

## CORIANT IS NOW PART OF INFINERA

## 8665 Smart Router

*Cost-Efficient, Scalable High Speed Ethernet Aggregator and IP/MPLS Router for Packet Networks*

The Coriant® 8665 Smart Router is a cost-efficient, future-proof, multi-layer IP/MPLS routing platform for high speed fixed mobile convergence (FMC) networks that can optionally extend to the optical transport layer. Providing Ethernet interfaces from 1 to 100 Gbps and offering 1.2 Tbps full duplex switching capacity with 780 Gbps redundant capacity, the 8665 Smart Router is designed to be deployed in medium-sized aggregation, metro, and core applications, as well as radio controller and core sites in advanced all-IP networks. The 8665 Smart Router provides the flexibility and capabilities to serve all-IP mobile and fixed networks, including applications such as consumer, enterprise, machine-to-machine connectivity, and cloud networking, and meet the demands of future 5G enabled transport networks. To effectively support advanced LTE-A and 5G air interface technologies, the 8665 Smart Router is equipped with Coriant's industry-leading range of network synchronization options that can be further optimized with low latency optical transport. While maintaining high quality for low latency voice traffic, the 8665 Smart Router offers the interface density, throughput, and cost effectiveness to address fast growing data services.

### ENABLING FLEXIBLE LTE NETWORK ARCHITECTURES

Offering ideal capabilities to implement flexible network architectures, the 8665 Smart Router effectively meets the demands of existing LTE, LTE-A, and future 5G mobile technologies. The platform provides IP routing and Ethernet switching to support the X2 interface between eNodeBs, and S1 and S1-Flex interfaces between eNodeBs and LTE network core elements. The 8665 Smart Router supports both fixed and mobile transport enabling mobile operators to extend their service offerings to include, for example, fixed business services. The synchronization capabilities of the 8665 Smart Router are essential for LTE networks.

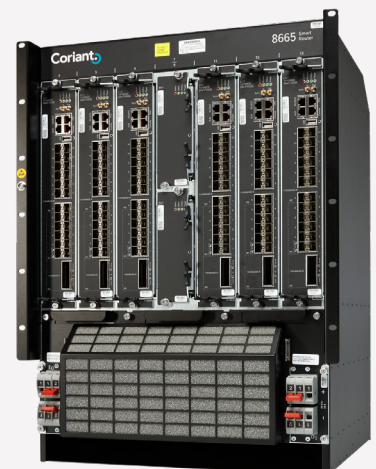
### SUPPORTING ALL-IP AND FIXED NETWORKS

The 8665 Smart Router is an optimal solution for mobile and fixed networks that deploy Ethernet technology as the underlying transport media. The platform contains IP routing as well as MPLS and Ethernet switching tables in combination with an optical transport layer that provides the flexibility to serve evolving network architectures and applications. The 8665 Smart Router supports a mix of IP and Ethernet services, such as IP VPNs, VPLS and Ethernet pseudowires, and significant buffering capacity for bursty data applications as well as advanced traffic management features with hierarchical QoS support for flexible end-user service definition. In addition, multicast capabilities enable applications such as IPTV and company town hall sessions.

The solution includes colored interfaces on the Smart Routers coupled with the Coriant® Pluggable Optical Layer (see Figure 1) or Coriant Groove™ G30 Network Disaggregation Platform (NDP) (see Figure 2) as a high-capacity transport underlay. The 8665 Smart Router installation can be optionally extended with the Pluggable Optical Layer FOADM or Groove G30. Flexible IP-Optical multi-layer transport configurations are supported together with the use of the CFP DCO and QSFP28 optical pluggables on 8665 line cards.

### BENEFITS OF THE CORIANT® 8665 SMART ROUTER

- **Support** all-IP mobile and fixed networks with a 1.2 Tbps full duplex IP/MPLS router
- **Enable** flexible LTE/5G network architectures
- **Optionally integrate** the FOADM optical layer for expanded capacity
- **Maximize** IP-Optical transmission performance for access, metro, and core applications
- **Unleash** the ideal platform for large aggregation and RNC/S-GW sites
- **Provide** dense 10G/1G aggregation with 100G connectivity
- **Deploy** a range of synchronization options
- **Leverage** a high-density and compact form factor



The IP passive optical solution, as shown in Figure 1, is a typical configuration providing cost-efficient multi-layer transport for access networks. Whereas Figure 2 shows the IP-Optical transport solution based on the Groove G30, which adds an optical transport layer for regional, metro, and long haul applications. The converged IP-Optical configuration options of the 8665 Smart Router address the challenges of continuously increasing bandwidth while minimizing OpEx and CapEx.

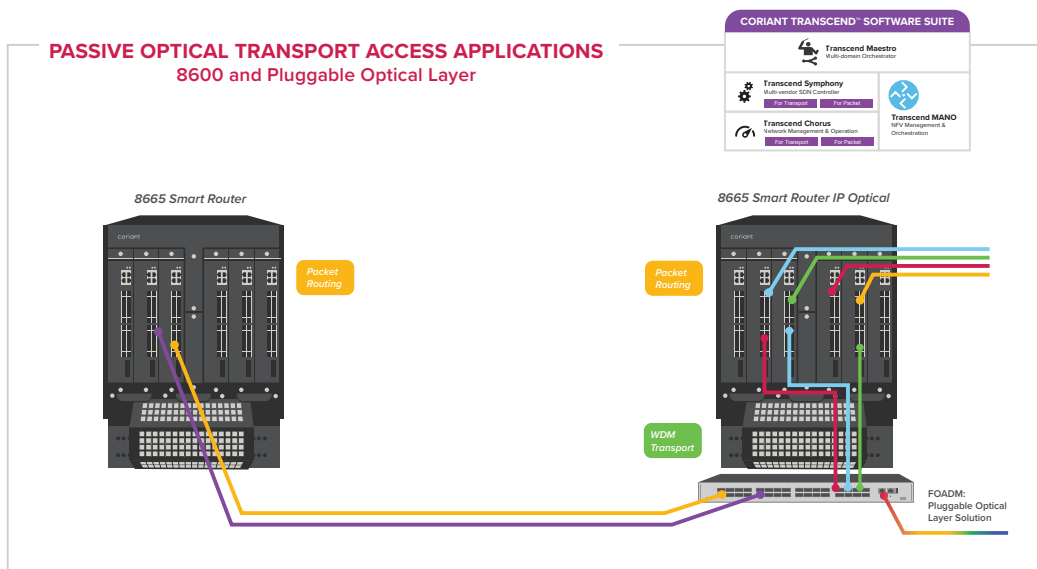


Figure 1: Coriant® 8665 Smart Router Variants with the Passive Pluggable Optical Layer Transport Option

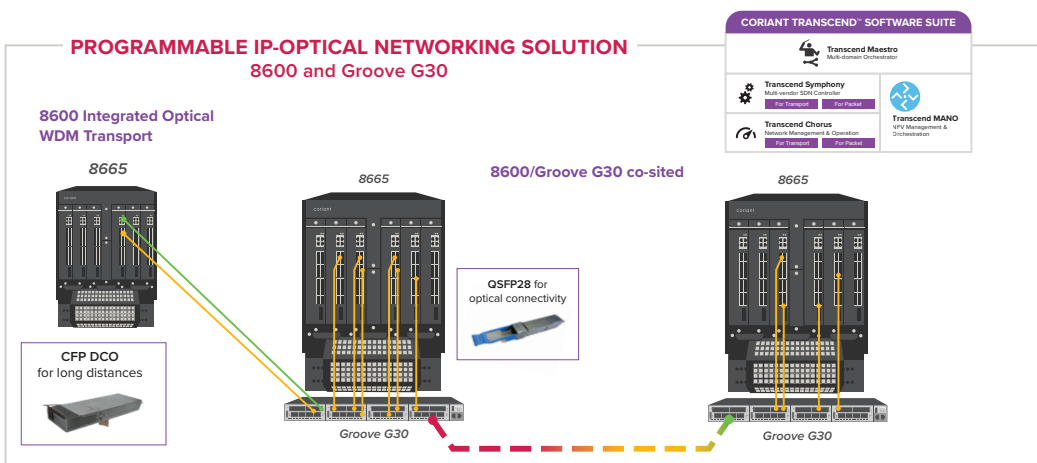


Figure 2: Coriant® 8665 Smart Router Variants with the Groove G30

## OFFERING A RANGE OF SYNCHRONIZATION OPTIONS

The 8665 Smart Router supports a wide range of synchronization features, such as Synchronous Ethernet, Synchronization Status Message (SSM) over Ethernet, and IEEE 1588v2 Boundary Clock, which is required for LTE Time-Division Duplex (LTE-TDD) and LTE Advanced (LTE-A). In addition to frequency synchronization, the 8665 Smart Router supports 1588 phase synchronization that is required by LTE-A and LTE-TDD along with 5G applications in the future. Phase synchronization can be provided using the innovative Coriant® Integrated GPS (GNSS) SFP receiver supported by the 8665 Smart Router. The integrated features of the 8665 Smart Router also enable simple migration to phase synchronization. The 8665 Smart Router multicast capabilities support applications such as eMBMS broadcast delivery.

## REDUCING OPERATING EXPENSES WITH INTELLIGENT NETWORK MANAGEMENT

Fully managed by the Coriant network management system, Coriant Transcend™ Chorus for Packet, the 8665 Smart Router seamlessly integrates into any existing Smart Router backhaul network, network expansion, or greenfield deployment. Transcend Chorus supports the operator throughout the network lifecycle from planning and deployment phases all the way to optimization and maintenance while automating many routine network management tasks and helping to reduce operational expenses.

## The Coriant® Smart Router Series

The Smart Router Series offers versatile and scalable solutions for service provider access and aggregation from small hub sites to controller and gateway sites. Smart Routers serve fixed and mobile convergence and cloud computing networking needs and are designed to meet the ever-growing requirements of data hungry mobile and enterprise users. The entire Smart Router Series shares a common Network Operating System for consistent support of an extensive Ethernet and IP/MPLS feature set, including broad QoS, OAM, and network resiliency options. Advanced traffic management features include hierarchical policing and shaping support with Strict Priority and WFQ Scheduling. Simultaneous support for multiservice applications in access and aggregation networks protects earlier network investments. The Smart Router Series is supported by the Coriant network management system, Coriant Transcend™ Chorus for Packet, and the Coriant multi-vendor SDN controller, Coriant Transcend™ Symphony for Packet.

## IMPLEMENTING AN OPEN, PROGRAMMABLE, AUTOMATED SDN SOLUTION

The Coriant multi-vendor SDN controller, Coriant Transcend™ Symphony for Packet, fully supports the 8665 Smart Router. The Transcend Symphony is an integral component of the overall Coriant Transcend™ Solution, a modular SDN software suite that combines the benefits of open, programmable, and automated multi-layer (Layer 0-3) SDN architecture and a proven portfolio of IP/MPLS edge routing and packet optical transport solutions to enable dynamic, end-to-end network control.

## LEVERAGING HIGH INTERFACE DENSITY AND COMPACT FORM FACTOR

The 8665 Smart Router is designed to offer high speed packet aggregation capabilities in a 15RU design with low power consumption and full redundancy of forwarding, control and management plane, synchronization, power, and fan modules. The 8665 Smart Router supports a flexible pay-as-you-grow Line Unit design with multiple interface configuration options including a mix of 100 Gbps, 10 Gbps, and 1 Gbps Ethernet support. The 8665 Smart Router supports up to six Line Units (LU1s) providing 1.2 Tbps of total throughput and 2.1 Tbps with future-planned LU2s. The Line Units support hot swap deployment to flexibly increase throughput without service interruption. Line Unit interconnectivity is implemented with two Switch Units. Advanced traffic management features include hierarchical policing and shaping with Strict Priority and WFQ Scheduling. The 8665 Smart Router supports a similar IP and Ethernet feature set as the ELC1 Line Card in the Coriant® 8660 Smart Router and Coriant® 8630 Smart Router.

## TECHNICAL SPECIFICATIONS

### Physical Dimensions

- 15RU high
- 420 mm / 16.5 in deep
- 19-inch rack mounting

### Power and Cooling

- -48 Vdc, redundant power supply
- Two user changeable power modules with optional protection
- Maximum power consumption: 1600 W
- Forced cooling with three fan modules

### Forwarding Plane

- IPv4 and IPv6 routing
- IPv4 and IPv6 multicast
- MPLS switching (LSR and LER)
- Ethernet MAC switching

### Functionality

- IP VPN (RFC 4364)
- IP VPN multicast
- VPLS and H-VPLS
- Integrated Routing and Bridging
- 6vPE support
- Ethernet/VLAN pseudowires
- Single and multi-segment pseudowires
- 802.1ad QinQ
- Seamless MPLS
- Two Way Active Measurement Protocol (TWAMP)
- Y.1731 frame loss, frame delay, and frame delay variation measurement
- IEEE 802.1ag Ethernet OAM loopback, continuity check, ping, and link trace
- BFD (Static, OSPF, ISIS, RSVP-TE)

### Forwarding Capacity

- 1.2 Tbps full duplex forwarding capacity with two operational Switch Units; 2.1 Tbps future-planned
- 780 Gbps full duplex forwarding capacity with one operational Switch Unit

### Chassis Configuration

- Two slots for Switch Units
- Two Power Input Modules
- Six slots for Line Units
- Three Fan Modules

### Line Units

- 1 x 100GBASE-R (CFP2) + 24 x 10GBASE-R with two operating modes:
  - 1 x 100GBASE-R (CFP2) + 14 x 10GBASE-R
  - 24 x 10GBASE-R

## TECHNICAL SPECIFICATIONS CONTINUED

### Resiliency and Load Balancing

- 1+1 Control plane protection
- Non-stop forwarding with control plane redundancy and graceful restart
- Power input protection
- Ethernet Link Protection
- Ethernet Link Aggregation
- 1:1 RSVP-TE LSP protection
- Fast Reroute (FRR)
- Ethernet pseudowire redundancy
- VRRP
- IP load balancing (Equal Cost Multipath [ECMP])
- BGP multipath for load balancing
- IPv4 and IP VPN load balancing to RSVP-TE tunnels

### Security

- L3/L4 Access Control Lists
- Denial of service protection
- Radius and TACACS+ authentication and accounting
- SSH-2 for FTP and Telnet
- MD5, SHA-1 authentication

### Synchronization

- ITU-T [G.8262]
- Station Clock Input/Output (SCI/SCO)
- Pulse-per-Second (PPS) input and output
- Time-of-Day (TOD) input
- Synchronous Ethernet
- SSM over Ethernet [G.8264]
- IEEE 1588v2 Boundary Clock for phase sync
- SyncE assist
- Support for the Integrated GPS (GNSS) SFP receiver

### Routing and MPLS Label Distribution Protocols

- OSPF-TE, ISIS-TE, BGP, and MP-BGP
- LDP, RSVP-TE
- PIM-SM and PIM-SSM

### Traffic Management

- DiffServ support for up to 7 traffic classes
- DiffServ aware MPLS Traffic Engineering (DS-TE)

- IEEE 802.1P/Q mapping to IP or MPLS
- Policing: port, VLAN, hierarchical
- Shaping: port, VLAN, hierarchical
- RED/WRED queue management
- Strict Priority and WFQ scheduling
- Access Control Lists (ACL)

### Management

- CLI with SSH2, FTP with SSH2
- SNMPv1 and SNMPv2 monitoring
- Coriant Transcend™ Chorus for Packet network management system
- Coriant Transcend™ Symphony for Packet multi-vendor SDN controller
- Radius and TACACS+ authentication and accounting
- External Alarms
- Console

### Environmental Conditions

- Operating temperature: -5°C to +45°C

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