The 1645 series of Ethernet Access Devices (EAD) offers service providers a cost-effective MEF CE 2.0 certified gigabit Ethernet access solution and enables them to offer managed Ethernet services to their business customers.

As Ethernet Demarcation Device it is possible to monitor and control Ethernet services end-to-end and to provide SLA reports. In addition to comprehensive layer-2 functionality the device also offers a layer-3 router implementation which makes it an ideal choice to deliver carrier Ethernet, Internet and IP services with one device. The equipment is interoperable with any standards-based carrier Ethernet equipment and can be integrated into any existing management environment.

Fibre access
The 1645 provides network operators the means to deliver advanced carrier Ethernet services to their business customers at minimal cost. One or Two Gigabit Ethernet Combo interfaces provide copper or fibre connectivity to the rest of the carrier Ethernet infrastructure and the 4-port GigE switch provides the interface to the user applications. Optionally DSL and/or LTE connectivity is available for redundancy.

Extensive feature set
At the heart of this platform is a high performance Ethernet switch/router incorporating advanced Layer 2 and Layer 3 forwarding, security and Quality of Service capabilities as standard. The software-based switching and routing core offers a very high degree of flexibility when compared to hardware-based designs in terms of features, software maintenance and upgrades.

Metro Ethernet services
As a demarcation device the unit delivers standard Metro Ethernet services E-Line, E-LAN, E-Tree and E-Access. For all these services, the 1645 is MEF CE 2.0 Certified at 1 gigabit per second rate.

OAM monitoring
Monitoring quality and availability of every dataflow as part of the carrier Ethernet service gives a clear view on the status and the performance of the Ethernet service. The 1645 supports both point-to-point OAM monitoring (IEEE 802.3ah) and end-to-end performance monitoring (IEEE 802.1ag & ITU-T Y.1731) on all Ethernet interfaces.

Accelerated deployment and service provisioning
The OneAccess 1645 Fibre EAD can be integrated in any managed environment and supports all the common management interfaces such as SNMP, Telnet, SSH, HTTP and HTTPS. In addition to these interfaces a number of management tools are available to facilitate the integration of these access devices in a managed environment. These include:

- TMA GUI application
- A customisable Web-configuration utility
- A CLI for scripting and simple integration with provisioning and management systems
- Element and Inventory Management for control and monitoring of large access networks

Quality monitoring and Service Level Agreements
The 1645 keeps statistics of the last 15 minutes, 2 hours, 24 hours and 7 days. Selected statistics can be stored over a longer period on the device for later retrieval and processing on a management platform. Traffic quality monitoring provides all the information needed to offer Service Level Agreement reports to the customer.
Technical Specifications

Basic hardware
- 1+1 (optional) GigE Ethernet Combo interface
- 4 port GigE switch
- 1 console port V.24/V.28 with RJ-45 connector
- Optional SHDSL or A/VDSL and/or LTE interface
- USB port with support for GPRS/EDGE/3G Dongle

Fibre Interfaces
- 1 or 2 combo GigE interfaces*
- 10/100/1000BASE-T
- 1000BASE-X and 100BASE-X SFP, GPON ready **
- Physical parameter monitoring of SFP modules (MSA SFF-8472)

SHDSL Interface (factory option)
- G.SHDSLbis ITU-T G.991.2 - 4 line pairs
- ATM, EFM and ATM/EFM auto detect
- Bonding based on EFM, SHDSL or ATM IMA
- RJ-11 connectors (2 RJ-11 for 4 pairs)
- Access multiplexing of up to 4 SHDSL lines in ATM mode

AVDSL Interfaces (factory option)*
- VDSL G.993.2 annexes A&B - 1 line pair
- Profiles 8, 12, 17 and 30
- ADSL G.992.1, G.992.2, G.992.4, G.992.5 - annexes A, B, I, L, M
- RJ11 connector

Copper Ethernet Interfaces
- 4 port switch 10/100/1000BASE-T
- Half/full duplex with auto-sense, automatic cross-over
- Link status and activity LEDs

USB Port
- USB 2.0 compliant
- Support for mobile USB devices
- On versions without built-in LTE

MEF CE 2.0 Services
- E-LINE: Ethernet Private Line (EPL) and Ethernet Virtual Private Line (EVPL)
- E-LAN: Ethernet Private LAN (EP-LAN) and Ethernet Virtual Private LAN (EV-P-LAN)
- E-TREE: Ethernet Private Tree (EP-TREE) and Ethernet Virtual Private Tree (EV-P-TREE)
- E-ACCESS: Access Ethernet Private Line (ACCESS-EPL) and Access Virtual Private Line (ACCESS-EVPL)
- MEF CE 2.0 certified at 1Gbps

Layer-2 functionality
- IEEE 802.1D Transparent Bridging
- 10k MAC addresses per bridge group
- IEEE 802.1Q VLAN Tagging - IEEE 802.1p QoS on Ethernet Levels
- Basic and extended MAC filtering
- Ethertype translation
- VLAN Switching
- Port-based VLANs
- IEEE 802.1ad Provider Bridges or QinQ
- Protection schemes: G.8031, Y.1731 APS, LAG/LACP, failover triggered by OAM events

Operations and maintenance (OAM)
- OAM IEEE 802.3 chapter 57 (for EFM operation)
- OAM IEEE 802.1ag & ITU-T-Y.1731
- Built-in traffic generator and analyser (RFC2544)
- Loopbacks on ports and virtual interfaces

IP functionality
- NAT/PAT
- DHCP client/relay/server, DNS server/relay
- Stateful Inspection Firewall
- IPSec native, GRE & L2TP

IP Routing
- Static routing
- Policy based routing
- RIP v1 and v2, OSPF, BGP-4
- VRF (VPN Routing & Forwarding)
- VRRP (Virtual Router Redundancy Protocol)

QoS
- Traffic Classification and Policing (inbound/outbound)
- Layer 2 classification based on MAC addresses/ranges, 802.1p, 802.1q, IP-TOS/DSCP, Ethertype (Protocol) and physical port
- Layer 3 classification based on IP addresses/ranges, IP-TOS/DSCP, Protocol
- Priority Queuing Layer 2 (8 levels, programmable))
- RED, WRED
- Traffic Shaping CIR/EIR
- Hierarchical queuing and shaping
- Queuing mechanisms: SP, RR, WFQ, LDWFQ

Performance and scalability
- 2000 Kpps bridging and switching performance
- 200-500 Mbps recommended WAN speed (depending on the services)
- Number of IPSEC, L2TP or GRE tunnels: 25

Maintenance and management support
- Console port, CLI, Telnet, SSH
- Multilevel password protection, Radius/TACACS+ AAA
- HTTP, HTTPS, customised Web Interface
- FTP/TFTP upload/download configuration/firmware
- SNMPv1, v2, v3, MIB II, proprietary MIB
- Statistics 5min, 15min, 2h, 24h, 7 days
- IP traffic monitoring: roundtrip delay, jitter, loss
- Statistics 5min, 15min, 2h, 24h, 7 days
- Traffic Shaping CIR/EIR
- Traffic Shaping CIR/EIR
- Hierarchical queuing and shaping
- Queuing mechanisms: SP, RR, WFQ, LDWFQ

Dimensions
- Desktop, wall mountable, rack mountable
- W x H x D: 275 x 55 x 150 mm; Weight: 1.3 kg

Power supply
- External adapter 12V – 2.8A
- Voltage range: 90-264 Vac – 50/60 Hz
- Power consumption: <30 W
- Optional 24/48Vdc powering

*The AVDSL and Second GigE Combo options are mutually exclusive
** Contact Product Management for GPON availability

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