

CONVERGED IP/OPTICAL NETWORK MANAGEMENT

THE ALCATEL-LUCENT 5620 SAM: A SERVICE-AWARE APPROACH TO MANAGING INTEGRATED IP/OPTICAL NETWORKS

- Maximize operational efficiency for IP and optical networks
- Accelerate deployment of 7750 SR and 7950 XRS with 1830 PSS interconnect
- Fully integrated end-to-end IP/MPLS and optical transport management
- Fast and flexible integration with existing OSS/BSS

As service providers take steps to integrate the IP and optical layers of their network infrastructure to ensure optimal efficiency, they are faced with the challenge of adjusting systems, workflows and processes. Flexibility in these integrated IP/optical networks is paramount. Often there are distinct groups with separate management systems for IP data and optical networks, so there must be an option for both integrated and divided responsibilities. This achieves the proper balance of operational collaboration and thus, the greatest efficiency.

Alcatel-Lucent has integrated its technology leadership in 100G optical into its 7750 SR and 7950 XRS portfolio, and is also leveraging this innovation in its management approach for the integrated IP/optical network with the Alcatel-Lucent 5620 Service Aware Manager (SAM).

The 5620 SAM leverages multi-domain, multi-layer management that spans both IP and optical domains to unify workflows, which achieves maximum efficiency across the broader IP/MPLS and optical management tool-set and OSS environment.

SOLUTION OVERVIEW

The 5620 SAM delivers powerful capabilities that simplify operations of integrated IP/optical networks, especially critical as convergence occurs and requirements change. Proactive assurance and advanced monitoring capabilities across elements, infrastructure layers, and services in the integrated IP and optical network, rapidly detect and isolate impairments before they impact customers.

Integrated views across multi-domain and multi-technology layers spanning physical, routing, MPLS and IP/optical service topologies provide valuable insight into the dependencies between these layers. This can simplify and accelerate troubleshooting as well as inform deployment decisions for both IP and optical operations.

End-to-end power control, monitoring, tracing and fault localization for individual wavelength channels – enabled through the Alcatel-Lucent Wavelength Tracker technology – proactively prevent service degradation through enabling delivery of true optical SLAs. Integrated IP/optical performance and SLA monitoring using comprehensive service-aware diagnostics validates end-to-end data services and IP/optical paths.

Fast and easy configuration and multi-vendor scripting workflows reduce the risk of errors and speed network deployment time.

Managing the integrated IP/optical network with the 5620 SAM helps service providers dramatically enhance visibility and operational control so they can more efficiently manage network growth.

Unified management for IP/MPLS and optical transport

The 5620 SAM manages the full Alcatel-Lucent IP/optical equipment portfolio, including the:

- 1830 Photonic Service Switch (PSS),
- 7950 Extensible Routing System (XRS),
- 7750 Service Router (SR),
- 7705 Service Aggregation Router (SAR),
- 7450 Ethernet Services Switch (ESS), and
- 7210 Service Access Switch (SAS).

With IP/MPLS and optical networks converging, the 5620 SAM maximizes operational efficiency by providing a multi-domain, multi-technology layer, service-aware management approach that spans physical, routing, MPLS and services (IP or optical transport). The 5620 SAM empowers operators to manage the IP and optical metro, edge and core domains from a single platform, with the flexibility to provision and maintain both infrastructures together or separately. Operators can determine the appropriate level of ownership and collaboration between the two infrastructures in order to achieve optimal efficiency. Further, they can protect network access by enabling user profiles to limit span of control based on an operator's responsibilities. This enables secure collaboration between IP and optical network engineers.

Domain-specific configuration and provisioning processes that once rested in separate silos can now be coordinated and orchestrated with the 5620 SAM, which decreases the number of manual touch-points across the network, accelerating IP/optical integration with reliable, error-free provisioning.

With the 5620 SAM, operators can rapidly introduce new integrated IP and optical technologies to optimize the network, such as:

- Ethernet and IP-based services over WDM
- Optical transport network (OTN) switching

A powerful ability to correlate faults for both IP and optical infrastructure with the 5620 SAM eliminates the time-consuming isolation of network faults to analyze whether the problem resides in the IP or optical layer. The 5620 SAM pinpoints the root cause of problems, making troubleshooting faults faster and easier.

Cross-domain visibility and monitoring for the integrated IP and optical network with the 5620 SAM enables operators to significantly reduce the risk of undetected performance problems.

Operators may also cross-navigate from the 5620 SAM to the Alcatel-Lucent 5650 Control Plane Assurance Manager (CPAM) for routing history to see where re-routes have impacted IP/optical services.

Networks operators can automate setup for proactive OAM diagnostics with the 5620 SAM. This will maintain comprehensive, service-aware performance monitoring that alerts operators to potential IP and optical SLA issues.

In addition, with the 5650 CPAM operators can automate execution of OAM performance testing on path changes to further monitor SLAs. This feature will alert operators when predefined thresholds are crossed so that operators may take action.

For WDM optics, the 5620 SAM provides photonics management including:

- Power monitoring (enabled through Wavelength Tracker technology)
- Automated IPoWDM transponder power adjustments

The comprehensive 5620 SAM north-bound interface enables rapid and cost-effective integration with leading industry OSS/BSS applications that address multi-vendor service activation, fault management, performance reporting, SLA management, billing, traffic engineering and network capacity planning in the all-IP network from metro to edge to core.

The 5620 SAM enables a new approach to managing the integrated IP/optical network that is highly flexible and provides cost-effective integration into existing IP and optical operational environments.

The 5620 SAM also provides additional benefits related to its ability to:

- Integrate multi-vendor route analytics through the 5650 CPAM
- Enable rapid and cost-effective integration with the existing OSS/BSS environment

SOLUTION COMPONENTS

5620 Service Aware Manager (SAM)

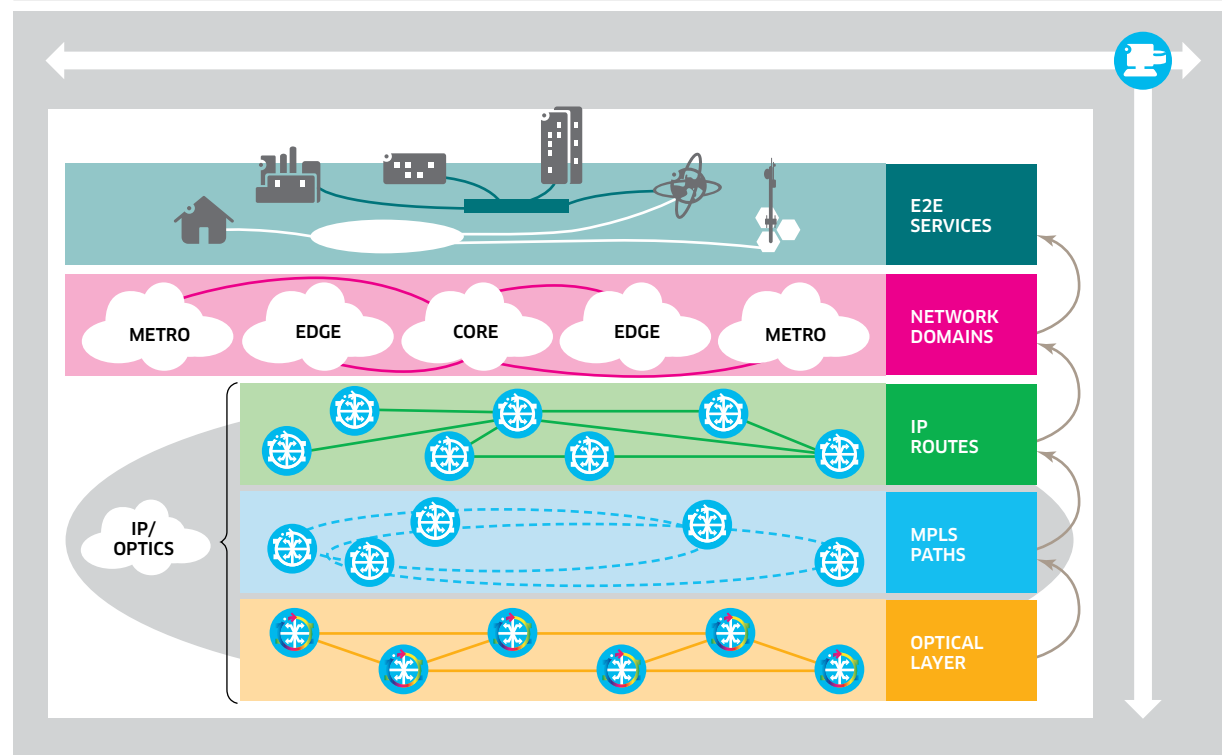
The 5620 SAM provides a modular, extensible and scalable architecture that enables IP/optical and MPLS element, network and service-aware management all from a single platform.

The 5620 SAM element management includes full Fault, Configuration, Accounting, Performance and Security (FCAPS) management. Discovery is provided for third-party equipment as well, including support for multi-vendor topology display, alarm surveillance, interface statistics collection, configuration and script management. The 5620 SAM network management includes provisioning, assurance and troubleshooting for the routing, MPLS and IP/optical infrastructure on which services depend.

In an IP network, there are strong dependencies between technology layers. Any layer relies on the proper function of underlying layers. Any issue with an underlying layer will affect the upper layers.

The 5620 SAM understands these inter-dependencies and provides a truly integrated view for optical, IP, MPLS and services, which simplifies and accelerates network and service deployment and troubleshooting. This is the fundamental prerequisite for service-aware management and is a key differentiator for the 5620 SAM.

Figure 1. Unified management of optical, IP and MPLS



5650 Control Plane Assurance Manager (CPAM)

The 5650 CPAM is a multi-vendor route and path analytics solution that is tightly integrated within the 5620 SAM to deliver unprecedented real-time visualization, surveillance and troubleshooting for dynamic IP/MPLS networks, including for both IPv4 and IPv6 routing for IS-IS, OSPF, BGP and VPNs.

With the 5650 CPAM, operators can better understand when and how optical transport service path changes impact the routing topology and end-to-end path performance.

The 5650 CPAM also gives operators the ability to analyze the impact of routing topology changes on the IP and MPLS paths in an off-line simulation before the actual changes are made to the live network. This includes the ability to simulate the creation of new RSVP LSPs to determine if a routing topology can accommodate new services.

Pre-certified interoperability with market-leading capacity management and traffic engineering OSS applications reduce OSS integration effort and cost.

SOLUTION BENEFITS

SERVICE PROVIDER CHALLENGES	HOW THE 5620 SAM ADDRESSES THE CHALLENGE
<ul style="list-style-type: none"> • Rigid domain-specific tools not designed for integrated IP/optics network operations and do not enable collaboration between teams 	<ul style="list-style-type: none"> • Integrated IP/optics management, with the option for integrated or divided responsibilities by distinct groups and systems • User security profiles allow the flexibility to limit span of control based on network domain, network equipment, services or operational responsibilities
<ul style="list-style-type: none"> • Reactive detection of network impairments and cumbersome troubleshooting tools delay problem resolution 	<ul style="list-style-type: none"> • Powerful fault correlation and extensive troubleshooting capabilities easily isolate problems to IP or optical domain and pin-point root cause – lowering MTTR • Proactive monitoring and assurance identifies problems before they affect customers
<ul style="list-style-type: none"> • Performance and SLA monitoring setup can be slow, time-consuming and difficult to maintain 	<ul style="list-style-type: none"> • Automated setup of OAM diagnostics to validate IP and optical SLAs and end-to-end IP/optical service performance
<ul style="list-style-type: none"> • Power monitoring and control can be difficult and resource intensive 	<ul style="list-style-type: none"> • End-to-end power control, monitoring, tracing and fault localization for each individual wavelength channel
<ul style="list-style-type: none"> • Lack of visibility into dynamic network control plane makes complex routing issues difficult to isolate 	<ul style="list-style-type: none"> • Integrated multi-vendor route analytics through the 5650 CPAM enables operators to visualize, monitor and troubleshoot dynamic IP/MPLS control plane in real-time, enabling insight into how re-routes have affected IP/optical service performance
<ul style="list-style-type: none"> • Manual configuration and provisioning introduces risk of human error and can be slow, resource-intensive process 	<ul style="list-style-type: none"> • Fast provisioning through easy-to-use GUIs, rules-based automation and IP/optical-specific workflows reduce manual effort and minimize errors
<ul style="list-style-type: none"> • Introduction of network management tools can be expensive and slow if processes and workflows need to be changed and new interfaces between systems need to be introduced 	<ul style="list-style-type: none"> • Easy-to-use service templates and light-weight GUI builders deliver workflow customization, enabling usage by staff with less training or domain-specific expertise • Comprehensive north-bound interface further enhances fit into even the most customized operational workflows and processes • OSS partner application interoperability pre-certified through Alcatel-Lucent OSS Connected Partner Program speeds introduction by enabling rapid and cost-effective OSS/BSS integration

THE ALCATEL-LUCENT ADVANTAGE

The Alcatel-Lucent 5620 SAM provides advanced capabilities that help service providers efficiently manage the complexities of today's network, including integrated IP and optical services.

The 5620 SAM has the advantage of almost a decade of experience managing IP/MPLS networks deployed at more than 550 service providers around the world. It brings this expertise to the management of its ground-breaking IP and optical metro, edge and core portfolios.

Independently shown to deliver quick and lasting return on investment, the 5620 SAM is a proven solution that sets the standard for service-aware management.

With the 5620 SAM service providers can address integrated IP/optical network challenges today, and leverage its innovation and efficiency to also support evolving requirements well into the future.

LEARN MORE

Visit the Alcatel-Lucent website for more information:
www.alcatel-lucent.com/5620sam

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