Cisco Carrier Routing System Carrier Grade Services Engine PLUS Module

Product Overview

The Cisco® Carrier Routing System (CRS) offers industry-leading performance, advanced services intelligence, environmentally conscious design, and system longevity. The Cisco CRS is powered by an advanced chipset architecture based on multidimensional engineering and Cisco IOS® XR Software, which is a unique self-healing, distributed operating system.

Packet-based data communications is being replaced by video and multimedia transported over the IP next-generation network (NGN) in multiple directions. This changing traffic pattern poses new challenges for the architectural foundations of both public and private networks that serve businesses and consumers. As part of the medianet, a media-aware Cisco IP NGN, the Cisco CRS delivers highly reliable operations and scales easily from single-chassis form factors to a massive multichassis system. Its design provides industry-leading efficiency, with exceptionally low consumption of power, cooling, and rack-space, while delivering the bandwidth and intelligence required for multimedia services. The Cisco CRS-3 model builds on the CRS-1. It is backward-compatible and forward-compatible to help protect existing and future investments for decades to come.

The Cisco CRS Carrier Grade Services Engine PLUS (CGSE-PLUS) is an important element of the Cisco High-Scalability Solution. The Cisco CGSE-PLUS hardware (Figure 1) is an integrated multi-CPU service module offering carrier-class performance and scale. The Cisco CGSE-PLUS is designed for IP NGNs that can integrate routing with several intelligent applications. The Cisco CGSE-PLUS can run Cisco Open Network Environment Platform Kit (Cisco OnePK) applications, software-defined networking (SDN) applications, analytics applications, Cisco Carrier-Grade IPv6 Solution applications, and anti-distributed denial of service (DDoS) applications.

The Cisco CGSE-PLUS is a single-slot module supported on all Cisco CRS-1 and Cisco CRS-3 models. The Cisco CGSE-PLUS is second-generation hardware for the Cisco Carrier Grade Services Engine (CGSE) Physical Layer Interface Module (PLIM) that was released in November 2010.

Software-Defined Networking and Analytics

The Cisco CRS-1 and Cisco CRS-3 router models support SDN infrastructure through the Cisco OnePK services set, supported by Cisco IOS® XR Software. The OnePK service set in the Cisco CRS-1 and Cisco CRS-3 router platforms can run several applications in blade-hosting mode or external server-hosting mode. The Cisco CGSE-PLUS next-generation carrier-class services hardware is designed to host the Cisco OnePK applications on Cisco CRS-1 and CRS-3 routers. The Cisco OnePK applications can also be integrated with analytics applications and help ensure intelligent routing mechanisms, new monetizing opportunities, and optimized network infrastructure for service providers.

Carrier-Grade IPv6 Solution

The Cisco Carrier-Grade IPv6 Solution, running on one or more Cisco CGSE-PLUS modules inside a Cisco CRS, can scale to tens of millions of IP address translations, with tens of gigabits of performance to address IPv4 run-out and facilitate IPv6 transition. Several modules can be populated within a chassis for a high-performance

solution that can be deployed in network locations that allow increased Cisco Carrier-Grade IPv6 coverage. The Cisco CGSE-PLUS supports a highly available architecture with line-rate accounting and logging of translation information. The platform's Cisco IOS XR Software offers a flexible means to divert selected packets through the Cisco CGSE-PLUS, while allowing global IPv4 and IPv6 packets to flow through the Cisco CRS forwarding infrastructure as usual.

Figure 1. Cisco CRS Carrier-Grade Service Engine PLUS

Powerful Performance

The Cisco CGSE-PLUS housed inside a Cisco CRS offers carrier-class performance for Cisco Carrier-Grade IPv6 services:

- More than 1 million connection setups per second for stateful IPv4 and IPv6 Network Address Translation (NAT)
- Real-time off-box logging of NAT states using Cisco NetFlow Version 9
- Line-rate forwarding for IPv4 and IPv6
- Powerful performance that helps ensure an outstanding end-user experience for all services

Exceptional Scalability

As an increasing number of subscribers and applications rely on the network, the Cisco CGSE-PLUS scales to support this growth:

- Up to 80 million stateful NAT translations per Cisco CGSE-PLUS module
- Support for tens to hundreds of thousands of private IPv4 subscribers accessing the public IPv4 Internet
- Support for tens to hundreds of thousands of IPv6 subscribers accessing the IPv4 Internet
- Support for multiple Cisco CGSE-PLUS modules in a chassis, allowing performance to be increased linearly

Integrated Services

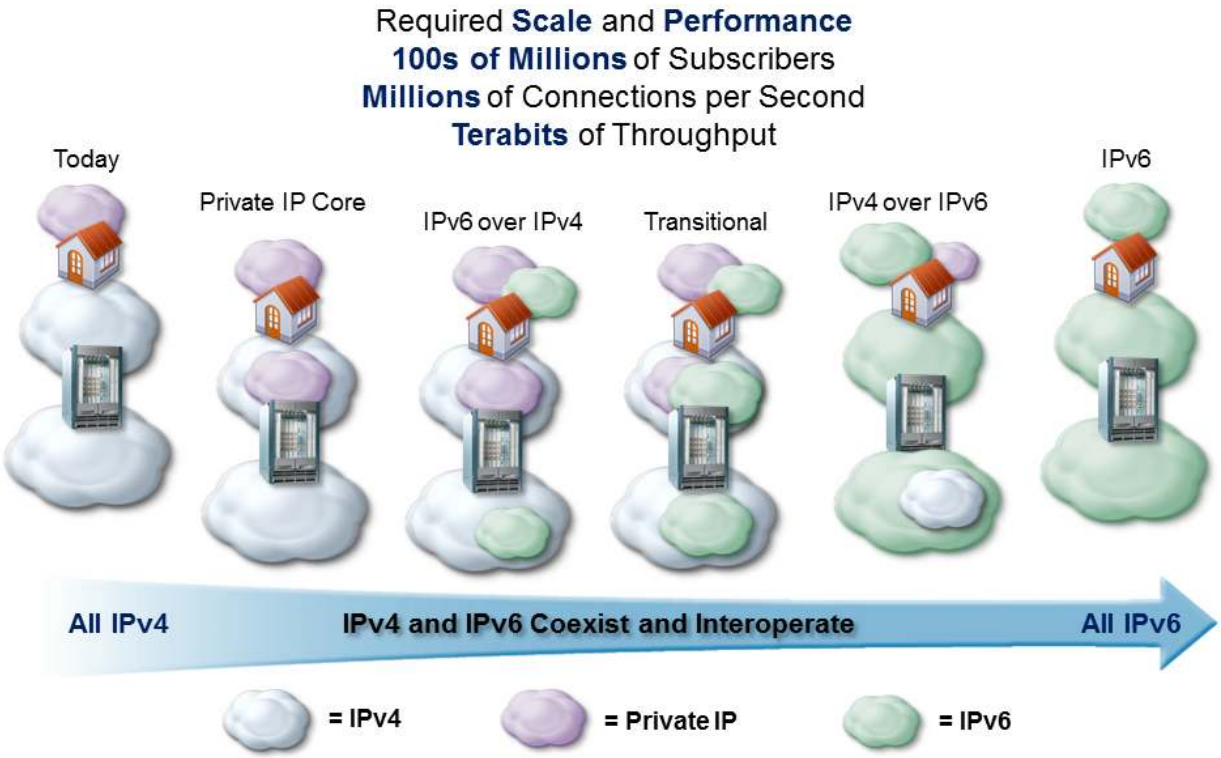
The Cisco CGSE-PLUS module is designed for the proven Cisco CRS high-end routing platform. It is supported on all form factors of the Cisco CRS-1 and Cisco CRS-3, 8-slot, 16-slot, and multichassis versions. With these deployment options, service providers can scale the Cisco CGSE-PLUS to their needs. The Cisco CGSE-PLUS is also integrated with the routing intelligence of the Cisco CRS, providing the unmatched operational efficiencies of a single OS. Because the Cisco CRS platform supports secure domain routing (SDR), service providers can integrate the Cisco CGSE-PLUS on a virtualized network infrastructure.

The following services are available on the Cisco CGSE-PLUS: Full IPv4 and IPv6 routing and forwarding on the Cisco CRS platform

- Service provider-class stateful IPv4 Network Address Translation (NAT44) to address IPv4 run-out, based on IETF NAT behaviors described in RFCs 4787, 5382, and 5508
- IPv6 Rapid Deployment Border Relay (6rd BR, described in RFC 5969)
- Stateful and stateless IPv4 and IPv6 translation, based on IETF BEHAVE specifications

The Cisco CGSE-PLUS interface module on the Cisco CRS offers service providers a near-term solution to address IPv4 run-out and preserve their present mode of operation. It also provides one or more low-risk, cost-effective means to activate IPv6 tunneling and translation functions.

Figure 2. Cisco Carrier-Grade IPv6



Product Specifications

Table 1 provides product specifications for the Cisco CRS Carrier-Grade Service Engine (CGSE-PLUS).

Table 1. Product Specifications

Feature	Description
Chassis compatibility	All current Cisco CRS-3 line-card chassis
Forwarding-engine compatibility	Cisco forwarding engines: CRS-MSC-140G andCRS-FP-140
Software compatibility	Cisco IOS XR Software Release 4.3.1
Protocols	• NAT44 (RFCs 4787, 5382, and 5508) • Cisco NetFlow Version 9 • Port Control Protocol (RFC 6887)

Feature	Description
Feature summary	• NAT44 • IPv6 Rapid Deployment Border Relay (6RD BR)
Performance	• 80 Gbps of throughput • Maximum number of PLIMs per chassis: ◦ 8 slots: 5 ◦ 16 slots: 10
Reliability and availability	• Online insertion and removal (OIR) without affecting system traffic
Network management	• Cisco IOS XR Software command-line interface (CLI) • XML interface • Cisco Active Network Abstraction (ANA)
Physical dimensions	• Occupies one PLIM slot on a Cisco CRS chassis • Weight: 7.05 lbs (3.2 kg) • Height: 1.675 in. (4.255 cm) • Depth: 11.13 in. (28.4 cm) • Width: 20.6 in. (52.2 cm)
Power	150W
Environmental conditions	• Storage temperature: –40 to 158℉ (–40 to 70℃) • Operating temperature: ◦ Normal: 41 to 104℉ (5 to 40℃) ◦ Short-term: 23 to 122℉ (–5 to 50℃) • Relative humidity: ◦ Normal: 5 to 85% ◦ Short-term: 5 to 90% but not to exceed 0.024 kg water or kg of dry air Short-term refers to a period of not more than 96 consecutive hours and a total of 360 hours but not more than 15 instances in 1 year.

Approvals and Compliance

Table 2 provides standards-compliance information for the Cisco CRS Carrier-Grade Services Engine PLIM.

Table 2. Compliance and Agency Approvals

Feature	Description
Safety standards	• UL/CSA/IEC/EN 60950-1 • IEC/EN 60825 Laser Safety • ACA TS001 • AS/NZS 60950 • FDA – Code of Federal Regulations Laser Safety
EMI	• FCC Class A • ICES 003 Class A • AS/NZS 3548 Class A • CISPR 22 (EN55022) Class A • VCCI Class A • BSMI Class A • IEC/EN 61000-3-2: Power Line Harmonics • IEC/EN 61000-3-3: Voltage Fluctuations and Flicker

Feature	Description
Immunity (basic standards)	• IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8-kV contact, 15-kV air) • IEC/EN-61000-4-3: Radiated Immunity (10V/m) • IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2-kV power, 1-kV signal) • IEC/EN-61000-4-5: Surge AC Port (4-kV CM, 2-kV DM) • IEC/EN-61000-4-5: Signal Ports (1 kV) • IEC/EN-61000-4-5: Surge DC Port (1 kV) • IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10 Vrms) IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m) • IEC/EN-61000-4-11: Voltage Dips, Short Interruptions, and Voltage Variations
ETSI and EN	• EN300 386: Telecommunications Network Equipment (EMC) EN55022: Information Technology Equipment (Emissions) EN55024: Information Technology Equipment (Immunity) • EN50082-1/EN-61000-6-1: Generic Immunity Standard
Network Equipment Building Standards (NEBS)	This product is designed to meet the following requirements (qualification in progress): • SR-3580: NEBS Criteria Levels (Level 3) • GR-1089-CORE: NEBS EMC and Safety • GR-63-CORE: NEBS Physical Protection

Ordering Information

To place an order, contact your local Cisco representative or visit Cisco Ordering Home Page. Use the ordering information in Table 3.

Table 3. Ordering Information for Carrier-Grade NAT licenses

Product Description	Part Number
CRS Service Card for CGN, Anti DDoS and SDN	CRS-CGSE-PLUS(=)
SW license for 6RD translations	XC-6RD-BR
SW license for flexible NAT44 or NAT64 translations	XC-XLAT-ANY-10M

Service and Support

Cisco delivers innovative services programs through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, contact your local Cisco representative or visit www.cisco.com.

For More Information

For more information about the Cisco CRS or about other interfaces available for the Cisco CRS, visit: www.cisco.com/go/crs.

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