



Ethernet Controller Node ECN320

Ethernet Controller Node ECN320 is both management and traffic aggregation node for Ericsson's EDA solution. The Ethernet Controller Node ECN320 facilitates a Layer 2 Fast Ethernet switch with built-in Power over Ethernet (PoE) and Ethernet Controller Node functionality. One special feature is the built-in EDA Management Proxy (EMP) application that removes dependency on the Public Ethernet Manager during start-up and restart and reduces the number of IP addresses needed in the network.

More than just a switch

The Ethernet Controller Node ECN320 is more than just an Ethernet switch. It includes the following functionalities, all integrated in one box:

- EDA Management Proxy (EMP) application
- Ethernet Controller Node functionality
- Data Aggregation Node functionality
- Traditional Layer 2 Fast Ethernet switch functionality
- Telecom grade HW (QoS, availability 99.999%)
- Power over Ethernet functionality (built-in PoE with -48 V on the tributary Ethernet ports for power distribution to the connected equipment)

EDA Management Proxy

EDA Management Proxy (EMP) is an application in the Ethernet Controller Node ECN320 with HW Inventory Function, DHCP, FTP, TFTP and NTP server functionality and SNMP proxy functionality. This enables the ECN320 to operate as one large and autonomous DSLAM in the network without connection to the Public Ethernet Manager (PEM). The ECN320 can be installed and configured for site

verification before operation using a Local Craft Tool (LCT) without connection to the Public Ethernet Manager (PEM).

Layer 2 Ethernet switch functionality

ECN320 has 24 10/100 Mbps Fast Ethernet tributary downlink ports and two aggregate uplink ports. The two uplink ports can be used as electrical and optical Ethernet interface. The electrical interface has two uplink ports for 10/100/1000 Mbps and the optical interface has two uplink ports for optical 100/1000 Mbps SFP. ECN320 can handle up to 288 lines directly connected (24 x 12-line IP DSLAMs), and the number of lines can be increased up to 2304 lines by aggregation of ESN108 switches. ECN320 is prepared for both ETSI and 19" rack mounting and has built-in fan units that can be replaced without service interruption.

Quality of Service

Priority queues are used to guarantee the Quality of Service (QoS) needed for delay-sensitive applications like voice (IP telephony), video conferencing, or video broadcasting. Each packet going through the switch can be assigned a queue priority. Packets with a higher priority are allowed to pass through the switch first (strict scheduling).

Virtual LAN (VLAN)

By use of VLAN technology, it is possible to create separate logical networks within the Ethernet LAN. In the EDA solution, VLAN is used to separate traffic types or different services and to improve security. Internal management within the ECN320 is separated via a dedicated

VLAN and all connected nodes will automatically communicate on this VLAN.

IP Multicast (IGMP snooping)

ECN320 supports multicast loading of IP DSLAM software and multicast video streaming by use of IGMP snooping (IGMP; Internet Group Management Protocol). The switch functionality listens to IGMP messages in order to build a mapping table and associate forwarding filters. It dynamically configures the switch ports to forward IP multicast traffic only to those ports associated with multicast hosts.

Management

ECN320 is managed by Ericsson's Public Ethernet Manager (PEM). PEM is based on HP OpenView and communicates with ECN320 via SNMPv2c. ECN320 is initially configured with static IP configurations through an RS-232C console port. As part of an EDA network, ECN320 is configured as any other node via the PEM Graphical User Interface (GUI).

EDA Management Proxy (EMP)

The EDA Management Proxy (EMP) application hosted within ECN320 provides the following functionalities:

- HW Inventory Function (provides configuration to the DHCP server on IP address assignment based on location instead of MAC address)
- DHCP Server (assigns local IP addresses on location)
- FTP Server (enables remote storage and download of software from PEM to the EMP application)
- TFTP Server (enables the download of software from the EMP application within ECN320 to the embedded components such as IP DSLAMs and ESN108 switches)
- SNMP Manager/Agent (management and alarm proxy)
- NTP Server/Client (synchronization of time)

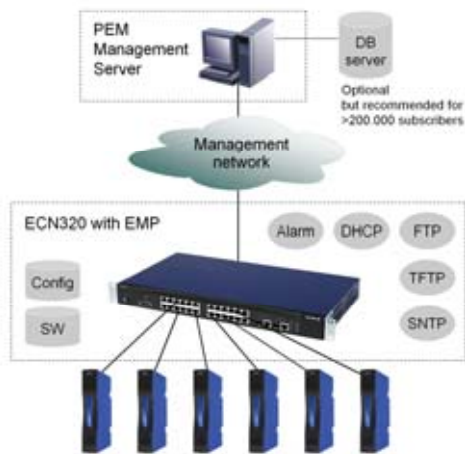
Advantages of EDA Management Proxy (EMP)

The built-in EMP functionality makes it possible to define the Ethernet Controller Node ECN320 and all embedded equipment as one Ethernet Access Node. The Ethernet Access Node can be seen as one large DSLAM with one IP address and a number of DSL ports. In this way, the EMP functionality offers the following advantages:

- EMP means that there is no dependency on the Public Ethernet Manager (PEM) during start-up or restart; ECN320 is completely autonomous as the Management Server functions are hosted by ECN320, removing the use of Windows-based platforms on local sites.
- EMP reduces the amount of IP addresses for management needed in the network, so it is possible to have sites with more than 2304 subscribers per IP address instead of 12.
- EMP reduces bottlenecks when downloading a software image, as software downloads to the IP DSLAMs are made by ECN320.
- With a Local Craft Tool, EMP gives the ability to pre-install and locally test and verify all lines.
- With EMP, the IP DSLAM MAC addresses are now automatically registered when installed. No scanner is needed – just plug & play based on physical location.
- Replacing a faulty unit attached to the ECN320 requires no operator intervention, as ECN320 automatically registers and configures new HW units.

EMP as stand-alone Domain Server

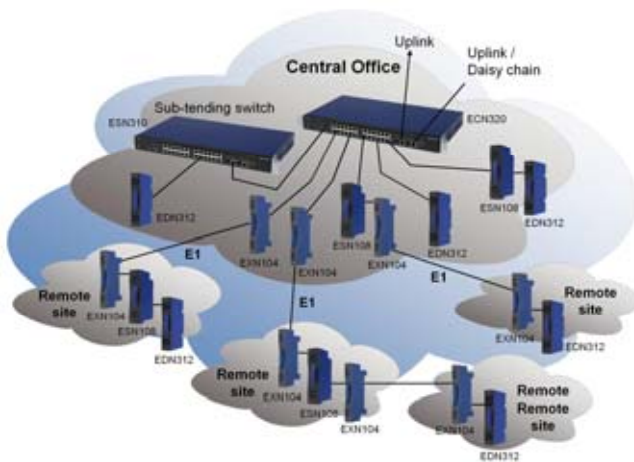
ECN320 with EMP and with PEM as Management Server makes it possible to aggregate more than 500,000 subscribers without the need for a physical Domain Server. To ensure smooth operation, it is recommended to add an extra database server to the Management Server when reaching more than 200,000 subscribers. This means that with ECN320 and EMP there is no dependency on the PEM Management Server (and Domain Server) during start-up or restart. The Ethernet Access Node is completely autonomous and self-contained, as the Management Server functions are now hosted by ECN320.



If the connection between the Management Server and the Ethernet Controller Node ECN320 is lost, it is still possible to continue traffic to the subscribers but it is not possible to change the subscriber parameters (e.g. line speed). ECN320 will continue to run in local mode, meaning that the EMP functionality starts acting as a stand-alone Domain Server using the last valid configuration and software in order to continue operation. Once the link to the Management Server recovers, the EMP identifies itself to the PEM system and receives the latest software and configuration data.

Aggregation node functionality

ECN320 with EMP is designed for aggregating different kinds of EDA scenarios in one ECN320. The elements included in the example below are 12-line IP DSLAM EDN312, 8-port switch ESN108, 24-port switch ESN310, Local Node ELN220 and FE to E1 converter EXN104.



The EMP Inventory Function

Based on the physical location, each IP DSLAM is registered by the switch port. The EMP Inventory Function means that the IP DSLAM ports are now automatically registered. When requesting an IP address via the standard Bridge MIB RFC 2684, an application is loaded from an operator specified HW-SW relation database. Therefore, configuration does not require operator intervention and PEM access to load SW.

Local handling with Local Craft Tool

ECN320 has a standard interface that allows access to basic configuration options from any PC without any requirement to special SW applications on the Local Craft Tool. The interface will not enable local management of ADSL lines, but allows the operator to locally change settings such as VLAN, IP addresses and domains, update SW, read interface status etc. The master in the system is always the PEM database, and the EMP functionality hosted within ECN320 will save the last received and valid SW and configuration if requested by the PEM. EMP will synchronize with PEM when the management recovers after being in stand-alone mode.

Static IP address

The Ethernet Access Node has one static IP address, assigned during initial configuration. The advantage is that in this way, ECN320 nodes have no need for a DHCP server in the switched Ethernet. Furthermore, Ethernet Access Node replacement becomes simple, as the new Ethernet Access Node is configured with the same static IP address, and therefore seamlessly takes the place of the original by making data synchronization.

Technical data

THIS DOCUMENT IS VALID FOR RELEASE

- EDA 2.1 and EDA 2.2

GENERAL

- RFC2131 DHCP protocol
- RFC1350 TFTP protocol
- RFC0959 FTP protocol
- RFC1305 NTP protocol
- RFC2236 IGMP Multicast
- IEEE 802.1D Bridged Ethernet
- IEEE 802.1D Spanning Tree
- IEEE 802.1w Rapid Spanning Tree
- IEEE 802.3ad Link aggregation (1-4 ports in 6 groups)
- IEEE 802.1Q VLAN
- Up to 255 VLANs (three are used for management)
- IEEE 802.1x port-based Network Access Control (for authentication for access to services)
- RFC2865 RADIUS

INTERFACES

Tributary interfaces, 24 ports:

- IEEE 802.3 10/100Base-T/TX Ethernet using shielded RJ-45 ports
- MDI/MDI-X auto sensing for twisted pair

Aggregate interfaces, 2 combo ports with:

- 2 x IEEE802.3ab 10/100/1000 Mbps Base-T Ethernet on twisted-pair, or
- 2 x 1000 Mbps optical interface SFP:
 - SMF SX: < 500 m
 - SMF LX: 10 km, 35 km, 80 km
- 2 x 100 Mbps optical interface SFP
 - SMF FX: 0-15 km

Management interfaces:

- RS-232 console port for local out-of-band management of EMP
- Console relay over RS-232 for changing embedded switch settings
- HTTP for site verification

MANAGEMENT

- Ericsson Public Ethernet Manager (PEM)
- Static IP and management VLAN set by CLI
- Built-in DHCP, FTP and TFTP server, SNMP proxy and SNTP for support of IP DSLAMs
- SNMPv2c
- RFC 2737 ENTITY-MIB alarms
- RFC 1757 RMON-MIB alarms
- RFC 1907 SNMPv2
- RFC 2819 Traps
- RFC 2662 ADSL line & Ext MIBs
- Ericsson proprietary MIBs

QUALITY OF SERVICE

- IEEE 802.3x. Flow control in full duplex operation. "Back-pressure" in half-duplex operation
- IEEE 802.1p with four priority queues per egress port. Strict scheduling or Weighted Round Robin

CAPACITY

- Throughput: 4.4 Gbps full-duplex, 8.8 Gbps half-duplex
- Packet/Sec: 8.9 Mbps
- MAC address table capacity = 8192 MAC addresses

POWER

- Dual power inlet
- Nominal input voltage: -48 V
- Power consumption (24 ports):
 - Cable length 1.3 m: Idle/Typical/Max: 50/62/70 W
 - Cable length 100m: Idle/Typical/Max: 50/64/74 W
- Maximum heat dissipation:
 - Without PoE: 45 W
 - With PoE: approx. 75 W

POWER OVER ETHERNET FEATURES

- Power over Ethernet (PoE) capability to IP DSLAMs
- Up to 23 W/600 mA continuous load per port
- Automatic load sensing
- Overload and short-circuit protection per port
- LED indicator for power status per port

RELIABILITY

- Fans are replaceable without service interruption
- MTBF 10 years at 25°C ambient

SAFETY

- CSA/NRTL (UL 1950, CSA 22.2.950)
- TUV/GS (EN 60950)

DIMENSIONS

- HxWxD: 43 x 440 x 250 mm
- Weight: 4 kg

ELECTROMAGNETIC COMPATIBILITY

- EN 300 386:2001 for Telecommunication Centers and locations other than Telecom Centers. Class A
- FCC Part 15 Class A

ENVIRONMENTAL

- ETS 300 019-2-1 class 1.2 (Storage)
- ETS 300 019-2-2 class 2.3 (Transportation)
- ETS 300 019-2-3 class 3.2 (Operation)
- Operational temperature range: 0°C to +55°C