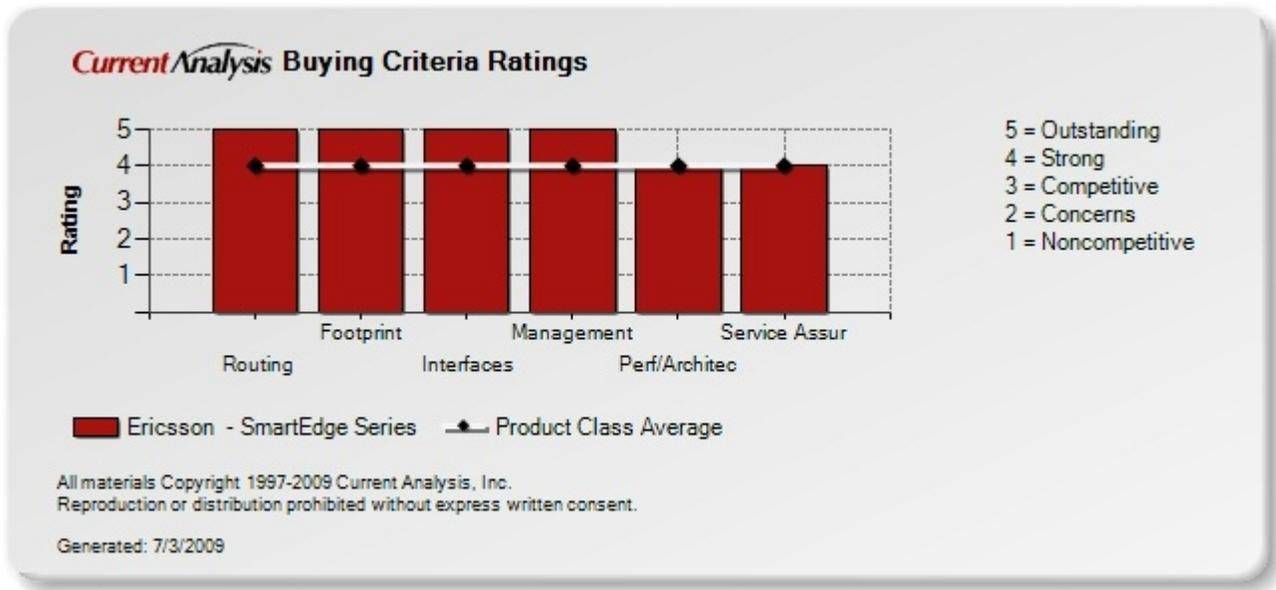


Product Assessment: **Ericsson - SmartEdge Series**  
Report Date: July 02, 2009 Expected Update: January 2010  
Analyst: Hunt, Glen  
Market: Carrier Infrastructure  
Class: Edge Switch Routing  
Current Perspective: ★★★★★

## Standard View

### Summary

#### Buying Criteria



#### Current Perspective ★★★★★

The SmartEdge (SE) Multi-Service Edge Router (MSER) is threatening to competitors due to its ability to perform multiple functions at the edge of the IP network. The SE can perform applications such as BRAS, supporting next-generation subscriber control capabilities; as an edge router, providing edge and triple play services and VPN services; and as an Ethernet aggregation platform, providing high-density Ethernet connectivity, in addition to network security functions such as peer to peer traffic (P2P) analysis via deep packet inspection (DPI) and heuristic analysis. Well-developed subscriber management capabilities, high reliability, density and scalability propositions have enabled the SE series to establish a presence and sizeable customer base in the broadband aggregation/subscriber management market. The SE 1200, the third-generation SE, addresses increased scale and density requirements of emerging broadband networks. The SE 1200 doubles the capacity of the SE 800 for delivery of new video service upgrades, extends triple-play services to broadband mobile and includes features such as deep-packet inspection for peer-to-peer traffic management, advanced session border gateway (SBG) capabilities and network security. The performance increase stems from the XCRP4 controller card (XCRP4), new software features as well as a four port 10 Gigabit Ethernet I/O card (the SE 1200 supports all previous SE 800 I/O cards and is fully backward compatible with earlier SE models). The leap in performance and new features enable the SE series to scale and meet the demands of high-definition television IP telephony, next-generation gaming, video calls, video e-mail, and similar applications. The SE1200 consumes 15mW per subscriber theoretically (5mW per subscriber was empirically determined, tests and methodologies available upon request), making it one of the most energy efficient edge routers in its class.

The SE series is deployed in 17 of the top 20 telephone carriers worldwide which use the platform to deliver a mix of broadband, phone and TV services to more than 50 million subscribers. Top wireline carriers deploying SE include AT&T, British Telecom, BSNL (India), China Telecom, China Netcom, ChungHwa Telecom, eAccess (Japan), France Telecom, Korea Telecom, Telefonica and Turk Telecom, among the more than 200 carriers worldwide. The first top 20-telephone carrier in the world that will use the SE 1200 is ChungHwa Telecom (CHT) of Taiwan. The SE series helps manage more than 300,000 IPTV subscribers at CHT, in addition to providing VPN and VoIP services. CHT chose the platform for its network upgrade, because the scaling and power to deliver CHT's next generation triple play services.

The SE 1200 platform is the key building block in Ericsson's "Full Service Broadband" infrastructure, operating at the edge of the IP backbone, and ready for delivering traffic-intensive applications such as video (HDTV) and Megabit Mobility. Ericsson broadened its carrier Ethernet portfolio with the introduction of the SM 480 Metro Ethernet Service Transport switch. Together the SE series and the SM 480 offer a full range of carrier Ethernet service solutions with the service aware capabilities needed to address next generation business and residential services.

## **Strengths and Weaknesses**

## Strengths

- The SE series is at the center of Ericsson's comprehensive full-service broadband architecture. The increased capabilities of the SE 1200 multiservice edge router enables the company to offer compelling next-generation video-centric services for wireline and wireless operators. The SE1200 meets the scale and increased functionality that are rapidly becoming key requirements for multiservice edge routers.
- The SE series supports network applications such as session border gateway (SBG), security and peer-to-peer management applications. The performance of the SBG, for example, is on par with typical standalone implementations, but with the added advantage of being integrated within the router's high-availability environment. The SE provides managed network security applications such as based on IPSec. The system provides support for peer-to-peer traffic detection via DPI and heuristic analysis to enable operators to manage growing traffic from applications, such as Skype, and optimize their network resources.
- The SE 1200 supports double the capacity of the former SE 800 while it retains backward compatibility. The XCRP4 provides a twofold increase in performance, but the new features can also run on previous generations of the SE platform at a reduced performance level. The new capabilities are available with a new software version and do not require a separate slot-consuming services module.
- The SE 1200 supports an increased number of subscribers for voice and video services. The system supports up to 256,000 subscribers as well as 8,000 MPLS Layer 3 VPN sessions and up to 2.5 million IP routes. As voice and video subscribers scale, the ability to handle the increased number and complexity of subscribers becomes more important. The SE 1200 provides additional CapEx optimization by supporting multiple services plus residential and business traffic within the same platform.
- The latest SE series Ethernet line modules support increased GigE and 10 GigE density; the GigE density increases from 120 to 240 ports per chassis and the quad-port 10 GigE line card more than doubles the density to 48 ports per chassis. These cards address business, consumer and mobile increases in broadband service usage. As a result, there will be an increase in GigE ports from DSL, Ethernet-based mobile base stations. WiFi/WiMAX and

## Weaknesses

- Competitors and suppliers of application-specific network appliances will indicate that, although the integration of additional functionality into the multiservice edge router may appear to offer operational advantages, application domains such as security, peer-to-peer traffic monitoring/control and SBG are moving targets and to normalize and integrate them into a mission-critical edge router may be premature.
- Ericsson will face additional software release complexities as it adds additional applications; not only will there be periodic releases of basic router functionality, but each of the applications will likely be changed and enhanced to meet changing customer requirements. Keeping the routers, applications, and the network management and provisioning platforms in harmony will be challenging.
- Since the new applications can leverage the capabilities of the new controller cards (XCRP4) and its two predecessors, providers need to understand any relevant performance and/or subscriber scale tradeoffs that apply when running these applications in combination or incrementally. As user options expand and the mix of voice, video and data moves from static subscriber profiles to more dynamic on-demand services, network and systems management processes will need to adapt.
- Competitors' multiservice edge routers have matched and/or exceeded the SE's scale and density metrics plus they have begun to add the advanced services features that once differentiated the platform from the rest of the field. As a result, Ericsson will face stiffer competition.

## Point and Counterpoint

### Point

- Alcatel-Lucent would highlight the strengths of its Terabit IP router product portfolio, commands the number two market share position in the overall service provider edge router market. Alcatel-Lucent should contrast the success of its triple play solutions against Ericsson's offer and note that its latest software/hardware release 6.1, has doubled the per slot performance. It should also note the new integrated service adapters to address new service capabilities.

### Point

- Cisco should highlight the strength of its IP NGN portfolio, as well as its leading market share position in the service provide edge router market, according to Synergy Research. Cisco should highlight the enhancements to the 7600 edge router, such as support for SBC, content delivery, and security, as well as its Video 2.0 portfolio to provide assured delivery. Cisco should also go head to head with the SE 100 now that it has unveiled the ASR 1000 platform and tout the high scale of its new ASR 9000 platform.

### Point

- Juniper should highlight its Intelligent Services Edge vision, which will enable providers to deliver a range of services such as broadband services routing, dynamic application awareness, intrusion detection and session border control functionality over a single operating system with maximum scale. ISE will facilitate intelligent convergence at the edge to deliver greater levels of device, network and service consolidation for its M Series and MX Series platforms.

### Counterpoint

- Ericsson should counter by noting that the SE MSER's increased capabilities of the SE 1200 multiservice edge router will enable the company to offer compelling next-generation video-centric services for wireline and wireless operators that meet the scale and increased functionality that is rapidly becoming the de facto industry standard for multiservice edge routers.

### Counterpoint

- Ericsson would counter by noting, that with the two-fold performance improvement provided by the SE 1200, the platform is fully capable of providing the required services to carriers and MSOs.

### Counterpoint

- Ericsson would counter by pointing out that its SE series MSER router can perform in all three of the areas noted above where Juniper currently needs to deploy three platforms. The SE series also runs the same field proven operating system to provide ubiquity of services and features across routing, switching and subscriber management. Ericsson can also point out the introduction of its Ethernet-optimized SM 480, which addresses the needs of operators who are converging their wireline and wireless infrastructures.

## Buying/Selecting Criteria

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### Footprint and Density



- The SE series is offered in four models, which include the 1200, 800, 400 and for access applications the 100. The SE 1200/800 have 14 slots, two for route processors and 12 slots for line cards and service cards; the SE 400 offers six total slots with four universal slots. The SE 1200/800 chassis requires 15 RUs and enables a service provider to house up to four chassis or seven chassis for the SE 400 per rack.

- The SE 800/1200 supports the following 10 GigE non-blocking densities on a chassis and seven-foot telco rack basis: 48 ports per chassis. Its 10 GigE densities for non-blocking applications are leading the class when compared on a chassis and rack basis, yielding a maximum of 192 non-blocking ports.
- The SE 800/1200 supports the following GigE Ethernet densities on a chassis and seven-foot telco rack basis: 240/960 non-blocking ports. The SE 1200 leads all platforms in the class in GigE non-blocking port density except for Cisco's 7600, which supports greater GigE port densities. The SE 800/1200 also supports 144/576 Fast Ethernet ports per chassis/rack. Twenty-port GE and four x10GE port cards are also available for the SE1200.
- The SE 800 provides the following POS support: 96/384 OC-3 ports per chassis/rack with eight-port card, 48/192 OC-12 ports per chassis with four-port card, and 12/48 OC-48 ports per chassis with one-port card. The SE does not support OC-192 interfaces; all other products in the class except the Cisco 10000 provide support for this interface.
- The SE 400/800 platforms support a variety of DS1/DS3 interfaces such as 3,360/13,440 DS1s per chassis/rack when deployed with redundant high-speed uplink interfaces. For DS3/E3 support, the SE provides supports for up to 120 ports of DS3 and CH DS3, 60 ports of clear channel E3 and 288 ports of channelized E3 per chassis. Also supported are 36 ports of CH STM-1, 12 ports of CH OC12/STM-4 down to the DS3 or DS1 level and 128 ports of CH OC3 per chassis.
- For ATM, the SE series can support up to 48 ports of OC3c/STM-1, 12 ports of OC12c/STM-4 and 120 ports of DSC per chassis.

## Interface Support



- The SE series supports the following Ethernet interfaces: a one-port 10 GigE, a four-port GigE, a 10-port GigE, a four-port 10 GigE (SE1200 only), a 20port GE (SE1200 only), a 20-port double-wide GigE and a 12-port 10/100TX Ethernet.
- The SE 400/800 support the following DS3/E3 interfaces: a 12-port DS3 (clear channel), a 12-port CH DS3, a 24-port CH E1, a six-port E3 (clear channel), a three-port CH STM-1, a single-port CH OC12 to DS3 and a single-port CH OC12 to DS1/DS3.
- The SE 400/800/1200 supports the following ATM interfaces: a four-port OC3c/STM-1, a single-port OC12c/STM-4 and a 12-port DS3 (SE400/800 only).
- The SE 400/800 supports the following POS interfaces: an eight-port OC3c/STM-1, a four-port OC12c/STM-4, and a single-port OC-48c/STM-16c.

## Performance and Architecture



- The SE 800/1200 provides 240/480 Gbps of total switching capacity using a passive mesh architecture that supports 120/240 Gbps on the ingress as well as the same on the egress.
- The SE series uses a passive backplane and currently supports 36 Mpps/432 Mpps per slot/chassis. Customers can upgrade to the latest routing processors and new software, such as the SE 1200, without changing the chassis. The SE 1200 also supports all previous SE 800 interface cards, which provides a significant level of investment protection.
- A standard seven-foot telco rack can house up to four SE 800 or 1200 chassis (depending on configuration). This provides a scalable model whereby service providers can add chassis as their interface density and subscriber growth expands. The closest in this regard is Alcatel-Lucent's 7750 SR-12/7450 ESS-12, which enables a service provider to house up to three chassis per rack.
- For class comparisons based on a fully loaded standard seven-foot telco rack, the SE provides total switching

capacity equivalent to approximately 1.44 Tbps per rack, which is well above the average for the products in this class

## Routing and Service Features



- The SE series provides a wide range of broadband aggregation services for provisioning and aggregating subscribers. The SE series supports applications such as L2/L3 VPNs, virtual routers, multicast content delivery, streaming video for DSL subscribers, multiple methods of subscriber encapsulation (RFC 1483, RFC 1490, PPP over ATM, and PPP over Ethernet) and wholesaling via L2TP or MPLS VPN. SE products can support subscriber termination over cable and WiFi networks, via its clientless IP services (CLIPS).
- The SE series is at the center of Ericsson's comprehensive Full Service Broadband architecture. The SE series supports next-generation video-centric services for wireline and wireless operators that meet the scale and increased functionality that is rapidly becoming table stakes for multiservice edge routers.
- The SE series supports network applications such as SBG, security and peer-to-peer management applications. The performance of the SBG is on par with typical standalone implementations, but with the added advantage of being integrated within the router's high-availability environment. The SE provides managed network via IPsec. The system provides support for peer-to-peer traffic detection to enable operators to manage growing traffic from P2P applications.
- The SE series supports the following Hierarchical QoS, packet classification (RFC 2474, 2475, 2597, 2598), DiffServ ACL, ingress policing, or BGP attribute-based QoS, class-based ingress policing and egress shaping, priority queuing and EDRR, RED and WRED, MPLS E-LSPs (RFC 3270) and per-sub ATM queuing.
- The SE series supports an extensive suite of routing protocols to offer a full complement of services, including support for BGP, IS-IS, OSPF, RIP and static routes, as well as proprietary dynamic verified static routes (DVSR).
- The SE series supports both Layer 2 and Layer 3 VPNs in conjunction with multiple contexts to create a flexible service offering. Each VPN gets its own IP address space, routing table, protected network traffic, user authentication, and other attributes. VPNs supported include BGP/MPLS (RFC 2547bis), Layer 2 MPLS (Draft Martini) and GRE tunneling.

## Service Assurance



- The SE series redundancy includes its router processor, as well as power/fan-circuit redundancy, routing protocol redundancy, ATM APS 1:1 and 1+1, and EoS APS 1:1 and 1+1. NEBS Level III certifications have been obtained. It also uses a redundant connectivity (mesh) architecture among its cards.
- The SE series supports BGP-graceful restart, restartable processes, non-stop forwarding, hot standby route processors and active component upgrades. SE also supports in-service upgrade of software as well as ASIC field re-programmability, eliminating scheduled system downtime.
- The SE series distributed packet forwarding functions and provided on each of line cards. A failure of one line card has no impact on packet forwarding for other line cards, and there is no central point of failure for packet forwarding.
- The SE series delivers a resilient network operation using techniques that provide SONET/SDH-like fail-over timing (50ms or better). Its MPLS Fast ReRoute has been clocked at 50ms or better and its innovative Dual PIM Join protocol assures 50ms or better failover in delivery of multicast data such as IPTV.
- The SE series allows for Lawful Intercept of data and port mirroring by re-directing traffic to the operator assigned port.

- The SE series supports Ethernet resiliency and optimization using industry-standard IEEE 802.3ad with up to eight/16 links per aggregation group.

## System and Service Management



- The SE series provides management and control features which includes: a full CLI command set to aid in provisioning and troubleshooting, an embedded SNMP agent with support for SNMP v1, v2c and v3, bulk statistics to provide an efficient alternative to SNMP as a means of gathering network accounting statistics.
- The NetOp Element Management System is a GUI-based, scalable and open element management platform designed to reduce operations costs through automated configuration, provisioning, alarm and fault management. NetOp supports multiple management methods and protocols, such as Telcordia's NCON system. The SE series also provides a gateway into existing and higher-level operations support systems (OSS) through CORBA interfaces.
- The NetOp Policy Manager (NetOp PM) provides policy management and control across the entire SMS and SE product families. Using RADIUS as the basis for subscriber provisioning, NetOp PM provides a variety of time-based, time-of-day-based, and volume-based services. Working in conjunction with the unique architectures of the SMS and SE products, NetOp PM allows a carrier to provision value-added services without having to change its operational model.
- The NetOp Network Services Manager enables a provisioning tool for point-and-click provisioning of L3VPNs and site to site IPsec tunnels.
- The SM 480 Metro Ethernet Switch is also managed by the NetOp element, policy manager and services manager, which provides a complete access – aggregation to multiservice edge solution for Ericsson's network operators.

## Metrics

### System Performance and Architecture

<b>Total Switching Capacity, Gbps</b>	SE 1200: 480 Gbps using a passive packet mesh architecture up to 240 Gbps
<b>Full Duplex Switching Cap.</b>	480 Gbps - 240 Gbps Ingress and 240 Gbps Egress
<b>Routing/Switching</b>	480 Gbps +
<b>Service Performance per Slot</b>	20 Gbps
<b>Rack Density</b>	3 or 4 depending on configuration

### Architecture

<b>Switch Fabric</b>	Fully distributed switching fabric and processing with a Passive Packet Switching-mesh that provides module-to-module interconnectivity. There is no central switching fabric so there is no single point of failure.
<b>Dist. of Intelligence</b>	All forwarding and IP Service functions are distributed on each Interface Module. Each Interface Module contains two PPA Broadband IP Engines that provide separated Ingress and Egress

processing.

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<b>Queuing, Buffering</b>	Line cards queuing with configurable number and use. Priority queuing (PQ) or Enhanced Deficit Round Robin (EDRR) with policing and shaping. For congestion control, Random Early Detect (RED) and Weighted Random Early Detect (WRED).
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## Service Assurance

<b>Hardware Redundancy</b>	All critical components can be deployed as fully redundant including XCRP Control Module, fans and power systems. Additionally, SmartEdge can also provide system redundancy with VRRP, IP-based Multicast reliability with Dual PIM joint, port-level redundancy for 1:1, circuit redundancy.
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<b>Redundant Power, Fans, Feeds</b>	Yes - distributed architecture with no switch fabric or central point of failure.
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<b>Interface Redundancy 1:1</b>	Yes
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<b>Interface Redundancy, 1:N</b>	Yes
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<b>Redundant Hot Swappable Components</b>	Yes
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<b>SONET APS</b>	Yes
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<b>RPR, Standard/Proprietary</b>	Not Supported
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<b>Resilience/Availability</b>	Subscriber session level resilience with stateful session failover, modular software with restartable processes, non-stop forwarding with stateful failover, hot-standby route processors, IP Multicast reliability with Dual PIM Join, BFD, VRRP, active component upgrade - in-service OS + in-service ASIC updates
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<b>Control, Data, and Management Plane Separation</b>	Yes
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<b>Graceful Restart</b>	Yes
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<b>50 ms Link Failover</b>	Yes
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<b>MPLS Fast Reroute</b>	Yes
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<b>Non-Stop Switching/Hitless Layer 2 failover</b>	Yes
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<b>Non-Stop</b>	Yes
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**Routing/Hitless****Layer 3****failover****Non-Stop** Yes**Services/Hitless****Layer 4****Hitless** Yes**Software****Upgrade****Interface Density****10 Gbps** 24**Ports/Chassis****(non-blocking)****10 Gbps** 48**Ports/Chassis****(oversubscribed)****1 Gbps** 240 with 20 port card**Ports/Chassis****(non-blocking)****1 Gbps** 240 with 20 port card**Ports/Chassis****(oversubscribed)****1 Gbps** 960**Ports/Rack****10/100** 720 w/ 60-port FE card**Mbps****Ports/Chassis****10/100** Data Not Provided**Mbps****Ports/Rack****100 Mbps** 720 with 60-port FE card**Ports/Chassis****T3/E3** SE 1200 Not Supported; SE 800/400: E3: 336 X  
**Ports/Chassis** 12 = 4032 ports per chassis via CHOC12, CH DS3**ATM** (5 per chassis with 4-port OC-3/STM-1; 96 w/8-  
**Ports/Chassis** port ATM card under development  
**(OC-3)****ATM** 5 per chassis with 1 port OC-12/STM-4c; 24 w/2-  
**Ports/Chassis** port ATM OC12 under development  
**(OC-12)****ATM** Not Supported**Ports/Chassis****(OC-48)****ATM** Not Supported**Ports/Chassis****(OC-192)****POS** Not Supported on SE 1200; 96 ports per chassis w/  
**Ports/Chassis** 8 port card  
**(OC-3)**

<b>POS Ports/Chassis (OC-12)</b>	Not Supported on SE 1200; 48 ports per chassis w/4 port card
<b>POS Ports/Chassis (OC-48)</b>	Not Supported on SE 1200; 48 ports per chassis w/4 port card
<b>POS Ports/Chassis (OC-192)</b>	12
<b>WDM Lambdas/Chassis</b>	Up to 240 Ports CWDM and/or DWDM can be supported on GbE and 10 GbE (up to 48 - 2:1 over subscribed) modules using industry standard SFP (GbE) and XFP (10GbE) pluggable module; DWDM: ITU channels 17 - 60 support. CWDM: 1470 nm - 1610 nm. 240 ports of GE

## Features

<b>CoS/QoS</b>	Packet class (RFC 2474, 2475, 2597, 2598); DiffServ ACL, ingress policing, or BGP attribute-based QoS; class-based ingress policing and egress shaping; priority queuing and EDRR; PWFQ, RED and WRED; MPLS E-LSPs (RFC 3270), per-sub ATM queueing, aligned with WT-92 and TR-59
<b>Hardware-based QoS</b>	Yes
<b>Number of Forwarding Classes Supported per Port</b>	Configurable and also assignable per-subscriber
<b>Service-based QoS</b>	Yes
<b>Interface-based QoS</b>	Yes
<b>Subscriber-based QoS</b>	Yes - with up to 8 queues per subscriber
<b>Rate Shaping/Limiting/Marking</b>	Yes
<b>Line rate forwarding with all features enabled</b>	Yes, for most configurations
<b>Layer 2, IEE 802.1p Traffic Prioritization</b>	Yes
<b>Policy-based Traffic Management</b>	Yes
<b>Hierarchical QoS</b>	Yes - up to 5 levels (per-subscriber hierarchy)
<b>Load</b>	Supports LAG on STM-1/4/16 OC-3/12/48 with

<b>Balancing</b>	FRR; POS/MLPPP Enhancements for Channelized STM-1/OC-12 cards; Netflow V5 Bind Int Interfaces; MPLS on MLPPP; ECMP support for up to 16 paths for OSPF, RIP, Static Routes, IS-IS and BGP, IS-IS features: multiple levels, multiple instances (with redistribution ), load balancing, and authentication
<b>Link Aggregation</b>	Yes
<b>MPLS</b>	Yes, supports up to 8,000 MPLS VPN
<b>Routed Protocols</b>	IPv4, IPv6
<b>Routing Protocols</b>	BGP-4, IS-IS, OSPFv2/v3, RIP v2/ng (RFC 2453), VRRP (RFC 2338); Bridged Virtual Interface (BVI) enables routing and switching on the same port.
<b>Route Scalability</b>	2.5 Million IPv4 routes, 2 Million IPv6 routes
<b>VLANs/Multicast</b>	PIM-SM (RFC 2362 + IETF Draft), PIM-DM (IETF Draft), IGMPv1, v2, v3 (RFC 3376), SSM (RFC 3569), MBGP (RFC 2858), MSDP (RFC 3618), IGMP snooping, IGMP filtering – RFC3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6; IPv6 Mstatic Support; Enhance PIM Static Joins for V6 Support and Enhanced PIM SSM for V6

## Advanced Service Features

<b>Application Awareness/Assurance</b>	Subscriber Awareness includes Subscriber Name, Service, IP Address, Address Management, DHCP Relay, DHCP Proxy, IPCP parameter negotiation, IP pools, RADIUS
<b>Deep Packet Inspection</b>	"Deep-packet inspection for peer-to-peer traffic management; includes Heuristic based P2P, Application Detection, e.g.,
<b>Intrusion Detection</b>	IPS/IDS
<b>IPSec</b>	Up to 16,000 tunnels
<b>Other Service Features</b>	"Premium Service Insertion, Mobile IP (Home Agent and Foreign Agent) -- as an ASN Gateway for WiMax; Home and Foreign Agent Support; Acts as an ASN gateway in WiMax; Mobile IP – Home Agent Subscriber Services: Hotlining (HTTP Redirect) Dynamic tunnels support (Home Agent and Foreign Agent) Foreign Agent Dynamic FA-HA Keys.
<b>Session Border Control</b>	Session Border Gateway (SBG) for IMS-based VoIP and non-IMS-based VoIP (based on H.248)
<b>Subscriber Management</b>	Broadband Subscriber Management supports – RADIUS Authentication, Authorization, and Accounting (AAA), dynamic circuit binding, CoA, Diameter, Subscriber level bridging and Dynamic / Static Clientless IP (CLIPs); Support for up to 256,000 subscribers

<b>Video Service Support</b>	Bandwidth adjustments directly by the end-user for optimal quality
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## Network Management

<b>EMS</b>	NetOp EMS is a GUI-based, scalable, and open element management platform with automated configuration, provisioning, alarm and fault management.
<b>Fault Management</b>	Event logs, SNMP traps, interface statistics for troubleshooting and performance monitoring, port views and chassis
<b>Configuration Management</b>	Transaction-based configuration against a configuration database including commits, aborts, and ability to roll back unintended changes
<b>Accounting</b>	SmartEdge offers bulkstats to provide alternative to SNMP for gathering network accounting statistics and intervals.
<b>Performance Management</b>	Interface statistics for troubleshooting and performance monitoring, port views and chassisPacket mirroring and sampling
<b>Security</b>	User authentication via RADIUS, TACACS+, SSH, multiple user groups or ACLs; Reverse Path Forwarding (RPF) check, SSH, MD5 support for routing protocols, key rollover, RADIUS, TACACS+.
<b>Provisioning</b>	NetOps gateway into existing and higher-level Operations Support Systems (OSS) through CORBA interfaces; Network Services Manager enables a provisioning

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## Physical Specifications

<b>Slots/Chassis</b>	14 slots total; 2 for Route Processors, 12 universal slots for line cards; SmartEdge 400 offers 6 total slots with 4 universal slots
<b>I/O slots</b>	12 for SE 1200 and 800, 4 for 400
<b>Dimensions</b>	25.9 x 17.3 x 22.7 or 19.5 x 17.3 x 22.7, depending on configuration
<b>MTBF</b>	Data available depending upon configuration
<b>NEBS Compliance</b>	Yes - NEBS Level 3 Certified Compliance
<b>Power Requirements</b>	SmartEdge 1200, 800 and 400 chassis are native DC power with -48 VDC input. SmartEdge 400 chassis offers a optional intelligent AC power shelf for AC power deployments.
<b>Power Draw &amp; Thermal Load</b>	Configuration Dependent, max 3840W
<b>Chassis Options</b>	SE 800 and SE 400; Both chassis use the same modules and offer same capabilities with different capacity for lower density network dep
<b>System Applications</b>	SE Services gateway supports three network roles: As a BRAS, provides next-gen subscriber control

capabilities; as a router, provides edge and services routing and edge router for the aggregation of leased lines and ATM, frame relay, and VPN services; as an Ethernet aggregation platform, provides high-density, high-functionality Ethernet connectivity.

<b>RU</b>	9 RU
<b>Chassis/Rack</b>	4
<b>Availability</b>	Available

## Interfaces

<b>10/100 Mbps Ethernet</b>	12-port 10/100TX
<b>100 Mbps Ethernet</b>	Not Supported
<b>100/1000 Mbps Ethernet</b>	4-, 5-, 10-, and 20-port GigE modules can support a copper SFP for 1000Base-T deployments as required
<b>1 Gbps Ethernet</b>	4/5/10/20-port SFP-based Gigabit Ethernet interface modules; 20-port module is dual-slot
<b>10 Gbps Ethernet</b>	1 and 4 port XFP-based 10 Gigabit Ethernet Interface Module
<b>DS-1/DS-3/HSSI</b>	Not Supported on SE 1200; SE 800:1 port CHOC-12 to DS3, 1 port CHOC-12 to DS1/DS3 (336 channels), 12 port CH DS3 (336 channels), 12 port Clear Channel DS3, 3 port CH STM-1 (336 channels), 24 port Ch E1 (336 channels), 6 port Clear Channel E3
<b>ATM</b>	1 port OC-12c/STM-4, 4 port OC-3c/STM-1
<b>POS</b>	8 port OC-3c/STM-1, 4 port OC-12c/STM-4, 1 port OC-48c/STM-16; 1 port OC-192
<b>Advanced Services Cards</b>	The ASE card, consumes one slot in the SE product line, provides application layer (L4-L7) services that include security (IPSec), Deep Packet Inspection, firewall, IPS/IDS, etc. One or more ASE cards can be deployed in a chassis and can load-share and redundancy. Can apply policy rules, QoS, logging, to inspected packets.

## Additional Information

<b>Customers</b>	The SE series is deployed in the following: ATT, BT, Turk Telecom, BellSouth, Sprint, Belgacom, France Telecom, China Telecom, Hanaro, Completel , KT, Scarlet, Neuf Telecom, Chunghwa Telecom, China Netcom (Liaoning Communications Corporation), Thai Telecom, ARCOR, Henro, Easy Net, Power Com, others
<b>Partners</b>	OSS/Billing partners: Concord, Micromuse, NARUS, Portal, Quallaby, Visonael, XACCT
<b>Special Notes (1)</b>	Ericsson has championed providing power efficiency measurements by calculating the per

subscriber power being consumed, more information is available on their web site

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**Special Notes (2)** Ethernet- optimized SM 480, which addresses the needs of operators who are converging their wireline and wireless infrastructures

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**Special Notes (3)** Subscriber Awareness – Subscriber Name, Session, IP Address – Address Management – DHCP Relay, DHCP Proxy, IPCP parameter negotiation, IP pools, RADIUS

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**Special Notes (4)**

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