features and to what scale the system is being used.

Cisco Smart Licensing uses Cisco Smart Call Home feature to communicate with the Cisco Smart Software Manager. Smart Call Home is auto-configured for default Smart Licensing Setup. For more information about Cisco Smart Call Home and non-default configuration, refer *Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide*, chapter *Configuring Call Home on the Cisco ASR 9000 Series Router*.

Cisco Smart Licensing uses the Cisco Smart Software Manager for managing licenses. To access the Cisco Smart Software Manager, click here.

For information on manually renewing smart license, and deregistering a device from Cisco Smart Licensing, see the section Managing Smart License , on page 5 .

For more information about Cisco Smart Software Manager, see the Cisco Smart Software Manager User Guide, which is accessible from the Cisco Smart Software Manager tool.

# Cisco IOS XRv 9000 Router Licensing Model

The Cisco IOS XRv 9000 Router licensing includes demo and production modes.

***Table 1: Cisco IOS XRv Router Licensing Mode***

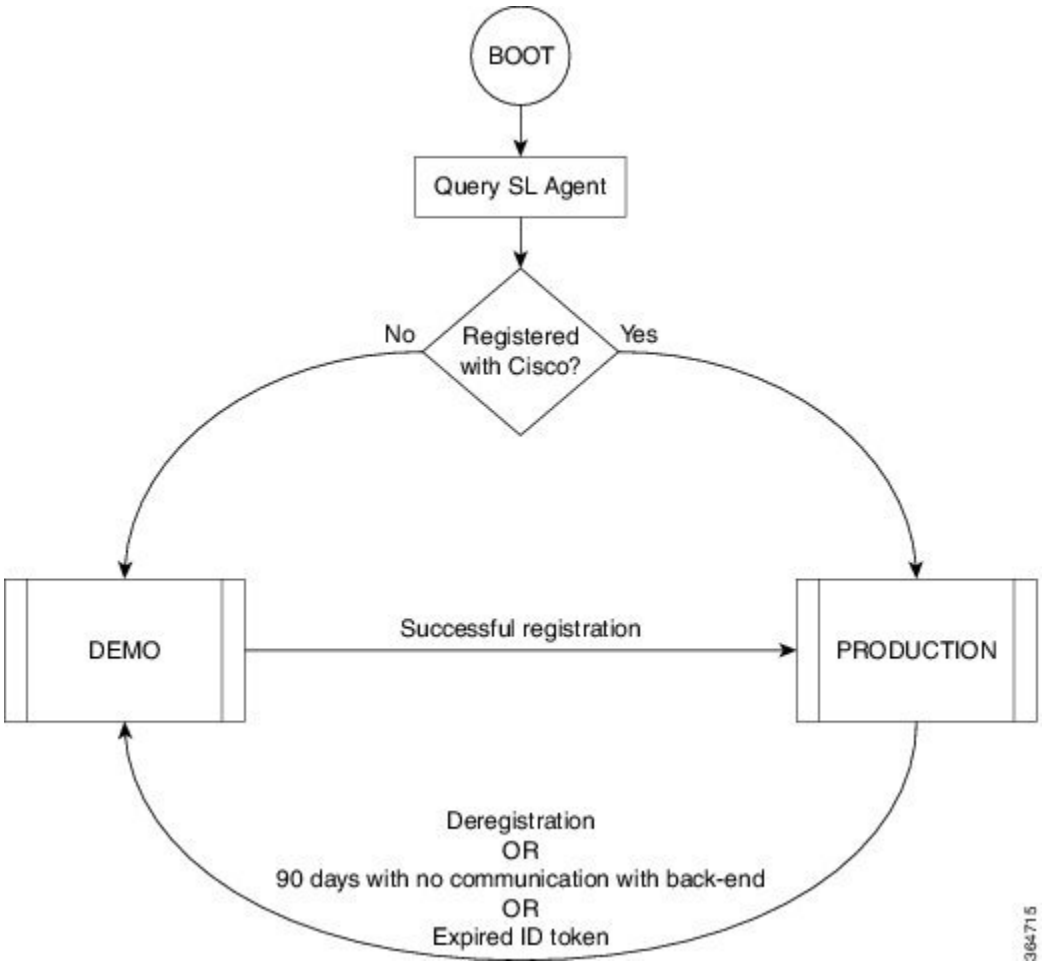
| Mode | Description |
|---|---|
| Demo | • This is the default mode when the router is launched.<br>• No cloud connectivity is required.<br>• No feature level enforcement.<br>• Rate limitations of 200 Kbps for throughput for all interfaces. |
| Production | • This mode requires registration.<br>• No enforcement applied. |

Unlike other Cisco products that have dedicated hardware (ASR9K, NCS 4K, and NCS 6K), because of its virtual nature, Cisco IOS XRv 9000 Router cannot boot into the evaluation mode; this provides users with unlimited access to features without requiring licenses, just by reinstalling the software every few months.

For this reason, when in demo mode, Cisco IOS XRv 9000 Router will impose throughput scale limitations that are sufficiently strong to render the system unusable in a deployment scenario, while remaining fully functional for demonstration purposes.

**Note** When the router is in an unregistered state, the licenses are in EVAL (evaluation) mode. Evaluation period will last for 90 days.

*Figure 1: Licensing Modes*




This figure illustrates the basic state transitions that support demo and production modes:

- The system boots into either demo or production mode, depending on whether the Smart Licensing Agent's state indicates that the system is currently registered with the Cisco back-end, or not
- When in demo mode, the system imposes rate limitations of 200 Kbps for throughput.
- When in production mode, no limitations are imposed, and no enforcement is applied, regardless of whether the customer is in compliance or not, from a licensing point of view. (This is in keeping with the smart licensing principles: each router only reports usage to the back-end, and any out-of-compliance accounts trigger back-end processes to reach out to customers to purchase or renew licenses).

For information on the Cisco IOS XRv 9000 Router license PIDs, refer the latest *Cisco IOS XRv 9000 Router Release Notes*, section *License Ordering Information*.

### Managing Evaluation Periods

Because of the limits imposed in the demo mode, an alternate approach needs to be taken to support customers who wish to evaluate Cisco IOS XRv 9000 Router in an unfettered fashion. This procedure explains the alternate approach:

1. The smart licensing back-end supports virtual accounts as a means for a customer to subdivide their licenses. Usually this applies mostly to larger customers; however it can be leveraged at any place.
2. The customer creates a “virtual account” within their licensing portal, intended only for evaluation purposes.
3. A Cisco representative populates limited-time entitlements for each feature the customer is interested in, into this virtual account.
4. The customer proceeds with registration of the on-router with the same procedure as for production, except in this case the consumed licenses comes from this virtual account.

This procedure has the added benefit of allowing the customer to practice (or automate or both) the registration procedure during the evaluation phase, since the on-router operations are identical.

# Restrictions and Guidelines for Smart Licensing

- Smart Licensing and/or Smart Licensing Using Policy is not supported on the following Cisco XRv9000 appliances:
  - UCS C220 M4S
  - UCS C220 M5SX
  - UCS C220 M7
- Smart Licensing and/or Smart Licensing Using Policy is not required on Cisco IOS XRv 9000 UCS M7 Appliance, as this platform uses a perpetual licensing model.

# Configure Cisco Smart Licence

Cisco IOS XRv 9000 Router comes with a default Smart Call Home configuration sufficient to run Smart Licensing. The Smart Call Home default configuration is triggered by Smart Licensing internally, using a built-in CiscoTAC-1 profile. This default configuration requires router connectivity to cisco.com through traffic or management ports.

There is no intervention required by the customer, except to ensure IP connectivity to the Cisco cloud.

If alternate Smart Licensing configurations are desired through a Smart Call Home Gateway, refer *Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide*, chapter *Configuring Call Home on the Cisco ASR 9000 Series Router*.

# Registering the Cisco IOS XRv 9000 Router with the Cisco Licensing Cloud

Cisco Smart Licensing is always enabled on Cisco IOS XRv 9000 Router. In order to use the router in production mode, you must register the router with Cisco. Using the ID token, the license agent on the router registers the product with Cisco and receives an identity certificate. This certificate is used for all future communications with Cisco. The license agent on the router automatically renews the registration information with Cisco every 30 days.

This registration step is performed once for each product instance.

**Note** License substitution is not supported on XRv 9000 router.

### Procedure

**Step 1** Configure connectivity to cisco.com, either using MgmtEth or other Ethernet interfaces.

**Step 2** Go to the Cisco Smart Software Manager website, select the appropriate account, request an ID token, and copy it to clipboard.

**Step 3** Execute this command on the router **license smart register idtoken** *id-token* in the configuration mode.

The *id-token* is copied in step 2.

Example:

```
Router(config)# license smart register idtoken YjBkOWM5YTItMDFiOS00ZjBmLTllY2YtODEzMzg1YTMyZDVhLTEz
 ODE0MjE0%0ANzc5NDF8U1BDUTAySWFRTmJqa1NnbmlzRUIyaGlYU
053L0pHZTNvUW9VTFpE%0AekxCOD0%3D%0A
```

The system communicates to the Cisco Smart Licensing servers to obtain authorization for Smart Licensing. For information on License Authorization Status, see the Troubleshooting Cisco Smart License Issues, on page 7

# Managing Smart License

The license agent automatically renews the registration information with Cisco every 30 days. However, you can manually renew the Smart License registration. You also have an option to deregister the router from Cisco Smart Licensing. For more information on these options, refer these sections.

### Manually Renewing the Smart License Registration

If you need to manually renew the registration information, execute the **license smart renew** command in EXEC mode.

**Note** Before deleting a VM registered with Cisco, you must deregister it so that it is not counted as one of your entitlements.

### Deregistering a Device from Cisco Smart Licensing

To remove the Cisco Smart Licensing registration for the router instance, execute the **license smart deregister** command in EXEC mode. All Cisco Smart Licensing certificates and entitlements are removed.

# Virtual Unique Device Identifier (vUDI)

Every Cisco platform has a Unique Device Identifier (UDI), which is comprised of the product ID, version, and a serial number. On physical platforms these are burned into the chassis during device manufacture. For virtual platforms, the system generates a serial number, combines it with product ID and version to create virtual UDI.

To view the UDI information of the router, execute **show license udi** command from EXEC mode.

```
RP/0/RP0/CPU0:ios#show license udi
Tue Aug 25 09:47:09.780 UTC

Product Information
===================
UDI:
PID:R-IOSXRV9000-IMG,SN:DF855094AA4,SUVI:R-IOSXRV9000-IMGDF855094AA4,UUID:1BB98DDC-3EE1-4A60-95A6-530870AC19D9
```

Because Cisco IOS XRv 9000 Router is virtual and represented as a virtual disk image, it can be copied or cloned. This can lead to multiple instances with the same vUDI. Because vUDIs are used as part of licensing to identify instances, care must be taken to ensure no collisions occur. However, in a virtualized environment, the instance itself can only work with the information that the hypervisor provides; so the **virtual-platform udi reset** command is provided as a fail-safe mechanism in addition to boot up logic.

**Note** The execution of the **virtual-platform udi reset** command causes the VM to reload.

### UDI Behavior at boot up

When the Cisco IOS XRv 9000 VM instance boots for the first time, a unique serial number (UDI) is created by the Cisco IOS XRv 9000 Router. If the serial number is not created then random number generator generates a serial number for the VM instance, and combines with the product ID and version to create a vUDI. This is stored in secure storage, and cannot be manually changed by the user.

When a VM is copied or cloned, the vUDI associated with VM is duplicated. Hence to mitigate duplication of vUDIs, hypervisor provides a Universally Unique Identifier (UUID) to a VM instance on every boot that is stored in the virtual hard disk. When the router boots for the first time from the virtual hard disk image, it stores the UUID assigned by the hypervisor inside that virtual hard disk. On sub-sequent boots, it compares the new UUID assigned by the hypervisor to what was used during the last boot. If the same hypervisor is booting the same virtual hard disk image, the UUID must remain same. However, if the disk image was copied and run on a different hypervisor, then the UUID would be different. So the system generates a new serial number and creates new vUDI for the cloned VM.

Identical UDIs are detected by the user because:

- random number generator created two identical serial numbers
- hypervisor did not provide UUID.

In this case users can execute the **virtual-platform udi reset** command from Admin mode to generate a new vUDI.

When you execute the **virtual-platform udi reset** command, you will be prompted to confirm, and then you will receive a series of system messages confirming the request. This will cause Smart Licensing to re-register

with the Cisco Smart Software Manager and a new vUID will be assigned to the Cisco IOS XRv 9000 VM instance.

# Troubleshooting Cisco Smart License Issues

To troubleshoot Cisco Smart license issues, these commands are available on all Smart Licensing platforms. These commands can be used to check which entitlements are being consumed, device compliance, etc:

- show license all
- show license status
- show license summary
- show license tech support
- show license udi
- show license usage

These are the Cisco IOS XRv 9000 Router platform specific commands used by Cisco support:

- show license platform detail
- show license platform summary
- show license platform trace

### License Authorization Status

The license authorization status has 4 primary available states:

| Status | Description |
|---|---|
| Registered | Device registration is complete and an ID certificate is received. The ID certificate is used for future communication with the Cisco licensing authority. |
| Authorized | Registration is complete with a valid Smart Account. The license consumption has commenced. This is the indication of being in compliance. |
| Out of Compliance | Consumption exceeds available licenses in the Smart Account. |
| Authorization Expired | The device is unable to communicate with the Cisco Smart Software Manager (CSSM) for an extended period of time. Typically after 90 days this state will be present. The device will attempt to contact the CSSM every hour in order to renew the authorization until the registration period expires. |