

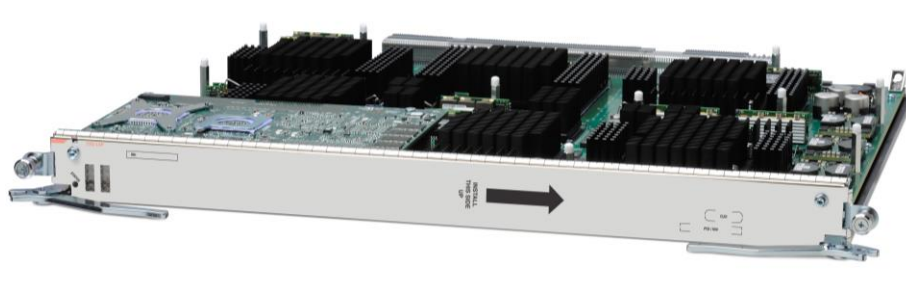
## Cisco CRS-3 Label Switch Processor

The Cisco® CRS-3 Carrier Routing System offers industry-leading performance, advanced services intelligence, environmentally conscious design, and system longevity. The Cisco CRS-3 is powered by the Cisco QuantumFlow Array™ – a chipset architecture based on multidimensional engineering and Cisco IOS® XR Software, an exceptional self-healing, distributed operating system.

Data-based communications are being replaced by video and interactive media traversing the IP Next-Generation Network (IP NGN) in multiple directions, straining 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-3 delivers continuous, always-on operations and scales easily from numerous single-chassis form factors to a massive multichassis system. Its highly efficient design conserves power, cooling, and rack-space resources while optimizing bandwidth capacity. The Cisco CRS-3 is compatible with the Cisco CRS-1 Carrier Routing System, protecting investments for decades to come.

This data sheet provides detailed product specifications for the Cisco CRS-3 Label Switch Processor. For more information about the Cisco CRS Family and other available processors, visit <http://www.cisco.com/go/crs>.

**Figure 1.** Cisco CRS-3 Label Switch Processor



### Product Overview

The Cisco CRS-3 Label Switch Processor provides 140-Gbps distributed forwarding engine capability for the Cisco CRS Family. The label switch processor allows a Flexible Packet Transport solution and is responsible for forwarding processing tasks, handling all network traffic flows through the data plane. Distinctive features of the label switch processor include the ability to switch Multiprotocol Label Switching (MPLS) traffic at high throughput and low latency and jitter, immediate scalability to hundreds of thousands of Label Switched Paths (LSPs).

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The Label Switch Processor offers many advantages:

- Powered by QuantumFlow Array, one of the world's most sophisticated chipset architectures, which includes a 140-Gbps application-specific integrated circuit (ASIC) based on 65-nanometer (nm) technology; QuantumFlow Array was engineered for the Cisco CRS Family of routers to provide higher bandwidth without compromising service performance
- Supported across all the Cisco CRS-1 and CRS-3 form factors: 4-slot, 8-slot, 16-slot, and multi-chassis
- Scales the Cisco CRS per-slot forwarding capacity 3.5 times from 40 Gbps to 140 Gbps
- Always paired with an interface module through the chassis midplane, thus occupying one-half of a slot
- Can be paired with a variety of interface modules, providing deployment flexibility
- Can be mixed with 40-Gbps-per-slot modules occupying other slots in the chassis
- Features two 140-Gbps forwarding ASICs for discrete ingress and egress packet handling
- Single-flow traffic processing at 140 Gbps in each direction
- Enhanced onboard multicore CPU for accelerated software processing
- Optimized for label switching functions in a service provider's network
- Packet Transport forwarding engine with industry-leading, wire-rate performance at 140 Gbps
- Additional services such as class of service (CoS) processing, multicast, traffic engineering, and statistics gathering, all performed at line-rate 140 Gbps
- Support for up to 8 queues per port
- Scale for hundreds of thousands of LSPs and traffic engineering midpoints
- Built-in support for carrier-class high availability with fast reroute (FRR) capability, providing guaranteed restoration in 50 ms in case of link and node failures
- Built-in hardware acceleration for critical network control traffic
- Built-in support for video monitoring for a comprehensive video quality of experience (QoE)
- Accurate hardware-assisted time-stamping support for service-level agreement (SLA) monitoring
- Industry-leading environmental efficiency with a lower power and weight profile

## Product Specifications

Table 1 gives specifications for the Cisco CRS-3 Label Switch Processor.

**Table 1.** Product Specifications

Feature	Description
<b>Chassis compatibility</b>	<ul style="list-style-type: none"> <li>• Compatible with all current Cisco CRS-3 line-card chassis</li> <li>• Compatible with all current Cisco CRS-1 line-card chassis with 140 Gbps fabric cards</li> <li>• Always paired with an interface module</li> <li>• Compatible with 100- and 140-Gbps interface modules</li> </ul>
<b>Software compatibility</b>	Cisco IOS XR Software Release 4.1.1 or later
<b>Features and protocols</b>	<p>IP features:</p> <ul style="list-style-type: none"> <li>• Optimized IP Features such as unicast, equal-cost multipathing (ECMP), multicast and load balancing</li> </ul> <p>Forwarding features:</p> <ul style="list-style-type: none"> <li>• Optimized QoS and Security features</li> <li>• Queuing (both ingress and egress)</li> <li>• Diagnostic and network management support</li> </ul> <p>MPLS features:</p> <ul style="list-style-type: none"> <li>• MPLS forwarding</li> <li>• MPLS load balancing</li> <li>• Traffic engineering, Point-to-Multipoint Traffic Engineering (P2MP TE)</li> <li>• Multicast Label Distribution Protocol (LDP)</li> <li>• Policy Based Tunnel Selection (PBTS)</li> <li>• MPLS operations, administration, and maintenance (OAM)</li> <li>• User-Network Interface (UNI)</li> <li>• Link Management Protocol (LMP)</li> </ul> <p>Error detection and fast convergence features:</p> <ul style="list-style-type: none"> <li>• Bidirectional Forwarding Detection (BFD)</li> <li>• Ethernet OAM (EOAM), SLA, 802.1ag, 802.3ah, Y.1731</li> </ul> <p>Accounting:</p> <ul style="list-style-type: none"> <li>• Interface Statistics and NetFlow</li> </ul>
<b>Memory</b>	<ul style="list-style-type: none"> <li>• Configurable with up to 8 GB of route table memory</li> <li>• 1 GB of packet buffer memory per side (2 GB total per processor, ingress and egress)</li> </ul>
<b>Performance</b>	<ul style="list-style-type: none"> <li>• 140-Gbps line-rate full-duplex throughput</li> <li>• 125-mpps switching performance</li> <li>• Maximum number of Label Switch Processors per chassis: 4 slot (4), 8 slot (8), 16 slot (16)</li> </ul>
<b>Reliability and availability</b>	<ul style="list-style-type: none"> <li>• Online insertion and removal (OIR) support without system impact</li> <li>• In-service software patching</li> <li>• Out of resource management</li> <li>• Process restartability</li> <li>• Fast ReRoute (FRR)</li> <li>• MPLS Traffic Engineering (TE) FRR with 50 ms guarantee</li> <li>• MPLS Loop Free Alternate (LFA) FRR with 50 ms guarantee</li> </ul>
<b>Network management</b>	<ul style="list-style-type: none"> <li>• Cisco IOS XR Software command-line interface (CLI)</li> <li>• Simple Network Management Protocol (SNMP)</li> <li>• XML interface</li> <li>• CraftWorks Interface (CWI)</li> <li>• Cisco Active Network Abstraction (ANA)</li> </ul>
<b>Physical dimensions</b>	<ul style="list-style-type: none"> <li>• Occupies one-half slot on a Cisco CRS-3 chassis</li> <li>• Weight: 14.75 lbs (6.7 kg)</li> <li>• Height: 20.6 in. (52.2 cm)</li> <li>• Depth: 18.62 in. (47.25 cm)</li> <li>• Width: 1.8 in. (4.49 cm)</li> </ul>

Feature	Description
<b>Power</b>	446W
<b>Environmental conditions</b>	<ul style="list-style-type: none"> <li>• Storage temperature: –40 to 70°C (–40 to 158°F)</li> <li>• Operating temperature: <ul style="list-style-type: none"> <li>◦ Normal: 5 to 40°C (41 to 104°F)</li> <li>◦ Short-term: –5 to 50°C (23 to 122°F)</li> </ul> </li> <li>• Relative humidity: <ul style="list-style-type: none"> <li>◦ Normal: 5 to 85%</li> <li>◦ Short-term: 5 to 90% but not to exceed 0.024 kg water/kg of dry air</li> </ul> </li> </ul> <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-3 Label Switch Processor.

**Table 2.** Compliance and Agency Approvals

Feature	Description
<b>Safety standards</b>	<ul style="list-style-type: none"> <li>• UL/CSA/IEC/EN 60950-1</li> <li>• IEC/EN 60825 Laser Safety</li> <li>• ACA TS001</li> <li>• AS/NZS 60950</li> <li>• FDA Code of Federal Regulations Laser Safety</li> </ul>
<b>EMI</b>	<ul style="list-style-type: none"> <li>• FCC Class A</li> <li>• ICES 003 Class A</li> <li>• AS/NZS 3548 Class A</li> <li>• CISPR 22 (EN55022) Class A</li> <li>• VCCI Class A</li> <li>• BSMI Class A</li> <li>• IEC/EN 61000-3-2: Power Line Harmonics</li> <li>• IEC/EN 61000-3-3: Voltage Fluctuations and Flicker</li> </ul>
<b>Immunity (basic standards)</b>	<ul style="list-style-type: none"> <li>• IEC/EN-61000-4-2: Electrostatic Discharge Immunity (8-kV contact, 15-kV air)</li> <li>• IEC/EN-61000-4-3: Radiated Immunity (10V/m)</li> <li>• IEC/EN-61000-4-4: Electrical Fast Transient Immunity (2-kV power, 1-kV signal)</li> <li>• IEC/EN-61000-4-5: Surge AC Port (4-kV CM, 2-kV DM)</li> <li>• IEC/EN-61000-4-5: Signal Ports (1 kV)</li> <li>• IEC/EN-61000-4-5: Surge DC Port (1 kV)</li> <li>• IEC/EN-61000-4-6: Immunity to Conducted Disturbances (10 Vrms)</li> <li>• IEC/EN-61000-4-8: Power Frequency Magnetic Field Immunity (30A/m)</li> <li>• IEC/EN-61000-4-11: Voltage Dips, Short Interruptions, and Voltage Variations</li> </ul>
<b>ETSI and EN</b>	<ul style="list-style-type: none"> <li>• EN300 386: Telecommunications Network Equipment (EMC)</li> <li>• EN55022: Information Technology Equipment (Emissions)</li> <li>• EN55024: Information Technology Equipment (Immunity)</li> <li>• EN50082-1/EN-61000-6-1: Generic Immunity Standard</li> </ul>
<b>Network Equipment Building Standards (NEBS)</b>	<p>This product is designed to meet the following requirements (qualification in progress):</p> <ul style="list-style-type: none"> <li>• SR-3580: NEBS Criteria Levels (Level 3)</li> <li>• GR-1089-CORE: NEBS EMC and Safety</li> <li>• GR-63-CORE: NEBS Physical Protection</li> </ul>

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## Ordering Information

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

**Table 3.** Ordering Information

Product Part Number	Product Name
CRS-LSP	Cisco CRS-3 Label Switch Processor

## Cisco Services

Cisco Services make networks, applications, and the people who use them work better together.

Today, the network is a strategic platform in a world that demands better integration between people, information, and ideas. The network works better when services, together with products, create solutions aligned with business needs and opportunities.

The unique Cisco Lifecycle approach to services defines the requisite activities at each phase of the network lifecycle to help ensure service excellence. With a collaborative delivery methodology that joins the forces of Cisco, our skilled network of partners, and our customers, we achieve the best results.

## For More Information

For more information about the Cisco CRS-3 Label Switch Processor, contact your local Cisco representative or visit: <http://www.cisco.com/go/crs>.



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