

Egate-2000

Carrier Ethernet Aggregator for PDH and SDH/SONET



Next-generation
Ethernet aggregator
over PDH and
SDH/SONET

- Grooming and transporting PDH and SDH/SONET traffic over Gigabit Ethernet
- Fully redundant, carrier class aggregation device with STM-16/OC-48 and multiple GbE interfaces for service resiliency
- MEF-supported services for Ethernet Private Line (EPL), Ethernet Virtual Private Line (EVPL), Ethernet Private LAN (EPLAN) and Ethernet Virtual Private LAN (EVPLAN)
- Enhanced traffic management with multiple priority queues, shapers and hierarchical QoS
- High availability and link resiliency using SDH/SONET and ITU-T G.8032 Ethernet rings

EtherAccess

Egate-2000 is a high-capacity aggregator that is typically deployed in a central location to groom multiple Ethernet user traffic streams received from remote devices, such as RAD's RICi Ethernet NTUs, over channelized STM-16/OC-48 or STM-4/OC-12 links. The aggregated traffic is then transmitted to the PSN over up to eight GbE links.

Egate-2000 is ideal for Ethernet services, IP DSLAM and WiMAX BTS backhaul applications; it leverages widely available PDH/SDH/SONET infrastructure to deliver carrier-class Ethernet services to sites where native Ethernet is not available.

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Carrier Ethernet Aggregator for PDH and SDH/SONET

Egate-2000 uses next generation Ethernet over PDH/SDH/SONET encapsulation and bonding methods including:

- Standard generic framing procedure (GFP) per G.8040 and G.7041/Y.1303
- Virtual concatenation (VCAT) per G.7043 (PDH), G.707 (SDH)
- Link capacity adjustment scheme (LCAS) per G.7042.

This allows aggregation of both EoPDH and EoSDH/SONET traffic in one device.

Egate-2000 features five SDH/SONET ports configurable to:

- 1xSTM-16/OC-48 and 2xSTM-4/OC-12 or
- 1xSTM-4/OC-12 and 4xSTM-1/OC-3

MEF COMPLIANCE

Egate-2000 is Metro Ethernet Forum (MEF) compliant with MEF 9 and MEF 14 for Ethernet Private Line (EPL), Ethernet Virtual Private Line (EVPL), Ethernet Private LAN (EPLAN) and Ethernet virtual Private LAN (EVPLAN) services.

MULTI-SITE CARRIER ETHERNET AGGREGATION

Egate-2000 aggregates up to:

- 256 remote LANs over E1 or T1 circuits for NG Ethernet over PDH access devices such as RAD's RIC, RICi and MiRICi

- 8 VC-4/STS-3c or 24 VC-3/STS-1 circuits when working with RICi-155GE and RIC-155L Ethernet over SDH/SONET access devices
- Any combination of the above with up to 504 VC-12 or 672 VT1.5 links
- Up to 256 VCGs

Service scalability, small footprint and low power consumption of the device allow service providers to reduce equipment costs significantly and simplify network operation.

SERVICE RESILIENCY AND HIGH AVAILABILITY

To ensure higher service uptime and carrier-grade resiliency, Egate-2000 includes fully redundant system cards, line cards and power supplies.

Service resiliency is offered via:

- 802.3ad-based link aggregation and Ethernet Ring Protection per G.8032 for GbE modules
- SDH/SONET 1+1 APS for 50 ms restoration of service in case of line faults.

ETHERNET TRAFFIC MANAGEMENT

Egate-2000 features advanced traffic management capabilities:

- User traffic classification according to VLAN ID, VLAN priority, DSCP, ToS, or MAC address, supporting thousands of Ethernet flows (EVC.CoS)

Two-rate, three-color traffic policing per CIR/CBS, PIR/PBS bandwidth profiles

- Hierarchical QoS supporting eight priority queues per EVC with Strict Priority and Weighted Fair Queuing (WFQ) scheduling.

The device perform VLAN-aware bridging (EPLAN and EVPLAN) and VLAN cross connect (EPL and EVPL). In addition it supports IEEE 802.1 Q VLAN tagging, Q-in-Q and jumbo frames.

DIAGNOSTICS AND STATISTICS

Comprehensive diagnostic and performance monitoring capabilities include:

- Ping test for checking IP connectivity
- Statistics and alarms for the physical Ethernet interfaces, SDH/SONET ports, bridge ports, and logical layer.

System logs are forwarded to the network according to predefined criteria.

ETHERNET OAM

Egate-2000 provides OAM Connectivity Fault Management (CFM) and Performance Management (PM) based on IEEE 802.1ag and ITU-T Y.1731, enabling Ethernet service providers to monitor their services proactively, measure end-to-end performance, and guarantee that customers receive the contracted SLA.

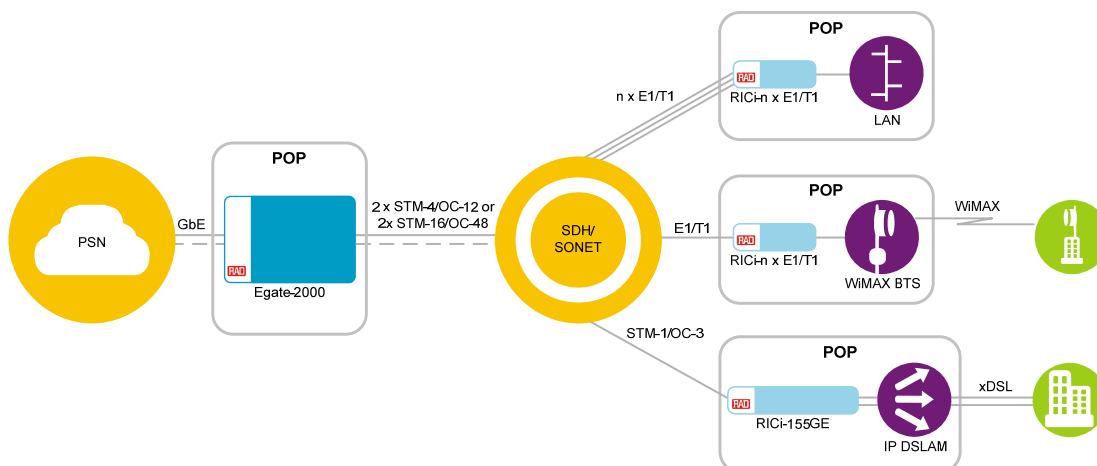


Figure 1. Aggregating Ethernet, WiMAX and IP DSLAM Backhaul over PDH/SDH/SONET

MANAGEMENT

The unit can be managed by a Web browser or RADview, RAD's SNMP-based EMS, using various ports and applications:

- Local management via a local Ethernet port.
- Out-of-band management via a dedicated Fast Ethernet port
- Remote inband management via one of the Gigabit Ethernet ports or DCC.

A dedicated VLAN can be used to secure the management traffic and separate it from user traffic.

SECURITY

The following security mechanisms are provided:

- Ingress L2 ACL profile for filtering frames based on the L2 field
- Storm control for Broadcast, Multicast and DLF (Destination Lookup Failed) per EVC
- Port mirroring for incoming and outgoing packets
- SSH for secure Web access
- RADIUS protocol for password management and user authentication.

Specifications**SDH/SONET INTERFACES****Number of Ports**

Egate-2000 features five SDH/SONET ports configurable to:

- 1xSTM-16/OC-48 and 2xSTM-4/OC-12
or
- 1xSTM-4/OC-12 and 4xSTM-1/OC-3

Compliance

STM-1/4/16 1310 or 1550 nm (per ITU-T G.957)

S/L 1.1, L 1.2, S/L 4.1, L 4.2

Data Rate

155 Mbps
622 Mbps
2.4 Gbps

Operation Mode

SDH/SONET

APS

1+1 SNCP, 1+1 MSP

SFP Transceivers

For full details, see the SFP Transceivers data sheet at www.rad.com

Connector

SFP slot

GIGABIT ETHERNET INTERFACE**Number of Ports**

8

Interface Type

4x100/1000BaseT
4x1000BaseFx via SFP

Compliance

Relevant sections of IEEE 802.1 and 802.3

Data Rate

Optical: 1000 Mbps
Electrical: 100/1000 Mbps

Max Frame Size

9600 Bytes

Gigabit Ethernet Redundancy

Link aggregation (IEEE 802.3ad)



SFP Transceivers

For full details, see the SFP Transceivers data sheet at www.rad.com

Connector

Optical: SFP slot
Electrical: RJ-45

Table 1. Egate Family Product Comparison

Features	Egate-100 (Ver. 4.0)	Egate-2000 (Ver 1.0)
		
Protocol Type	GFP (G.8040), VCAT (G.7043), LCAS (G.7042), RAD HDLC, PPP/BCP, MLPPP (BCP)	GFP (G.7041, G.8040), VCAT (G.7043), LCAS (G.7042)
MAC Address Table	64KB	128 KB
Traffic Classification	802.1p, DSCP, IP precedence, per port	VLAN ID, 802.1p, DSCP, EtherType
QoS Mechanism	4 queues per bridge port (max 128 bridge ports), Strict Priority and WFQ	8 queues per EVC/ EVC.CoS, Strict Priority and WFQ
Policing	CIR/CBS, EIR/EBS	CIR/CBS, PIR/PBS
Number of Ethernet Flows	254	3200

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ENCAPSULATION PROTOCOLS

GFP (ITU-T G.7041/Y.1303, G.8040)
 VCAT (ITU-T G.707, G.7043)
 LCAS (ITU-T G.7042)

SERVICES

E-Line (EPL, EVPL)
 E-LAN (EPLAN, EVPLAN)

INTERNAL BRIDGE**Operation Mode**

VLAN-aware learning bridge
 VLAN cross connect

Number of VLANs

Up to 4096

Compliance

Relevant sections of 802.1Q

LAN Table

Up to 128,000 MAC addresses

MANAGEMENT PORTS**CONTROL**

10/100BaseT, local management, RJ-45

MNG-ETH

10/100BaseT, out-of-band management,
 RJ-45

MNG

RS-232/DCC, RJ-45

TIMING**External Clock**

Interface E1, RJ-45

GENERAL**Alarm Connector**

ALM In, RJ-45
 ALM Out, RJ-45

Indicators

Egate-2000M-Main card:

ACT: Active

STATUS: Card status (Red/Amber)

SDH/SONET Port:

SYNC (green):

On: STM-1 port is synchronized
 Off: LOS, LOF, AIS
 Blinks: RDI

Egate-2000M-8GbE card:

ACT: Active

STATUS: Card status (red/amber)

Ethernet:

LINK (green):

On: Ethernet connection is up
 Off: Ethernet connection is down

ACT: Active

Egate-2000-MNG card:

ACT: Active

STATUS: Card status (red/amber)

PWR: Power (green)

CRT: Critical alarm (red)

MAJ: Major alarm (red)

MIN: Minor alarm (amber)

Power

DC: 48 VDC nominal (40–72 VDC)

Power Consumption

150W max

Dimensions

Height: 177 mm (7 in)
 Width: 445 mm (17.5 in)
 Depth: 231 mm (9.0 in)
 Weight: 12 kg (26.4 lb), max

Environment

Temperature: 0°–50°C (32°–122°F)

Humidity: Up to 90%, non-condensing

Ordering**CHASSIS****Egate-2000 /*/E/\$**

Egate-2000 chassis with 2 power supplies,
 1 management module, 1 fan unit

Legend

* Power supply

48R Dual DC power supply

E Main module:

MAIN Single main module

MAINR Dual main module

\$ Ethernet module:

8GBE Single 8-port GbE module

8GBER Dual 8-port GbE module

MODULES**Egate-2000M-MAIN**

SDH/SONET module with STM-16/OC-48,
 STM-4/OC-12 and STM-1/OC-3 interfaces

Egate-2000M-8GBE

Ethernet module with 8 GbE interfaces

Egate-2000M-MNG

Management module for local
 configuration, out-of-band management
 and alarm output

Egate-2000M-PS/DC

-48 VDC power supply module

Egate-2000M-FAN

Fan unit

SUPPLIED ACCESSORIES

Two DC power cables

Grounding cable

Management cable

Clock cable

Alarm cable

Fasteners for installing Egate-2000 in 19",
 21" or 23" racks