

Cisco CRS Carrier-Grade Services Engine Module

The Cisco® CRS Carrier Routing System 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, a unique self-healing, distributed operating system.

Packet-based data communications is being replaced by video and rich-media traversing the IP Next-Generation Network (NGN) in multiple directions, straining the architectural foundations of both public and private networks serving businesses and consumers. As part of the medianet, a media-aware Cisco IP NGN, the Cisco CRS delivers continuous, always-on operations and scales easily from numerous single-chassis form factors to a massive multichassis system. Its design provides an industry-leading efficiency, consuming the one of the lowest power, cooling, and rack-space resources for an intelligent service-rich bandwidth capacity. The Cisco CRS-3 model builds on the CRS-1; it is backward- and forward-compatible to protect existing and future investments for decades to come.

This data sheet provides detailed product specifications for an important element of the Cisco High-Scalability Solution, the Cisco CRS Carrier-Grade Services Engine (CGSE) (Figure 1).

The Cisco CGSE is an integrated multi-CPU service module offering carrier-class performance and scale in support of the Cisco Carrier-Grade IPv6 (CGv6) solution. The CGSE is a single-slot module supported on all models of Cisco's proven high-end carrier-class routing system: the Cisco CRS-1 and CRS-3 series. The Cisco CGv6 solution, running on one or more CGSE modules inside a CRS, can scale to tens of millions of IP address translations with tens of gigabits of performance to address IPv4 run-out and enable IPv6 transition. Several modules can be populated within a chassis for a high-performance solution that is deployable at places in the network where maximum CGv6 coverage can be obtained. The Cisco CGSE supports a highly available architecture with line-rate accounting and logging of translation information. The Cisco IOS XR Software on the platform offers a flexible means to divert select packets through the CGSE, while enabling global IPv4 and IPv6 packets to traverse the CRS forwarding infrastructure as usual.

Figure 1. Cisco CRS Carrier-Grade Service Engine (CGSE)



Powerful Performance

The Cisco CGSE housed inside a Cisco CRS offers carrier-class performance for Cisco CGv6 services:

- 1+ million connection setups per second for stateful IPv4 Network Address Translation (NAT44)
- Real-time off-box logging of NAT44 translation states using NetFlow 9
- Line-rate forwarding for IPv4 and IPv6

The powerful performance of the Cisco CGSE, as outlined previously, helps ensure that the end-user experience continues to be optimal for all services.

Massive Scalability

As an increasing multitude of subscribers with their numerous applications traverse the network, the Cisco CGSE scales to support this growth:

- Up to 20 million stateful NAT44 translations per Cisco CGSE module
- Support for tens to hundreds of thousands of private IPv4 subscribers accessing the public IPv4 Internet
- Ability to add multiple Cisco CGSE modules in a chassis, increasing performance linearly

Integrated Services

The Cisco CGSE module is designed for the proven high-end routing platform of the Cisco CRS. It is supported on all the form factors of the Cisco CRS-1 and CRS-3: 4-, 8-, 16-slot and multichassis versions. This breadth of deployment options allows service providers to scale the CGSE to their appropriate needs. Also, the CGSE is integrated with the routing intelligence of the CRS, providing unmatched operational efficiencies of a single OS. Because the Cisco CRS platform supports Secure Domain Routing (SDR), providers have the flexibility to integrate the Cisco CGSE on a virtualized network infrastructure.

The following services are available on the Cisco CGSE (Figure 1) starting with IOS-XR 3.9.1:

- Full IPv4 and IPv6 routing and forwarding on the Cisco CRS platform
- Service provider-class NAT44 to address IPv4 run-out based on existing IETF NAT behaviors described in RFCs 4787, 5382, and 5508

The following services are being developed to support IPv6 transition:

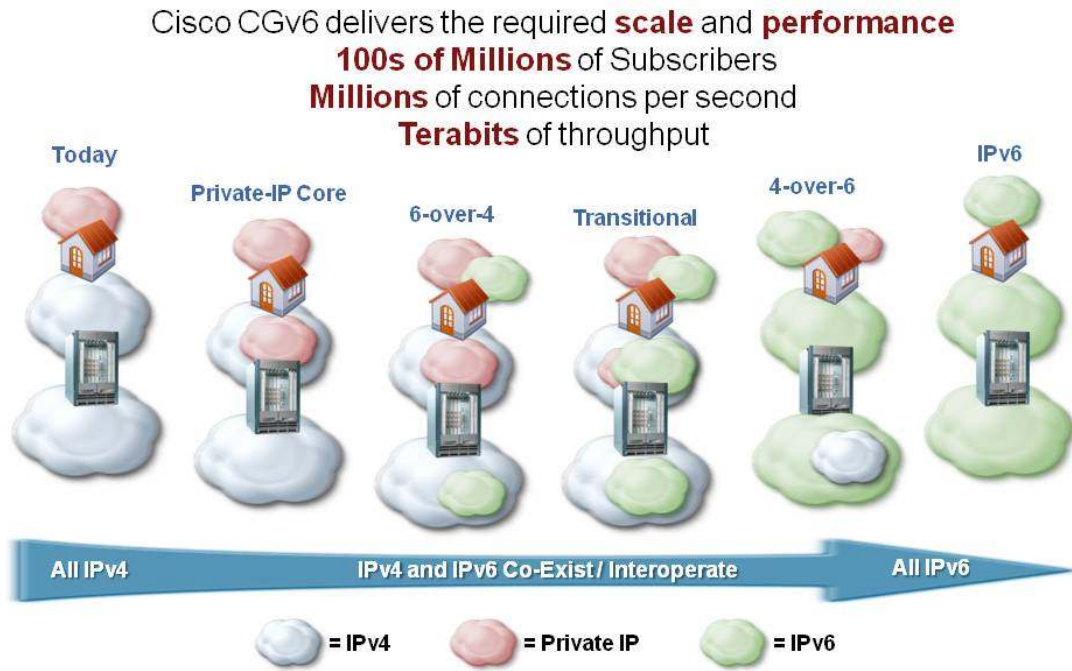
- Stateful and stateless IPv4 and IPv6 translation based on IETF BEHAVE specifications
- IPv6 Rapid Deployment Border Relay (6rd BR, described in RFC 5969)

The Cisco CGSE interface module on the Cisco CRS offers service providers a near-term solution to address IPv4 run-out and preserve a Service Provider's present mode of operation (PMO). At the same time, it enables one or more methods to offer a low-risk, cost-effective means to activate IPv6 tunneling and translation functions.

For more information about the Cisco CRS or about other interfaces available for the Cisco CRS, visit:

www.cisco.com/go/crs.

Figure 2. Cisco CGv6



Product Specifications

Table 1 gives specifications of the Cisco CRS Carrier-Grade Service Engine (CGSE).

Table 1. Product Specifications

Feature	Description
Chassis compatibility	Compatible with all current Cisco CRS-1 and CRS-3 line-card chassis
Forwarding-engine compatibility	Compatible with the following forwarding engines: CRS-MSC-40G-B, CRS-MSC-20G-B, and CRS-MSC
Software compatibility	Cisco IOS XR Software Release 3.9.1
Protocols	<ul style="list-style-type: none"> • NAT44 (RFCs 4787, 5382, and 5508) • NetFlow v9
Feature summary	<ul style="list-style-type: none"> • Stateful IPv4 Network Address Translation (NAT44)
Performance	<ul style="list-style-type: none"> • 20 Gbps of throughput • Maximum number of physical layer interface modules (PLIMs) per chassis: 4 slots: 3; 8 slots: 7; 16 slots: 12
Reliability and availability	<ul style="list-style-type: none"> • Online insertion and removal (OIR) without affecting system traffic
Network management	<ul style="list-style-type: none"> • Cisco IOS XR Software command-line interface (CLI) • XML interface • Cisco Active Network Abstraction (ANA)
Physical dimensions	<ul style="list-style-type: none"> • Occupies one PLIM slot on a Cisco CRS chassis • Weight: 7.85 lb (3.55 kg) • Height: 20.6 in. (52.2 cm) • Depth: 11.2 in. (28.4 cm) • Width: 1.8 in. (4.49 cm)
Power	150 watts

Feature	Description
Environmental conditions	<ul style="list-style-type: none"> Storage temperature: -40 to 70°C (-40 to 158°F) Operating temperature: <ul style="list-style-type: none"> Normal: 5 to 40°C (41 to 104°F) Short-term: -5 to 50°C (23 to 122°F) Relative humidity: <ul style="list-style-type: none"> Normal: 5 to 85% Short-term: 5 to 90% but not to exceed 0.024 kg water/kg of dry air <p>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.</p>

Approvals and Compliance

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

Table 2. Compliance and Agency Approvals

Feature	Description
Safety standards	<ul style="list-style-type: none"> UL/CSA/IEC/EN 60950-1 IEC/EN 60825 Laser Safety ACA TS001 AS/NZS 60950 FDA – Code of Federal Regulations Laser Safety
EMI	<ul style="list-style-type: none"> 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
Immunity (basic standards)	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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)	<p>This product is designed to meet the following requirements (qualification in progress):</p> <ul style="list-style-type: none"> 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 the Ordering page on www.cisco.com. Use the ordering information in Table 3.

Table 3. Ordering Information

Product Part Number	Product Name
CRS-CGSE-PLIM(=)	Cisco CRS Carrier Grade Services Engine (CGSE) PLIM
XC-XLAT44-5M	SW license for 5M NAT44 translations
XC-XLAT44-10M	SW license for 10M NAT44 translations
XC-XLAT44-20M	SW license for 20M NAT44 translations

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For More Information

For more information about the Cisco CRS Carrier-Grade Services Engine PLIM, contact your local Cisco representative or visit: www.cisco.com/go/crs.



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