



# UNLOCKING NEW REVENUE STREAMS WITH MANAGED ETHERNET SERVICES

THE VALUE OF INTELLIGENT  
SERVICE DEMARCATION

APPLICATION NOTE

# TABLE OF CONTENTS

Abstract / 1

Ethernet services market overview / 1

Dynamic enterprise / 1

Growing wholesale opportunity / 1

Ethernet services market opportunity / 2

Managed Ethernet services delivery challenges / 2

Intelligent service demarcation / 3

Unlocking the value of the Alcatel-Lucent 7210 SAS Demarcation / 3

Playing a vital role in an end-to-end solution / 5

Unlocking new revenue streams through service differentiation / 6

Summary / 9

Acronym List / 10

# ABSTRACT

For service providers to gain a bigger piece of the rapidly growing retail and wholesale Ethernet services market, they must offer service level agreement (SLA)-enabled services with value-added attributes that can be tailored to their customers' needs rapidly and cost effectively. This requires an intelligent demarcation device to extend the service intelligence to the customer edge. This application note presents a) the value of using the fully managed Alcatel-Lucent 7210 Service Access Switch (SAS)-D and the Alcatel-Lucent 7210 SAS-T as the service demarcation device; and b) the ways to innovate Ethernet virtual private network (VPN) services for increased revenues and high customer impact.

## ETHERNET SERVICES MARKET OVERVIEW

### Dynamic enterprise

The Ethernet VPN services market is undergoing a dramatic shift. To gain a competitive advantage, dynamic enterprises are increasing their reliance on high-bandwidth IP-based applications to interconnect core assets, drive company strategies, carry out business operations and reduce business latency. The performance of these applications and the underlying network has become critical to the life of the company. In addition, enterprise networking requirements are as unique and diverse as the products they deliver and the customers they serve. These factors are reshaping the enterprise communications landscape.

Enterprises are also under pressure to reduce capital expenditures (CAPEX), simplify operations and focus on their core strengths. To achieve these business objectives, they are looking to service providers with whom they can partner as they look to migrate from legacy technology and basic connectivity services toward managed Ethernet services with enhanced SLAs, tailored to meet their networking requirements.

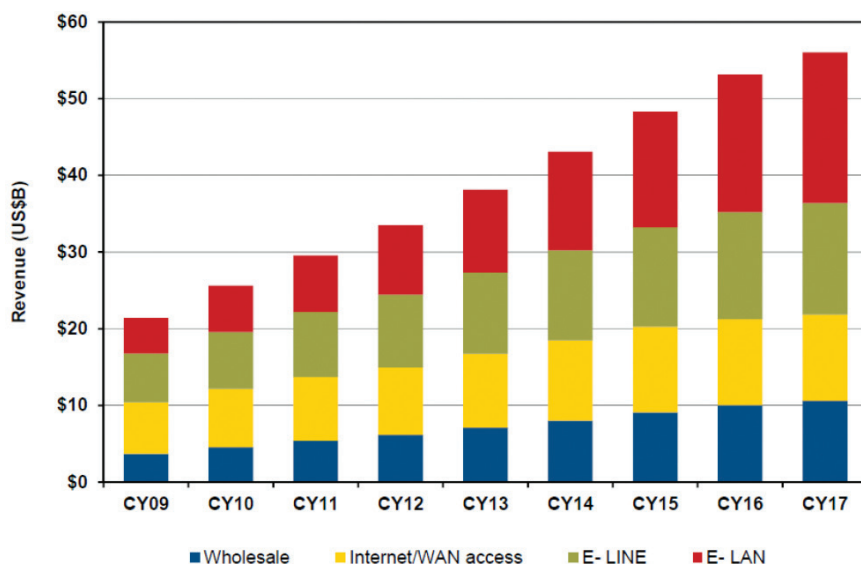
### Growing wholesale opportunity

The demand for wholesale Ethernet transport services is growing as wholesale customers look to expand their network reach while reducing infrastructure costs. The wholesale Ethernet access market is driven by an increasing number of mobile service providers looking for Ethernet backhaul to expand its cell tower footprint and for wireline service providers looking to reach out-of-region enterprise customers. Wholesale customers also require managed Ethernet VPN services with enhanced SLAs so that they can ensure performance requirements to their customers with confidence.

## Ethernet services market opportunity

These market realities are driving new revenue opportunities for retail and wholesale Ethernet services. Infonetics is projecting Ethernet service revenue to exceed US\$56B by 2017, for an 11 percent compound annual growth rate (CAGR) over the forecast period (see Figure 1).

Figure 1. Ethernet Service Revenue Forecast



Source: Infonetics – Ethernet and IP MPLS VPN Services - Annual Worldwide and Regional Market Size and Forecasts (June 6, 2013)

The wholesale figures include Ethernet transport services sold to mobile service providers for backhaul and to service providers selling retail Ethernet services.

## Managed Ethernet services delivery challenges

A snapshot of the competitive landscape shows that the Ethernet services market segment is becoming highly competitive, with competitors from both in-region and out-of-region. As a result, Ethernet services are starting to commoditize.

At the same time, service providers are looking to expand revenue opportunities of their installed base organically and attract new customers. This requires an Ethernet service portfolio with strategies to upsell enterprise customers from bandwidth-dimensioned connectivity services to value-added services with enhanced SLAs, and move customers off more costly legacy technology networks to next-generation managed Ethernet services.

The commoditizing of Ethernet services in a crowded landscape drives the need for service differentiation. Bandwidth granularity, service quality, performance, availability, proactive management along with self-service monitoring, reporting and on-demand parameter changes are key service attributes that can be used to enhance SLAs and differentiate services. However, enabling these attributes brings about a number of challenges, including:

- A demarcation device with 10GigE and GigE interfaces to enable enhanced SLAs
- The ability to fully manage services with enhanced SLAs

- The ability to monitor and report SLA performance metrics
- The ability to deliver self-service customer portals
- The ability to integrate the demarcation device with the provider edge and management system
- The cost to deploy mass-market services
- Managing upgrade and operations support systems (OSS) integration costs

To gain a larger piece of the retail and wholesale Ethernet services opportunity, a fully managed, intelligent service demarcation is the next critical step. The 7210 SAS-D and the 7210 SAS-T, with seamless integration into Alcatel-Lucent Service Router (SR) solutions, uniquely solve these issues.

“At Telepak, we are committed to our customers and to maintaining a high level of customer satisfaction. Since our customers operate in extremely competitive markets, it’s imperative that we have the ability to enhance our services while keeping operating costs low.”

(Gregg Logan, Telepak Networks, Inc., Vice-President)

## INTELLIGENT SERVICE DEMARCATION

### Unlocking the value of the Alcatel-Lucent 7210 SAS Demarcation

The Alcatel-Lucent 7210 SAS-D and the 7210 SAS-T are a low-cost, intelligent Ethernet-edge demarcation device. They are designed for use as a demarcation device for SLA-based virtual private line service (VPLS) (MEF-based E-LAN) and virtual leased line (VLL) (MEF-based E-Line) business services along with Ethernet access to IP VPN and Internet services.

The Alcatel-Lucent 7210 SAS-D and 7210 SAS-T can also be used as a demarcation device for wholesale access services with enhanced SLAs. The wholesale customer can be a mobile service provider that requires Ethernet backhaul to expand cell-site deployments or another service provider that is selling retail business services and requires Ethernet backhaul to reach an out-of-region enterprise location.

The 7210 SAS-D is wirespeed and supports 4 x 10/100/1000BASE-TX and 6 x 100/1000BASE (SFP) ports. The 7210 SAS-T is wirespeed and supports 4 x 10GigE (XFP), 12 x GigE (SFP) and 10 x 10/100/1000BASE-TX (4 of which are Power over Ethernet [PoE] and PoE + capable) ports. Both variants offer extended temperature range (ETR) variants and support for ITU-T Synchronous Ethernet and IEEE 1588v2 (Boundary Clock (BC) and Ordinary Clock (OC)).

The 7210 SAS-D and 7210 SAS-T support MEF-based E-LAN and E-Line services and feature hierarchical quality of service (H-QoS), ITU-T Y.1564 Test Head, IEEE 802.1ag, IEEE 802.3ah and local/remote service mirroring. Ethernet protocol support also includes ITU-T G.8032v2 and IEEE 802.1D/Q/AD (QinQ).

As a member of the Alcatel-Lucent IP/Multiprotocol Label Switching (MPLS) Service Router product portfolio which includes the Alcatel-Lucent 7750 Service Router (SR) and the Alcatel-Lucent 7450 Ethernet Service Switch (ESS), the Alcatel-Lucent 7210 SAS product family leverages the powerful Service Router Operating System (SR OS) to deliver advanced capabilities. The 7210 SAS-D and 7210 SAS-T have the service richness with H-QoS and advanced operations, administration, and maintenance (OAM) features to deliver managed Ethernet services with enhanced SLAs.

The Alcatel-Lucent 7210 SAS product family is managed by the industry-leading Alcatel-Lucent 5620 Service Aware Manager (SAM) for simplified management. The Alcatel-Lucent 5620 SAM integrates element, network and service management into one unified platform. The tight integration with SR OS reduces operating expenses (OPEX) with accelerated service activation, rapid troubleshooting, end-to-end SLA control, cost-effective service portals and OSS integration.

The 5620 SAM takes service providers well beyond the traditional boundaries of element, network and service management. It enables unified, end-to-end management of IP/MPLS and Carrier Ethernet networks as well as the services they deliver to help service providers quickly gain the efficiencies they need to beat the competition. The 5620 SAM offers a modular, extensible and scalable architecture that can be customized to fit specific operational environments. It consists of four modules that provide:

- Element management for traditional fault management, configuration, accounting, performance, and security (FCAPS) functionality
- Network infrastructure configuration, service provisioning, scripting and customer management
- Service assurance including physical, network and service topology views and OAM service diagnostics tools
- OSS integration with external applications

Service providers can further enhance the 5620 SAM management capabilities with:

- Alcatel-Lucent self-service customer and operator service portals
- Alcatel-Lucent 5650 Control Plane Assurance Manager (CPAM)
- Alcatel-Lucent 5670 Reporting and Analysis Manager (RAM)
- Precertified OSS and customer premises equipment (CPE) partner application integrations

The combination of a fully managed, feature-rich device at the enterprise location extends the service intelligence to the customer edge to give service providers the ability to differentiate services with enhanced SLAs and value-added enhancements. Now, service providers can unlock new revenue streams and lower customer churn with services tailored to meet enterprise application requirements and improve the user's quality of experience (QoE).

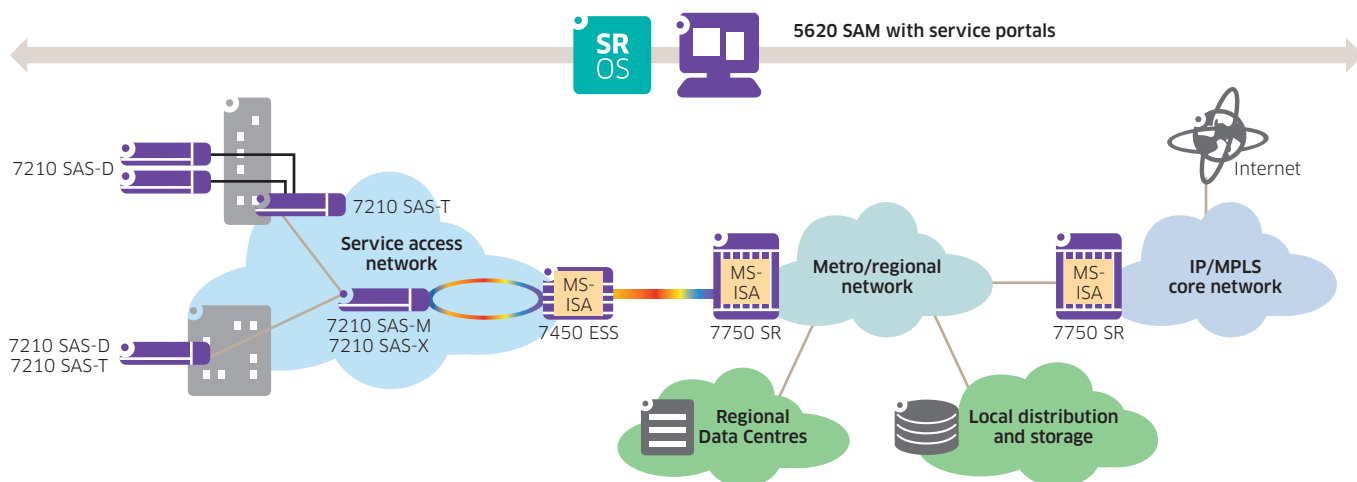
"Alcatel-Lucent's 5620 SAM far exceeds any other network and service management system we have seen – and that was a key factor in selecting Alcatel-Lucent. We believe the Alcatel-Lucent platform will enable us to meet the growing demand for mobile backhaul services and expand our service portfolio to offer advanced services to both new and existing customers."

(Tillman Rodabough, Telepak Networks, Inc., Director of Technical Operations)

## Playing a vital role in an end-to-end solution

The Alcatel-Lucent 7210 SAS product family, including the 7210 SAS-D and 7210 SAS-T, are an integral part of a comprehensive IP/MPLS solution that delivers high customer impact through service innovation while minimizing the cost per bit. The Alcatel-Lucent Business Networking Services Solution enables service providers to offer a choice of secure, scalable, flexible and always-on managed business VPN services, which meet enterprise business-critical communications requirements efficiently and cost effectively. It allows service providers to undertake IP transformation projects and evolve to packet-based network architectures with converged IP voice, data and video running over Layer 2 and/or Layer 3 business VPNs. The 7210 SAS serves as the Ethernet-edge and service access aggregation devices for Layer 2 VPLS and VLL business services (see Figure 2).

**Figure 2. The Alcatel-Lucent Business Networking Ethernet Services Solution**



**7210 SAS-M:** The Alcatel-Lucent 7210 SAS-M with 10GigE and ETR options is an MPLS-enabled device designed to support enhanced VPLS, VLL, IP VPN and enhanced Internet services over 10GigE uplinks. Its compact form factor and enhanced scalability, including deeper buffers to handle traffic bursts above line rate, make it ideal for more service-intensive environments of smaller network locations.

**7210 SAS-X:** The Alcatel-Lucent 7210 SAS-X is a high-performance MPLS-enabled device designed to aggregate VPLS, VLL, IP VPN and enhanced Internet services over 10GigE uplinks. Its compact form factor and enhanced scalability, including deeper buffers to handle traffic bursts above line rate, make it ideal for more service-intensive environments of smaller network locations.

**7450 ESS:** The Alcatel-Lucent 7450 Ethernet Service Switch (ESS) is a market-leading MPLS-enabled Carrier Ethernet platform dedicated to Ethernet service delivery at maximum scale. Supporting 4 Tb/s and beyond, this high-performance platform provides Carrier Ethernet service aggregation with industry-leading densities, reliability advanced QoS and service-aware application processing.

**7750 SR:** The Alcatel-Lucent 7750 Service Router (SR) is a market-leading multiservice edge routing platform designed to deliver differentiated, high-performance, high-availability services. With platform capacity that scales to 4.8 Tb/s and beyond, service-aware application processing, advanced QoS, the 7750 SR provides industry-leading scale and intelligence to deliver IP services on a converged edge routing platform.

With an end-to-end solution that boasts one OS, proven technology, industry-leading components and one management platform, the Alcatel-Lucent solution provides a solid foundation to enable higher margin, customer-focused services rapidly and cost effectively.

The Alcatel-Lucent 7210 SAS is also a key element of Alcatel-Lucent High Leverage Network™ architecture — a fully converged, scalable, next-generation, all-IP multiservice infrastructure that enables operators to deliver traffic more reliably, efficiently and at the lowest cost, while also leveraging the network to generate revenue from sophisticated managed services and applications.



## Unlocking new revenue streams through service differentiation

As Ethernet services commoditize, service differentiation is the key to unlocking new revenue streams and protection against price erosion. As part of an end-to-end solution, the Alcatel-Lucent 7210 SAS-D and 7210 SAS-T, along with the Alcatel-Lucent 5620 SAM, enable compelling service attributes to enhance SLAs and differentiate services, while at the same time reducing the cost and simplifying service delivery. With the network becoming critical to the success of the company, value-added service enhancements will be compelling if they simplify operations and improve service and application performance as they look to focus on core strengths.

To lower WAN networking costs and minimize the complexity of dealing with multiple service providers for video, data, voice and Internet services, enterprises are looking to converge services over a single uplink. The advanced quality of service (QoS) capabilities of the 7210 SAS-D and 7210 SAS-T apply differentiated treatment to each service (that is, class of traffic) in accordance with performance profiles to consolidate multiple services over a single uplink. Performance parameters include committed and peak information rates (CIR/PIR) along with delay, jitter and packet loss. For further service differentiation, the H-QoS capabilities of the 7210 SAS-D and 7210 SAS-T allow individual services to burst up to line rate when aggregate bandwidth is available, while ensuring the performance parameters of each individual service is met. This enables service providers to bundle multiple services under one SLA and enhance SLAs with per-service QoS, bandwidth guarantees, and the ability to burst for higher margin services.

To expand revenue opportunities across a wide range of enterprise market segments and provide a strategy to move customers up the value chain, the advanced 7210 SAS-D and 7210 SAS-T capabilities enable tiered service models. To move customers from simple on/off bandwidth-dimensioned services without QoS, service providers can enhance the SLA with tiered QoS profile options into gold, silver and bronze QoS category options that align with new service and application performance requirements. Redundant uplinks with end-to-end resiliency protect services against link, nodal and path failures for highly available services and higher customer satisfaction. In these ways, QoS and high-availability mechanisms enable service providers to enhance SLAs with tiered service models for higher margin services.

To create further service differentiation and deepen customer engagement, the simple addition of the Alcatel-Lucent Multiservice Integrated Service Adapter (MS-ISA) into the 7750 SR or 7450 ESS — along with reporting and analysis capabilities of the Alcatel-Lucent 5670 RAM — enables advanced business service options for enterprises:

- Application Assured VPNs (AA-VPNs) provide a network-based solution to give Information Technology (IT) managers application-level awareness, reporting and policy control over the applications running over the WAN
- Diverse, multiple Cloud-based services provide ITC managers with application, service-level reporting and control
- Threat Management Services provide ITC managers with scrubbing services to detect and mitigate distributed denial of service (DDoS) attacks on their enterprise network

“With the Alcatel-Lucent solution, we can cost-effectively deliver ultra-fast data services and voice connections, utilizing carrier-grade networking equipment that is reliable, scalable and proven, both in New Zealand and around the world.”

(Nigel Purdy, General Manager, UnisonFibre)

“Alcatel-Lucent’s IP/MPLS portfolio not only helps us serving a unique and unrivaled 3G experience to our customers today thanks to their advanced QoS, performance monitoring and resiliency features but also paved the way for a cost-efficient and future-proof all-IP mobile backhaul architecture ready for higher speeds of HSPA Evolution and LTE.”

(Gülay Yardim, Transport Network Product Head at Planning Division, Turkcell)



Proactive SLA enforcement is an important component to enhanced SLAs. As enterprises partner with the service provider to offload the day-to-day management of the network, service assurance becomes critical. The service test manager of the 5620 SAM proactively monitors SLAs using scheduled OAM tests that trigger threshold crossing alerts to identify problems before they become service affecting. The 5620 SAM uses the ITU-T Y.1731 and IEEE 802.1ag OAM tools and the SR extensive accounting framework to continuously monitor and measure traffic end-to-end. Performance measurement metrics include one-way and two-way frame delay, frame loss ratio and connectivity check messages.

Self-service customer portals are becoming a must-have service option for enterprises. As the service provider assumes more of the daily management tasks, enterprises want the ability to make changes to service parameters (for example, bandwidth, QoS attributes), a real-time view into SLA metrics, request application or service diagnostics, and the ability to archive reports. These capabilities and more are easily integrated into the 5620 SAM to offer enterprises customized on-demand management capabilities for improved QoE.

The extensive SR accounting framework, which provides all the necessary information to track detailed customer usage on a per-port, per-service or per-application basis, can also be used to develop tiered service offerings with flexible billing models.

The cohesive integration of the SR OS and the Alcatel-Lucent 5620 SAM helps reduce the operational cost of service delivery. The 5620 SAM accelerates network configuration and service provisioning through an easy-to-use GUI and preset service templates. The service test manager of the 5620 SAM uses IEEE 802.1ag and IEEE 802.3ah OAM to verify connectivity, and ITU-T Y.1731 and ITU-T Y.1564 Test Head to perform SLA verification.

Further OPEX efficiencies can be achieved through operator service portals. SLA management, service provisioning, service changes, service assurance, application assurance and bulk service provisioning for order entry systems are examples of operator tasks that can easily be automated into service portals and integrated into the 5620 SAM to simplify internal workflows and processes and improve service quality.

The plug-and-play capabilities of the Alcatel-Lucent 7210 SAS-D and 7210 SAS-T, along with the Alcatel-Lucent 5620 SAM, deliver unmatched service velocity and service turnup without a truck roll. The auto-configure feature dynamically boots the system and uses the network to retrieve the necessary IP address and required files to bring it online without any manual intervention. The enterprise needs only to power up the unit and plug in the uplink fiber. To expedite time to market and streamline operational processes, an operator service portal can be used to automate the entire process. These capabilities significantly reduce the deployment cost of mass-market services and time to revenue for new service additions.

The powerful troubleshooting tools of the Alcatel-Lucent 5620 SAM provide simplified management with rapid fault detection, isolation and problem resolution. When a fault occurs, the operator receives immediate service impact information with alarms that provide real-time root-cause analysis and OAM trace results on topology maps. The 5620 SAM uses IEEE 802.1ag and IEEE 802.3ah to detect and locate faults to reduce the mean time to repair (MTTR). For improved customer satisfaction, the operator can be alerted of service degradation using threshold crossing alerts, so as to rectify the problem before the customer calls.

“The 5620 SAM enables us to build-out a unique self-service capability that will provide invaluable performance information and control to our customers.”

(Andrew McEwan, Senior Product Manager, National Ethernet Portfolio, NTL: Telewest Business)

“The Service Portal is the tool which provides speed and automation in the provisioning and managing global changes and policy consistency.”

(Cable & Wireless spokesperson – Return on Investment of the Alcatel-Lucent 5620 SAM by Analysis Mason)

Finally, the cohesive software integration and alignment between the 7210 SAS demarcation device, the provider edge device (i.e., 7750 SR or 7450 ESS) and 5620 SAM streamlines upgrades. Node and management software are solution-tested and validated. Common SR OS ensures coherent QoS and OAM capabilities for optimal and consistent performance and measurement end-to-end with seamless metro, regional and global service reach. This level of coordination reduces costs, simplifies upgrades and test cycles, and reduces overall deployment risk. The Alcatel-Lucent 5620 SAM also features open northbound interfaces to ensure seamless operational fit into OSSs and business support systems (BSSs).

Table 1 summarizes ways to innovate Ethernet services for increased revenues and high customer impact as well as reduce the cost of service delivery.

**Table 1. Innovating Ethernet services with Alcatel-Lucent**

SERVICE ENHANCEMENT	DESCRIPTION
Service convergence	Consolidates multiple video, voice, data and Internet services over one uplink, with burst capabilities
Tiered service models	Differentiates services based on bandwidth, QoS parameters and availability, with seamless service enhancements to Application Assured VPNs, Threat Management Services, hybrid Cloud services and Managed Video Services
SLA enforcement	Extensive service assurance to proactively monitor and measure SLA performance parameters end-to-end
Self-service portals	Flexible options for customers, including the ability to change service parameters (for example, bandwidth, QoS profile), a real-time view into SLA metrics, request application or service diagnostics, and the ability to archive reports
Flexible billing models	Leverages accounting statistics to track detailed customer usage on a per-port, per-service or per-application basis
Deployment velocity	Accelerates network and service provisioning with plug-and-play demarcation device and automates service activation for reduced deployment costs
Simplified management	Provides powerful troubleshooting tools for rapid fault detection, isolation and problem resolution with per-service fault management
Node management integration	Cohesive software integration and alignment between SR OS and 5620 SAM provides coherent QoS and OAM capabilities, simplifies upgrades and test cycles, provides seamless OSS integration, and reduces overall deployment risk

“Without the 5620 SAM, we would have had to get the OSS provisioning application to completely model the new service and its dozens of QoS parameters, which is very expensive. But using the 5620 SAM’s QoS policies and service templates has reduced the OSS integration cost. We can also reduce MTTR and provide better customer service with the 5620 SAM’s customer impact information, OAM diagnostics, and proactive service testing.”

(Technician, TELUS, National IP Core Networks – Forrester Consulting: The Total Economic Impact of Alcatel-Lucent’s 5620 SAM)

## SUMMARY

The fully managed Alcatel-Lucent 7210 SAS-D and the 7210 SAS-T, as part of an end-to-end service router solution, uniquely overcomes the issues that service providers face with the commoditization of retail and wholesale Ethernet VPN services. By extending the service intelligence to the customer edge, service providers have a number of ways they can innovate Ethernet services while reducing the cost per bit.

Service providers can offer converged services, supporting multiple services under one SLA with per-service QoS and bandwidth guarantees, and the ability for each service to burst up to line rate. Tiered service models with flexible billing options allow the service provider to tailor service packages based on the performance and availability requirements of the enterprise. For further differentiation, service providers can leverage the intelligence in their network to offer advanced services such as application assured VPN and managed video services. Extensive service assurance with proactive SLA enforcement gives the service provider the ability to continuously monitor and measure traffic end-to-end. Finally, self-service customer portals with customized on-demand management capabilities add an intangible service dimension to improve the overall QoE.

To minimize the cost of service delivery and improve customer satisfaction, the Alcatel-Lucent 5620 SAM with tight SR OS integration offers powerful management capabilities. Service providers gain unmatched deployment velocity through accelerated service activation techniques and the ability to turn up a new enterprise site without a truck roll. Powerful troubleshooting tools provide simplified management with rapid fault detection, isolation and problem resolution. Cohesive node management integration provides coherent end-to-end QoS and OAM capabilities, simplified upgrades and test cycles, and seamless OSS integration.

With these powerful service attributes, service providers can deliver enhanced SLAs to unlock new revenue streams and combat price erosion, while at the same time reduce the cost and simplify end-to-end service delivery.

Alcatel-Lucent is a leading global network solutions provider with the full-breadth of business services solutions. Market momentum and success includes more than 130 7210 SAS customers globally, with the Alcatel-Lucent Service Router portfolio deployed in more than 500 service provider networks in over 110 countries since 2004.

“GTS CE will provide a wide range of advanced data, Internet and voice services to its corporate customers and carriers tailored to their respective needs. Given Alcatel-Lucent’s reliability, large deployment references within Europe and our previous successful cooperation, we are confident we will offer the highest quality services to all our customers from the Baltics to the Balkans and from Frankfurt to Istanbul.”

(Ignacio Irurita, CTO of GTS CE)

# ACRONYM LIST

AA	application assured	MPLS	multiprotocol label switching
BC	boundary clock	MS-ISA	multiservice integrated service adapter
BSS	business support system	MTTR	mean time to repair
CAGR	cumulative annual growth rate	OAM	operations, administration and maintenance
CAPEX	capital expenditure	OC	optical carrier
CIR	committed information rate	OPEX	operational expenditures
CPAM	control plane assurance manager	OSS	operational support system
CPE	customer premise equipment	PIR	peak information rate
DDoS	distributed denial of service	PoE	power over Ethernet
E-LAN	Ethernet LAN	QoE	quality of experience
E-Line	Ethernet Line	QoS	quality of service
ESS	Ethernet Service Switch	RAM	reporting and analysis manager
ETR	extended temperature range	SAM	service aware manager
FCAPS	fault management, configuration, accounting, performance and security	SAS	service access switch
GigE	gigabit Ethernet	SFP	small form-factor pluggable
GUI	graphical user interface	SLA	service level agreement
H-QoS	hierarchical quality of service	SR	service router
IEEE	Institute of Electrical and Electronics Engineers	SR OS	service router operating system
IP	Internet protocol	VLL	virtual leased line
IP VPN	IP virtual private network	VPLS	virtual private LAN service
IT	information technology	VPN	virtual private network
ITU-T	international telecommunication union telecommunication standardization	WAN	wide area network
MEF	metro Ethernet forum	XFP	10Gigabit small form-factor pluggable