MiNID

Miniature Programmable Network Interface Device

- Field programmable Network Interface Device (NID) for service providers, wholesalers, and mobile operators
- Part of RAD's Distributed Network Functions Virtualization (D-NFV) portfolio
- Patent-protected SPF sleeve design for seamless integration and enhancement of any existing network device
- Service demarcation, SLA assurance and diagnostic tools at Layer-2, 3, and 4
- Low OpEx due to decreased power consumption, space and installation costs

RAD's patent-protected MiNID is a field-programmable miniature L2/L3 network interface device (NID), available in an SFP form factor, SFP sleeve form factor or in a standalone enclosure. As part of RAD's Distributed Network Functions Virtualization (D-NFV) offering, MiNID enriches the Service Assured Access portfolio with software-defined network functionalities for enhanced demarcation, remote monitoring, fault isolation and more. MiNID programmability is based on a powerful FPGA that enables field updates to the product software and application.

The SFP sleeve is a revolutionary platform for service providers looking to upgrade their networks to deliver reliable bandwidth with end-to-end SLA assurance. MiNID's innovative patent-based design breaks through the barriers of cost and complexity to make Carrier Ethernet available to everyone, everywhere.

MiNID provides instant Carrier Ethernet functionality for switches, routers, DSLAMs, and mobile base stations. It offers comprehensive tools for service activation, performance monitoring, and fault diagnostics, providing ongoing SLA reports while reducing costs associated with fault isolation

MiNID can be ordered in SFP form factor with integrated optics, SFP-sleeve form factor or as a standalone unit, all offering similar functionality.

The SFP sleeve patent-protected design is easily pluggable into standard SFP ports, eliminating power, space, and cabling expenses.

It transparently envelops a large variety of SFPs, enabling full reuse of customer equipment and seamless deployment over multiple access infrastructure types such as short haul and long haul fiber connections, bidirectional single fiber links and copper lines.

In its standalone version, MiNID offers a compact, low power, low-cost two-port solution. When equipped with combo interfaces, it allows seamless installation in any field scenario; when equipped with copper interfaces it also offers bypass relays that bypass the device in case of critical failure.

MiNID is a true plug-and-play solution. Its zero-touch provisioning capabilities enable easy installation by anyone.

MiNID preserves existing investments, enhancing legacy networks with Carrier Ethernet capabilities without having to discard and replace existing equipment.

MARKET SEGMENTS AND APPLICATIONS

As an important part of the toolkit offered by RAD's Service Assured Access Solution, MiNID is the perfect solution for service assurance in residential and mobile backhauling networks, small cells, business services, and wholesale services.

As a service demarcation device, MiNID ensures proper service handling throughout the service provider network by attaching service VLANs and adding priority marking to multiple services at the customer premises.

Simultaneously, MiNID offers multi-layer performance monitoring tools for every service. At Layer-2, it offers OAM and PM tools that actively measure key performance indicators including delay, jitter, and packet loss rate. At Layer-3, its integrated TWAMP-light and UDP echo responders allow seamless monitoring across any packet network and in multi-vendor environments.

MiNID also participates in service activation tests and offers wire-speed layer-2/3/4 loopbacks for diagnostic purposes.

For the mobile backhauling market, MiNID SFP sleeve offers SyncE support including transparent ESSM message forwarding.

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ETHERNET

Service Demarcation

For service demarcation, MiNID provides:

- Port-based and flow-based classification of multiple services
- Flow classification per VLAN range,P-bits, DSCP, EtherType, source/destination MAC address
- VLAN addition or replacement per flow with priority marking per P-bits and DSCP
- Layer-2 control protocol tunneling with optional MAC change (L2PT).

MONITORING AND DIAGNOSTICS

OAM

MiNID complies with the following per EVC.COS:

- IEEE-802.1ag (CFM) for continuity check, loopback, and link trace
- ITU-T Y.1731 for loss (synthetic and real traffic), delay, and delay variation measurements, as well as fault propagation (AIS/RDI)
- IEEE 802.3-2005 link OAM and dying gasp trap
- RFC-5357 TWAMP responder with multiple session reflectors offering hardware-based time stamping.

Loopback Tests

MiNID can perform on-demand intrusive and non-intrusive layer-2/3/4 loopbacks at wire speed, with optional MAC, IP and UDP port swap per flow. MiNID also offers UDP echo responder functionality.

Service Activation Tests

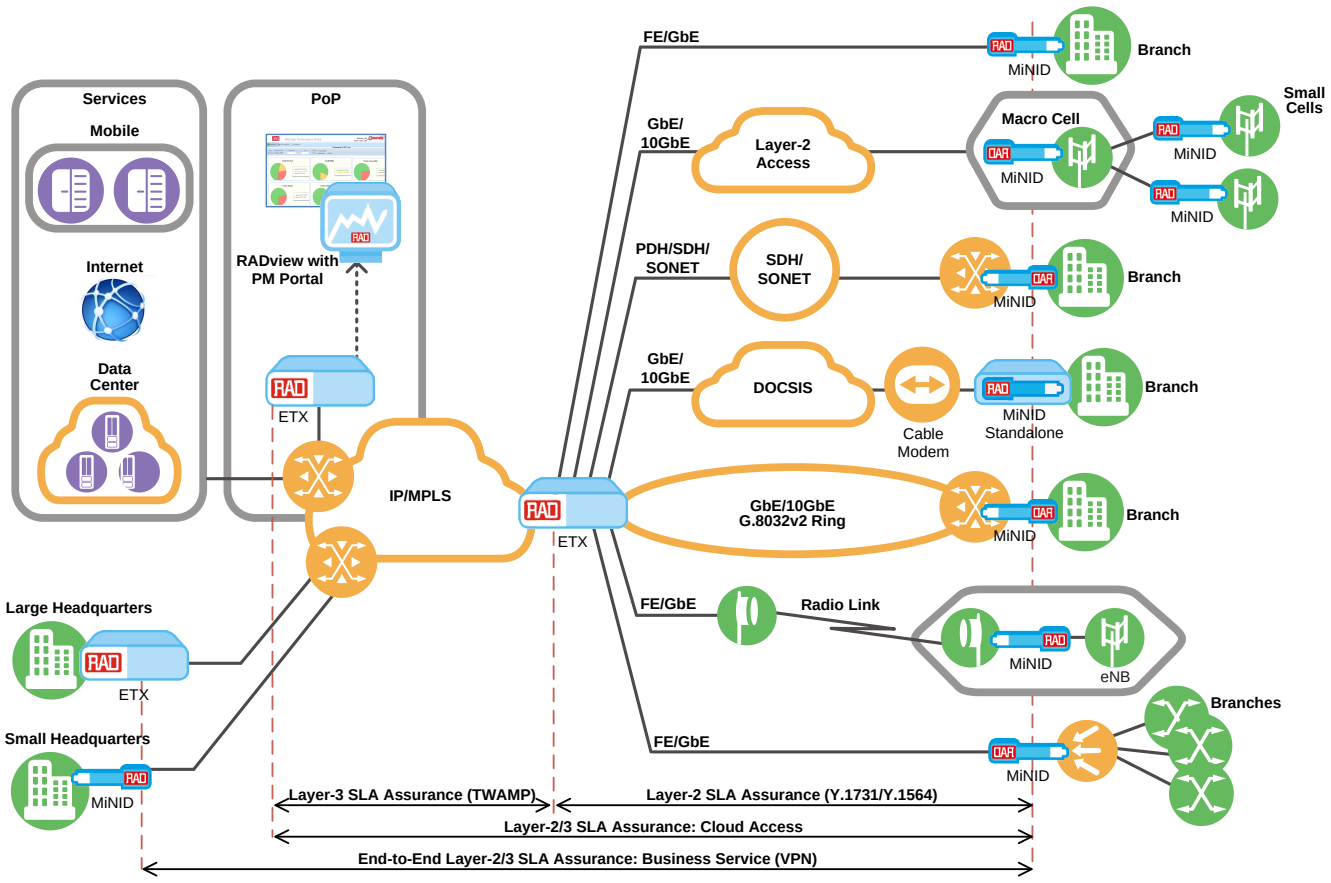
MiNID responds to RFC-2544 and Y.1564 service activation tests at wire speed.

Digital Diagnostic Monitoring

- MiNID transparently relays Digital Diagnostics Monitoring (DDM) information.

Auto Responder

MiNID can work "out-of-the-box" automatically detecting and responding to L2, L3,L4 loopbacks and OAM traffic with minimal installation effort and no configuration. The auto-responder mode is transparent to user traffic and provides smooth introduction of service visibility into the network.



MANAGEMENT

RADView PM Portal

RADView manages MiNID, and the RADView PM portal provides SLA reports based on PM counters and utilization measurements.

Management Options

MiNID can be managed via the following interfaces:

- Web-based menu-driven interface
- Command Line Interface (CLI) via secured Telnet (SSH)
- SNMPv2
- Inband management (VLAN based) Out-of-band management and software configuration from any Ethernet port in the host device.

Access Control List (ACL)

The ACL enables permission/denial of management access to specified IP addresses for increased security.

Application software can be downloaded to MiNID via:

- SFTP or TFTP for remote SW download
- SFP-CA.2 unit, using YMODEM protocol for SFP sleeve option
- Serial interface for standalone option.

Zero Touch Provisioning

Host IP address and configuration files can be automatically obtained using standard DHCP client functionality.

Loaned IP

MiNID can be managed without a dedicated IP address, by loaning the IP address of the hosting device.

Specifications

ETHERNET INTERFACES

SFP sleeve: 2 × SFP-based, MSA-compliant edge connectors

Standalone: 2 × SFP/copper combo or 2 × copper, with bypass relay

Type

SFP sleeve: 100BaseFx or 1000BaseFx

Standalone: 100/1000BaseT or 100BaseFx or 1000BaseFx

SFP Transceivers

Electrical: 100BaseT/1000BaseT

Optical: Dual/single, multi mode/single mode fiber:
FE: 100Base-FX/LX/BX
GbE: 1000Base-SX/LX/ZX/BX and CWDM

Compliance

IEEE 802.3

Max. Frame Size

12,000 bytes

GENERAL

Power

SFP sleeve:
Max 1.2W

Max 1.68W (including standard 10km SFP)

Standalone: Max 3.5W

SFP:
1.68W (10km optics)

Note: *See table 1 for available optic interfaces for SFP form factor.*

Physical

SFP sleeve:
Height: 12.7 mm (0.50 in)
Width: 14.3 mm (0.56 in)
Depth: 81.1 mm (3.19 in)
Weight: 30.0 g (1.0 oz)

Standalone:
Height: 30 mm (1.18 in)
Width: 113 mm (4.45 in)
Depth: 113 mm (4.45 in)
Weight: 0.3 kg (0.66 lb)

Environment

Operating case temperature:
Sleeve: -20 to 85°C (-4 to 185°F)
Ambient temperature:
Standalone: -20 to 65°C (-4 to 149°F)

Extended Temperature:
-40 to 65°C (-104°F to 149°F)

Humidity: Up to 90%, non-condensing

Patents:

US patent 8,851,929
US patent 8,641,429

Data Sheet

MiNID

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Ordering

RECOMMENDED CONFIGURATIONS

Hardware:

MINID/SLV/GE
SFP sleeve enclosure, 1 Gbps per port

MINID/STU/GE/ACEX/CMB
Standalone enclosure, 1 Gbps per port, external AC power supply, 2 combo Ethernet ports

MINID/STU/GE/ACEX/BPS/UTP
Standalone enclosure, 1 Gbps per port, external AC power supply, bypass relay, 2 RJ-45 Ethernet ports

Note: *All options are available with Fast Ethernet*

Software:

MINID-SW/DEMARC
Service demarcation application software

Note*: A hardware and software option must be ordered.*

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for configuration options.

SUPPLIED ACCESSORIES

CBL-MUSB-DB9F
Mini-USB cable to connect MiNID standalone to a serial port.

P/S-AC/5/2000/UNIVERSAL-W/LOCK
Power supply for MiNID standalone. Available with Australian, USA, UK and European plugs.

OPTIONAL ACCESSORIES

SFP-CA.2
Adapter to connect MiNID to a PC

Table 1. Optic Interface

Media	Wave Length, Fiber Type	Rate	Typica Max Range [km]	[miles]
Fiber	1310, 9/125 single mode	GbE	10	6.2
Fiber	1310, 9/125 single mode	GbE	40	24.8
Fiber	1550, 9/125 single mode	GbE	80	49.7
Fiber	850, 50/125 multimode	GbE	0.55	0.3
Single Fiber	Tx –1310/Rx – 1490, 9/125 single mode (single fiber)	GbE	10	6.2
Copper		FE/GbE		

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