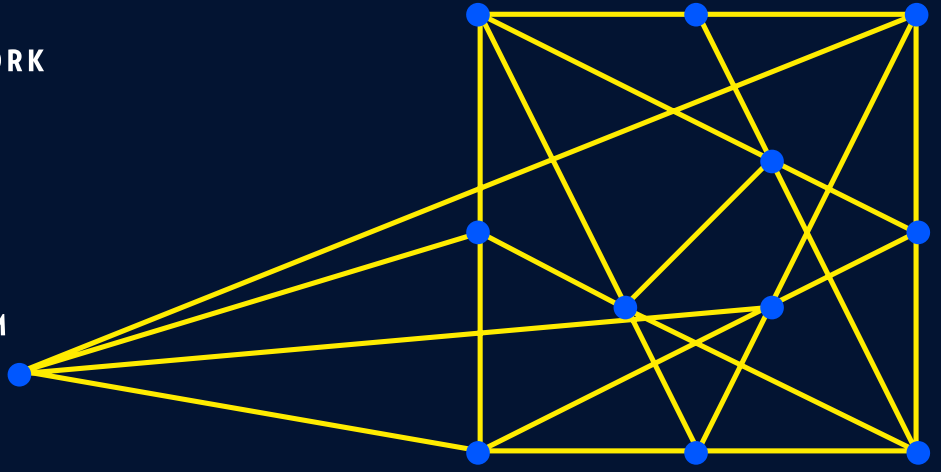


# ElastiGRID™

## FOR HIGHWAYS



## RISK-FREE TRANSITION TO A SECURE PACKET NETWORK

Highway agencies and departments of transportation expect a highly reliable communications network to deliver the voice, video, and data that they require to operate and maintain road infrastructures. However, with traffic volumes constantly increasing, there is a need to introduce Intelligent Transport Systems to manage congestion, reduce pollution, and improve road safety. These systems use thousands of IP devices along the roadside to support real-time video from closed-circuit TV cameras (CCTV), voice from emergency telephones, data from sensors, weather stations, and information for highway message signs. With IoT, this trend will continue with information sharing with vehicles using the highway. For risk-free evolution of traffic management, the network must have a future-proof, IP-based infrastructure, supporting both traditional and new IP devices.

**Risk-Free Transition**  
with tailor made evolution  
for legacy services

**Secure Packet**  
guarantees  
mission-critical services

**High Availability**  
provided by advanced  
operations software

**Multiservice**  
to enable the Intelligent  
Transport System

### DRIVERS OF MODERNIZATION

#### AGING NETWORKS VS EVOLUTION TO INTELLIGENT TRANSPORT SYSTEMS (ITS)

TDM networks used by highways are end-of-life and Intelligent Transport Systems are needed to improve traveler satisfaction, meet safety requirements, and reduce congestion and pollution. Network refresh is required to introduce these systems.

#### SECURITY AND SAFETY

Paramount for highways, with signaling and control needing to be “always-up”. Networks must be highly secure to reduce cyber attacks.



#### INCREASED REGULATION

Highways are critical national infrastructures. We see ever-increasing regulation to reduce carbon emission, improve traffic punctuality, and provide video surveillance.

#### IMPROVE USER EXPERIENCE OF THE HIGHWAYS

Intelligent transport systems use vast amounts of data from thousands of sensors to greatly improve the highway experience. With IoT, we see information being shared directly between vehicles and the traffic management systems.

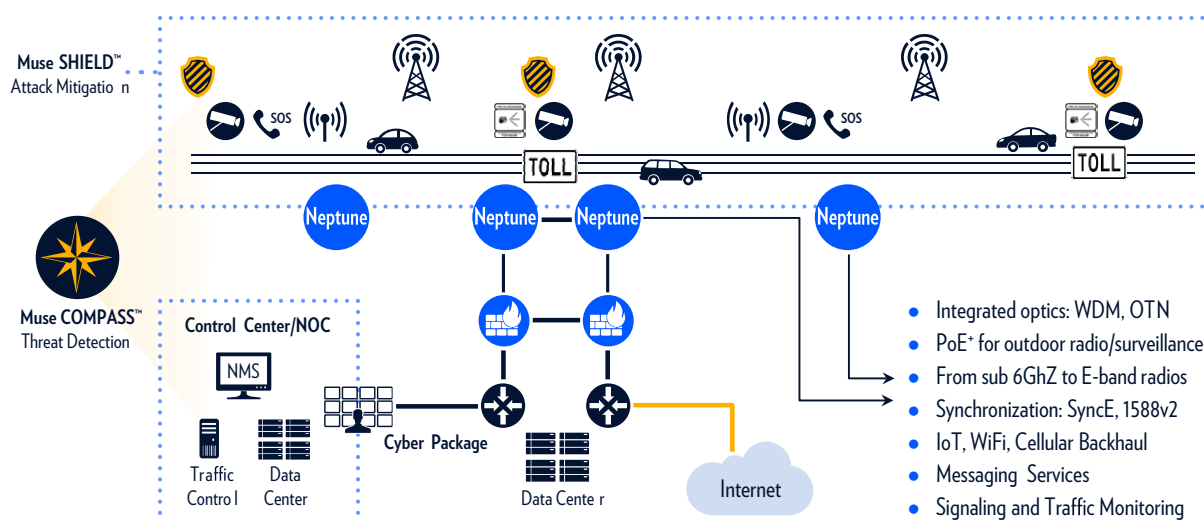
# COST-EFFECTIVE AND RISK-FREE TRANSITION TO PACKET

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, monitoring, and traffic control. When it makes sense, these services are migrated to the packet layer using circuit emulation. The ElastiGRID circuit emulation approach allows seamless transition to packet; MPLS-TP provides the deterministic behavior and extensive OAM expected for these services and the legacy interfaces remain unchanged. The ElastiGRID solution provides a pay-as-you grow architecture, making the transition to

packet extremely cost-effective:

- **Capacity is added 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).
- **Technology is introduced when required** with in-service expansion units to introduce (Eth, Optical, PCM, CES) and integrated WDM, OTN, and bidirectional SFPs.

ECI has extensive experience in transitioning networks and has 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.

## ADVANCED OPERATIONS SOFTWARE

ElastiGRID provides software to simplify network operations with LightSOFT® network management, providing an intuitive GUI that simplifies operations with rapid right first time network provisioning and rapid 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 by using ECI's 3rd party integration solution.

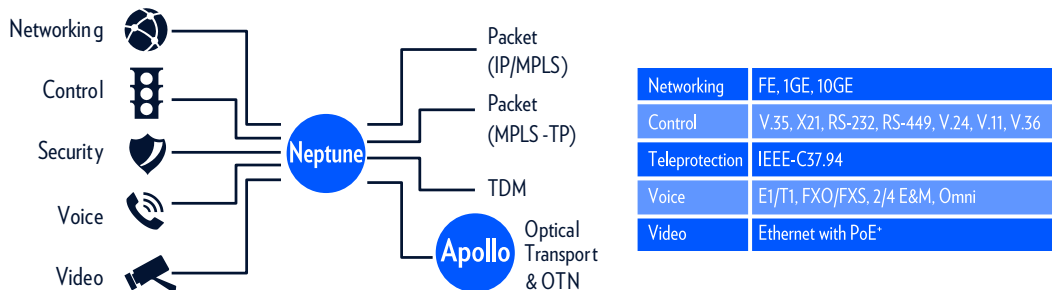
# OPTIMIZED FOR HIGH AVAILABILITY

Highways require communications networks that provide ‘five-9s availability’ or better, ElastiGRID achieves this with:

- **Fully-redundant hardened design of the network elements** - with 1+1 and 1:1 protection of key units and extended temperature range for use in highway 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** - allowing network and management restoration from geographically dispersed sites in the event of catastrophic failure
- **Potential network failure prediction** - Muse provides advanced operations software to monitor network performance in real time and help identify trends over time.

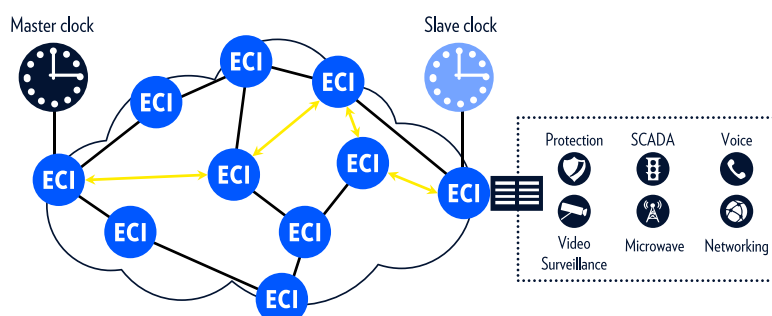
# MULTISERVICE PLATFORM

Mission-critical control and security Operational Technology (OT) requires the static, deterministic behavior that TDM and MPLS-TP provides. Whereas, IP/MPLS provides optimized support for Information Technology (IT) services like voice, video, and non-mission-critical networking. ElastiGRID provides a complete multiservice platform supporting the (OT) and (IT) services over the most appropriate transport technology. 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 adds specific challenges; thousands of roadside cameras generate vast quantities of HD video and need it backhauled to a few control locations for real-time analysis of traffic flow, number plate recognition, and hazard identification. 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 provided by optical transport and Power over Ethernet (PoE) interfaces are available to power the roadside cameras and other outdoor monitoring devices.



Traditionally, TDM provides the tools to derive and distribute the accurate timing that is fundamental to the operation of highways 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.

For highway agencies wishing to use their unique geographical footprint to generate extra revenues as a Utelco, the multiservice capabilities of ElastiGRID provide the L2 and L3 VPNs required for business services, residential services, mobile backhaul, and future IoT applications.



# RISK-FREE TRANSITION TO PACKET

## YOUR CHALLENGES

## OUR SOLUTIONS

### Risk-free Evolution to Intelligent Transport System

ElastiGRID provides the scalable, elastic multiservice platform required for an Intelligent Transport System. Legacy services are supported on this platform, natively or using circuit emulation (CES). This ensures seamless, risk-free transition from the legacy network to the Intelligent Transport System

### Transition Mission Critical Services

ElastiGRID has been optimized to support transition of mission-critical applications:

- MPLS-TP provides the deterministic transport and advanced OAM required for mission-critical applications
- Mission-critical service assurance is guaranteed by the advanced operations software provided by LightSOFT® and Muse®
- The solution provides ultra-high availability with hardened design and advanced operations software, monitoring network performance and trends in real time

### Enhanced Security

ElastiGRID

- Multiservice platform with proven SDN and NFV capabilities. This allows new applications to be supported as they are added to the highway network
- Pay-as-you-grow design, with unique in-service expansion units, scalable cross-connects and in-service upgradable packet fabrics
- Supports business services, residential services, mobile backhaul, and future IoT applications, allowing highway operators to evolve as a Utelco.

# INTELLIGENT MULTISERVICE

## YOUR CHALLENGES

## OUR SOLUTIONS

### Reducing Complexity

- ElastiGRID uses advanced operations software to provide intelligent highly-available networks:
- LightSOFT provides intuitive operations and rapid fault isolation.
- Muse provides advanced software to ensure the network is operating at maximum availability, utilization, and efficiency
- Muse integrates 3<sup>rd</sup> party devices into ECI's end-to-end management

### Need Supporting New Services

Extensive multiservice capabilities range from traffic monitoring to data centers and video:

- A single platform provides support for legacy services and next-generation traffic management capabilities, as they are introduced
- Easy extension of the communications network with intuitive, get-it-right-the-first time introduction of new resources enabled by LightSOFT
- 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
- Support for L2 and L3 VPNs with per-customer and per-service QoS

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