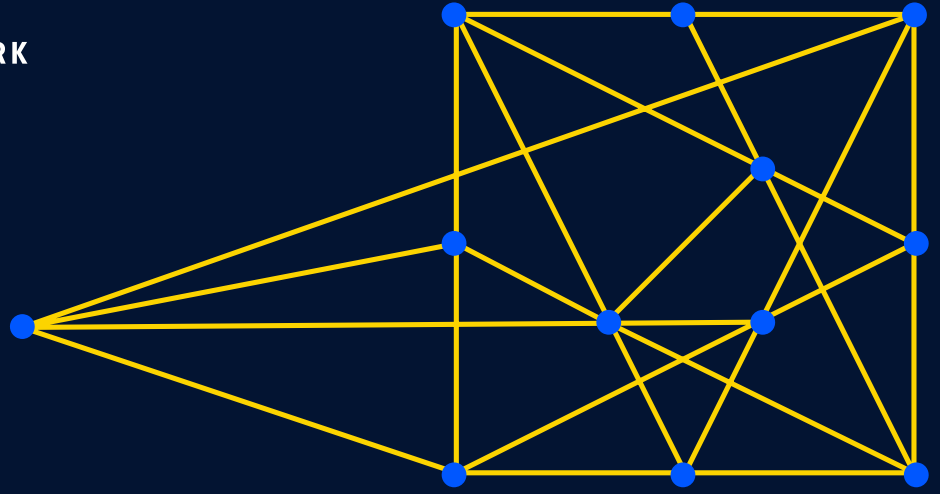


ElastiGRID™

**FOR CRITICAL
INFRASTRUCTURE
NETWORK OPERATORS**



RISK-FREE AND FUTURE-PROOF TRANSITION FOR CRITICAL INFRASTRUCTURE NETWORKS

Critical Infrastructure Network Operators are coming under increasing pressure to modernize their communications networks to support new services, reduce carbon emission, improve security and increase safety. Achieving this requires the Critical Infrastructure Network Operators to transition to a modernized communications network that seamlessly supports both packet and optical transport.

ECI's ElastiGRID™ gives Critical Infrastructure Network Operators confidence to transition their communications network. Field hardened, proven transition processes and capabilities, guarantee five 9s support for legacy, mission critical applications whilst providing a risk-free, future-proof, transition path to a new secure network.

ElastiGRID ensures:

Risk-Free Transition

enables tailor made
network evolution

Secure Packet

to secure your network
against attack

High Availability

provided by advanced
network capabilities

Multiservice

to evolve as the
network evolves

Over the past 50 years, ECI has been providing communications solutions for hundreds of critical infrastructure networks in power utilities, rail, highways, rail, airports, oil, gas, water, government and defense. ECI uses this experience to optimize its ElastiGRID solution to meet the unique needs of Critical Infrastructure Network Operators.

Drivers for Modernizing Critical Infrastructure Network

The critical industries sector, spans across many strategic industries and strategic operations; examples include the energy sector with distribution and transmission businesses; the transportation sector with industries like highways, rail and airports; the utilities sector with industries like oil; gas and water; the public sector with government and defense institutions; and more recently smart cities and smart municipalities. While the specific needs of each critical industry in each country is unique, there are a number of drivers that are common across all of them, the four most important for driving modernization being:

AGING NETWORK

- End of life SDH/TDM/ATM vs network expansion and population growth and service
- High maintenance costs
- Need for convergence

REGULATION

- Compliance to standards
- Carbon emission reduction
- Improve service availability and customer satisfaction



SECURITY AND SAFETY

- Control automation
- Safety recommendation
- Video surveillance
- Cyber and physical security

INTERNET OF THINGS

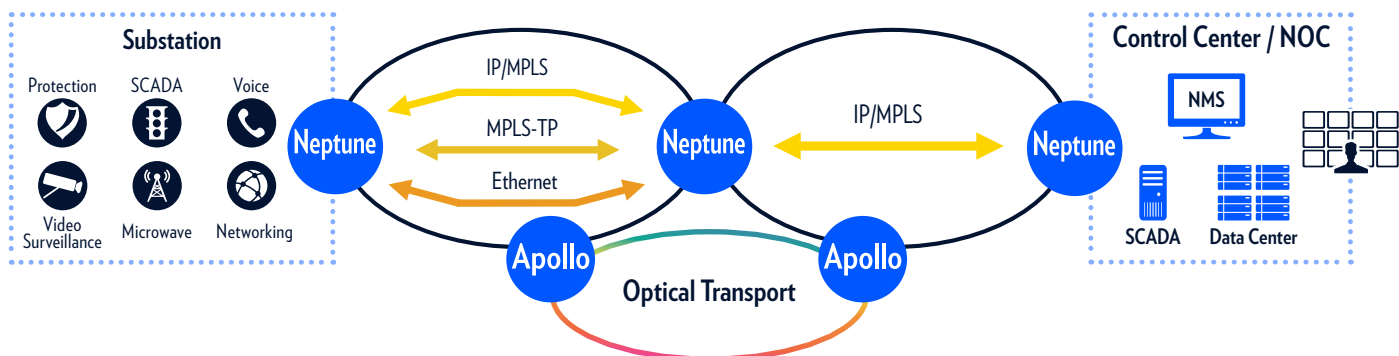
- Always connected sensors
- SCADA
- Automation and control
- Smart devices

The outcome → Critical industries need to transition to packet based networks.

ECI's ElastiGRID Solution - Main Benefits

Critical Infrastructure Network Operators are coming under increasing pressure to modernize their communications networks to support new services, reduce carbon emission, improve security and increase safety.

Packet transport is required to support the vast amounts of smart IoT devices which are being introduced to give better control of network resources. Optical transport is required support high-capacity services (like video from CCTV cameras) that is being used to increase security, improve safety and provide better customers services. During, and after, any network transition to support these capabilities it is essential that the communications network maintains its full five 9s support for the legacy, mission critical, applications like SCADA, Teleprotection and emergency communications.



ElastiGRID ensures:

Risk-free transition to secure packet

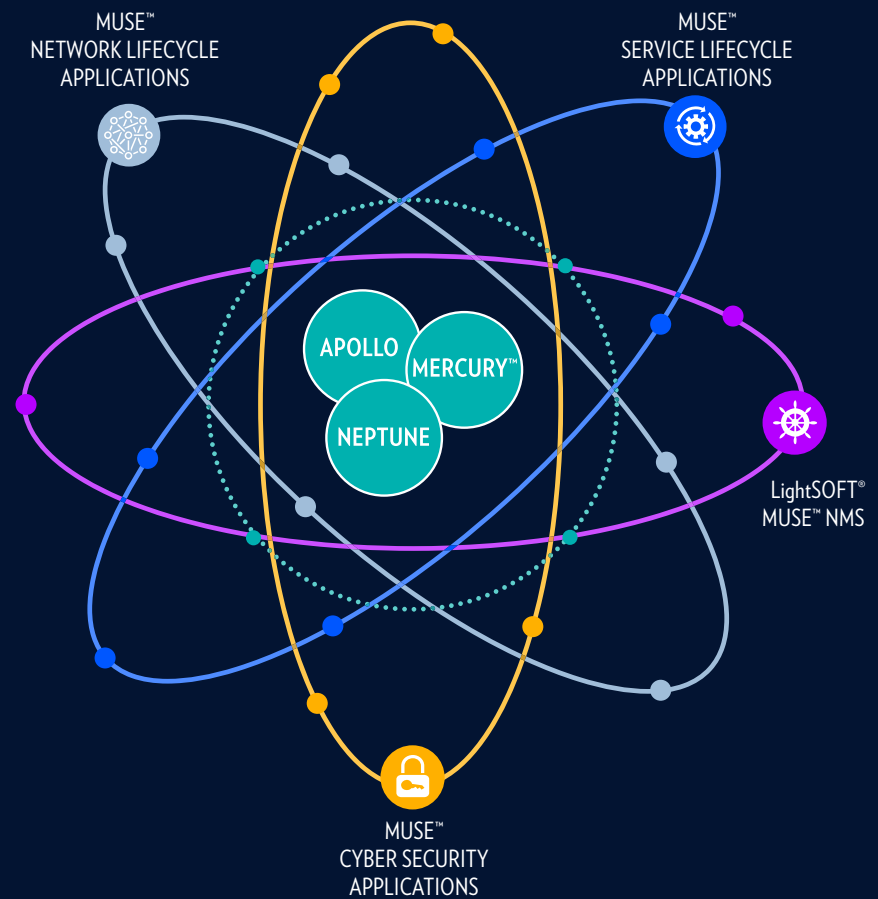
- Field hardened, proven migration processes
- Seamless multilayer support across packet, optical and TDM/SDH
- The right technology at the right time with Elastic MPLS
- Deterministic Performance for packet networks
- Mission Critical Service Assurance
- Flexible SCADA Support
- Multi-layer Security

Future proof multiservice

- Pay As You Grow, modular architecture
- IP/MPLS provides packet platform for modernized services
- Elastic MPLS provides elastic multiservice
- Apollo for high-capacity services like video
- Easy evolution to UTelco

Elastic Services Platform

The ELASTIC Services Platform is ECI's portfolio framework for a set of dynamic network resources controlled by a suite of modular software applications. This provides Critical Infrastructure Network operators with the tools they need to easily manage and evolve their communications network.





APOLLO Optical Transport Family

The Apollo product line provides state-of-the-art transparent and flexible DWDM transport with integrated OTN and packet switching capabilities. Apollo's modular architecture enables solutions that extend from the access network to the metro core to regional long haul spans in point-to-point, ring, and mesh architectures. Apollo combines high performance, low-latency, OTN transport and OTN switching, with software configurable optical routing, for maximum efficiency. Apollo has unique integrated intelligence features to make network administration and maintenance simple and insightful. The benefits of using Apollo provides for critical infrastructure network operators are:

- Flexible optical infrastructure including ADMs, ROADMs, muxponders, and amplifiers
- Seamless integration with the packet layer
- Optical encryption per service
- Integrated OSNR reporting and OTDR capabilities for the fibre network, allowing network degradation and failure to be easily detected and rapidly fixed
- Ready for future business evolution with WDM scalable from 10 Gbps to 1 Tbps



NEPTUNE Packet Transport Family

The Neptune product family provides native support for the legacy TDM/SDH services and low-rate mission-critical services like SCADA and teleprotection as well as providing cost optimized packet transport. When it makes sense, these services are migrated to the packet layer using Neptune's circuit emulation capabilities. Elastic MPLS allows Neptune to provide a complete multiservice platform to support the (OT) and (IT) services over the most appropriate transport technology (whether MPLS-TP or IP/MPLS).

Thus both IT and OT traffic can be supported on the same platform or on different platforms if air-gap security is required. The key benefits that Neptune provides for critical infrastructure network operators are:

- MPLS-TP for mission critical OT services
- Mission-critical service availability with advanced redundancy and protection schemes
- Native support of legacy TDM/SDN interfaces
- Flexible SCADA support (TDM and Packet)
- Integrated NFVi for best of breed point of access security applications
- Unrivaled multi-service support ready for future business evolution



MERCURY™ NFV Solutions

Mercury mixes and matches a rich library of certified ECI and third-party virtualized network functions (VNFs). This allows critical infrastructure network operators to instantiate functionality where and when they need it. This is key for security functionality, multi-access edge computing and services which require ultra-low latency



MUSE™ Advanced operations software

The Muse suite is ECI's holistic software offering, leveraging the best of industry-leading management systems and applications. Muse delivers real-time control over a secure network infrastructure and automates the service and network operation life cycles. The benefits MUSE provides for critical infrastructure network operators are:

- **LightSOFT®:**
ECI's GUI based network management system (NMS)

provides intuitive, integrated network management allowing Critical Infrastructure network operators to manage their entire communications networks from a single network operations centre (NOC) in real time.

- **SERVICE APPLICATIONS:**

A comprehensive set of advanced software providing intelligence and automation to enhance the operation of services running on the Critical Infrastructure communication network.

- **NETWORK APPLICATIONS:**

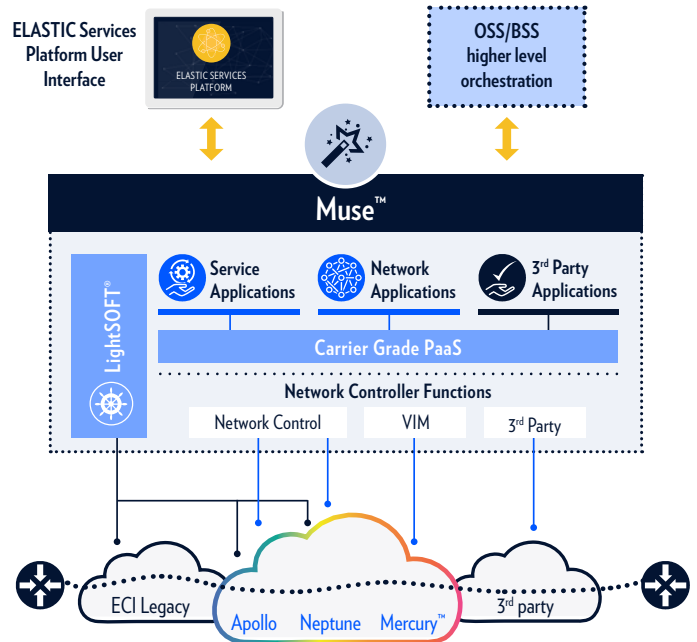
A suite of advanced operations software focused providing network optimization, fault analysis, and automated maintenance to improve the operations and ongoing management of the Critical Infrastructure communications networks.

- **LightPULSE™**

Powerful maintenance tools to quickly locate and address hard failures. In particular, LightPULSE™ OTDR interworking with a GPS mapping system lets you precisely locate faults in the fiber.

- **LightINSIGHT™:**

Provides a comprehensive, unified network view of network resources. This gives an in-depth look into the state of NEs, cards, ports and allows inventory changes to be tracked over periods of up to one year, indicating trends and availability of resources.



MUSE™ CYBER SECURITY Applications

Critical industries are a prime target for cyber-attacks. Data security is a particularly complex matter; it must protect both information technologies (IT) and operational technologies (OT) and be able to identify tangible threats from amongst the multitude of reported events.

The Mercury™ NFV platform hosts the MUSE cyber security solution. This provides physical layer security with encryption, firewalls, and intrusion detection. It provides the capabilities to identify and deal with potential attacks in several ways:

- Prevents attacks where they occur with distributed attack mitigation.
- Guards the integrity of the SCADA and OT network. The system maintains a complete OT network map and continuously monitors all transactions for abnormal behavior allowing early warnings of any tampering to be provided.
- Identifies real threats with advanced correlation and analysis for a clear view of tangible threats and ranks them by severity.

Risk-Free Transition to Packet

YOUR CHALLENGES

OUR SOLUTIONS

Network Modernization	<p>Risk-free evolution path allows critical infrastructure network operators to have confidence in modernizing their networks:</p> <ul style="list-style-type: none">• Field hardened, proven migration processes• Legacy TDM/SDH services are supported, natively or by using circuit emulation• MPLS-TP used to provide the deterministic packet transport and advanced OAM required for mission-critical (OT) services like tele-protection and SCADA• IP/MPLS used to support non mission critical and IT services• Optical transport for high bandwidth services like HD-video
Enhanced Multilayer Security	<p>Tailored, holistic, security, with the MUSE cyber security suite. This provides comprehensive protection for both OT and IT networks, with:</p> <ul style="list-style-type: none">• Integrated SCADA protection, secured connectivity, and secured services provided at point of access by using the embedded NFVi capability embedded on Neptune• L1 to L3 encryption with L1 optical intrusion detection• Optical wavelength encryption
Multiservice Network to Support OT and IT Requirements	<p>Extensive multiservice capabilities allowing OT services, IT services and advanced consumer services to be supported from a single platform:</p> <ul style="list-style-type: none">• IP/MPLS provides the platform for transporting the next generation of IP devices and modernized services• Elastic MPLS allows the right technology to be used for the right service• Pay-as-you-grow design, with unique in-service expansion units, scalable cross-connects and in-service upgradable packet fabrics and• Seamless integration of TDM/SDH, packet and optical transport• Enhanced functionality easily added with integrated NFV blade• MUSE™ software suite allows easy introduction of new services and evolution to SDN when required• Supports carrier of carrier, business services, residential services, mobile backhaul and future IoT applications, allowing operators to evolve as a UTelco.
High Availability for Mission Critical Services	<p>Intelligent, highly-available network required for mission-critical services is enabled by:</p> <ul style="list-style-type: none">• Hardened network elements and optimized architectures provided by Neptune and Apollo• Advanced operations software enhances services availability and guarantees service assurance• LightINSIGHT™ ensures the network is operating at maximum availability, utilization, and efficiency• Third party device management integrated into ECIs end-to-end management

Speak to us to discover how ECI ensures risk-free and future proof transition to packet.

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