

iConverter HybridNID®

Network Interface Device with Dual Management and Provisioning

The *iConverter* HybridNID® is a Network Interface Device that enables the delivery of Carrier Ethernet 2.0 E-Access services across multiple-operator networks. With the *iConverter* HybridNID installed at the customer premises or cell tower, both a Service Provider and Wholesale Access Provider partner can independently provision, manage and monitor the Carrier Ethernet service.

The *iConverter* HybridNID clearly defines the service responsibilities between the Service Provider and the Wholesale Access Provider. The Wholesale Access Provider owns, installs, manages and maintains the *iConverter* HybridNID, which is part of the Wholesale Access Provider's E-Access service that is leased by the Service Provider. The Service Provider also has secure management access to provision the end-to-end service attributes. Both the Wholesale Access Provider and Service Provider can monitor Service OAM functions.

The *iConverter* HybridNID features dual management entities with secure and independent management access for the Wholesale Access Provider and the Service Provider. Wholesale Access Provider management is accessed from the Network Operations Center (NOC) via the Access Provider's network. Service Provider management is accessed remotely through the Access Provider's network using the management channel.

This unified demarcation simplifies service maintenance at out-of-franchise customer locations. The Wholesale Access Provider can focus on providing transparent Ethernet service and the hardware logistics, without worrying about the details of subscriber (end user) service attributes. The Service Provider can focus on providing end-to-end Ethernet service and SLA enforcement, without having to address remote equipment sparing and truck roll logistics.

The *iConverter* HybridNID can be remotely managed through TELNET, SNMPv1/v2c/v3, SSH and IP-less 802.3ah OAM extensions. SNMP management is accessed via Omnitron's *NetOutlook*® Network Management software.

Physical port interfaces include 100BASE-FX and 1000BASE-X Small Form Pluggable Transceivers for standard or CWDM wavelengths. Management interface ports and Customer-facing service ports are available in copper RJ-45 or SFP fiber interfaces.



SFPs not included

KEY FEATURES

- Simplifies the delivery of wholesale Carrier Ethernet Services and enables value-added SLA assurance
- Provider Bridge VLAN stacking for service multiplexing of multiple E-LINE and E-LAN services
- End-to-End Service OAM with IEEE 802.1ag Connectivity Fault Management and ITU-T Y.1731 Performance Monitoring
- MEF 9, 14 and 21 Certified Compliant
- MEF 30 and 31 Compliant
- Zero-touch and one-touch provisioning for rapid service deployment
- ITU-T Y.1564 Ethernet Service Activation testing
- RFC 2544 built-in test-head and loopback with MAC swap
- Compatible with third party testers
- IEEE 1588v2 Transparent Clock
- ITU-T G.8261 Synchronous Ethernet
- Complete standards compliance and demonstrated Service OAM interoperability with third-party equipment
- Tiered back-up and restore of service provisioning configurations
- Dual management elements with secure access for Service Provider and Wholesale Access Provider
- Remote management through SNMPv1/v2c/v3, IP-less 802.3ah OAM extensions, TELNET and SSH
- SNMP management via Omnitron's *NetOutlook*® Network Management Software or 3rd party software
- Fully integrated with Cyan CyPortal®
- ITU-T G.8031 and G.8032v2 protection switching and redundant SFP ports for sub-50ms link and service protection
- Commercial (0 to 50°C) and wide (-40 to 60°C) operating temperature ranges

ETHERNET SERVICE LIFECYCLE

The HybridNID provides tools that enable both the Wholesale Access Provider and the Service Provider to optimize service delivery and manage the customer experience throughout the lifecycle of an Ethernet service.



1) Provisioning and Turn-up

The HybridNID features Zero-Touch Provisioning (ZTP), which allows Ethernet Services to be turned up quickly and accurately. ZTP allows service provisioning to be centralized, standardized and remotely managed. ZTP can remotely provision Ethernet Virtual Connections (EVCs), Bandwidth Profiles, Class of Service management and Ethernet Service OAM probes. ZTP accelerates turn-up and reduces the need for onsite technicians.

Once the service is provisioned, the HybridNID can validate the integrity of the wholesale service and the end-to-end service. A built-in test-head runs Y.1564 multi-flow and per flow RFC 2544 traffic up to full wire speed. These service validation features include checks for information rate, traffic policing, delay, delay variation, and loss. Once validated, a service is ready to be handed over to a customer.

2) Performance Monitoring

The HybridNID enables the delivery of Ethernet services with SLAs that meet stringent requirements. ITU-T Y.1731 Performance Monitoring measures a variety of service parameters. Standards-based reporting mechanisms provide for periodic and historical measures of delay, delay variation, frame loss and availability.

3) Fault Management

The HybridNID proactively monitors the Ethernet service with 802.1ag Connectivity Fault Management, and in the event of a network fault, the HybridNID instantly notifies the NOC of a problem.

The HybridNID also supports a variety of service protection features, including G.8032v2 ring protection and G.8031 linear protection with sub-50ms failover.

BUSINESS CASE

Conventional NIDs are a challenge when Service Providers deliver E-Access services outside of their network (off-net), and must partner with Wholesale Access Providers to provide Carrier Ethernet business services or LTE mobile backhaul.

Omnitron's *iConverter* HybridNID provides a single platform that delivers the Ethernet service via one User Network Interface and enables both the Service Provider and the Wholesale Access Provider to manage and monitor the Ethernet service.

Generate Value Added Revenue

- Provide Ethernet services with SLA assurance for both Access Service (wholesale) and End-to-End (retail)
- Offer HybridNID functionality with secure access to management, provisioning and performance monitoring

Time to Market

- Zero-Touch Provisioning enables turn-up in days instead of weeks

System Reliability

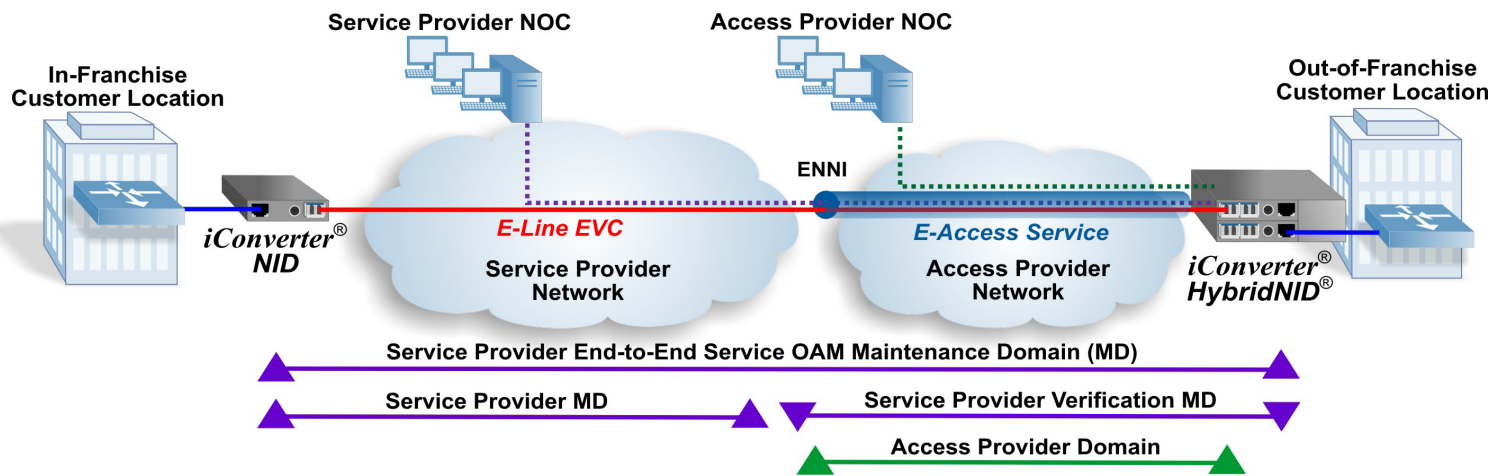
- Single device is more reliable than multiple devices
- Compact platform is easier to maintain and troubleshoot

Hardware Cost Savings

- No need for multiple devices at the customer premises
- Single platform for inventory and sparring

Operational Savings

- Easy to install and turn-up service
- Deploy NID functionality uniformly



TRAFFIC MANAGEMENT

- IEEE 802.1Q VLAN tagging and 802.1ad Q-in-Q VLAN stacking
- Service Multiplexing of up to 256 EVCs
- User-configurable EtherType
- Ingress and Egress traffic management
- CIR/EIR Color Aware “two rates, three colors” bandwidth profiles for ingress rate limiting
- Advanced Flow and CoS classification per Port, VLAN ID, PCP, IPv4/IPv6 (TOS/DiffServe) Priority, MAC address, IP address, TCP Port or L2CP
- Layer 2 Protocol Tunneling (L2PT) to encapsulate STP, VTP, PVST and CDP protocols (subscriber CISCO protocols)
- All ports configurable as UNI or NNI
- IEEE 1588v2 Compliant transparent clock mode
- ITU-T G.8261 Synchronous Ethernet
- 10,240 byte Jumbo frames

NETWORK MANAGEMENT

- Remote management via TELNET, SSH, SNMPv1/v2c/v3
- Dual management elements with secure access for Service Provider and Wholesale Access Provider
- SNMP management via Omnitron’s *NetOutlook* Network Management software
- IP-less management through 802.3ah OAM extensions
- Fully integrated with Cyan CyPortal for SLA monitoring
- MEF 30 and 31 Service OAM Fault Management MIBs

INTERFACES

- 10/100/1000BASE-T Copper and 100/1000BASE-X SFP fiber
- Small Form Pluggable (SFP) transceivers for standard or CWDM applications

SERVICE OAM AND TESTING

- IEEE 802.1ag End-to-End Connectivity Fault Management (CFM) – with 8 Maintenance Domain levels and 256 Maintenance Associations
- Supports 802.1ag Maintenance Intermediate Points (MIPs) for fault isolation
- ITU-T Y.1731 End-to-End Performance Monitoring
- Hardware-based Delay and Loopback measurement with nanosecond resolution
- Y.1731 threshold monitoring and threshold crossing alerts
- Advanced classification and filtering of Layer 1, 2, 3 or 4 subscriber traffic as a EVC or CoS flow
- IEEE 802.3ah Ethernet Link OAM with dying gasp
- Zero-Touch Provisioning
- ITU-T Y.1564 Ethernet Service Activation testing with multi-flow testing of information rate, latency, jitter and frame loss
- RFC 2544 built-in test-head with wire-speed, per-flow testing of throughput, latency, jitter and loss
- Y.1564 and 2544 test-heads support generation/reception of in-service and out-of-service L2, L3 and L4 frames
- Per-port and per-flow Loopback with MAC swap
- Compatible with third party in-band loopback testing
- Built-in UTP cable tester for troubleshooting through to the Customer Equipment

PROTECTION AND REDUNDANCY

- ITU-T G.8031 Ethernet Linear Protection Switching
- ITU-T G.8032v2 Ethernet Ring Protection Switching with multi-ring protection and sub-ring support
- Sub-50ms failover for G.8031 and G.8032v2
- Link Failover 50ms protection switching
- Rapid Spanning Tree
- Optional UNI-to-UNI failure propagation

SPECIFICATIONS

| | |
|---|--|
| Description | <i>iConverter</i> Hybrid Network Interface Device |
| Protocols | 10BASE-T, 100BASE-TX, 1000BASE-T, 100BASE-FX, 1000BASE-X |
| Other Protocols | TCP/IP, ICMP, ARP, RSTP, SNMP, DAYTIME |
| Compliances | UL, cUL, CE, FCC Class A, NEBS 3 Compliant, MEF 9, MEF 14, and MEF 21 Certified Compliant MEF 30 and 31 Compliant |
| IP Management | TELNET, SNMPv1, SNMPv2c, SNMPv3, SSH |
| Frame Size | Up to 10,240 bytes |
| Ports | Copper: (2) RJ-45 SFP: (4) MSA compliant fiber SFPs; SGMII 10/100/1000BASE-T Copper SFPs Serial: (2) Mini DIN-6 female, included |
| Power Supply | Fixed Internal |
| Typical Input Power Requirements | AC Power: 100 to 240VAC, 50/60Hz, 0.5A @ 120VAC DC Power: +/- 18 to 60VDC, -48VDC @ 2.0A |
| Power Connector | AC Power: IEC-320 DC Power: 3-Pin Terminal Connector |
| Temperature | Standard Operating: 0 to 50°C Wide Operating: -40 to 60°C Storage: -40 to 80°C |
| Dimensions | W 6.7" x D 5.51" x H 1.87" |
| Weight | 2.5 lbs |
| Humidity | 5 to 95% (non-condensing) |
| Altitude | -100m to 4000m |
| MTBF (hrs) | AC Power: 120,000 DC Power: 130,000 |

ORDERING INFORMATION

2459x-33-x

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|---|--|
| P | Standard |
| R | Adds 2544, Y.1564, G.8031, G.8032v2, 1588v2, G.8261 and SSH capabilities |

| | |
|---|----------|
| 1 | AC Power |
| 9 | DC Power |



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