

Egate-100

Channelized Ethernet Gateway



FEATURES

- A channelized Ethernet gateway, extending Ethernet services over TDM access networks
- Flexible Ethernet aggregation of Gigabit Ethernet traffic to STM-1/OC-3 port for any combination of:
 - Up to 32 or 42 remote LANs over bonded $n \times$ E1 or T1 lines, using MLPPP
 - Up to 63 or 84 remote LANs over E1 or T1 lines
 - Up to 126 remote LANs over fractional E1 or T1 lines
- High utilization of WAN interface forwarding, at wire-speed of up to 253,000 pps
- Equipment and maintenance costs lower than other alternatives
- Provides QoS by utilizing four priority queues per 802.1p, DSCP and IP precedence
- Enables transparent Ethernet services in point-to-point and point-to-multipoint topologies by utilizing VLAN tagging, stacking and switching
- Inband and out-of-band management access via:
 - ASCII terminal/Telnet
 - Web browser using ConfiguRAD
 - SNMP using RADview-Lite
- Secure management achieved by separating user and management traffic into different VLANs
- Comprehensive diagnostic and statistics collection tools for SDH/SONET
- 1U high, 19" wide enclosure

DESCRIPTION

- Egate-100 is a channelized Ethernet gateway for interconnecting PDH and packet networks.
- Egate-100 aggregates and switches Ethernet traffic to a single STM-1/OC-3 port, for the following link combinations:
 - Up to 126 remote LANs over fractional E1 or T1 circuits
 - Up to 63 or 84 remote LANs over E1 or T1 circuits
 - Up to 32 or 42 remote LANs over bonded $n \times$ E1 or $n \times$ T1 lines.The traffic is combined into a channelized STM-1/OC-3 stream, and handed over to the PSN via the unit's Gigabit Ethernet port.
- Egate-100 replaces current high-priced solutions, such as channelized STM-1/OC-3 routers or multibox solutions based on converter racks and switches. Together with service scalability, small footprint, and low power consumption, Egate-100 significantly reduces equipment cost and simplifies network operation.

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- Egate-100 is typically deployed at a central location (see *Figure 1*), aggregating user Ethernet traffic received from remote devices, such as RAD's RICI, FCD, and ASMi, thus completing a full access solution from the service provider central site to the customer premises.
- Typical applications include:
 - Ethernet private line/LAN services
 - IP DSLAM and IP base station traffic backhauling
 - Aggregation of Ethernet traffic over PDH wireless links
 - Network management backhauling.
- VLAN tagging and double tagging (Q-in-Q) allows adding a provider's VLAN to enable transparent LAN services in parallel to user VLAN settings.
- In VLAN-aware mode (IVL), frames are forwarded according to VLAN tags and MAC address. This allows defining different user traffic domains in order to create point-to-point (E-Line) or point-to-multipoint (E-LAN) topologies. A VLAN tunnel can be created for separating management and user traffic.
- Each bridge port can switch and filter up to 512 VLANs out of the 5000 VLANs allowed per device.
- This enables each remote location to be part of numerous VLAN domains.
- In a typical service provisioning structure (see *Figure 2*), Egate-100 links between users connected to the packet-switched network, and users connected to the TDM network. Virtual channels are established between the far-end users by tagging separate user traffic channels with VLANs (B and C). These virtual channels enable transparent forwarding of all user traffic. In addition, all devices are managed over the VLAN A management channel, which enables secure separation between user traffic and management traffic.

BRIDGE

- Since Egate-100 functions as a bridge in an SDH/SONET environment, service providers achieve a seamless interconnection between customers using the TDM network and customers using the packet network, while maintaining the same service level attributes.
- The bridge filters and forwards traffic at wire-speed up to 253,000 pps, enabling full utilization of the high-priced WAN circuit.

QUALITY OF SERVICE (QoS)

- Egate-100 allows providing differentiated services on the same link according to Ethernet or IP marking. Classification is based on 802.1p, IP precedence or DSCP, while the traffic is forwarded by four strict priority queues. Different service rates can be provided with TDM-based $n \times 64$, $n \times E1/T1$ granularity.

PROTOCOLS

- Egate-100 utilizes native HDLC for encapsulating Ethernet traffic over E1/T1 circuits and MLPPP (Multi-link PPP) for bonding the circuits.
- The unit's MLPPP features include:
 - Support for up to 32 MLPPP groups for E1 lines, and up to 42 groups for T1 lines
 - Up to eight E1 or T1 lines per bundle
 - Up to 16 ms delay compensation for traffic arriving from different circuits
 - Max Transmit Unit can be configured between 80 to 1540 bytes, enabling users to control delay and throughput parameters
 - LCP (including MLPPP extension for LCP) and BCP control protocols per RFC 1661, RFC 1990 and RFC 3518.

APPLICATIONS

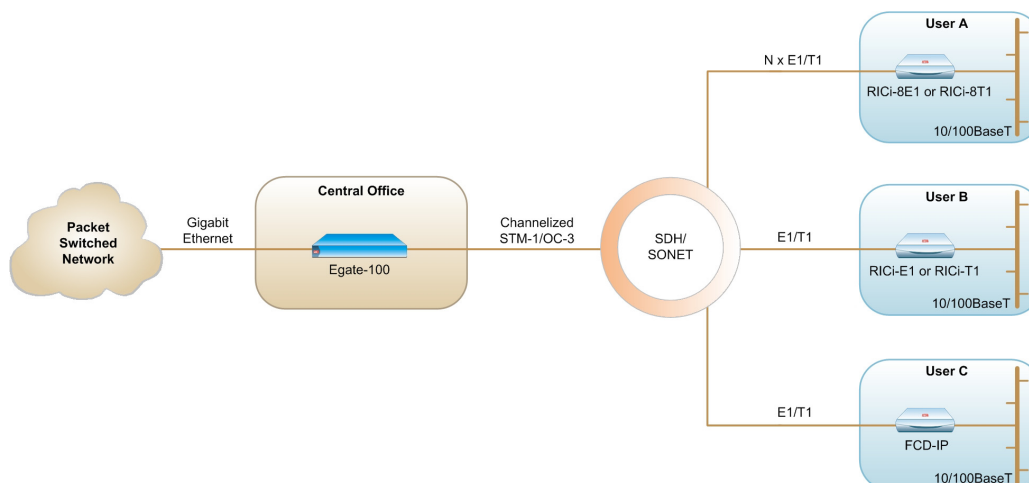


Figure 1. Aggregating Ethernet over E1/T1 Traffic

Channelized Ethernet Gateway

DIAGNOSTICS AND STATISTICS

- Comprehensive diagnostic and performance monitoring capabilities include:
 - Ping and trace route for IP connectivity checks
 - BER testing over E1 or T1 lines
 - Statistics and alarms for the physical SDH/SONET and Ethernet interfaces, and for the internal bridge.

MANAGEMENT

- Egate-100 can be managed using different ports and applications:
 - Local out-of-band management via an ASCII terminal connected to the RS-232 port
 - Remote out-of-band management via the dedicated 10/100BaseT port
 - Remote inband management via the Gigabit Ethernet port, performed using Telnet, Web browser or RADview-Lite, RAD's SNMP-based element management system.
- Software upgrades and configuration files can be remotely downloaded/uploaded to/from Egate-100 via TFTP.
- A dedicated VLAN tunnel is used to secure the management traffic and to separate it from user traffic.

- Access to the unit's management software is password-protected, and the unit can be managed by and report to up to 16 different managers simultaneously. This enables viewing the network status and managing the unit from different locations.

SPECIFICATIONS

STM-1/OC-3 INTERFACE

- **Number of Ports**
1
- **Compliance**
G.957 S1.1, G.957 L1.1, ANSI T1.646, G. 825 (jitter)
- **Data Rate**
155 Mbps
- **Operation Mode**
SDH/SONET
- **Fiber Optic Interface Types**
See Table 1

GIGABIT ETHERNET INTERFACE

- **Number of Ports**
1
- **Interface Type**
1000BaseSx, 1000BaseLx or 1000BaseT
- **Compliance**
Relevant sections of IEEE 802.3
- **Data Rate**
1000 Mbps

- **Max Frame Size**
1600 bytes
- **Connectors**
 - LC (SFF) for optical
 - RJ-45 for electrical (1000BaseT)
- **Electrical Cable Type**
Cat. 5

FAST ETHERNET INTERFACE

- **Number of Ports**
1
- **Interface**
10/100BaseT
- **Compliance**
Relevant sections of IEEE 802.3
- **Data Rate**
10/100 Mbps
- **Max Frame Size**
1600 bytes
- **Modes**
Half/full duplex, autonegotiation
- **Connector**
RJ-45 shielded

CONTROL INTERFACE

- **Interface Type**
RS-232/V.24 (DCE asynchronous)
- **Data Rate**
9.6, 19.2, 38.4, 57.6, 115.2 kbps
- **Connector**
9-pin, D-type, female

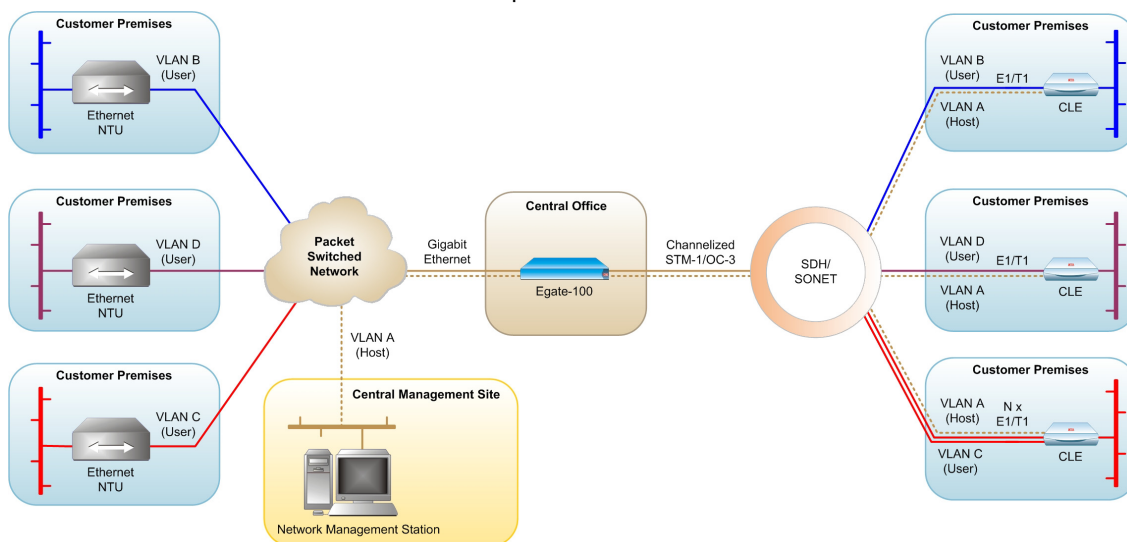


Figure 2. VLAN-Based Service Provisioning over Packet and TDM Networks

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PROTOCOLS

- Native HDLC
- MLPPP (BCP) according to: RFC 1661, RFC 1990, RFC 3518
- Up to 16 ms delay compensation. Max Transmit Unit: 80 to 1540 bytes

INTERNAL BRIDGE

- **Number of Ports**
Up to 128
- **Compliance**
 - Switching according to MAC address
 - VLAN tag according to relevant sections of 802.1Q
- **LAN Table**
Up to 64,000 MAC addresses (learned, with automatic aging check)
- **Buffer**
3150 frames
- **Filtering and Forwarding**
Up to 253,000 pps
- **Quality of Service (QoS)**
 - Classification according to 802.1p, DSCP and IP precedence
 - Congestion management: Four queues with strict forwarding

GENERAL

- **Power**
AC: 100–240 VAC (±10%), 50–60 Hz
DC: 48 VDC (±10%)
- **Power Consumption**
30W max
- **Environment**
Temperature: 0°–50°C (32°–122°F)
Humidity: Up to 90%, non-condensing
- **Physical**
Height: 43.7 mm (1.7 in / 1U)
Width: 440 mm (17.3 in)
Depth: 240 mm (9.4 in)
Weight: 3.5 kg (7.7 lb; single PS)
4.0 kg (8.8 lb; dual PS)

ORDERING

Egate-100/*/#/\$/&

Channelized Ethernet gateway

- * Specify power supply (PS) type:
AC for 100 to 230 VAC
48 for 48 VDC

- # Specify **R** for optional redundant hot-swappable power supply (same as first)

\$ Specify STM-1/OC-3 interface type:

SFP-1 (see Table 1)

SFP-2 (see Table 1)

SFP-3 (see Table 1)

& Specify Gigabit Ethernet interface type:

85 (see Table 1)

13L (see Table 1)

UTP (see Table 1)

SUPPLIED ACCESSORIES

Power cord

DC connection kit (if a DC-powered unit is ordered)

OPTIONAL ACCESSORIES

CBL-DB9F-DB9M-STR

Control port cable

RM-34

Hardware kit for mounting one Egate-100 unit into a 19-inch rack

Pulse, Inc
Toll Free: 1-888-785-7393
Int'l: 1-951-694-1173
rad@pulsewan.com
www.pulsewan.com

Table 1. Interface Characteristics

Interface Option	Interface Type, Connector	Cable Type [μm]	Wave length [nm]	Standard	Transmitter Type	Input Range [dBm]		Output Power [dBm]		Typical Range	
						(min)	(max)	(min)	(max)	[km]	[miles]
SFP-1	STM-1/OC-3 fiber optic, LC	62.5/125 multimode	1310	ANSI T1646-1995	LED	-30	-14	-20	-14	2	1.2
SFP-2	STM-1/OC-3 fiber optic, LC	9/125 single mode	1310	G.957 S1.1	Laser (short haul)	-28	-8	-15	-8	15	9.3
SFP-3	STM-1/OC-3 fiber optic, LC	9/125 single mode	1310	G.957 L1.1	Laser (long haul)	-34	-10	-5	0	40	24.8
85	GbE fiber optic, LC	62.5/125 multimode	850	IEEE 802.3 1000BaseSX	Laser	-17	0	-9.5	0	270m	1000 ft
13L	GbE fiber optic, LC	9/125 single mode	1310	G.957 S1.1	Laser	-28	-8	-15	-8	15	9.4
UTP	GbE copper, RJ-45	Cat. 5	—	IEEE 802.3 1000BaseT	Electrical					100m	330 ft