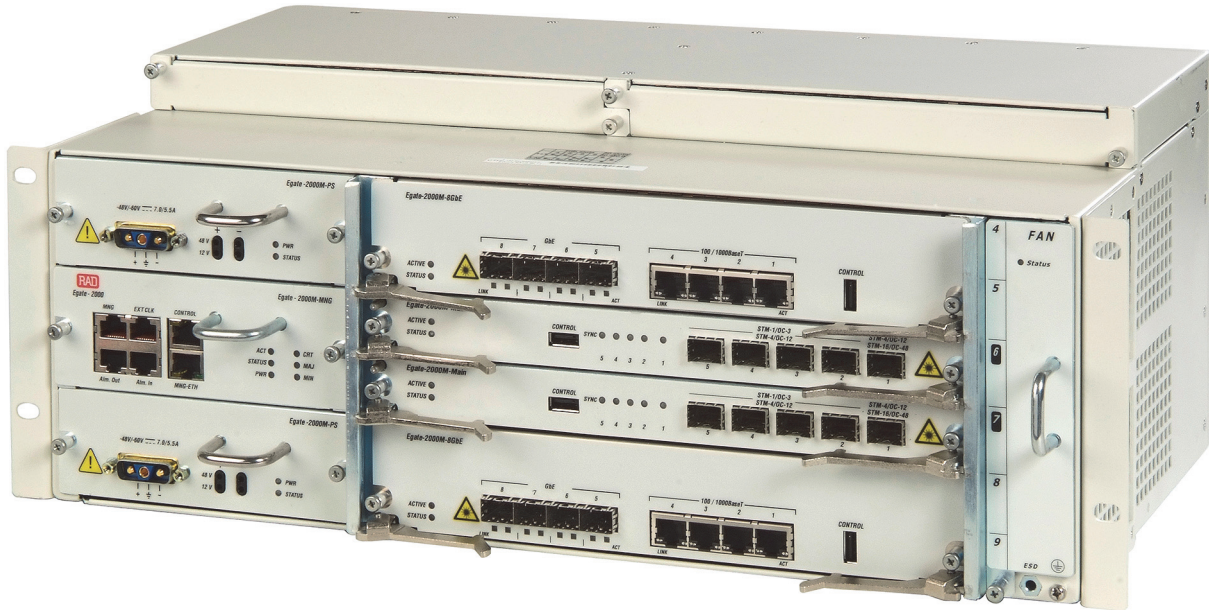




# Egate-2000

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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# Egate-2000

## 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.

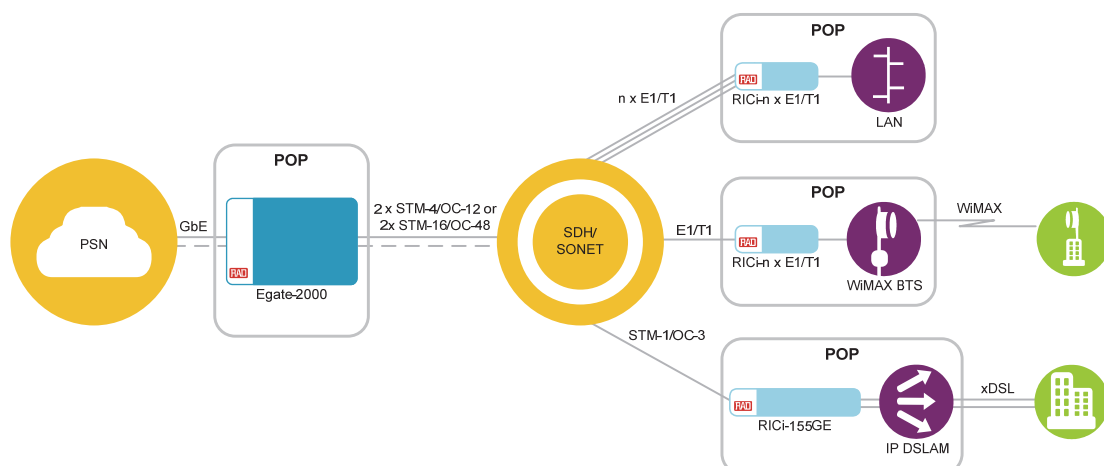


Figure 1. Aggregating Ethernet, WiMAX and IP DSLAM Backhaul over PDH/SDH/SONET

## 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:

- 1×STM-16/OC-48 and 2×STM-4/OC-12  
or
- 1×STM-4/OC-12 and 4×STM-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](http://www.rad.com)

#### Connector

SFP slot

### GIGABIT ETHERNET INTERFACE

#### Number of Ports

8

#### Interface Type

4×100/1000BaseT  
4×1000BaseFx 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](http://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

# Egate-2000

## Carrier Ethernet Aggregator for PDH and SDH/SONET

### 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

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