The Nokia ISAM FGLT-D is available in the ISAM FX access nodes and supports a total non-blocking capacity of up to 40Gb/s. Each PON interface delivers 2.5Gb/s in downstream and 1.2Gb/s in upstream, and has a reach of up to 60km (37.3 miles), which makes this card ideal for cost-effective delivery of high-bandwidth IP services to residential and business users.

Features

- 16-port GPON line card
- Non-blocking architecture
- Available in Nokia FX access nodes (FX-16/FX-8/FX-4)
- Quillion based for high capacity, low latency, and low power consumption
- SDN-ready
- Multi service
- Supports IPTV and RF video
- Built-in troubleshooting mechanisms
- Class C++ optics (34 dB link loss budget) C+ optics (32 dB link loss budget) and B+ optics (28 dB link loss budget)
- Pluggable optics
- Supports 1:128 split; support for 30/60 km (18.6/37.3 miles) reach
- Type B PON protection
- Wide range of ONT management options
- Industrially hardened
Benefits

• Efficient delivery of premium Gigabit services
• Enhanced deployment flexibility for:
  – indoor/outdoor
  – various shelf sizes
  – various pluggable optic types.
• Operational efficiency with:
  – low power consumption
  – troubleshooting mechanisms
  – long reach and high split ratio to enable network consolidation.

Technical specifications

External interfaces:

• 16-port GPON interfaces, using pluggable B+, C+ or C++ optics, allowing 28dB, 32dB or 34dB optical loss budget, respectively, based on:
  – G.984.1 – GPON service requirements
  – G.984.2 – GPON physical media dependent (PMD) layer
  – G.984.2 – GPON PMD layer, Amendment 1
  – G.984.3 – GPON transmission convergence (GTC) layer; GPON Encapsulation Method (GEM) based
  – G.984.3 – GTC layer, Amendments 1 and 2
  – G.988 – GPON OMCI, Appendixes I and II
  – TR-156
• Support for:
  – Advanced Encryption Standard (AES)
  – Forward error correction (FEC)
  – Dynamic bandwidth allocation (DBA)
  – Configurable delay tolerance

Forwarding

• Layer 2 forwarding – Generic:
  – Ethernet packet types include Ethernet II Encapsulation and logical link control/Subnetwork Access Protocol (LLC/SNAP)
  – Any combination of untagged/priority/single tagged packets, selective Internet Protocol over Ethernet/Point-to-Point Protocol over Ethernet (iPoE/PPPoE) filtering
  – Virtual LAN (VLAN) assignment for untagged/priority tagged packets based on port and protocol default VLAN, multi-VLAN support at UNI
• Layer 2 forwarding – CC mode:
  – VLAN stacking (S-VLAN CC and S-VLAN/C-VLAN CC)
• Layer 2 forwarding – RB mode:
  – VLAN stacking (S-iBridge), selective broadcast
• Layer 3 multicast:
  – High-performance Internet Group Management Protocol (IGMP) processing
  – IGMP proxy
  – Immediate leave
  – Source-specific multicast/any-source multicast (SSM/ASM)
• Active-Active load sharing for up to 4 x 10Gb/s bidirectional aggregate

Protocols

• Management using Simple Network Management Protocol (SNMP), command-line interface (CLI) and TL1
• Provisioning and surveillance interface between optical line terminal (OLT) and optical network terminal (ONT) is assured using standard OMCI
• User access protocols: Address Resolution Protocol (ARP), IEEE 802.1X authentication, Dynamic Host Configuration Protocol (DHCP) Option 82 insertion, PPPoE relay tag

Quality of service (QoS)

• QoS classification based on L2/L3/L4 multifield classification
• Priority bit (re)marking
• Connection admission control (CAC) at various levels of aggregation
• Policing
• Flexible traffic manager combining tail drop/weighted random early detection (TD/WRED) buffer admission, strict priority/weighted fair queueing (SP/WFQ) scheduling and shaping at various levels
• In-field, upgradeable, fully programmable packet processing
• Advanced traffic management capabilities for service level agreement (SLA) execution

Security
• Protection against malicious media access control (MAC) move
• Assignment of virtual MAC address
• Proxies to avoid downstream multicast/broadcast (ARP)
• IPv4/IPv6 address antispoofing for user data packets/ARP/IGMP/DHCP
• Access control list (ACL) based on L2/L3/L4 multifield classification
• Rate control of control packets

Standards compliance

Environmental
• ETS 300 019-1-1 storage – Class 1.1 (weather protected, partly temperature-controlled locations)
• ETS 300 019-1-2 transport – Class 2.3 (packet, public transportation)
• ETS 300 019-1-3 stationary use – Class 3.1E (temperature-controlled locations), when used in configuration with up to 2 FX or 2 FD shelves

Protection
• ITU-T K.20/K.45

Safety
• IEC/UL 62368-1
• EMC and ESD: ETSI EN 300 386 V1.6.1 (2012-09) for telecommunication network equipment
• EU Directive 2011/65/EU (RoHS2 Directive) as amended (including 2015/863/EU)
• EU Regulation 2006/1907/CE (REACH regulation)

Operating environment
• Temperature, inlet/ambient:
  – -5°C to 45°C (23°F to 113°F), when used in configuration with up to 2 FX or 2 FD shelves
  – -40°C to 65°C (-40°F to 149°F), when used in standalone ISAM FX or FD shelf
• Over-temperature sensors and shutdown
• Humidity: 10% to 95% (non-condensing)

Dimensions
• Height: 405mm (15.94in)
• Width
  – Top: 225mm (8.85in)
  – Bottom: 205mm (8.07in)
• Board-to-board pitch: 25mm (0.98in) ITU-T K.20 (Enhanced)