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### **Cisco CRS-1 Delivers Industry-leading IP over DWDM Integration for IP NGN**

*Increases efficiency, speed to service, scale and reliability through integration of IP and DWDM technologies for converged network core; results in 4X increase in throughput for existing 10Gbps DWDM systems*

**Cisco Worldwide Analyst Conference – SAN JOSE, Calif. – December 5, 2005** – Cisco Systems® today announced further momentum in development of the Network Convergence Layer of its Internet Protocol Next Generation Network (IP NGN) architecture with the introduction of support for Internet Protocol over Dense Wavelength Division Multiplexing (IPoDWDM) on the Cisco CRS-1 Carrier Routing System. This solution helps enable seamless element, control and management integration between the IP layer and the DWDM layer and increases throughput of existing DWDM infrastructures from 10Gbps to 40Gbps to efficiently manage traffic growth from video/IPTV services.

“Comcast’s and Cisco’s shared vision of integrated 10Gbps and 40Gbps DWDM interfaces, was one of the key reasons for our selection of the CRS-1,” said Vik Saxena, Comcast Director of IP Architecture. “As we move to transport all services over IP, including broadcast video and video on demand, cost-effectiveness, scalability, reliability, and service flexibility become critical. By meeting these important needs, Cisco’s CRS-1 is an ideal platform on which to base our service growth.”

“With the majority of traffic on provider core networks moving to IP -- manual provisioning and cross-connect devices can delay service deployment, be costly, with traditional deployment of transponders, and less flexible,” said Eve Griliches, research manager, IDC. “Cisco is helping providers merge the intelligence of IP with DWDM while improving capital and operational efficiencies in their networks.”

Rapid traffic growth from video and IPTV applications is driving providers to continue to increase network bandwidth, requiring the additional capital and operating expenses associated with procurement and management of multiple elements at the service provider network core.

To help address and manage the traffic growth from video/IPTV, the Cisco IPoDWDM integration strategy features three key integration points: Element Integration, Control Integration, and Management Integration.

- Element integration minimizes optical-electrical-optical conversions in the network to reduce expensive stand-alone transponders and complex electrical switching equipment. In 2004, Cisco introduced OC768c optical interfaces on the CRS-1, delivering 40Gbps trunking for high capacity terabit POPs and central offices and also launched its reconfigurable optical add/drop multiplexers (ROADMs), which integrate photonic switching into optical multiplexers. Building on its efforts to integrate IP and DWDM, Cisco today is introducing two new interfaces for the CRS-1 with integrated transponder functionality, enabling the CRS-1 to originate fully tunable International Telecommunications Union (ITU)-grid compatible colored wavelengths.

The new interfaces feature two industry firsts:

- A one-port 40 gigabit per second (Gbps) tunable DWDM packet-over-SONET (POS) interface that is designed to be compatible with existing 10 Gbps DWDM systems. This is the first tunable interface that enables a 4X increase in throughput without requiring upgrades to existing DWDM infrastructures.
- A four-port 10 Gbps Gigabit Ethernet Tunable DWDM PHY interface with SONET/SDH-like operations, administration, maintenance and provisioning (OAM&P). Now for the first time providers can achieve 10GE economics with carrier class OAM&P and full compatibility with existing SONET/SDH OSS systems.

Both interfaces support enhanced integrated forward error correction (FEC) providing up to a 5X increase in reach and 50 percent reduction in optics. The interfaces are fully compatible with the Cisco ONS 15454 Multiservice Transport Platform (MSTP) and are also designed to interoperate with any existing installed DWDM infrastructure.

“NLR has deployed a combination of CRS-1s and Cisco ONS 15454 platforms to drive the high traffic throughput that research networks require,” said Tom West, President of National LambdaRail, Inc. “The integration of DWDM transponders simplifies the network by reducing the number of network elements, and enables rapid and easy scalability, an increasingly critical issue given the steady and rapid growth of traffic on networks like ours.”

- Control integration enables providers to migrate from today’s manual provisioning process to a dynamic service activation provisioning process. Building on the success of Cisco ROADM platforms, which enable the remote provisioning of optical wavelengths without a truck roll, Cisco is announcing the Segmentation model of GMPLS (S-GMPLS) available on the CRS-1. For the first time, S-GMPLS leverages the power of GMPLS IP control protocols for auto-configuration of wavelengths while keeping the topology of the routing domain isolated from the topology of the DWDM domains, providing a way to deploy GMPLS while respecting organizational boundaries.
- Management integration provides flexible operating models designed to enable separate management of the IP and the DWDM equipment by separate operating groups, and, alternatively, to enable providers to deploy a unified management model to achieve operational cost efficiencies and reduce time to service deployment. The CRS-1 supports

integration with third-party interfaces through extensible markup language (XML) and simple network management protocol (SNMP).

“Network convergence through integration of core routing and DWDM transport offers service providers a number of practical and economic benefits while efficiently managing rapid growth of video traffic,” said Tony Bates, senior vice president of carrier core and multiservice switching Business Unit for Cisco. “Driving these cost efficiencies and service flexibility is at the heart of the IP NGN strategy.”

The Cisco CRS-1 is the first carrier-class routing system that seamlessly scales up to 92 terabits per second, simplifying today’s networks while providing investment protection for decades to come. The Cisco CRS-1 features continuous operation, IP/MPLS service flexibility, scalability, multicast capability for digital broadcast video and seamless optical integration. The platform received an InfoVision Award in the “Network Core Innovation and Advances” category from the International Engineering Consortium in October 2005.

For more information about the products and solutions being announced today, please visit the Cisco web site at [www.cisco.com/go/ipngn4](http://www.cisco.com/go/ipngn4).

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