SMARTEDGE 600
MULTI-SERVICE EDGE ROUTER

Carrier-class, Scalable, Compact, Multi-Service Edge Router integrates Edge Routing, Subscriber Management, Ethernet Aggregation, and Advanced Applications. Ideal for delivery of residential and business services; ready for fixed-mobile convergence

Key benefits

• Functionality consolidation at the edge of the IP/MPLS network: Enables economies of scale, reduces the need for sparing, extra ports, and power

• Carrier-Grade Design: Engineered to standards for deployment in carrier networks worldwide – NEBS and RoHS compliant

• Resilient software architecture: Modular design provides stability and protects against crashes and protocol errors

• High performance programmable packet forwarding: Based on a Packet Processing ASIC (PPA) developed by Ericsson

• Session level reliability: Supports Non-Stop Forwarding and keeps Subscriber Sessions running uninterrupted during a Route Processor fail-over

• Supports up to 256,000 active Multi-Play subscribers, 256,000 PPP/DHCP subscribers, 256,000 VLAN cross-connects and 1.5 million MAC addresses

• Highly scalable compact platform (7 RUs), capable of delivering services to about 1.2 millions of subscribers in one rack, using minimal power per subscriber served

• Supports up to 8000 MPLS L2/L3 VPN, with 1280 BGP, 1280 t-LDP peers and up to 2.5 million BGP routes

• Advanced services for VoIP with Session Border Gateway (SBG) with Border Gateway Function, Security, and P2P applications analysis and traffic management

• Optional A/C power shelf

Ericsson's SmartEdge 600 (SE600) platform is a highly scalable, compact platform that delivers multiple functions at the edge of the IP/MPLS network to reduce the networks' physical topology. The edge of the IP network has been evolved to require additional functionality beyond edge routing. The SE600 is a platform that delivers all of the necessary functionalities in one small form factor. These functions are: IP/MPLS edge routing, Broadband Remote Access Server (B-RAS), Ethernet aggregation, Mobile IP, Session Border Gateway - BGF, Network Security (IPSec) and P2P traffic analysis and management. The SE600 delivers services that are required for residential and business applications, e.g., triple-play (HDTV, HD VoD), L2/L3 VPNs and broadband mobility, all from the same network. Support for the new applications in the SmartEdge 600 enables service providers to architect their network with minimal number of devices

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and reduce network and device overlay resulting in simpler network topology and operation.

SE600 utilizes the latest ASIC technology that was designed in-house by Ericsson to deliver up to four 10G interfaces per line card. Any of the six line cards interfaces can be used for user or network connectivity. The SmartEdge 600 platform introduces major innovations. It offers the highest ratio of subscriber to size and energy consumption in the SmartEdge family. It is only a 7-rack-unit platform that offers up to 256,000 subscriber consuming only 10.7 mWatts per subscriber when fully loaded. The SmartEdge 600 MSER delivers 240Gbps of throughput using 6 slots, each capable of up to 20Gbps full duplex. The SmartEdge 600 packet mesh architecture uses no central switching fabric, common connectivity modules, or active backplane components. This architecture eliminates single point of failures and provides for a much smaller foot print relative to competitive platforms of the same capacity.

All SmartEdge MSER interface modules are hot-swappable and highly resilient with full session and stateful redundancy in the event of a failure or replacement. The SmartEdge 600 uses the same highly resilient operating system that is used in all SmartEdge product lines. The SmartEdge operating system (SEOS) is modular and capable of hitless restart. This means that when a software task goes down the system will continue to operate as the task is restarted independently.

The SmartEdge 600 allows the 10GE, 1GE, 10/100 FE, OC-192 PoS, ATM OC-3, and ATM OC-12 cards that are currently used in SE1200 to be deployed in any of its slots with backwards compatibility. This interoperability results in easy upgrade and re-use of current resources.

SmartEdge 600 Multi-Service Edge Router (MSER) offers advanced traffic engineering and management on a per port basis including options to mixing of PWFQ and MDDR on the same GE interface for different data circuits (flows) for maximum flexibility in service offering. Hierarchical QoS, policing, shaping and granular rate limiting can be configured on a per subscriber per service basis.

By converging wired and wireless networks, Ericsson will enable a world where any network can deliver any service to any Internet-enabled device regardless of how the user is connected to the network. The SE600 paves the way for Fixed/Mobile Convergence by providing a stable IP point-of-presence for all users regardless of mobility within or between access technologies. The SE600 also provides state-of-the-art Packet Inspection and Service Classification which are important functions of network centric service awareness. This is the point of the network where other service-differentiated capabilities are based (for example service access control, service based QoS and policy based routing). Packet inspection, using both local policies and "Policy Server" policies, allows the SE600 to identify a service based on the analysis and classification of the data packets.

The SmartEdge 600 also enables advanced security functions to protect the network right at its edge closer to subscribers, for maximum effect. With its Advanced Services Engine (ASE) card, it offers P2P traffic analysis and management via Deep Packet Inspection (DPI) and Heuristic Analysis. This functionality provides a more efficient and secure network operation. Example applications are detection of leading instant messaging (IM) services.

A high-performance, full-function multi-service edge router

The SmartEdge 600 MSER unifies high-performance edge routing, Ethernet aggregation, advanced subscriber management, and advanced services. The SmartEdge 600 can be deployed in many advanced applications, e.g., as a major component of an IMS infrastructure providing security, call control, and high speed routing. SE600 can be managed by Ericsson's NetOp Policy Manager for subscriber care to offer flexibility in service policies and selection; it can be provisioned by Ericsson's EMS. An SE600 can be provisioned by Ericsson's Element Manager System (EMS product). For establishing VPN services in SE600, Ericsson's Network Services Manager product may be used for rapid deployment and management.

Device specifications for SmartEdge 600

Hardware

Chassis
- Dimensions: 12.2"(H) x 17.3" (W) x 16.6" (D) – 7 RU, 6 chassis per 7' rack
- Optional A/C Power Shelf: Dimensions : 1.75"(H) x 17.3" (W) x" (D) – 1 RU
- 19" or 23" rack mountable
- 8 slots, 2 for Route Processors; 6 slots for line cards.
- Side to back airflow for cooling
- Backplane capacity of 240 Gbps
- Up to 20Gbps slot to slot forwarding throughput

Route processor module
- 2 per chassis (1:1 redundancy)
- Compact Flash slot for secondary storage
- Management ports XCRP3: 2 craft ports: DB-9/RS-232, Asynchronous modem port, Ethernet 10/100TX. XCRP4 : 1 craft
  ports: DB-9/RS-232, Asynchronous modem port, 2 Ethernet 10/100/1000TX

Line cards
- Dual Packet Processing ASICs (PPA1/2/3); 1 for ingress, 1 for egress
- Fully meshed backplane – no slots used for switch fabric card

Card types
- 1 port OC-12/STM-4c (ATM)
- 4 port OC-3/STM-1c (ATM)
- 8 port OC-3/STM-1c (ATM)
- 4 port OC-48 PoS
- 8 port OC-3 PoS
- 1 port OC-192 PoS
- 12 port 10/100TX Ethernet
- 60 port 10/100TX Ethernet
- 4 port Gigabit Ethernet (GBIC or SFP)
- 5 port Gigabit Ethernet (GBIC or SFP)
- 10 port Gigabit Ethernet with SFP
- 20 port Gigabit Ethernet with SFP
- 1 port 10-Gigabit Ethernet with XFP
- 4 port 10-Gigabit Ethernet with XFP

High availability and redundancy
- 1+1 for all common CPUs, clock and independent power to each line card
- Hot standby route processors
- Restartable software processes (for example PPP, BGP, SNMP, etc.)
- In Service System Upgrade

Application services
- SBG - BGF (Session Border Gateway – Border Gateway Function)
- Heuristic based P2P Application Detection, e.g., Bit Torrent, Gnu Tella, Jabber IM, eDonkey, and other leading instant
  messaging services

Operating environment
- Temperature: 5 to 40 C degrees (long term), 5 to 55C (short term)
- Humidity: 5-95% non-condensing
- Input current rating per feed: 57A @ -48VDC, 70.2A @ -39VDC
- Redundant input power, max 2736 VA
- NEBS Level III, CE Mark, SR-3580, UL 1950, GR-63 Core, GR-1089 Core, ETS 300 386-2 FCC Part 15, EN55022 class
  A, ETS 300 386-2
- RoHS-5 compliance

Software

Architectural features
• Modular Operating System, with separation of control, data and services planes; independent tasks with its own thread and memory space

Broadband subscriber management
• RADIUS Authentication, Authorization, and Accounting (AAA), dynamic circuit binding, CoA
• Diameter
• Subscriber level bridging
• Dynamic / Static Clientless IP (CLIPs)

Encapsulations
• PPP/HDLC, cHDLC, Ethernet, IEEE 802.1q, RFC 1490 routed IP over Frame Relay, MPLS, MLPPP, 802.3ad, MFLR
• PPP over Ethernet (RFC 2516), PPP over ATM, RFC 1483 bridged and routed IP over ATM

Multicast protocols
• PIM-SM (RFC 2362 + IETF Draft), PIM-DM (IEFT Draft), IGMPv1, v2, v3 (RFC 3376), SSM (RFC 3569), MBGP (RFC 2858), MSDP (RFC 3618), IGMP snooping, IGMP filtering
• IPv6 Mstatic Support; Enhance PIM Static Joins for V6 Support and Enhanced PIM SSM for V6

Routing Protocols
• BGP-4 (RFC 1771), IS-IS (RFC 1195 & ISO/IEC10589), OSPFv2/v3, RIP v2, RIPng, VRRP (RFC 2338), LDP, RSVP
• LDP tunneling over RSVP LSPs (RFC 3209); BFD for OSPF, ISIS, BGP, static routes and individual links in 802.3ad link group
• OSPF V3, RIPNG
• Mobile IP (Home and Foreign Agents), WiMAX Forum AAA Attributes for MIP Home Agent

Configuration and network management
• Command Line Interface (CLI) support via telnet or SSH
• RADIUS, Diameter, TACACS+
• SNMP v1/2/3
• L2 Control Protocol (L2CP) with support for DSL Sync Rate with Dynamic QoS change and ATM Ping command to DSLAM
• NetOp EMS support for event logs, SNMP traps, interface statistics for troubleshooting and performance monitoring, port views and chassis views.

MPLS features & virtual private networking
• Traffic Engineering, RSVP (RFC 3209), LDP (RFC 3036, 3478), L2 VPN (martini) VPLS, H-VPLS, Transport Independent (MPLS VPN over soft GRE), Multicast over MPLS VPN
• MPLS VPNs (RFC 4364 previously known as 2547bis), Carrier of carriers and Inter-AS, MPLS VPN (options A, B, C), MPLS FRR,EoMPLS.

Layer 2 non-MPLS VPN:
• GRE, Hard GRE
• L2TP (RFC 2661) LAC, LTS, LNS
• 802.1Q Virtual LAN (VLAN) support with 802.1QinQ - with CoS mutation, 802.1Q tunneling with VLAN mapping
• 802.1ag Connectivity Fault Management
• Ethernet OAM – CPE Ping
• Virtual Circuit Connection Verification (VCCV)
• MPLS ping and trace
• Bridge Virtual Interface (BVI) (routing and bridging on the same interface)

Quality of service
• 802.1p Class of Service (CoS), Differentiated Services Code Point (DSCP) ToS, IP Precedence, and MPLS EXP bits
• Packet classification (RFC 2474, 2475, 2597, 2598); DiffServ packet marking by ACL, ingress policing, or BGP attribute based QoS; class-based ingress policing and egress shaping; priority queuing and EDRR; RED and WRED; Hierarchical Scheduling aligned with DSL forum's WT-92 and TR-59 specifications.

Security
- Reverse Path Forwarding (RPF), Secure ARP, MD5 support for routing protocols, key rollover, RADIUS, Diameter,
  TA CACS+; Administrative ACLs, packet mirroring and sampling, Secure Shell (SSH) Protocol, Kerberos, SNMPv3, IGMP
  filtering, SSHv2, VLAN ACLs, IP security router ACLs, subscriber-based ACLs
- IPSec
- Lawful Intercept (CALEA)

Subscriber awareness
- Subscriber Name, Session, IP Address
- Address Management
- DHCP Relay, DHCP Proxy, IPCP parameter negotiation, IP pools, RADIUS

Advanced features
- H.248 MGCP
- Multiple contexts with inter-context routing
- Premium Service Insertion
- Cross connect support (for L2 traffic) Bulk stats
- Network Address Translation (NAT)
- Dynamically Verified Static Routing
- Policy routing
- Traffic mirroring with CALEA support