# Smart Licensing Troubleshooting and Case Studies

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# Cisco Webex App

## Questions?
Use Cisco Webex App to chat
with the speaker after the session

## How

1. Find this session in the Cisco Live Mobile App
2. Click "Join the Discussion"
3. Install the Webex App or go directly to the Webex space
4. Enter messages/questions in the Webex space

Webex spaces will be moderated
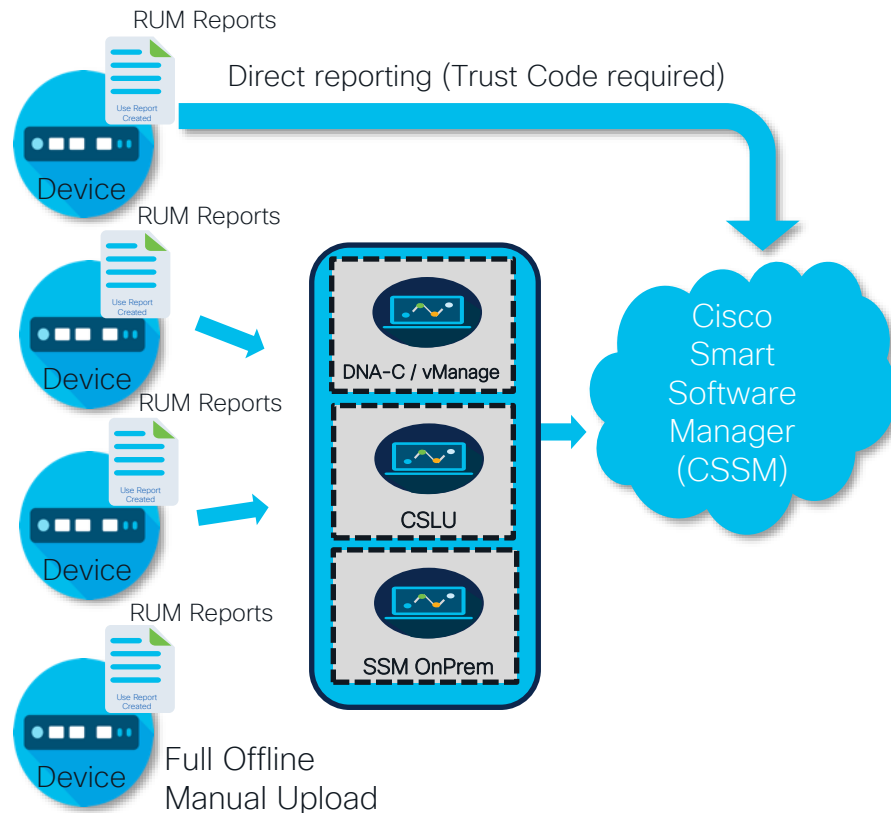until February 24, 2023.

# Agenda

- Introduction

- Deployment Guidelines

- Troubleshooting Smart Licensing

- Case Studies & Recommendations

# Introduction

# Smart Licensing Using Policy

- Smart Licensing using Policy first implemented in IOS-XE version 17.3.2.

- Policy determines the reporting frequency for each license type.

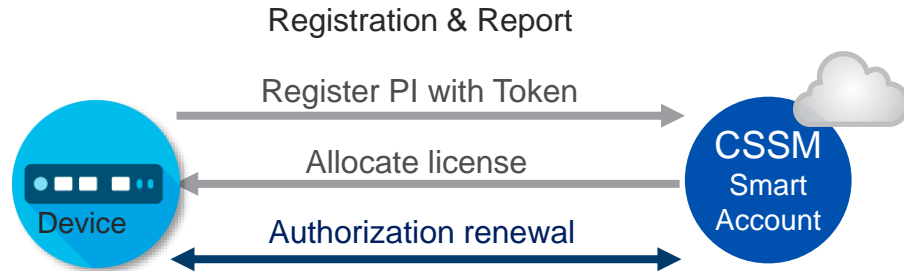- Custom policies available for certain use cases based on contract agreements.



RUM Reports

Direct reporting (Trust Code required)

Device

RUM Reports

Device

RUM Reports

Device

RUM Reports

Device

Full Offline Manual Upload

DNA-C / vManage

CSLU

SSM OnPrem

Cisco Smart Software Manager (CSSM)

# Difference between SL and SLP

**Key Differences**

| Legacy Smart License (SL) | Smart Licensing using Policy (SLP) |
|---|---|
| • Mandatory evaluation mode | • No registration or evaluation mode |
| • Registration to CSSM/satellite for compliance | • Allows usage of un-enforced licenses |
| • Licenses reported at regular intervals | • Usage reports gathered and sent later |

**Registration & Report**

Register PI with Token →

Allocate license ←

**Authorization renewal** ↔

Device — CSSM Smart Account

**Report Only**

Usage Report (RUM) →

Device — CSSM Smart Account
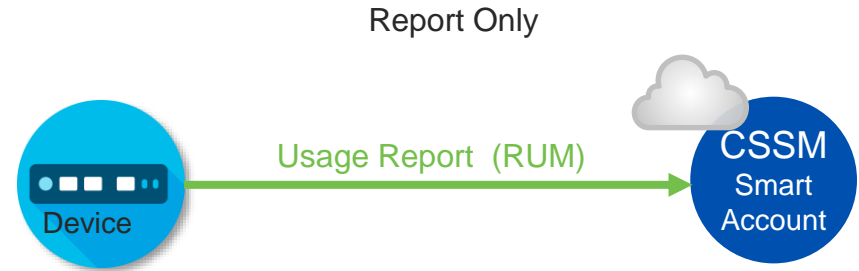
# RUM (Resource Utilization Measurement) report

RUM

➤ Generated by the Product Instance

➤ Generated for each license IN USE

➤ Cisco authentic, cert-signed by the HW chip onboard

➤ Can be pulled from the device via APIs or CLIs

➤ Can be exported from the device to a file

➤ May be accompanied by other requests (e.g. DLC or SLAC request)

➤ An ACK from CSSM may include RUM report IDs, authorization codes, trust codes, policy files

# Reporting: What data does Cisco care about?

| Required data fields for SW reconciliation per customer, per product | |
|---|---|
| UDI | HW Product serial number |
| SW | SW Unique ID SN |
| SW Package + Reg ID | Software product package and entitlement tag |
| Count | Software use count per license entitlement |
| Time and date stamp | Per license entitlement change and use |

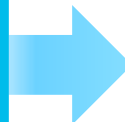Device hostname is included in RUM reports in IOS-XE 17.9.1 onwards.

# SLP Policy (IOS-XE)

## Default policy

✓ Unenforced Perpetual Licenses:
- First report – 365 days
- Subsequent reports – Not required

✓ Unenforced Subscription Licenses:
- First report – 90 days
- Subsequent reports – 90 days

✓ On license change:
- Perpetual – Within 90 days
- Subscription – Within 90 days

Custom policies available based on contract agreements (e.g. military/government devices)

```
#show license status
<...>

Policy:
  Policy in use: Merged from multiple sources.
  Reporting ACK required: yes (CISCO default)

  Unenforced/Non-Export Perpetual Attributes:
    First report requirement (days): 365 (CISCO default)
    Reporting frequency (days): 0 (CISCO default)
    Report on change (days): 90 (CISCO default)

  Unenforced/Non-Export Subscription Attributes:
    First report requirement (days): 90 (CISCO default)
    Reporting frequency (days): 90 (CISCO default)
    Report on change (days): 90 (CISCO default)
```

# Default Policy vs Custom Policy
## Policy definition displayed in "show license all"

**Custom Policy (Example)**

Policy:
  Policy in use: Installed On Jan 10 16:39:30 2023 CET
  **Policy name: <CustomerName Policy>**
  Reporting ACK required: yes (Customer Policy)

  Unenforced/Non-Export Perpetual Attributes:
    First report requirement (days): 365 (Customer Policy)
    Reporting frequency (days): 0 (Customer Policy)
    Report on change (days): 365 (Customer Policy)
  Unenforced/Non-Export Subscription Attributes:
    First report requirement (days): 365 (Customer Policy)
    Reporting frequency (days): 0 (Customer Policy)
    Report on change (days): 365 (Customer Policy)
  Enforced (Perpetual/Subscription) License Attributes:
    First report requirement (days): 0 (CISCO default)
    Reporting frequency (days): 0 (Customer Policy)
    Report on change (days): 0 (Customer Policy)
  Export (Perpetual/Subscription) License Attributes:
    First report requirement (days): 0 (CISCO default)
    Reporting frequency (days): 0 (Customer Policy)
    Report on change (days): 0 (Customer Policy)

**Default Policy**

Policy:
  Policy in use: Merged from multiple sources.
  Reporting ACK required: yes (CISCO default)

  Unenforced/Non-Export Perpetual Attributes:
    First report requirement (days): 365 (CISCO default)
    Reporting frequency (days): 0 (CISCO default)
    Report on change (days): 90 (CISCO default)
  Unenforced/Non-Export Subscription Attributes:
    First report requirement (days): 90 (CISCO default)
    Reporting frequency (days): 90 (CISCO default)
    Report on change (days): 90 (CISCO default)
  Enforced (Perpetual/Subscription) License Attributes:
    First report requirement (days): 0 (CISCO default)
    Reporting frequency (days): 0 (CISCO default)
    Report on change (days): 0 (CISCO default)
  Export (Perpetual/Subscription) License Attributes:
    First report requirement (days): 0 (CISCO default)
    Reporting frequency (days): 0 (CISCO default)
    Report on change (days): 0 (CISCO default)

# Authorization Code (SLAC) for HSEC

HSEC

➢ Required for any purchased export-controlled software

➢ High Performance Security (HSEC) license

  ➢ To enforce a US export law that prevents selling/exporting devices capable of encryption > 250 Mbps to restricted countries.

➢ Requested from CSSM or installed at manufacturing

➢ License status change on the Virtual Account:

Available ➡ Reserved  (not included in RUMs)

➢ SLAC can be returned (reserved license becomes available again)

CISCO Live!

# CSLU Functions

## What is CSLU?

## CSLU Different Form Factor

## CSLU Key Functions

**Cisco Smart License Utility** can be deployed as micro service on Windows/Linux host

Can also be integrated as software component with controller-based products (e.g. Cisco DNA Center)

Able to deliver an on-line or off-line connectivity model for the license data.


CSLU
Windows/Linux


CSLU
Controller


CSLU
SSM On-Prem

Administer all licenses and their associated device

Sends authorization code requests to CSSM, receives authorization codes from CSSM and can install authorization codes on a device

Collects usage reports from the device and upload these usage reports to SA/VA in CSSM

The RUM report ACK from CSSM is collected online, or offline, and provided back to a device

# Deployment Guidelines

# SLP Connected directly to CSSM - 1/2

Config on Product Instance

### 1. Smart Transport Config

```
(config)# license smart transport smart
(config)# license smart url default
```

### 2. Establish Trust with CSSM

```
license smart trust id <token-from-CSSM> all
```

(optional) If non-default trustpoint was configured:

```
(config)# ip http client secure-trustpoint SLA-TrustPoint
```

(optional) If VRF needs to be used:

```
(config)# ip http client source-interface <interface>
   or
(config)# license smart vrf <name>
```

Smart Transport is generally recommended.

Call-Home should work ... but it is legacy.

A single token can be used for multiple products, if it didn't expire.

For Call-Home

For Smart Transport (17.9.x onwards)

CISCO Live!

# SLP Connected directly to CSSM - 2/2

- HTTPS connection to **smartreceiver.cisco.com**
  - Configure DNS or add static host entry
  - Load balancing implemented
  - IP addresses might change (use nslookup, dig or similar utility)

As of February 2023:
- 192.133.220.120
- 173.36.127.32
- 72.163.15.137

- Test connectivity with Telnet instead of ICMP

ICMP blocked

```
$ ping smartreceiver.cisco.com
PING smartreceiver.xglb.cisco.com (173.36.127.32): 56 data bytes
Request timeout for icmp_seq 0
Request timeout for icmp_seq 1
```

Telnet using IPv4

```
$ telnet smartreceiver.cisco.com 443 /ipv4 [/source-int <N>] [/vrf <M>]
Trying 173.36.127.32...
Connected to smartreceiver.cisco.com.
Escape character is '^]'.
```

CISCO *Live!*

# SLP Connected directly to CSSM – Verification

```
show license status
<..>

Transport:
  Type: Smart
  URL: https://smartreceiver.cisco.com/licservice/license
<..>

Usage Reporting:
  Last ACK received: Sep 22 12:54:51 2021 UTC
  Next ACK deadline: <none>
  Reporting push interval: 0 (no reporting)
  Next ACK push check: <none>
  Next report push: <none>
  Last report push: Sep 22 12:48:18 2021 UTC
  Last report file write: <none>

 Trust Code Installed: Sep 22 12:47:40 2021 UTC
```

Smart Transport URL

Last ACK received from CSSM

Last RUM report sent

Trust established with CSSM

# High Security (HSECk9) license

- Enforced license - must be aquired before use
- Requires SLAC to be installed first.

```
ISR4000(config)# license feature hseck9          (Applicable to ISR1k/4k and Catalyst 8200/8300 Edge)

or

C8000v# license smart authorization request add hseck9 local     (Applicable to Catalyst 8000v)

*Mar 11 13:37:57.320: %SMART_LIC-6-AUTHORIZATION_INSTALL_SUCCESS: A new licensing authorization code
was successfully installed on PID:C8000V,SN:99F5xxxxx
*Mar 11 13:37:57.596: %SMART_LIC-6-EXPORT_CONTROLLED: Usage of export controlled features is allowed
for feature hseck9

Cat8000# show license authorization

Overall status:
  Active: PID:C8300-2N2S-6T,SN:FDOxxxxxx
    Status: SMART AUTHORIZATION INSTALLED on May 08 08:45:52 2021 UTC
    Last Confirmation code: xxxxxx
```

# SLP SSM On-Prem

# SLP Connected through On-Prem

**From On-Prem GUI**

**Config on Product Instance**

**Product Registration URL** ✕

https://<On-Prem-FQDN>/cslu/v1/pi/TAC-Workshop-6

*Press ctrl + c to copy selected text to clipboard.*

**1. CSLU URL Config**

```
(config)#license smart transport cslu
(config)#license smart url cslu https://<On-Prem-FQDN>/cslu/v1/pi/TAC-Workshop-6
```

**2. Disable revocation check**

```
(config)#crypto pki trustpoint SLA-TrustPoint
(ca-trustpoint)# revocation-check none
```

No CRL check for TLS certificate self-signed by On-Prem

**3. CLI to Push RUM Report**

```
license smart sync all
```

**(optional) configure HTTP client source interface**

```
(config)# ip http client source-interface <Interface-Name>
```

# On-Prem: Registration URL vs CSLU Transport URL

Smart Software Manager On-Prem > **Smart Licensing**

## Smart Licensing

Alerts | Inventory | Convert to Smart Licensing | Reports | Preferences | Activity

**TAC-Workshop** ▾

Local Virtual Account: **Default**

General | Licenses | Product Instances | SL Using Policy | Event Log

**Local Virtual Account**

| Description | This is the default virtual account created during company account creation. |
| Default Local Virtual Account: | Yes |

**Product Instance Registration Tokens**

The registration tokens below can be used to register new product instances to this Local Virtual Account. For products that support Smart Transport, you must configure the "license smart url" on the product to use the Smart Transport Registration URL. For products that support Smart Licensing Using Policy that use cslu as transport, you must configure the "license smart transport cslu" to use the CSLU Transport URL. For legacy products that still use Smart Call Home, you must configure the "destination address http" on the product to use the Smart Call Home Registration URL. The recommended method is Smart Transport. Please consult your Products Configuration Guide for setting the destination URL value.

New Token...

**Standard SL (Call Home)**

**SL Using Policy**

**Standard SL (Smart Transport)**

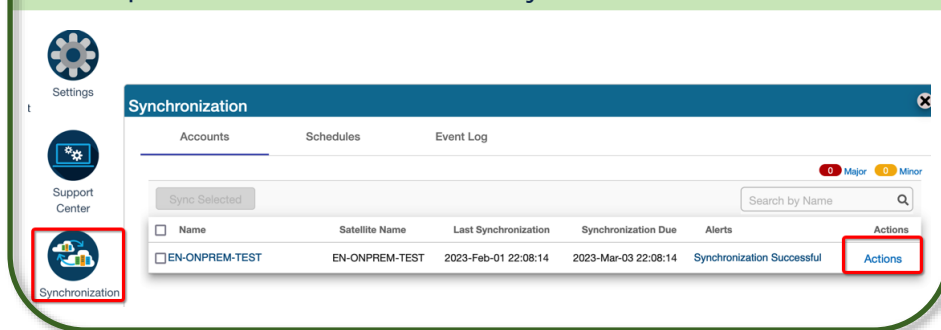https://ssm1-lab.cisco.com/cslu/v1/pi/TAC-Workshop-6

https://ssm1-lab.cisco.com/Transportgateway/services/DeviceRequestHandler

https:// ssm1-lab.cisco.com /SmartTransport

# On-Prem: Host Common Name

On-Prem Admin Workspace



Avoid potential issues with strict SSL certificate check failures

Use FQDN instead of IP address

After modifying Host Common Name perform account synchronization

# On-Prem: Tenants & Local Accounts

SSM On-Prem <CNAME>

Tenant

**ClientA-1**

Local Account XYZ

Local Account ABC

**Default Local Account**

CSLU Transport URL

Device

*license smart url cslu*
*https://<CNAME>/cslu/v1/pi/ClientA-1*

**ClientB-2**

Local Account ABC

**Default Local Account**

CSLU Transport URL

Device

*license smart url cslu*
*https://<CNAME>/cslu/v1/pi/ClientB-2*

Tenant

CSSM
*software.cisco.com*

Smart Account

VA: ClientA

VA: ClientB
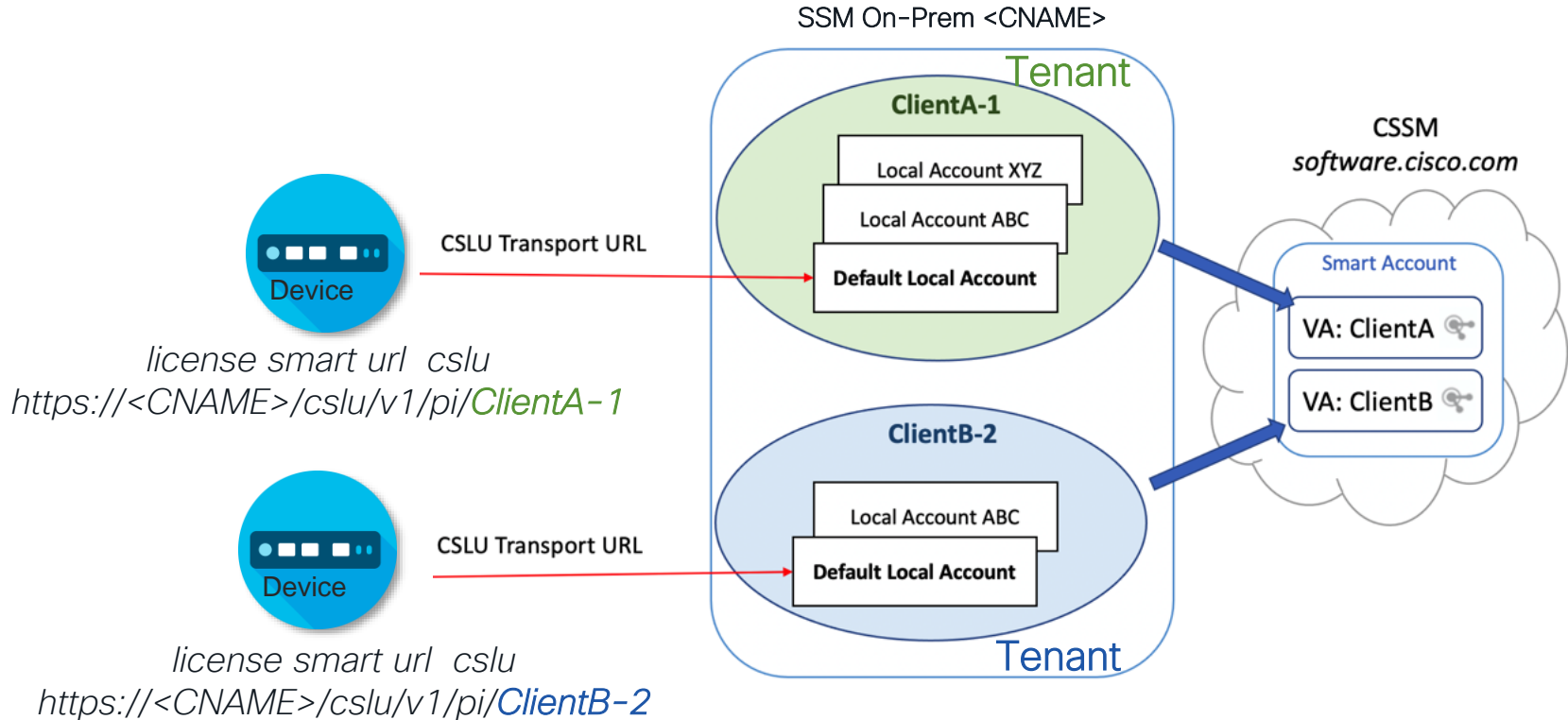
# On-Prem: Account sync vs SLP license usage sync

- **Admin workspace** -> Synchronization
  - Every 30 days or on-demand
  - Standard SL + license count
  - RUM reports for SLP are not included

- **Licensing workspace** -> Reports tab
  - SLP usage sync (1:01 AM daily)
  - Manual: "Synchronize now with Cisco"
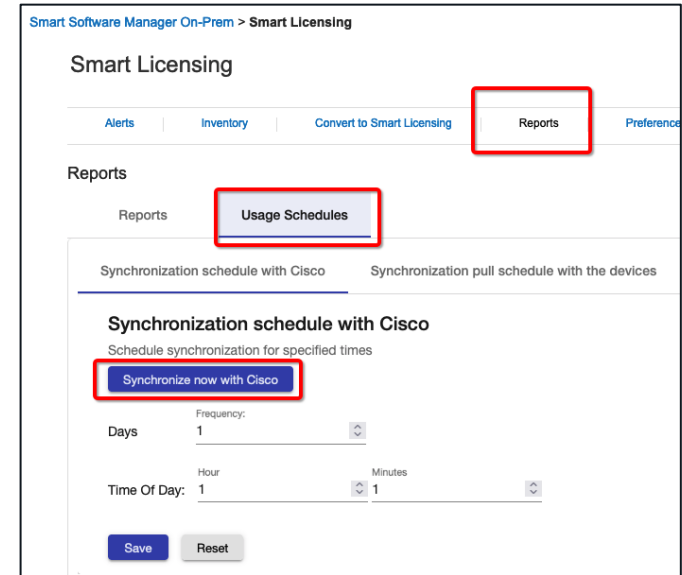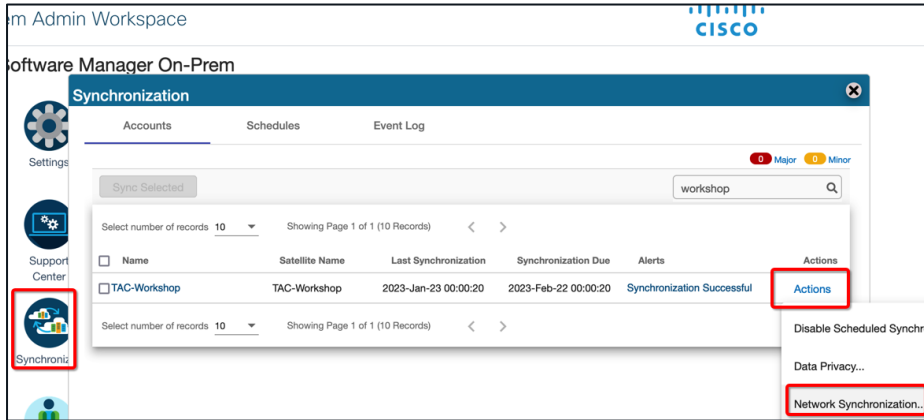
# On-Prem: SLP Sync with CSSM (demistyfied)

- RUM report sent to OnPrem

- Product Instance starts polling for ACK every 5 mins

- OnPrem syncs daily with CSSM (obtains ACK for pending RUMs)
  - or manual sync through **"Synchronize with Cisco"**

- OnPrem responds with ACK upon next check from Product Instance
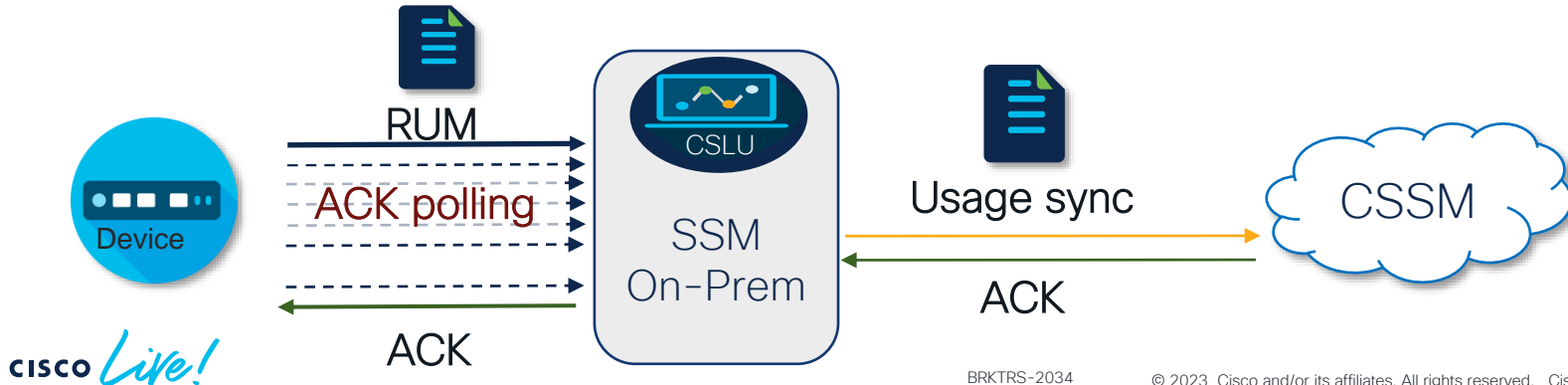
# HSECk9 via SSM On-Prem

➤ Make Product Instance known to SSM On-Prem and CSSM:

1. Push RUM report to SSM On-Prem

2. Perform SLP sync with CSSM

3. Wait for ACK on Product Instance
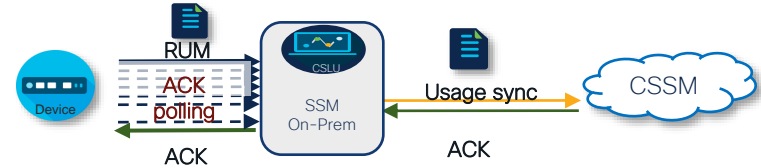


➤ [CSSM] Generate Auth Code for Product Instance, save it as Auth File

➤ [SSM On-Prem] Import Auth File

➤ [Product Instance] Trigger SLAC request

```
license feature hseck9
  or
license smart authorization request add hseck9 local
```

Automated through **Bulk Auth** (available in **SSM 8-202206** and **IOS-XE 17.7.x**)

➤ SSM On-Prem already has the Auth Code (Auth File) and will respond

# SLP CSLU

# CSLU Preferences (Administration Panel)

Devices | Preferences

**Preferences**

**CSSM Connectivity**

[1] CSSM Is Available — CSLU in online mode

CSSM Connection Timeout *
10

CSSM Response *
90

CSSM Retry Interval *
900

CSSM URL *
https://swapi-stage0.cisco.com/services/api/smart-accounts-and-licensing/v2/

HTTP PROXY HOST
http://proxy.esl.cisco.com:80

OAuth URL
https://cloudsso-test.cisco.com/as/token.oauth2

**CSLU Connectivity**

Device Service Port *
8182

REST API Port *
8180

Smart Account
SDWAN LabTests — [2] Smart Account

Virtual Account
SLE_Routing_Demo — [3] Virtual Account

☐ Validate Device — [4]

CSLU Working Directory

Device Initiated — [5] Push Mode

CSLU Initiated - NETCONF
CSLU Initiated - RESTCONF — [6] Pull Mode
CSLU Initiated - REST API

[1] Switch CSLU between Online or Offline Mode.

[2] Select Smart Account

[3] Select Virtual Account

[4] Validated Device: Check to prevent PI to be created on receipt of usage report

[5] Default connection method as Device Initiated (Push)

OR

[6] CSLU Pull mode

# SLP Connected through CSLU – Push Mode

Config on Product Instance

Config on CSLU for Push Mode

1. CSLU URL Config

```
(config)# license smart transport cslu
```

2. CSLU Discovery

```
Option 1: Use DNS to resolve cslu-local
Option 2: Use DNS to resolve cslu-local.<domain_name>
Option 3: Specify CSLU IP address in CSLU URL:
(config)# license smart url cslu http://<cslu-ip>:8182/cslu/v1/pi
```

(optional) configure HTTP client source interface

```
(config)# ip http client source-interface <interface>
```

Leave un-selected →

☐ Validate Device

CSLU Working Directory
C:\Users\Administrator\AppData\R

Default Connection Method

Product Instance Initiated Only

CSLU Initiated - NETCONF

CSLU Initiated - RESTCONF

CSLU Initiated - REST API

# SLP Connected through CSLU – Pull Mode

**Config on Product Instance**

**Config on CSLU for Pull Mode**

**1. CSLU URL Config**

```
(config)# license smart transport cslu
```

(optional) configure HTTP client source interface

```
(config)# ip http client source-interface <interface>
```

(optional) if NETCONF is used

```
(config)# netconf-yang
```

(optional) if RESTCONF is used

```
(config)# ip http secure-server
(config)# restconf
(config)# ip http authentication local
```

1. Add devices manually in CSLU or perform bulk upload with .csv file

**Add Product**

Host Identifier

Host *
172.10.11.2

Connection Method

CSLU Initiated - NETCONF

CSLU Initiated - RESTCONF

CSLU Initiated - REST API

2. Select Product Instance(s) and click "Collect Usage"

# CSLU with HTTPS

- Collect CSLU certificate from CSLU (<working_dir>/conf) and upload it to the IOSXE device



- Create a new trustpoint on the device

- Display the contents of the .crt file

- Import the CSLU certificate under the new trustpoint

- Configure CSLU URL using HTTPS and **port 8543**

```
Router(config)#crypto pki trustpoint CSLU
Router(ca-trustpoint)#enrollment terminal

Router# more bootflash:cslu.crt
<base 64 encoded certificate displayed>

Router(config)#crypto pki authenticate CSLU

Enter the base 64 encoded CA certificate.
-----BEGIN CERTIFICATE-----
<...>
-----END CERTIFICATE-----

% Do you accept this certificate? [yes/no]: yes
% Certificate successfully imported

Router(config)#license smart url cslu https://<IP-addr>:8543/cslu/v1/pi
```
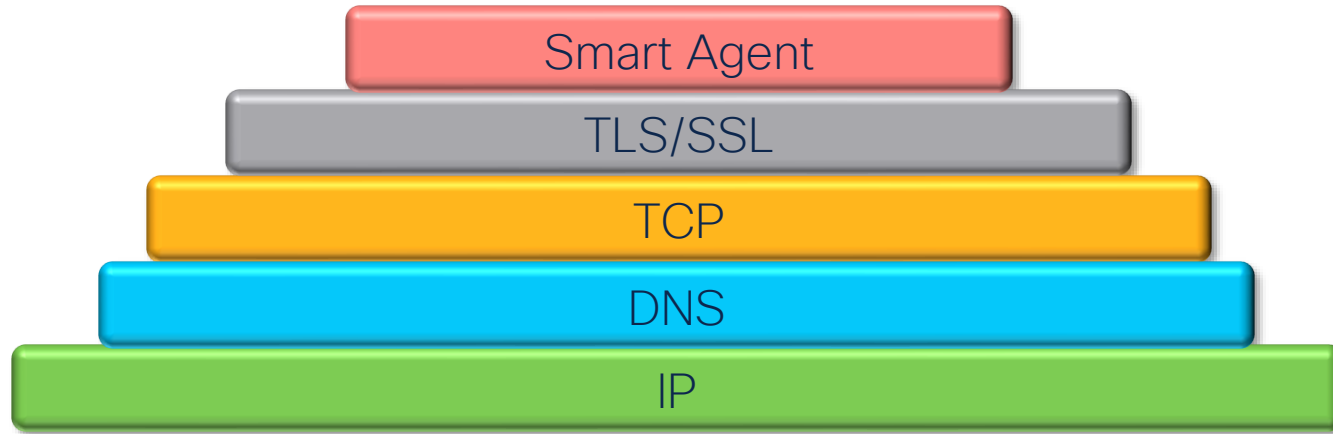
# Is it a Smart Licensing problem?

- Identify the actual troublemaker
- More than one layer might be causing the issue

Smart Agent

TLS/SSL

TCP

DNS

IP

# Useful IOS-XE commands for troubleshooting SLP

- show license status
- show license summary
- show license all
- show license tech support
- show crypto pki trustpoint

One-stop-shop output

**TIP**

show tech license

**TIP**

- show license eventlog [days]    – SL related events
- show license history message    – SL messages exchanged with CSSM / SSM On-Prem

# Licensing communications details

- View messages (XML format) sent between device and CSSM / SSM On-Prem

```
show license history message

Message History (oldest to newest):
===================================
Trust Establishment:

Usage Reporting:

Result Polling:

Authorization Request:

Authorization Return:

Trust Sync:
```

- Did the device send the request?

- Was the response received?

- Any errors reported?

# Viewing RUM reports

RUM

- Examine the status and contents of RUM reports

**IOS-XE 17.6.x and older**

```
(config)# service internal
#test license smart rum id-list
```

**IOS-XE 17.7.x and newer**

```
#show license rum id all
```

```
test license smart rum id-list
report_id:1673725840  state:SmartAgentRumStateUnacknowledged
report_id:1673725841  state:SmartAgentRumStateUnacknowledged
report_id:1673725842  state:SmartAgentRumStateOpen
report_id:1673725843  state:SmartAgentRumStateOpen

test license smart rum show 1673725843
    <snip>
```

```
show license rum id all
Smart Licensing Usage Report:
=====================================
Report Id        State      Flag        Feature Name
1673377132       UNACK      E  ← Error   network-advantage_100M
1673377133       OPEN       N  ← Normal  network-advantage_100M

show license rum id 1673377133 detail
  <snip>
```
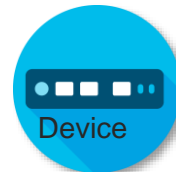
# RUM states

| RUM state | Description |
|-----------|-------------|
| Open | New report created by Smart Agent on the device |
| | |
| | |
| | |

RUM

Open

Device

CSSM

# RUM states

| RUM state | Description |
|-----------|-------------|
| Open | New report created by Smart Agent on the device |
| Closed | RUM report sent to CSSM or saved locally |
| | |
| | |

Open

Closed

RUM

Device

CSSM

# RUM states

| RUM state | Description |
|---|---|
| Open | New report created by Smart Agent on the device |
| Closed | RUM report sent to CSSM or saved locally |
| Unacknowledged | RUM report pending acknowledgement from CSSM (poll ID provided) |
| | |

**Open**

RUM →

**Closed**

← Poll ID

**Unacknowledged**

Device

CSSM

# RUM states

| RUM state | Description |
|-----------|-------------|
| Open | New report created by Smart Agent on the device |
| Closed | RUM report sent to CSSM or saved locally |
| Unacknowledged | RUM report pending acknowledgement from CSSM (poll ID provided) |
| Acknowledged | RUM acknowledged by CSSM |

**Open**

RUM

**Closed**

Poll ID

**Unacknowledged**

ACK request

ACK response

**Acknowledged**

Device

CSSM
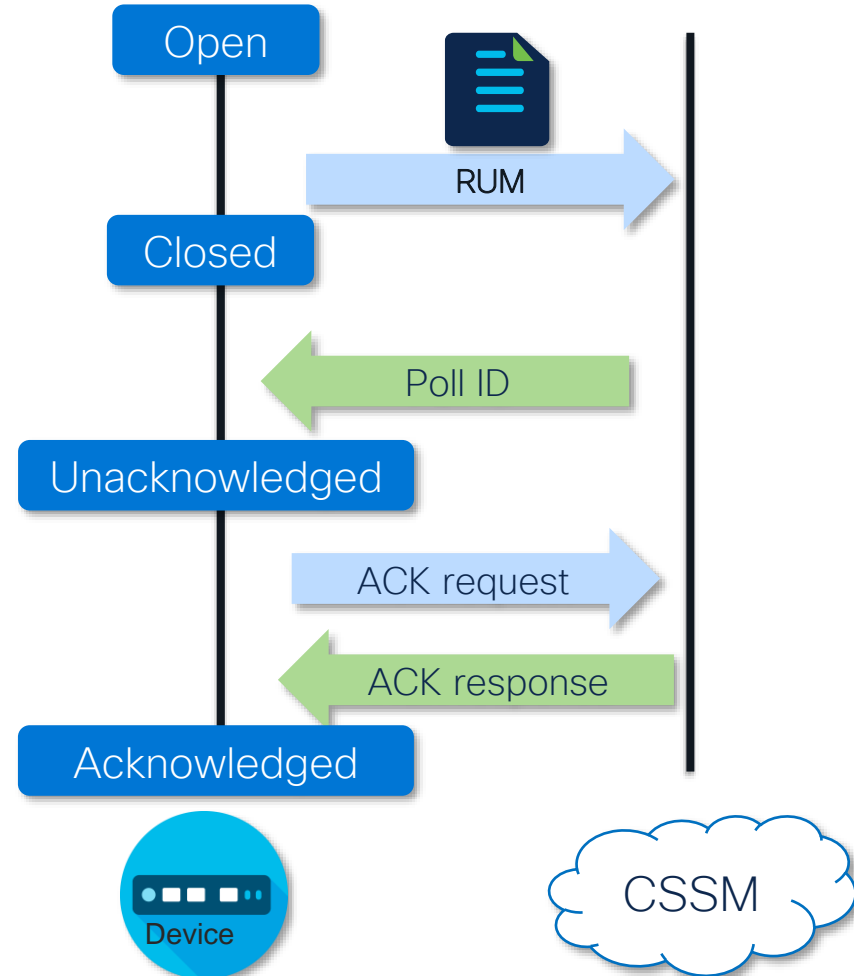
# Useful debugs and traces

- HTTP layer:
  - debug ip http client all

- Crypto layer:
  - debug crypto pki […]
  - debug ssl openssl msg

- Smart Agent layer:
  - show log process iosrp module smart-agent internal start last <X>

# On-Prem: monitoring license usage reporting

- RUM pushed by the device:

| Name | Product Type | Last Contact | Alerts |
|------|-------------|-------------|--------|
| 10.62.154.135 | CAT8500 | 2021-Sep-29 21:58:23 | ✅ Usage report from product instance |

- SLP Sync with CSSM completed:

| Name | Product Type | Last Contact | Alerts |
|------|-------------|-------------|--------|
| 10.62.154.135 | CAT8500 | 2021-Sep-29 22:00:04 | ✅ Acknowledgement received from CSSM |

- ACK pushed to the device upon the next ACK poll:

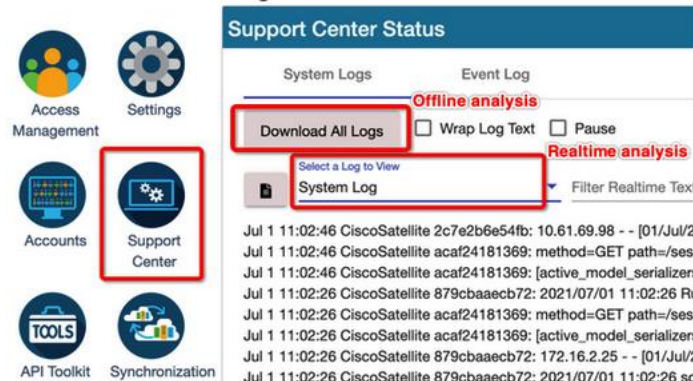| Name | Product Type | Last Contact | Alerts |
|------|-------------|-------------|--------|
| 10.62.154.135 | CAT8500 | 2021-Sep-29 22:03:24 | ✅ Usage report acknowledgement to product instance |

# On-Prem: System logs and DB dump [Admin WS]

- **System logs**:
  - Offline analysis: **Download All Logs**
  - Real-time analysis: **System Log**

- **Database Backup** collection:

1. Connect as admin and log into the console

2. Select the destination, start the DB backup

3. Collect the backup file for analysis

On-Prem Admin Workspace

Smart Software Manager On-Prem

```
$onprem-console

$database_backup
<...>
Database successfully backed up to [destination directory]:
/var/files/backups/onprem-8-202206-2022072016822.sql.gz
```

# Case Studies

# CSLU: Unable to resolve server hostname

```
%SMART_LIC-3-COMM_FAILED: Communications failure with the Cisco Smart License
Utility (CSLU) : Unable to resolve server hostname/domain name
```

- With default config in place (CSLU Transport) RUM reports get sent to „*cslu-local*"

- Example trace message from IOSRP tracelogs:

*{IOSRP R0-0}{1}: [smart-agent] SAUtilReport-URL[http://cslu-local.domain.cisco.com:8182/cslu/v1/pi/hello]*

Solution:

→ configure DNS server to resolve ***cslu-local*** into the IP address of the CSLU (zero-touch)

     or

→ configure CSLU URL pointing to CSLU IP address:

    `(config)# license smart url cslu http://X.X.X.X:8182/cslu/v1/pi`

# CSSM Reachability Issues

```
%SMART_LIC-3-COMM_FAILED: Communications failure with the Cisco Smart
Software Manager (CSSM) : No detailed information given
```

→ HTTPS communication with CSSM could not be established
- → Determine which interface should be the source interface (e.g. management port?)
- → Check if correct HTTP client source interface is configured
- → Check if smartreceiver.cisco.com / tools.cisco.com is resolved into IP address
- → Check if smartreceiver.cisco.com / tools.cisco.com is reachable on TCP port 443
- → Clock not in sync (NTP disabled?)

  *%PKI-2-NON_AUTHORITATIVE_CLOCK: PKI functions can not be initialized until an authoritative time source, like NTP, can be obtained.*

→ Collect debugs (http client, ssl, pki)

# No RUM reports sent

```
Router# show license status
<..>
Usage Reporting:
  Last ACK received: <none>
  Next ACK deadline: <none>
  Reporting push interval: 0 (no reporting)
  Next ACK push check: <none>
  Next report push: <none>
  Last report push: <none>
  Last report file write: <none>


Router# show license summary

License Usage:
  License              Entitlement Tag          Count Status
  --------------------------------------------------------------
  No licenses in use


Router#test license smart rum-report id-list
No report in device
```

```
Router# show version
<..>

License Type: Perpetual
License Level:  <empty>
Next reload license Level:  <empty>
License Type: Subscription
License Level: <empty>
Next reload license Level: <empty>
```

## Solution:

1. Configure "license boot level…"
2. Save the config
3. Reload

# No ACK received from On-Prem

```
Router# show license status
<..>
Usage Reporting:
 Last ACK received: <none>
 Next ACK deadline: Apr 23 20:54:13 2023 UTC
 Reporting push interval: 30  days
 Next ACK push check: Jan 23 22:49:06 2023 UTC
 Next report push: Feb 22 20:49:32 2023 UTC
 Last report push: Jan 23 20:49:15 2023 UTC
 Last report file write: <none>
```

- *"Next ACK push check"* updated every 5 minutes

- Collect:
  - show license eventlog
  - show license history message

- Confirm RUM was successfully sent out

- Confirm On-Prem responded with Poll ID

- In On-Prem GUI (Licensing Workspace) navigate to:

  Reports → Usage Schedules and click **"Synchronize now with Cisco"**

- Allow 5-10 minutes and verify if ACK was received on Product Instance

# High CPU due to a number of RUM reports

```
C9300#show process cpu sorted
CPU utilization for five seconds: 100%/1%; one minute: 61%; five minutes: 28%
 PID Runtime(ms)      Invoked      uSecs    5Sec    1Min    5Min TTY Process
 662   272007421     19185503     14177 60.00% 45.62% 13.41%    0 SAGetRUMIds
 150   310763355     20821285     14925 38.03% 12.50% 13.43%    0 SAUtilRepSave
```

- Buildup of unacknowledged RUM reports due to a communication issue (ACK not received)

Workaround:

→ Set Transport Mode to "OFF"

- No new RUM reports will be generated

→ Licensing Factory Reset

- Clear all saved smart licensing information:
  - Trust code + RUM reports + reporting timestamps + SLAC

```
Device #license smart factory reset
%Warning: reload required after
"license smart factory reset" command
```

# License consumed from incorrect account

| ☐ License | Billing | Available to Use | In Use | Substitution | Balance | Alerts |
|---|---|---|---|---|---|---|
| ⊕ Routing DNA Advantage: Tier 2: 250M | Prepaid | 0 | 2 | - | -2 | ❌ Insufficient Licenses |

**Which Virtual Account do we actually communicate with?**

➢ Device connecting directly to CSSM ⟹ Virtual Account determined by Token-ID

➢ Device connected to CSLU ⟹ Virtual Account selected in CSLU config

➢ Device connected to On-Prem ⟹ Virtual Account determined by CSLU Transport URL

➢ Device air-gapped / off-line ⟹ RUM report uploaded manually to Virtual Account

Workaround:

Transfer the Product Instance to the correct Virtual Account (along with licenses it consumes)

| Actions |
|---|
| Actions ▾ |
| Transfer... |
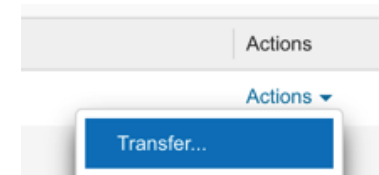
# Wrapping Up

# Key Takeaways

➤ In SLP all unenforced licenses are authorized by default

➤ RUM report created for each license in use

➤ License reporting intervals determined by policy

➤ By default the SLP transport refers to CSLU – modify as needed

➤ Smart Transport preferred over Call Home

➤ Verify connectivity before claiming licensing problem

➤ "License factory reset" is the last resort remedy (reload required)

# Related Sessions@Cisco Live 2023

Smart Licensing with CSSM On-Prem – LABOPS-1159

Hands-on with Smart Licensing using Policy – LABOPS-1007

Cisco DNA Center Licensing for Campus Networks – BRKOPS-2019

Introduction to Smart Licensing using Policy – LTROPS-1007

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# Complete your Session Survey

- Please complete your session survey after each session. Your feedback is very important.

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- All surveys can be taken in the Cisco Events Mobile App or by logging in to the Session Catalog and clicking the "Attendee Dashboard" at https://www.ciscolive.com/emea/learn/sessions/session-catalog.html

# Continue Your Education

Visit the Cisco Showcase for related demos.

Book your one-on-one Meet the Engineer meeting.

Attend any of the related sessions at the DevNet, Capture the Flag, and Walk-in Labs zones.

Visit the On-Demand Library for more sessions at ciscolive.com/on-demand.

Thank you

# SSM On-Prem – important updates

➢8-202102:  support for SLP (integrated CSLU)

➢8-202108:  support for proxy between On-Prem and CSSM + fixes

➢8-202112:  support for SLP Bulk Auth Code + fixes

➢8-202201:  suport for License Hierarchy + fixes

➢8-202206:  support for MSLA, PI Hostname + fixes

➢8-202212:  support for TLS 1.3, SAN extension to Host CNAME,

API enhancements + fixes

# CSLU 2.0 Key Features/Enhancements

➢Bulk Authorization support for SLAC

➢Hostname feature for SLP products, push and pull modes

➢Trust request support so customers can get trust code also via CSLU

➢Scalability fixes for large RUM reports, duplicate RUM reports, etc…

➢Diagnostic Logging for faster customer case resolution.

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