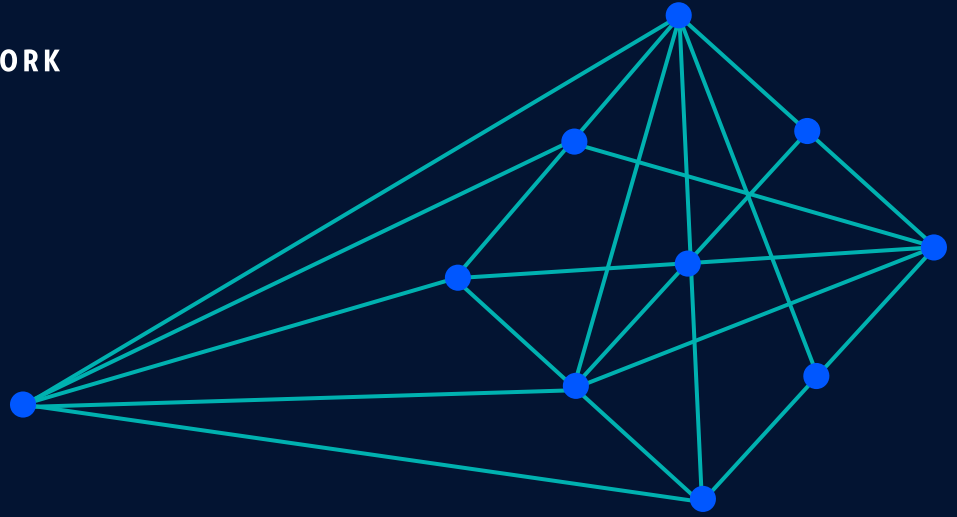


OPTICAL ENCRYPTION IN APOLLO



In today's world, where information security is a critical business imperative, information must be secured throughout the data center, enterprise, and interconnecting networks. Communications traffic that can be intercepted at any point in the network (for example, via fiber taps) necessitates encryption to guarantee the integrity of the data being transmitted. Optical-layer encryption in particular has recently migrated from a niche application for high-security applications, such as governments and large financial institutions, into a key part of the security strategy for any optical network.

ECI's Apollo optical product line provides optical encryption via both transponders and muxponders, supporting per-service encryption up to 100Gbps, with line rates up to 200Gbps, without sacrificing optical interoperability, scalability, or flexibility.



Secure

Highest level of security available



Low Latency

Line-speed operation for high-speed links



Flexible

Unique per-service encryption



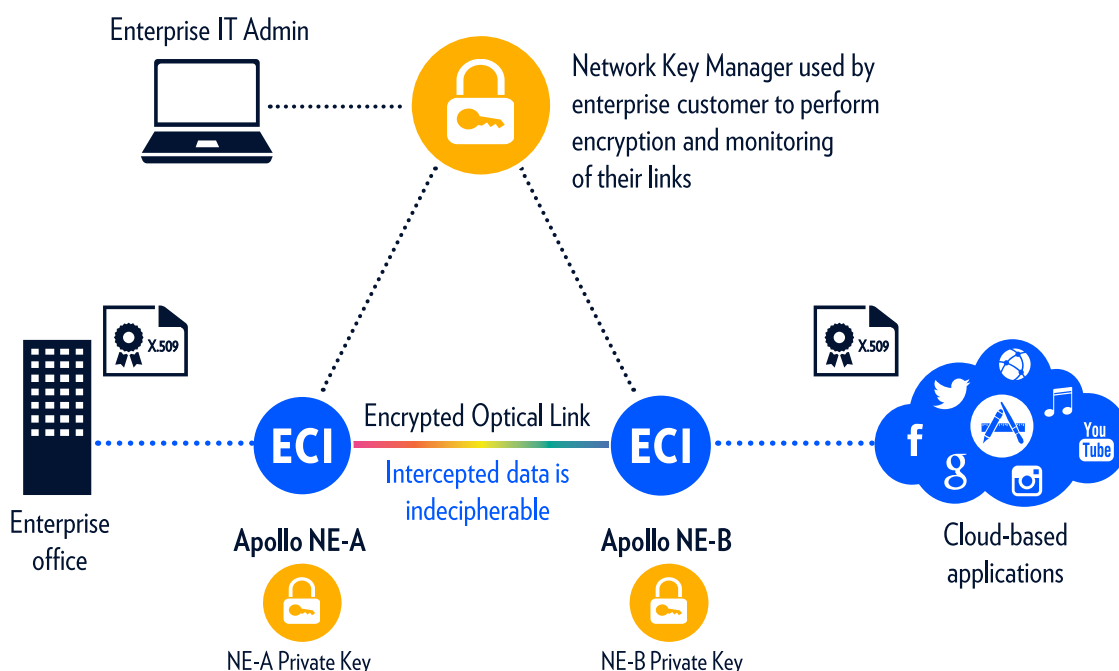
Interoperable

Standard OTN framing for interoperability

OPTICAL ENCRYPTION

Contrary to Layer 2 (or higher layer) encryption, optical encryption provides no information about the underlying services to a potential hacker. It adds almost no delay to the network and can be used to encrypt any service - not just Ethernet-based services. The cost of optical encryption is often incremental to the cost of the optical network infrastructure, so that many customers – from small telcos with business services to utility networks – are now considering optical encryption as the default for all of their optical communication needs.

Optical encryption in Apollo is performed on the payload of an OTN-framed signal. The payload is scrambled using standard, highly secure algorithms that can only be decoded via access to a key that is shared privately between both ends. By scrambling the OTN payload and leaving the OTN header in place, the service can still be carried over a standard WDM/OTN network without any interoperability issues. And since there is no information in the OTN header about the content of the service, any hacker with access to the optical line will not be able to determine anything about the types of services carried, much less the content.



The ability to provide encryption on a per-service basis in the 200Gbps encrypted transponder/muxponder is unique to the Apollo product line. This feature allows individual services to be separately and individually encrypted with unique secure session keys per service and multiplexed onto a higher speed line. For example, multiple 10Gbps service customers with different service types can have their services individually encrypted - or not, depending on the service requested - and combined onto a 200Gbps line. This way, service providers who wish to enhance revenue can provide encrypted services alongside standard services at a sub-wavelength level using a single muxponder. Also, each service can be a different type, including Ethernet, OTN, SONET/SDH, Fibre Channel, and Infiniband.

Encryption in the Apollo product line is performed using AES256-GCM encryption, the highest level encryption available in the industry. Key exchange is performed using Diffie-Hellman techniques and an external key manager. This is a very secure transfer technique that ensures that the keys themselves are never actually transmitted, but are calculated securely on-site. Encryption on Apollo has been certified to FIPS 140-2 Security Level 2 standards, a U.S. government computer security standard used to accredit cryptographic modules.

200G ENCRYPTED TRANSPONDER / MUXPONDER

Apollo's 200G encrypted transponder/muxponder boasts the latest innovation in optical encryption. The module is a double-slot card available for any Apollo 96xx chassis that can be used as muxponder, combining lower-speed signals from 10G to 100G onto a 200G line, as a 6 x 10G transponder card or as a 4 x 10G Y-protected transponder card (1 client, 2 lines). Each client service can be independently encrypted, and un-encrypted services can be combined on the same line without restrictions. The optical line can be either a coherent 100G/200G or a direct-detect 100G D-CFP2 pluggable module. The coherent module can be software programmed for either rate, just as with other 200G optical modules offered by ECI.

The optical clients include:

- Two QSP pluggable modules supporting 100GE, 40GE, or 10GE (via fan-out cable) services
- Twelve SFP+ pluggable modules supporting Fibre Channel (8G/10G/16G/32G), SONET/SDH (STM-64/OC-192), OTN (OTU2/2e), and Ethernet (10G/25G), or a mixture of services, up to the total capacity of the card.

10G ENCRYPTED TRANSPONDER

Apollo's 10G encrypted transponder is a single slot card with two independent encrypted 10G transponders that can fit into any Apollo 96xx chassis. Each transponder on the card is independently encrypted and can support a variety of signals, including 10G Ethernet, 8G and 10G Fibre Channel, STM-64, OC-192, and OTU2/2e.

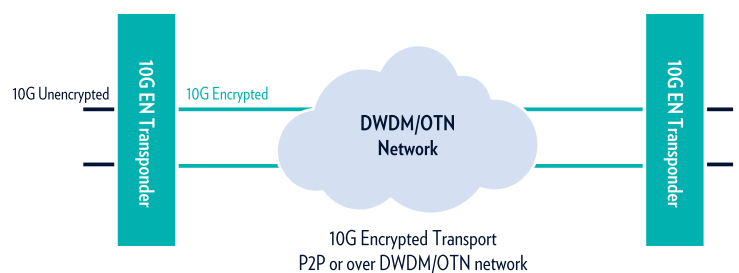
The 10G Encrypted Transponder is ideal for 10G enterprise services, data center interconnections, and other end-to-end 10G connections.

APPLICATIONS

10G Encrypted Transport

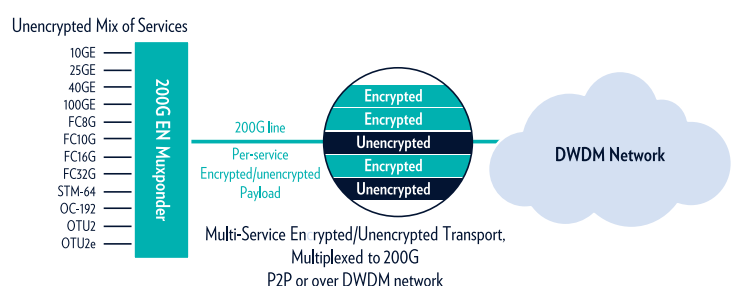
The 10G encrypted transport is ideal for a single encrypted 10G signal.

The output is a standard OTU2 that can be transported transparently over an existing OTN-based network, input into a DWDM network, or transported point-to-point.



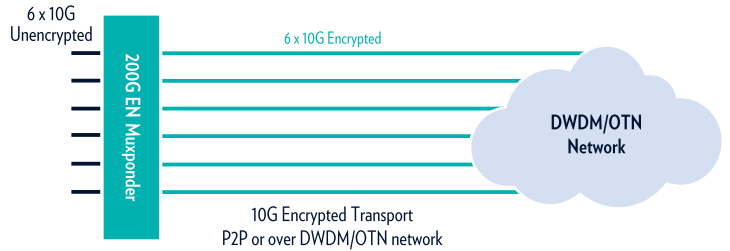
Multiservice Encrypted/Unencrypted Transport Multiplexed to 200G

Per-service encryption of up to 100% of the 200G bandwidth, with each service having a unique secure session key for added security. Any combination of services from 10G to 100G can be combined. The output can either be directly connected (point-to-point) to another 200G Muxponder or added as a wavelength onto a DWDM network.



Multiple 10G Encrypted Transport

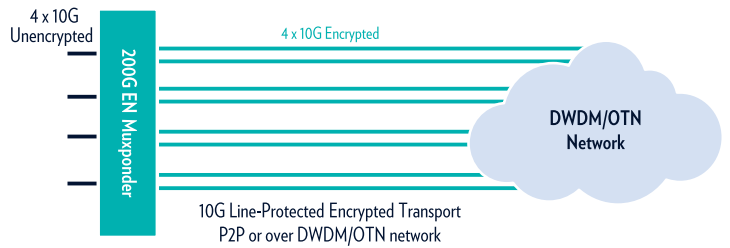
This is independent encryption of up to six 10G services, each with a unique secure session key, for added security. The output is standard OTU2 formatted signals that can be transported transparently over an existing OTN-based network, input into a DWDM network, or transported point-to-point.



Multiple 10G Line-Protected Encrypted Transport

As in the multiple 10G encrypted transport application above, this application offers independent encryption 10G services, each with a unique secure session key for added security. In this application, up to four 10G services can be line-protected with redundant line outputs, eliminating the need for additional protection equipment.

The output is standard OTU2 formatted signals that can be transported transparently over an existing OTN-based network, input into a DWDM network, or transported point-to-point.



IT'S TIME TO GO OPTICAL

Today, when security is an absolute imperative, optical encryption offers the highest level of security for data transported across fiber networks. Optical layer encryption adds almost no latency, obscures all information about the payload, and can be used on any service type. ECI offers solutions for optical encryption from 10Gbps to 200Gbps, including unique per-service encryption, available on the 200Gbps transponder/muxponder. The range of applications include simple point-to-point encryption, interoperable encryption over standard OTN/DWDM networks, protected encryption services, and per-service encryption over high speed links.

Contact us to find out how our ELASTIC networks can help you grow



ABOUT ECI

ECI is a global provider of ELASTIC network solutions to CSPs, utilities as well as data center operators. Along with its long-standing, industry-proven packet-optical transport, ECI offers a variety of SDN/NFV applications, end-to-end network management, a comprehensive cyber security solution, and a range of professional services. ECI's ELASTIC solutions ensure open, future-proof, and secure communications. With ECI, customers have the luxury of choosing a network that can be tailor-made to their needs today - while being flexible enough to evolve with the changing needs of tomorrow. For more information, visit us at www.ecitele.com