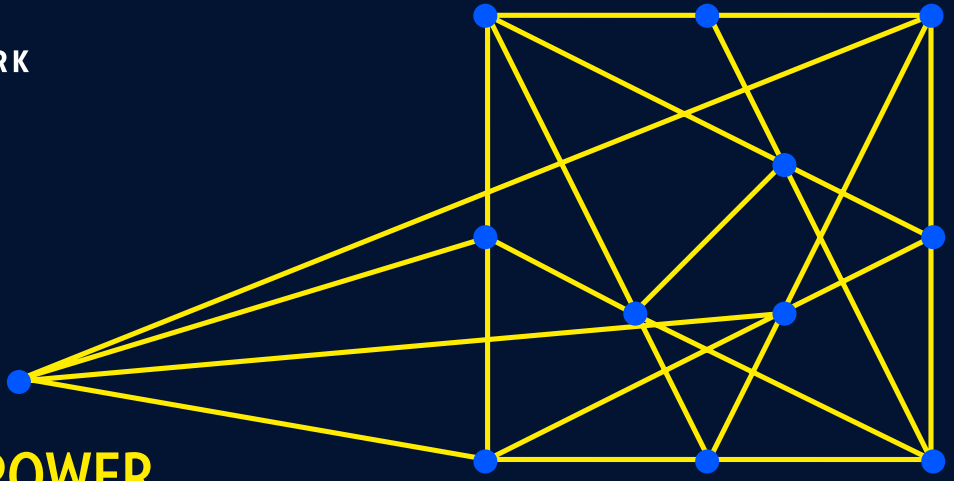


# ElastiGRID™

## FOR ENERGY AND POWER



## DIGITIZING THE NETWORK TO SUPPORT SMART ENERGY AND POWER

In the energy business, transmission system operators (TSOs) and distribution system operators (DSOs) are under immense pressure to modernize their networks. Regulators are driving the energy operators for increased energy efficiency by use of renewables, smart metering, and DSO neutrality. The operators themselves want to escalate revenues from energy trading, while increasing network security. To meet these challenges, energy operators need to modernize their energy networks to provide a secure data infrastructure that is able to detect and react instantaneously to changes in energy supply and demand. Accurate, real-time data is key for managing renewables, facilitating good communications between DSOs and TSOs, allowing revenues from energy-trading to be optimized, and managing the data from smart meters. The communications network is essential to transport this data efficiently while continuing to support mission-critical services like teleprotection and SCADA. In the age of Distributed Energy Resources (DER), ECI extends smart traffic engineering to the edge of the networks, including the Field Area Network (FAN).

- Risk-Free Transition**  
tailor-made evolution for legacy services
- Secure Packet**  
guarantees mission critical services
- Multiservice**  
supports evolution to smart energy
- High Availability**  
provided by advanced network architecture

### DRIVERS OF MODERNIZATION

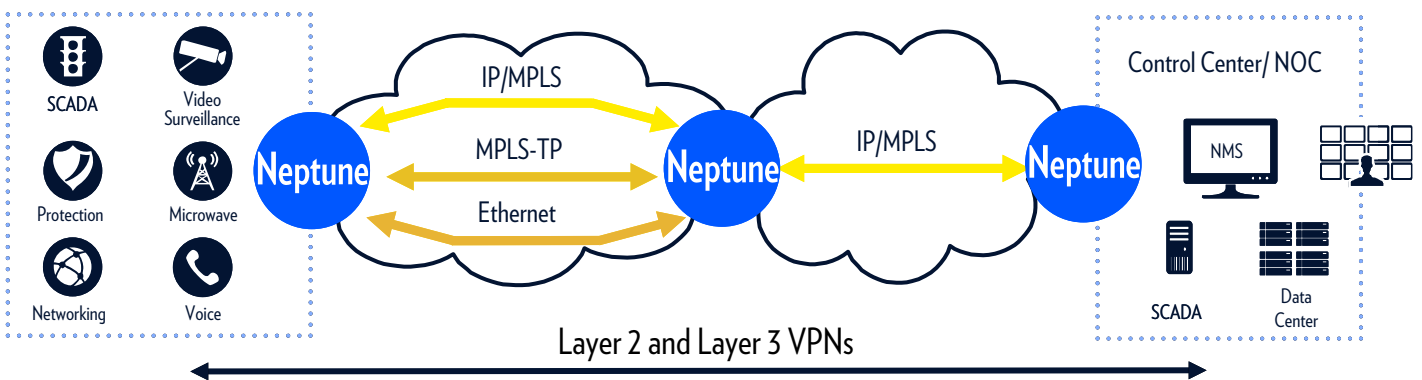
<p><b>EVOLUTION TO A DIGITAL ENERGY</b></p> <p>The move to digital energy is dependent on providing a secure digital data infrastructure. The legacy TDM networks used by energy operators cannot support the efficient transport of the packet services that drive the move to digital energy.</p>		<p><b>SMART GRID - IOT</b></p> <p>With smart grid, we see the introduction of renewable energy sources and smart devices. Renewables require accurate, real-time monitoring to allow them to be used effectively. Smart meters and smart appliances require IoT techniques to allow them to be meet their potential for improving energy efficiency.</p>
<p><b>INCREASED REGULATION</b></p> <p>We see ever-increasing regulation to strengthen, standardize, and safeguard energy networks, all with a view to dramatically improve energy efficiency.</p>		<p><b>SECURITY AND SAFETY</b></p> <p>Paramount for energy operators. The networks must be highly secure to reduce both physical and cyber attacks.</p>

# COST-EFFECTIVE AND RISK-FREE TRANSITION TO PACKET

ElastiGRID provides cost-effective, risk-free transition to a packet-based network. It supports native transport for legacy services and low-rate mission-critical services like SCADA, teleprotection, and control. When it makes sense, these services are migrated to the packet layer using circuit emulation. ElastiGRID's circuit emulation approach allows seamless transition to packet. Elastic MPLS uses a dual-stack approach where IP/MPLS provides transport for non-mission critical applications and MPLS-TP provides the deterministic behavior and extensive OAM expected for mission-critical services.

ElastiGRID provides a pay-as-you grow architecture, making the transition to packet extremely cost-effective:

- **Add capacity when needed** - with unique in-service expansion units and in-service upgradeable packet fabrics (e.g. 10G to 60G, 100G to 200/320G, 1T to 2T).
- **Introduce technology when required** - with unique in-service expansion units to scale connectivity and elasticity (Eth, Optical, PCM, CES); and with integrated WDM, OTN, and bidirectional SFPs to simplify optical connectivity.



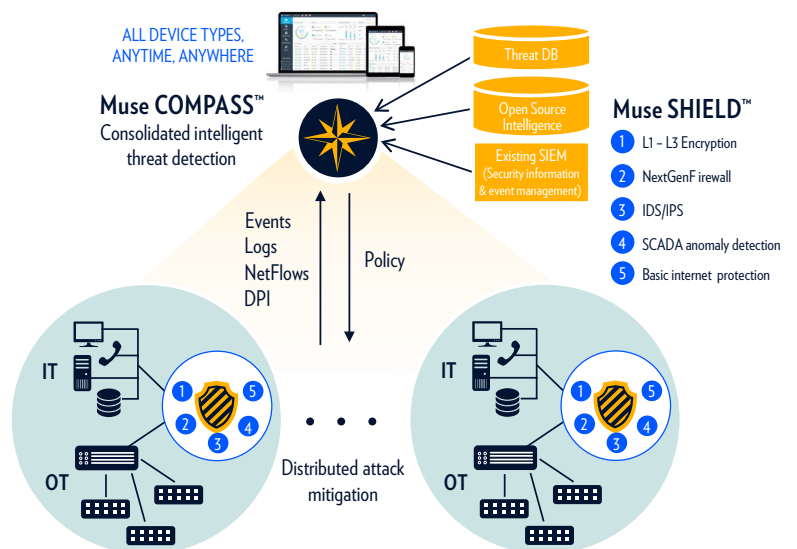
ECI has extensive experience in transitioning networks and developed field hardened, proven processes for this migration.

## HOLISTIC SECURITY SUITE

Critical infrastructures (CI) are a prime target for cyber-attacks. Proper protection is a particularly complex matter. It must defend information and operational technologies (IT/OT), and be able to discern tangible threats from a multitude of reported events.

ElastiGRID uses the Muse™ cyber security suite for physical layer security with encryption, firewalls, and intrusion detection. It provides the capabilities to identify and deal with potential attacks by:

- **Preventing attacks where they occur** with distributed attack mitigation
- **Guarding the integrity of the SCADA and OT network** - maintains an OT network map and continuously monitors transactions for abnormal behavior, providing early warnings of any tampering
- **Identifying real threats** - advanced correlation and analysis provides a clear view of tangible threats and ranks them by severity.

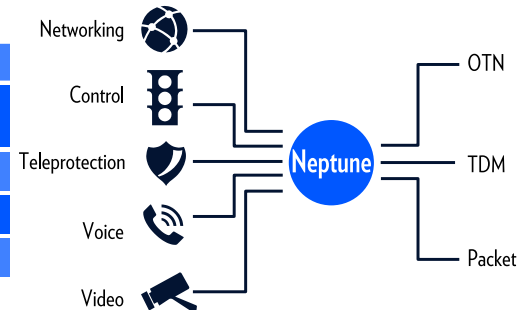


# MULTISERVICE PLATFORM

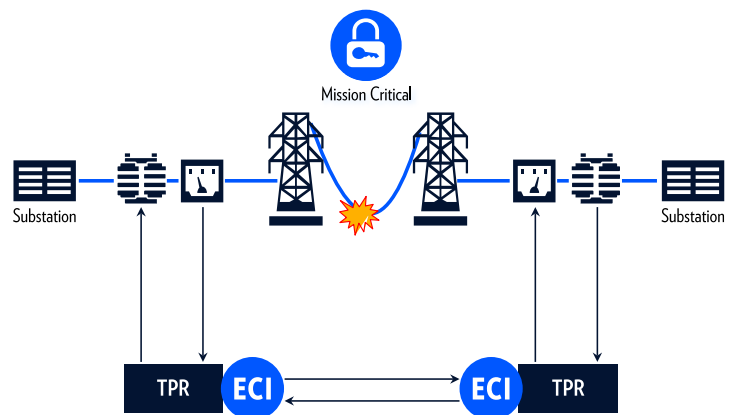
ElastiGRID provides a complete multiservice platform supporting the (OT) and (IT) services over the most appropriate transport technology. Mission-critical Operational Technologies (OT) like teleprotection and SCADA require the static, deterministic behavior that TDM and MPLS-TP provides. Concurrently, IP/MPLS provides optimized support for Information Technology (IT) services like voice, video, and non-mission-critical networking. ElastiGRID seamlessly integrates the packet and optical layers to enable cost-efficient transport of the high-capacity data generated by video and other (IT) applications.

Video technology introduces additional challenges. Cameras used for security in substations generate vast quantities of HD content. This needs to be backhauled to a few control locations to allow the real-time analysis required to search for potential security breaches. ElastiGRID provides a multicast architecture with end-to-end QoS monitoring to ensure the quality of the video network. Cost-effective bulk transport of the video traffic is enabled by optical transport and Power over Ethernet (PoE) interfaces. These provide power to the cameras and other outdoor monitoring devices. The Mercury™ NFV platform delivers an open and future-proof way to add new services and applications in the form of VNFs, such as cyber security, virtual routing, enhanced OAM, CCTV storage, and more.

Networking	FE, 1GE, 10GE
Control	V.35, X.21, RS-232, RS-449, V.24, V.11, V.36
Teleprotection	IEEE-C37.94
Voice	E1/T1, FXO/FXS, 2/4 E&M, Omni
Video	Ethernet with PoE+



Traditionally, TDM provides the tools to derive and distribute the accurate timing that is fundamental to the operation of energy services. As networks evolve to packet, the timing architecture must remain robust. ElastiGRID allows an approach similar to that used in TDM. A built-in GPS receiver or an external timing source provides the master clock. 1588v2 Precision Timing Protocol (PTP) distributes timing across the network and MPLS-TP reduces packet delay variation by using deterministic, bidirectional traffic paths.



ElastiGRID's software simplifies network operations with LightSOFT® network management, providing an intuitive GUI. This simplifies operations with rapid right-first-time network provisioning and fast fault isolation. Advanced operations software provided by Muse™ is able to analyze the network data to ensure the network is operating at maximum availability, utilization, and efficiency. This functionality can be further extended to non-ECI transport devices with ECI's 3rd-party integration solution.

For energy operators wishing to use their unique geographical footprint to generate extra revenues as a Utelco, the multiservice capabilities of ElastiGRID provide managed L2 and L3 VPNs. These are needed for business services, residential services, mobile backhaul, and future IoT applications.

## OPTIMIZED FOR HIGH AVAILABILITY

Energy operators require communications networks that provide 'five-9s availability' or better. ElastiGRID achieves this level, via:

- **Fully-redundant hardened design of the network elements** with 1+1 and 1:1 protection of key units and an extended temperature range for use in energy applications (-25°C to +70°C)
- **Fast protection against single and multiple network failures:** MPLS-TP supports sub-50ms protection switching for single failures. Used in conjunction with pseudowire redundancy, protection is provided for multiple failures.
- **Remote disaster recovery** allows network and management restoration from geographically dispersed sites in the event of catastrophic failure.
- **Potential network failure protection:** Muse provides advanced operation software to monitor network performance in real time and help identify trends over time.

# RISK-FREE TRANSITION TO PACKET

## YOUR CHALLENGES

## OUR SOLUTIONS

**Need risk-free evolution to the digital railway**

ElastiGRID provides the scalable, elastic multiservice platform required for migrating mission-critical services, as networks move to provide the Intelligent Transport System that supports the digital railway:

- Legacy services operate on this platform - natively or by using circuit emulation
- MPLS-TP is used to provide the deterministic transport and advanced OAM required for mission-critical services
- Service assurance is guaranteed with advanced operations software provided by LightSOFT® and Muse™

**Need enhanced security**

ElastiGRID provides tailored, holistic security via the Muse™ security suite. This provides comprehensive protection for both transport and IT networks, including:

- Integrated SCADA protection, secured connectivity, and secured services
- L1 to L3 encryption with L1 optical intrusion detection

# INTELLIGENT HIGH AVAILABILITY MULTISERVICE

## YOUR CHALLENGES

## OUR SOLUTIONS

**Need a multiservice network to support all the services associated with the digital railway**

ElastiGRID provides extensive multiservice capabilities, allowing support of OT services, IT services, and advanced consumer services from a single platform:

- Mission-critical services like SCADA and teleprotection and supported by MPLS-TP
- IP/MPLS is used to support L2 and L3 services
- Pay-as-you-grow design, with unique in-service expansion units, scalable crossconnects and in-service upgradable packet fabrics
- Enhanced functionality can be easily added by using the embedded NFVI capability, e.g. improved security and real-time services, which require ultra-low latency
- Easy extension of the services with intuitive, get-it-right-the-first-time introduction of new resources enabled by LightSOFT
- Proven SDN and NFV capabilities can be introduced as they are required by the rail network
- Supports business services, residential services, mobile backhaul, and future IoT applications, allowing rail operators to evolve as a Utelco.

**Need highly available telecoms network for mission-critical services**

ElastiGRID provides the intelligent, highly-available network required for mission-critical services with:

- Hardened network elements and optimized architectures provided by Neptune and Apollo
- Intuitive operations and rapid fault isolation provided by LightSOFT
- Advanced software provided by Muse ensures the network is operating at maximum availability, utilization, and efficiency
- Third-party device management integrated into ECI's end-to-end management

Contact us to discover how ElastiGRID ensures risk-free transition to a secure packet network

## 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](http://www.ecitele.com)