The Nokia 7750 Service Router (SR) and Nokia 7450 Ethernet Service Switch (ESS) Media Dependent Adapter-XP (MDA-e-XP) and MDA-e deliver high-density Ethernet interfaces for highly scalable IP routing functions, services and applications.

Flexible and scalable

With Gigabit Ethernet (GE), 10GE, 25GE, 40GE and 100GE interface options, the Nokia MDA-e-XP and MDA-e deliver the performance, flexibility and advanced service capabilities to meet a full array of IP network functions, services and applications.

The MDA-e-XP delivers up to 600 Gb/s full duplex (FD) performance in a half-slot adapter and supports QSFP28, QSFP+ and CFP2-Digital Coherent Optical (DCO) optics. Universal connectors with breakout options give the MDA-e-XP the flexibility to configure any connector for 100GE, 40GE and 10GE — all on a single adapter.

The MDA-e delivers up to 100 Gb/s FD performance in a half-slot adapter and supports a wide range of optical modules, including QSFP28 and QSFP+ optics. It also supports a wide range of OTU standards, forward error correction (FEC) and ITU-T G.709. Universal connectors with breakout options on the 2-connector QSFP28 MDA-e with MACsec provide the flexibility to configure any connector for 100GE, 40GE, 25GE and 10GE — all on a single adapter.

Up to two MDA-e-XPs are supported by the Nokia FP4-based Input/Output Module 5-e (IOM5-e) in the 7750 SR-12e, SR-12, SR-7 and in the 7750 SR-1 system, which has an integrated IOM5-e based on the Nokia FP4 silicon.
Up to two MDA-e adapters are supported in the IOM4-e, IOM4-e-B and IOM4-e-HS in 7750 SR-12e, 7750 SR-12 and 7750 SR-7 systems.

Up to four MDA-e adapters are supported by the IOM-e in 7750 SR-e systems. For 7450 ESS systems, up to two MDA-e adapters are supported using the 7750 SR IOM4-e.

In combination with 7750 SR IOM technology, the MDA-e-XP and MDA-e support processing-intensive routing applications without sacrificing performance. For service providers, they enable advanced residential services, mobile backhaul, enterprise VPN services/internet access, and cloud and data center interconnect services.

For webscale companies, the combination of 7750 SR IOM technology and the MDA-e-XP and MDA-e enables data center aggregation, gateway and interconnect, point of presence (PoP) edge, internet peering and backbone router functions. For enterprises, they provide high-performance networking for cloud, data center and branch office applications.

Features and benefits

- Delivering up to 600 Gb/s FD and universal interfaces, the 12-connector and 6-connector MDA-e-XP uses front faceplate connectors capable of supporting QSFP28 and QSFP+ optical modules and flexible optical breakout options, including support for: 1 x 100GE (QSFP28), 1 x 40GE (QSFP+), 4 x 10GE (QSFP+) and 10 x 10GE (QSFP28) breakouts on any connector.

- The 3-connector CFP2-DCO MDA-e-XP supports 100 Gb/s using QPSK modulation and 2 x 100 Gb/s using either 8QAM or 16QAM for enhanced flexibility in a pluggable coherent solution.

- With the IOM5-e and MDA-e-XP, a pay-as-you-grow licensing model is available with hardware capability-level and functional-level licenses and upgrade options that are enabled through software. Intelligent fan-in/fan-out is a leading capability with FP4, enabling the IOM5-e to support much higher capacity and density in a fully deterministic way.

- The 100 Gb/s FD MDA-e provides GE, 10GE, 25GE, 40GE and 100GE interfaces with support for CSFP, SFP, SFP+, CFP2, CFP4, QSFP+, and QSFP28 optics. The 2-connector QSFP28 Universal MDA-e is available in a variant that supports MACsec on all connectors along with RS-FEC (Clause 91 FEC) support. It uses front faceplate connectors capable of supporting QSFP28 and QSFP+ optical modules and flexible optical breakout options, including 1 x 100GE, 1 x 40GE, 4 x 25GE and 4 x 10GE.

- Modular, compact MDA-e-XP and MDA-e adapters and IOMs provide a flexible, mix-and-match approach to system configuration, for reduced TCO and investment protection.

- OTU1e, OTU2, OTU2e and OTU4 line rates support a wide range of OTN environments and automatically increase the payload rate from the standard 10.709 Gb/s (OTU2) to either 11.0491 Gb/s (OTU1e) or 11.0957 Gb/s (OTU2e).

- ITU-T G.709 FEC and generic FEC (GFEC) algorithms extend optical reach for long haul applications.

- ITU-T Synchronous Ethernet (SyncE) and IEEE 1588v2 distribute precision network timing and synchronization over Ethernet.

- MDA-e variants with MACsec support IEEE 802.1AE MACsec to provide secure connectivity for all traffic on Ethernet links between nodes and support VLAN tags in clear (WAN) mode or encrypted.

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1 Some features are not supported on all MDA-e-XP and MDA-e variants.
Technical specifications

Table 1. Nokia 7750 SR and 7450 ESS MDA-e-XP and MDA-e summary

<table>
<thead>
<tr>
<th>MDA type</th>
<th>Connector / port</th>
<th>Connector / port type</th>
<th>Maximum density</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>7750 SR/7450 ESS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SR-12e</td>
</tr>
<tr>
<td>MDA-e-XP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100GBASE/40GBASE/10GBASE**</td>
<td>12</td>
<td>QSFP28/ QSFP+</td>
<td>216/216/2160</td>
</tr>
<tr>
<td>100GBASE/40GBASE/10GBASE**</td>
<td>6</td>
<td>QSFP28/ QSFP+</td>
<td>108/108/1080</td>
</tr>
<tr>
<td>100GBASE</td>
<td>3</td>
<td>CFP2-DCO</td>
<td>108/-/-</td>
</tr>
<tr>
<td>MDA-e</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100GBASE/40GBASE/25GBASE/10GBASE (MACsec)</td>
<td>2</td>
<td>QSFP28/ QSFP+</td>
<td>36/36/144/144</td>
</tr>
<tr>
<td>100GBASE/40GBASE</td>
<td>2</td>
<td>QSFP28/ QSFP+</td>
<td>36/36/144/144</td>
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<td>100BASE</td>
<td>2, 1</td>
<td>CFP4, CFP2</td>
<td>36, 18</td>
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<td>10GBASE</td>
<td>10, 6</td>
<td>SFP+</td>
<td>180, 108</td>
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<tr>
<td>10GBASE/100BASE (MACsec)</td>
<td>12</td>
<td>SFP+/SFP</td>
<td>216</td>
</tr>
<tr>
<td>100BASE</td>
<td>40</td>
<td>CFP4/SFP</td>
<td>720</td>
</tr>
</tbody>
</table>

* The new ess-system-type BOF option allows a 7750 SR-7-B or SR-12-B chassis to operate as a 7450 ESS-7 or ESS-12 chassis.

** Leverages intelligent fan-in/fan-out.

Dimensions²
- Height: 3.6 cm (1.4 in)
- Width: 19.3 cm (7.6 in)
- Depth: 19.6 cm (7.7 in)

Weight²
- 40-port GE CSFP/SFP MDA-e: 0.95 kg (2.1 lb)
- 12-port 10/1GE SFP+ MACsec MDA-e: 1.06 kg (2.33 lb)
- 10-port 10GE SFP+ MDA-e: 0.90 kg (1.98 lb)
- 6-port 10GE SFP+ MDA-e: 0.88 kg (1.94 lb)
- 2-connector QSFP28 (MACsec) MDA-e: 1 kg (2.2 lb)
- 2-port 100GE QSFP28 MDA-e: 1 kg (2.2 lb)
- 2-port 100GE CFP4 MDA-e: 1 kg (2.2 lb)
- 1-port 100GE CFP2 MDA-e: 0.91 kg (2.01 lb)
- 12-connector QSFP28 MDA-e-XP: 1.13 kg (2.5 lb)
- 6-connector QSFP28 MDA-e-XP: 0.95 kg (2.1 lb)
- 3-connector CFP2 DCO MDA-e-XP: 0.95 kg (2.1 lb)

Refer to the 7750 SR and 7450 ESS platform data sheets and product documentation for full system details on safety standards, compliance agency certifications and protocol support.

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Document code: SR1906036024EN (June) CID194147