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# Cisco Ultra Packet Core Licensing Quick Reference

## Licensing for Cisco Ultra Packet Core

This article provides information on available licenses and deployment solutions on Cisco Ultra Packet Core (UPC) .

Cisco's Ultra Packet Core licensing is designed to provide flexibility and scalability to meet the diverse needs of service providers.

## Cisco Ultra Packet Core

The Cisco Ultra Packet Core (UPC) is the Virtual Packet Core (VPC) solution that brings together Cisco's UPC and Service Functioning Chaining (SFC) technology into a single, integrated virtual network function (VNF). It also brings a set of tools to automate and simplify the on-boarding, instantiation, and operation of this tightly coupled collection of technologies.

In compliance with 3GPP standard architectural enhancements, Cisco enhanced the operation of the EPC through the separation of Control and User Plane functions. As part of CUPS, Packet Gateway application is split into independent components—Control Plane and User Plane.

- CUPS Control Plane: CUPS Control Plane (CUPS CP) is deployed on either VPC-Distributed Instance (VPC-DI) or VPC-Single Instance (VPC-SI) .
- CUPS User Plane: CUPS User Plane (CUPS UP) is deployed on VPC-SI.

The Cisco UPC (CUPS) solution is based on the StarOS-based VPC platforms.

## Cisco Virtualized Packet Core Distributed Instance

Cisco Virtualized Packet Core—Distributed Instance (VPC-DI) is a solution designed to provide mobile network operators with a scalable, flexible, and efficient way to manage their packet core network functions. VPC-DI supports scalability for virtualized cloud architectures by extending the boundaries beyond a single virtual machine (VM).

The system operates as a fully distributed network of multiple VMs grouped to form a StarOS instance, with VMs performing management and session processing with a standby VM.

## Cisco Virtualized Packet Core Single Instance

Cisco Virtualized Packet Core Single Instance (VPC-SI) is a solution designed to virtualize the packet core functions of a mobile network within a single instance. This approach offers several benefits, particularly for smaller deployments or specific use cases.

VPC-SI addresses the need for virtualized cloud architectures that enable the accelerated deployment of new applications and services in the mobile market.

VPC-SI consolidates the operations of physical Cisco ASR 5500 chassis running StarOS into a single Virtual Machine (VM) able to run on commercial off-the-shelf servers. Each VPC-SI virtual machine operates as an independent StarOS instance, incorporating the management and session processing capabilities of a physical chassis.

## Licensing Solutions and Offerings

Cisco Ultra Packet Core offers licensing solutions for you to manage your licenses.

- **Traditional Licensing:** A model that involves purchasing of a perpetual license for a specific feature set. The license is activated with a license key that is tied to the hardware device. You can activate all available software packages on your network devices and enable all the bundled features. For more information, see [Traditional Licensing](#).
- **Smart Licensing:** A flexible and convenient cloud-based software licensing model that simplifies the management of software licenses across your organization. It automatically creates a pool of licenses or entitlements for use throughout the organization. With Smart Licensing, you only pay for the features you currently need, with the option to upgrade as necessary, ensuring the security of your investment. For more information, see [Smart Licensing](#).
- **Specific License Reservation (SLR):** A solution specifically designed for classified environments where electronic communication is restricted. In such environments, routers are unable to communicate directly with the Cisco Smart Software Manager (CSSM) or through SSM On-Prem. SLR enables the use of all entitlements on the router without the need for communication with Cisco.

## Key Differences between Licensing Solutions

*Table 1: Available Licensing Solutions*

License Attributes	Traditional Licensing	Smart Licensing	Specific License Reservation
Activation of Licenses	Manual registration using Product Activation Keys (PAK)	Registers with CSSM	Generates code from the device to reserve licenses in CSSM
Supported Deployments	Doesn't communicate with CSSM	<ul style="list-style-type: none"> <li>• SSM On-Prem deployment</li> <li>• Direct deployment</li> <li>• Offline deployment</li> </ul>	Offline deployment for air-gapped environments
License Reporting	No reporting. Doesn't communicate with CSSM	Generates Product Instance reports from CSSM or SSM On-Prem	Not applicable for SLR

## License Types

Smart Licensing enables all Parent and Child Licenses based on the Product type. However, the reporting is done only for Parent Licenses.

- **Reporting Licenses (Parent Licenses):** The Parent Licenses report to CSSM and account for usage of licenses. Each Parent Licenses creates the entitlement tags to identify the type service or feature.
- **Non-Reporting Licenses (Child Licenses):** The Child Licenses do not report to CSSM. Child licenses are enabled by default with the Parent Licenses and do not have Entitlement tags.

## Reporting Licenses

Reporting licenses provide software and entitlements tags help to identify, report, and enforce licenses. These are the two types of reporting licenses.

- **Software Tags:** Software tags identify each licensed software product or product suite uniquely on a device.
- **Entitlement Tags:** Entitlement tags identify licenses in use for each product type.

**Table 2: Software Tags**

Description	Software Tag
CUPS_CP or 4G CUPS - Control Plane	regid.2020-08.com.cisco.CUPS_CP, 1.0_7afd7a3c-38dd-4a04-aecc-26df25029649
CUPS_UP or 4G CUPS - User Plane	regid.2020-08.com.cisco.CUPS_UP, 1.0_fd28551c-a541-4902-87af-bba2d6b33cf1

**Table 3: Entitlement Tags**

Description	Entitlement Tag	License Type	Reporting Slab	Tag Name
4G CUPS CP 1K or 4G CUPS Control Plane 1K Sessions	regid.2020-08.com.cisco.L_CUPS_CP_SAE_1K, 1.0_a84e70b6-d3f9-41c9-8449-4b7bb7426b30	Counting	1K	L_CUPS_CP_SAE_1K
4G CUPS UP 1K or 4G CUPS User Plane 1K Sessions	regid.2020-08.com.cisco.L_CUPS_UP_SAE_1K, 1.0_41005ab7-1ad0-46ac-905b-c3c5ed402981	Counting	1K	L_CUPS_UP_SAE_1K
4G CUPS UP Instances or 4G CUPS User Plane Instances	regid.2020-08.com.cisco.F_CUPS_UP_INS, 1.0_897c46a0-04b5-4fdb-bedd-9d5fb75bdb76	On/Off	1/0	F_CUPS_UP_INS

## Non-Reporting Licenses

Child Licenses are enabled by default when the Parent Licenses are enabled.

License Description	License Type
PGW 1K sessions	Counting
SGW 1K sessions	Counting
GGSN 1K sessions	Counting
Per Subscriber Stateful Firewall 1K sessions	Counting
ENAT 1K sessions	Counting
Enhanced Charging Bundle 1	Counting
Enhanced charging bundle 2	On/Off
Dynamic policy interface	On/Off
Enhanced LI service	On/Off
Lawful intercept	On/Off

<b>License Description</b>	<b>License Type</b>
Session recover	On/Off
Radius AAA server group	On/Off
IPv6	On/Off
Intelligent Traffic Control	On/Off
DIAMETER Closed-Loop Charging Interface	On/Off
Per-Subscriber Traffic Policing/Shaping	On/Off
Dynamic Radius extensions (CoA and PoD)	On/Off
Proxy MIP	On/Off
FA	On/Off
IPSec	On/Off
Inter-Chassis Session Recovery	On/Off
ICSR/SR Performance Improvements	On/Off
ICSR Enhanced Recovery for Data and Control Plane 1K sessions	On/Off
MPLS	On/Off
TACACS+	On/Off
NAT/PAT With DPI	On/Off
Rate Limiting Function (Throttling)	On/Off
Overcharging Protection for EPC-GW	On/Off
Overcharging Protection Upgrade for EPC-GW	On/Off
ADC Trigger Over Gx, 1K sessions	On/Off
Gx Based Virtual APN Selection 1K sessions	On/Off
EPC-GW Support for Wi-Fi Integration 1K sessions	On/Off
EPC-GW Non-Standard QCI Support 1K sessions	On/Off
Local Policy Decision Engine	On/Off
Header Enrichment	On/Off
HTTP Header Encryption	On/Off
HTTP Header Enrichment and Encryption	On/Off
Broadcast & Multicast Services	On/Off

License Description	License Type
Integrated Content Filtering Provisioned Service	On/Off
Application Detection and Control 1K sessions	Counting
5G NSA Feature Set 100K sessions, VPCSW Active 1K sessions	Counting
5G NSA Enablement Fee, Network Wide	On/Off
Multimedia Priority Service Feature Set 1K sessions	On/Off
EPC Gw VoLTE enhancements	On/Off
DNS Snooping	On/Off

## Enforcement Policy

Cisco's license enforcement policy outlines how on/off feature licenses are managed and enforced. These licenses are tied to service licenses, which may use the on/off features. The policy also describes the handling of compliance, evaluation periods, and out-of-compliance (OOC) scenarios.

A 90-day evaluation period is granted for all licenses in use. You can use all feature licenses without any limitation, and up to one counting license. The evaluation period ends when the system registers successfully with the CSSM.

### Handling Out of Compliance

If there are not enough licenses in the virtual account for a given SKU, CSSM sends an Out Of Compliance (OOC) message to the device. The system stops allowing extra sessions until the OOC state is cleared. The OOC state is cleared when the device receives an authorized response

A 90-day grace period is granted when the account in OOC state. The the system generates SNMP traps to inform of the unavailability of valid licenses.

You can view the enforcement policy on your device with the **show license enforcement policy** command.

You can view the enforcement status with the **show license enforcement status** command.

If the feature license is in...	then...
90-day grace period	purchase and register licenses for the feature, or disabe the feature.
90-day grace period expires	OOC is enforced for each license and new calls for the corresponding services to the on/off licenses are dropped. cleat the OOC message by authorizing the licenses.

# Revision History

**Table 4: Feature History Table**

Feature Name	Release Information	
Smart Licensing	Pre 21.24	Smart Licensing is a cloud-based approach to licensing that simplifies the purchase, deployment, and management of Cisco software assets. Entitlements are purchased through your Cisco account via Cisco Commerce Workspace (CCW) and immediately deposited into your Virtual Account for usage eliminating the need to install license files on every device. Products that are smart-enabled, communicate directly to Cisco to report consumption.
Smart Licensing support for On/Off feature Licenses	21.6	Smart Licensing supports on/off feature licenses. In earlier releases Smart Licensing only supported counting licenses
Mixed mode support for PAK-based licensing and Smart Licensing	21.3	Legacy (PAK-based) licenses continue to be used for On/Off features.  Smart licensing is used for counting each service. Entitlement Tag licenses are managed by Smart Licensing. All other counting licenses use PAK-based licenses.
Support for Smart Licensing on VPC-DI and VPC SI	21.3	Smart Licensing is a cloud-based approach to licensing that simplifies the purchase, deployment, and management of Cisco software assets. Entitlements are purchased through your Cisco account via Cisco Commerce Workspace (CCW) and immediately deposited into your Virtual Account for usage eliminating the need to install license files on every device. Products that are smart-enabled, communicate directly to Cisco to report consumption.