

# ML2300N MSAN Aggregation Unit

**The ML2300N Ethernet MSAN Aggregation Unit from Actelis® is an advanced intelligent Ethernet MSAN service delivery unit. Using the existing copper network, the ML2300N can support 16 or 32 copper pairs and up to 230 Mbps of symmetrical Ethernet traffic at fiber quality over existing voice-grade copper as well as SyncE and external clocks 2 Mhz and 2 Mbps capabilities. Two models are supported ML2316N and ML2332N capable of supporting 16 or 32 copper pairs. ML2300N has two or four SFP interfaces supporting 100/1000Base-FX SFPs. It offers CE 2.0 services on all its ports - both copper and fiber.**

The ML2300N Aggregation Unit can be deployed in a Multi-Point topologies with Actelis' ML600/E Ethernet Access Devices. With its superior performance, extensive functionality and low cost, the ML2300N offers rapid CE 2.0 service delivery as well as advanced synchronization enabling further utilization of the existing network infrastructure.

The ML2300N compact aggregation unit is interoperable with any standard Ethernet switch, router or hub. Compliant with Metro Ethernet Forum (MEF) CE 2.0 specifications, ML2300N seamlessly integrates into carrier Ethernet networks. Equipped with two/four 10/100/1000Base-T Ethernet interfaces, two/four 10/100Base-T Ethernet interfaces, and 2 or 4 ports for 100/1000Base-FX Small Form Factor (SFPs).

ML2300N offers cost effective aggregation of PWE E1, V35 or Nx64kbps services. These services, encapsulated by Actelis EADs - ML650V/T/VT using PWE could be aggregated and distributed either by a GbEthernet uplink connected to a MetroE network or through E1 ports towards legacy TDM/PDH networks. Multiple customers can be consolidated into a maximum of 16 E1s or a GbE interface.

Cascading multiple ML2300Ns, allows higher number of customers per uplink. For example , four ML2316N, i.e. 64 pairs can be aggregated into a single uplink. Actelis' solution can support also

a higher level of stacking per CO. 1+1 GE uplinks can be used for redundancy.

Service providers utilizing the ML2300N intelligent can offer CE 2.0 based services with comprehensive bandwidth control and traffic management features. The ML2300N's flexible service provisioning using Ethernet Virtual Connections (EVCs), along with its advanced mapping and Hierarchical Quality of Service (H-QoS) capabilities, allows carriers to maximize the efficiency of the access bandwidth on all their ports and configurations. Service Level Agreements (SLAs) can be easily enforced per each subscriber enabling service providers to safely aggregate multiple services or multiple subscribers, on the same Ethernet access uplink.

All ML2300N models provide 802.1q VLAN-aware wire-speed bridging, double tagging (VLAN stacking) for end-user VLAN transparency, VLAN translation, L2, L3 and L4 classification with eight traffic classes, RSTP/STP, ERPS, bandwidth monitoring, Multicast/Broadcast limiting, as well as IGMP snooping for video distribution applications.

The ML2300N provides proactive and dynamic tools for enhanced trouble shooting and monitoring capabilities. Advanced Carrier-class OAM, including EFM OAM per 802.3ah , CFM (802.1ag) and , Y.1731 are supported by the product, offering both physical link as well as service level end-to-end advanced troubleshooting mechanisms.

The ML2300N can be managed In- and Out-of-Band by the MetaASSIST™ View graphical craft application and via the multi-platform Element Management System, MetaASSIST EMS. The management protocols include standard command line interface, Telnet and SNMP using standard MIBs for seamless integration with third-party Network Management Systems .



## Highlights

- Standards-based IEEE 802.3ah Ethernet in the First Mile (EFM) 2Base-TL transport
- MEF CE 2.0 compliant
- H-QoS
- SyncE
- Rapid Service Deployment
- Superior Rate, Reach & Reliability
- Low Delay and Jitter for Voice and Video Transmission
- Carrier Class OAM, including Y.1731, CFM, EFM OAM
- Worldwide Spectral Compliancy
- NEBS, FCC, UL, CE
- Environmentally Hardened

## Applications

- Transparent LAN Service
- Fast Internet Access
- Metro Ethernet Extension
- Private Campus Network Intra-Connection
- MDU/MTU Backhaul
- DSLAM Backhaul
- WiFi and Cellular Backhaul (Radio Access Network)
- Leased Lines Replacement

## Markets Served

- ILECs, CLECs, IOCs, PTTs, and Alternative Carriers
- Federal, State and Local Government Agencies
- Education, Health Care, Utilities, and Private Campuses

### Specifications

#### Interfaces

##### Ethernet (Network/User)

- **10/100/1000 Base-T:** 2 ports (ML2316N) or 4 ports (ML2332N)
- **10/100 Base-T:** 2 ports (ML2316N) or 4 ports (ML2332N)

Connector: RJ45, Auto-MDIX

- **100/1000Base-FX:** 2 ports (ML2316N) or 4 ports (ML2332N)

Connector: SFP based, MSA compliant

- **E1 port:** 16x E1 as uplinks for all E1/V35 traffic. E1 interfaces can aggregate multiple ML2300N units at the same location

##### Synchronization

- **Clock Source:** 5 or 10 x Synchronous Ethernet per G.8261, G.8262 over copper or fiber BITS-2MHz or 2Mbps external clock
- **Clock Quality:** EEC-option1, EEC-option2
- **Clock APS:** Automatic Protection Switch from Primary to Secondary per GR-1244-CORE
- **Reference clock to NTU-** Symbol Clock over SHDSL

##### High Speed Link (Bonded Copper Pairs)

- **Protocol:** IEEE 802.3ah 2Base-TL
- **Line code:** ITU-T G.991.2 rev. 2
- **Bandwidth per HSL:** 1-230 Mbps (symmetrical) up to 15 Mbps per pair, bonding up to 16 pairs.
- **Cut line protection** - Resiliency to multiple failures
- **Number of Copper Pairs per unit:** 16 or 32
- **Copper Pairs per HSL:** 1-16
- **Connector:** RJ45 - 2 modems/pairs per connector
- **Line code:** ITU-T G.991.2 rev. 2
- **End-to-end Delay:** 2-4 ms (typical)
- **Spectral Compliance:** ITU-T G.991.2 annex A, B, F, G, ETSI TS 101 524 annex E, ANSI T1.417, T1.426 Per-country regulatory compliant spectral modes
- **Spectral Friendliness:** Dynamic Spectral Shaping (DSS)

##### Management (Out-of-Band)

- **10/100Base-T Connector:** RJ45, Auto-MDIX
- **Craft EIA RS-232 (DCE) Connector:** DB9

#### Ethernet Bridge Features

- **Bridging:** IEEE 802.1q
- **Forwarding Database size:** 16K MAC addresses
- **MTU:** 1518 – 2048 Bytes (configurable per system)
- **TPID:** up to 4 settable per inner/outer tag
- **Aging:** Configurable
- **Switching Capacity:** 8Gbps non-blocking
- **MAC Limiting and Filtering**
- **Multicast/Broadcast Control**

- **Port based VLAN Stacking (Q-in-Q)**
- **Conditional VLAN Stacking**
- **VLANs: 4K,** supports VLAN translations
- **L2CP Tunneling**
- **RSTP, STP:** IEEE 802.1d
- **Link Aggregation:** IEEE 802.3, L2/L3 balancing
- **Provider Bridges:** IEEE 802.1ad
- **LLDP:** IEEE 802.1ab
- **IGMP Snooping:** RFC 4541, V1/V2 RFC 1112/2236
- **ERPS:** ITU-T G.8032
- **EFM OAM:** IEEE 802.3ah clause 57 inc. Dying Gasp
- **CFM/MEF OAM:** IEEE 802.1ag, ITU Y.1731

#### Quality of Service Features

- **Classes of Service** (queues per port): 8
- **Two Levels Hierarchical Scheduler (H-QOS),** up to 64 queues per port, WFQ, SP, Hybrid
- **Bandwidth Control:** 32 profiles, 2 rate, 3 color metering (CIR, CBS, EIR, EBS)
- **EVCs:** 32 Services
- **Classification:** 128 rules (Port/VLAN/L2 L3/L4)
- **Shaping:** per queue/port
- **Color Mode Awareness** by COS or DEI
- **CoS Marking:** by COS or DEI, per Service

#### Management

##### Applications

- **EMS:** MetaASSIST EMS
- **Craft GUI:** MetaASSIST View

##### Protocols

- IPv4 and IPv6
- **DHCP Client:** RFC 2132
- **ACS Client, CWMP:** TR-069
- **Command Line Interface:** TL1, CLI
- **Remote Access:** Telnet
- **SNMP:** V3, V2C, V1
- **Radius Authentication:** RFC 2865
- **Secure Access (option):** SSH v2
- **Time Synchronization:** SNTP v3
- **Web Access:** HTTP
- **File transfer:** FTP, TFTP
- **Syslog:** RFC 3164

#### Alarm Contacts

- **Terminal Block:** 2 Input, 1 Output Physical

#### Front Panel Indicators (LEDs)

- **Power**
- **Status**
- **Sync**
- **Alarm**
- **MLP** per modem/pair
- **ACT (Activity)** - per Ethernet port
- **LNK (Link)** per Ethernet/HSL port

#### Physical

- **Dimensions Height:** 1.6" / 40 mm (1U)
- **Depth:** 11.0" / 280 mm
- **Width:** 8.4" / 213 mm (ML2316N)  
16.8" / 426 mm (ML2332N)
- **Weight:** 3.75 lbs / 1.7 Kg (ML2316N)  
7.5 lbs / 3.4 Kg (ML2332N)
- **Mounting Rack:** 2 units in 19" rack (ML2316N)  
1 unit in 19" rack (ML2332N),  
Desktop, Wall Mount
- **Power**
- **DC:** 24/48 Vdc nominal (20-60 Vdc range),  
25-50 Watt (per model)
- **AC:** 90-264 VAC, 47-63 Hz, up to 60 Watt

#### Environmental

- **Operating Temp:** -40° to +65°C
- **Storage Temp:** -40° to +70°C
- **Relative humidity:** Up to 95%, non-cond.

#### Regulatory and Compliance

##### Metro Ethernet Forum

- CE 2.0

##### Safety

- UL 60950, CSA C22.2 60950
- EN 60950-1, IEC 60950-1

##### EMC

- FCC Part 15 Class
- ICES-003 Class B
- ETSI EN 300 386 Class B
- ETSI ETS 300 132-2
- ITU-T K.20, K.21

##### NEBS

- GR-1089-CORE, GR-63-CORE

##### CE

- EMC and Safety

##### Environmental

- GR-63-CORE
- ETSI ETS 300 019



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