Carrier Ethernet 9000 Family

SR9700 Series

Carrier Ethernet Switch/Routers for Metro Applications

- **Complete portfolio of services** for business, residential, and mobile customers with the full range of Ethernet and IP capabilities

- **Highly scalable and reliable CESR platform** delivering all services at full line rate

- **Field-proven IP/MPLS control-plane** with full standard compliance

- **Simplified provisioning and monitoring** of Layer 2 VPNs (E-LINE, E-LAN, and E-TREE) and IP- VPNs

- **Efficient bandwidth management** and guaranteed premium services, such as IPTV and VoIP

- **Investment protection** scaling to 1Tbps capacity, and integration with WDM

- **LightSoft® NMS as common management** umbrella for ECI's Optical and Packet platforms enbaling smooth network evolution

Transport Networking Division

eci
experience
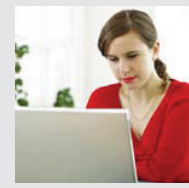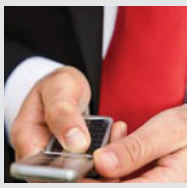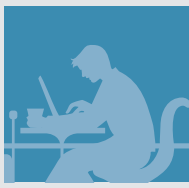
EVOLUTION TO CARRIER ETHERNET

Fueled by rapid globalization and digitization in recent years, enterprises have moved beyond traditional TLS/private-line services and are demanding a scalable, reliable extension of their networks to accommodate mission- critical applications such as CRM, VoIP, storage networking, and video conferencing. The residential market has simultaneously transitioned from simple voice and high-speed Internet to a multi-play of IPTV, VoD, VoIP, and high-speed Internet services. These extremely high-bandwidth IP based applications have driven the evolution of the metro from SONET/SDH technology to a packet-optimized "Ethernet + WDM" transport.

Current generation Ethernet platforms designed for the LAN lack the scalability, reliability, and QoS that is needed to deliver carrier-class VPNs, voice, and video services. The SR9700 series was designed from the ground up to bring the qualities of transport networks to a scalable packet platform and enable smooth migration from TDM to Carrier Ethernet networks. It is the highest density CESR platform offering a complete suite of Ethernet/IP services and transport of business, residential, and mobile networks.

KEY FEATURES

High-Performance Programmable ASIC

At the heart of the SR9700 platform is ECI's in-house developed LRISC™ technology. LRISC is an ultimate mix of custom-built ASIC and NPU technology, which provides optimal performance-cost ratio. LRISC technology uses cutting-edge reconfigurable pipeline architecture to provide:

- Wirespeed performance for both Layer 2 and Layer 3 services with no bottlenecks
- Deterministic performance
- Flexibility for new feature additions
- Hitless fast path upgrades

Reliability

With the stringent requirements of Carrier Ethernet in mind, the SR9700 series was purposely built to provide high availability that exceeds Five 9's. The SR9700 platform is based on a true carrier-class design that consists of a non-blocking switch fabric and fully redundant common components (CPU, fabric, power, and fan). To minimize network outages and improve service resiliency, the SR9700 delivers advanced features such as hitless card insertion and removal, hitless software upgrades, and non-stop forwarding. The multi-process, multi-threaded ShadeTree OS further ensures that deterministic wire-speed performance is met even during extreme loads. The SR9700 platform also includes a comprehensive set of network resiliency features such as sub-50 ms MPLS fast-reroute, hardware-based OAM (BFD, Ethernet CFM), and Ethernet Link aggregation to deliver "Always On" services.
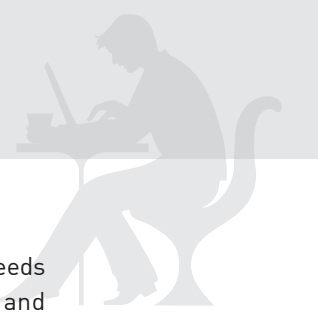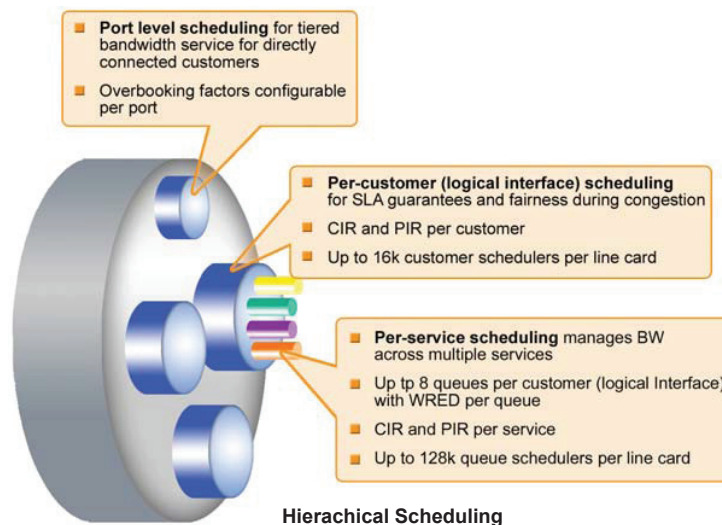
Scalability

The SR9700 platform provides industry-leading scalability to meet Carrier Ethernet needs for today and the future. The SR9700 series leverages its distributed hardware and software architecture to simultaneously support thousands of EVCs (Ethernet Virtual Connections) and IP services. With the industry's highest port density (1200 Gigabit Ethernet ports per rack) and capacity (1.2 Tbps per rack), the SR9700 provides the lowest cost Ethernet aggregation solution. The SR9700 platform is built for a "pay-as-you-grow" approach and seamlessly scales up to 100 Gpbs per slot (100 Gigabit Ethernet ready!) to guarantee a high ROI.

Service Diversity

The SR9700 series is optimized for multiple layers (optical, Ethernet, IP) and provides a complete suite of Layer 2 and Layer 3 features that can be used to meet the diverse traffic handling requirements based on network location or service type. The SR9700 platform has integrated support for colored SFP modules, enabling efficient WDM point-to-point transport over metro or regional fiber infrastructure when combined with ECI's industry-leading ROADM solutions. This tight integration with the optical WDM layer and mapping of packets directly over wavelengths reduces costs and simplifies management and service provisioning.

Sophisticated H-QoS with Admission Control (CAC)

The SR9700 platform provides the most sophisticated QoS available on a CESR. For Layer 2 services, the SR9700 H-QoS model supports simultaneous MEF UNI, EVC and per-CoS ingress and egress bandwidth profiles. The H-QoS model also enables the SR9700 to perform QoS management when deployed as a MEF Virtual UNI (i.e., with an access switch between the CPE and SR9700). When deployed as an edge router in a triple-play application, the SR9700 H-QoS model supports the per-subscriber queuing necessary to offer a flexible and fair mix of guaranteed and burstable services. In addition, the SR9700's advanced admission control (CAC) mechanism allows administrative control for overbooking of best-effort services such as high-speed Internet, while reserving capacity for high-priority services such as voice and video.

- **Port level scheduling** for tiered bandwidth service for directly connected customers
- Overbooking factors configurable per port

- **Per-customer (logical interface) scheduling** for SLA guarantees and fairness during congestion
- CIR and PIR per customer
- Up to 16k customer schedulers per line card

- **Per-service scheduling** manages BW across multiple services
- Up tp 8 queues per customer (logical Interface) with WRED per queue
- CIR and PIR per service
- Up to 128k queue schedulers per line card

Hierachical Scheduling

STMS - Powerful, Integrated Service Management

The ShadeTree Management Suite (STMS) is a modular and fully FCAPS compliant EMS/NMS for the SR9700 series. STMS provides GUI-based alarm management and notification, full device inventory, and service creation/monitoring tools for E-LINE, E-LAN and IP VPNs. The result is dramatically reduced provisioning time and cost, as well as improved service and network management.
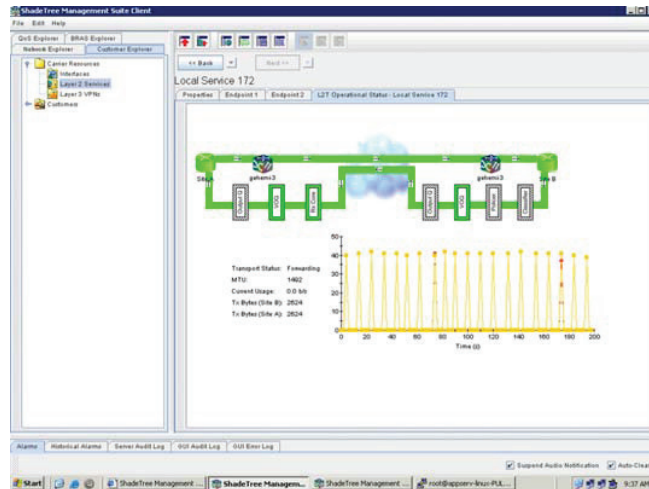
CARRIER-CLASS ETHERNET SERVICES

The SR9700 series uses IETF standardized VPLS (Virtual Private LAN Services) and PWE3 (Pseudowire Emulation Edge to Edge) technology to deliver a complete suite of switched Ethernet services over an IP/MPLS network. The SR9700 series is fully compliant with MEF (Metro Ethernet Forum) standards and is certified for MEF-9 and MEF-14. The various Layer 2 services supported on the SR9700 platform include:

- IEEE 802.1d bridging, 802.1q/Q VLAN tagging and provider bridging (Q-in-Q VLAN stacking)
- Ethernet link aggregation
- Point-to-point Ethernet connectivity, including:
  - Ethernet Private Line (EPL)
  - Ethernet Virtual Private Line (EVPL)
- Multipoint-to-multipoint Ethernet connectivity, including :
  - Ethernet Private LAN (EPLAN)
  - Ethernet Virtual Private LAN (EVPLAN)
- Point-to-multipoint Ethernet connectivity, such as:
  - Ethernet Private Tree (EP-Tree)
  - Ethernet Virtual Private Tree (EVP-Tree)
- Hierarchical VPLS (H-VPLS)
- Hardware assisted Ethernet OAM (IEEE-802.1ag - Connectivity Fault Management, ITU-Y17.31 - Performance Monitoring, IEEE-802.3ah)
- Layer 2 filtering and classification

FIELD-PROVEN ROUTING CAPABILITIES

The SR9700 series includes a veteran, mature IP routing/MPLS suite (ShadeTree OS) that has been successfully deployed in large scale IP networks worldwide. The ShadeTree OS supports a comprehensive list of Layer 3 features, including:

- Routing
  - IPv4/IPv6
  - BGP-4, MP-BGP
  - IS-IS with TE extensions
  - OSPFv2 with TE extensions
  - RIPv1/v2
  - ECMP routing up to 16 paths
- Multicast
  - PIM spare mode
  - MBGP
  - IGMPv2/3
- VRRP
- MPLS
  - LDP
  - RSVP-TE with MPLS fast-reroute and primary/secondary (standby) LSP
  - PWE3
  - VPLS/H-VPLS using LDP signaling
  - L3 VPNs (RFC 4364, formerly RFC 2547bis)
- Graceful restart for LDP, RSVP, OSPF, IS-IS, and BGP
- Proxy ARP, DHCP relay, DHCP proxy
- Hardware-assisted BFD (bi-directional forwarding detection) for fast failure detection
- Hardware-based layer 3 classification and filtering
- Denial of service protection, anti-spoofing, packet filtering

SR9700 SERIES APPLICATIONS

Business Services

- Virtual private networks (L2VPNs/L3VPNs)
- Integrated Voice (VOIP)
- Dedicated Internet Access (DIA)
- Per-Customer Per-Service QoS
- Guaranteed SLA with CIR/PIR per customer and per service
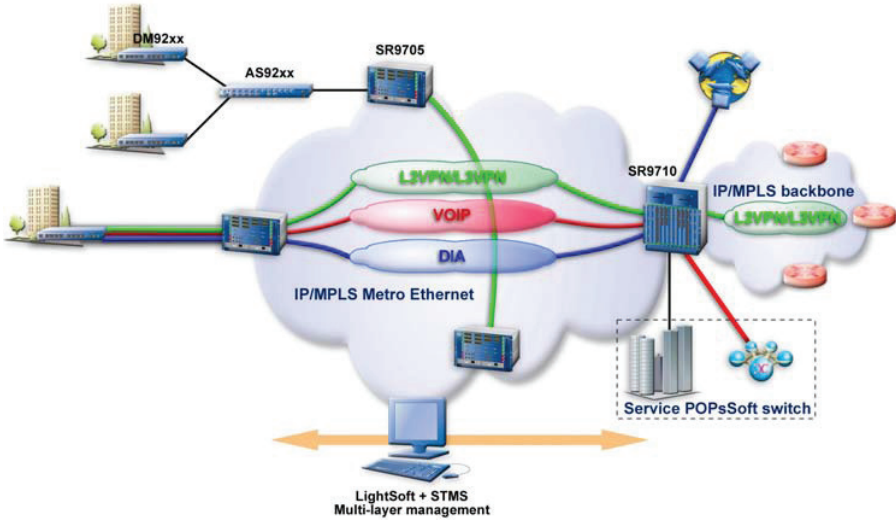

Residential Services

- High Speed Internet (HSI)
- Integrated Voice (VOIP)
- Unicast Video On Demand (VOD) using L2 (VPLS/ VPWS) or L3
- Optimized Broadcast TV using IGMP + PIM-SM
- H-QoS with 3 levels of scheduling for triple-play
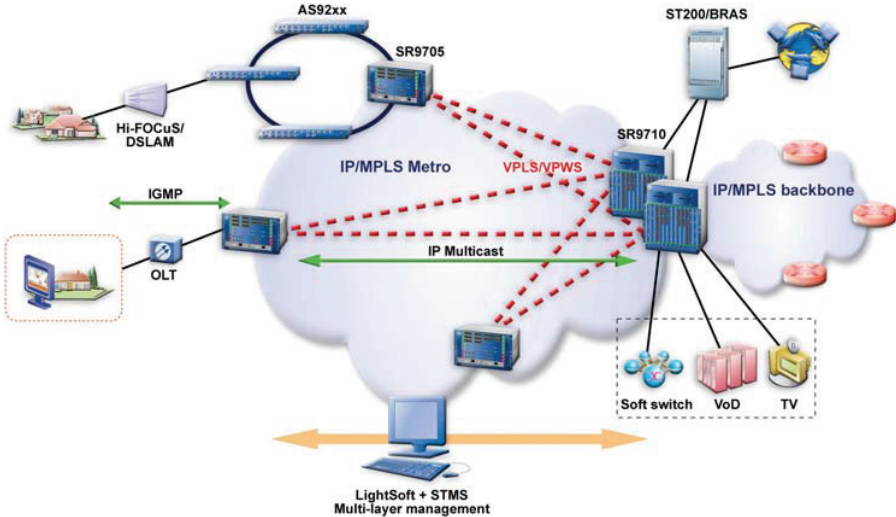
Mobile Backhaul

- Reduced OPEX by transporting legacy TDM and ATM traffic over MPLS Pseudowires (PW)
- Delivery of higher bandwidth to cell sites, with low latency, jitter, and packet loss
- Future proof solution for 3G-All-IP and 4G WiMax backhaul
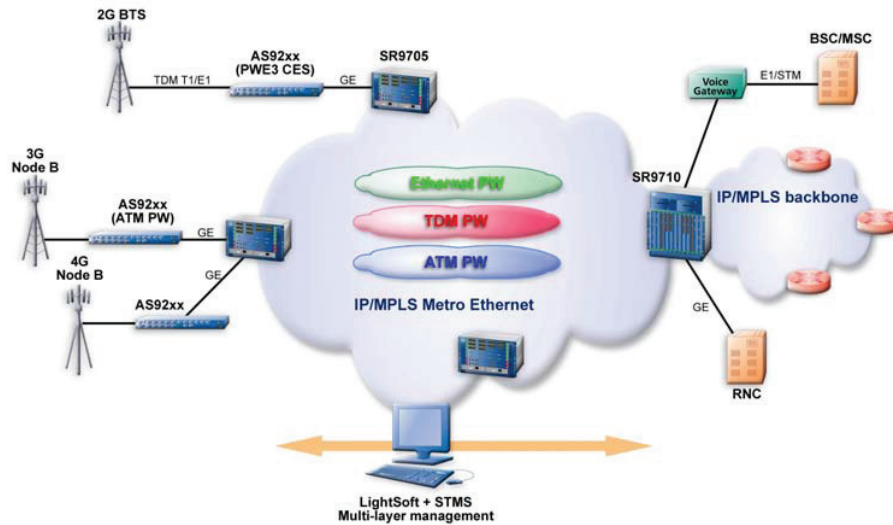
Complete ECI Solution

The SR 9700 series is a best-of-breed platform for Metro Ethernet applications and can be combined with other ECI products to provide complete solutions:

- Combine with ECI's 9200 series aggregation and demarcation switches and Hi-FOCuS™ MSAN for an end-to-end Carrier Ethernet solution
- Deploy SR9700 with ECI's industry leading XDM® MSPP to enable a smooth migration from SONET/SDH to next-generation Ethernet and IP
- Integrate with ECI's LightSoft NMS for a unified, multi-layer approach to network management
- Combine with ECI's XDM ROADM platform for an industry-leading packet+optical solution which drives down costs and simplifies the network

TECHNICAL SPECIFICATIONS

Model	SR9710	SR9705
Line card slots	10	5
Backplane capacity	400 Gbps	200 Gbps
Forwarding performance	595 Mpps	297 Mpps
Gigabit Ethernet density	400	200
10 Gigabit Ethernet density	40	20
Size	13 RU	8 RU
Gigabit Ethernet line cards	20 port GE line card 40 port GE line card	20 port GE line card 40 port GE line card
10 Gigabit Ethernet line cards	2 port 10 GE line card 4 port 10 GE line card	2 port 10 GE line card 4 port 10 GE line card
Redundancy	Power, CPU, fabric, fan	Power, CPU, fabric, fan
Air flow	Front to back	Side to back
Max. power dissipation	4000 W	2400 W
Power input	-40 VDC to -60 VDC Support optional add-on AC power system	-40 VDC to -60 VDC
Operating temperature range	-5°C to +55°C (-23°F to +131°F)	
Operating RH range	5% to 95%, noncondensing	
Environmental standards	ETS 300 019-1-3 Class 3.2 ETS 300 019-1-1 Class 1.2 ETS 300 019-1-2 Class 2.3	
Safety	EN 60950-1:2006, according to LVD Directive 72/23/EEC EN 60825-1&2	
NEBS	GR-63-CORE (level 3), GR-1089-CORE, UL 60950:1, last edition	
EMC	EN 300 386-2, 1TR9	