Alcatel 7670 RSP

Routing Switch Platform

ARCHITECTS OF AN INTERNET WORLD

ALCATEL

The Alcatel 7670 RSP enables carriers to preserve profitable services while supporting the technologies and protocols necessary for evolution to new, advanced services in the next generation network. A unique product architecture allows service providers to migrate at their own pace toward their chosen type of network.

THE CHALLENGE:
DELIVER CONVERGENCE TODAY

As a service provider, you are faced with a serious business dilemma. You have invested heavily to satisfy the increased demand for new Internet protocol (IP) traffic. Market demand for IP-based data services remains strong, and IP data traffic growth is expected to continue, increasing on average between 80 and 100 percent per year between 2001 and 2005. At the same time, you are continuing to invest in traditional data and voice services, in order to protect your market position in these areas.

How can you preserve and expand existing services — and grow revenue — while accommodating the buildout of an IP infrastructure, as well as having the flexibility to develop new service offerings?

You need a platform with the power to deliver today's profitable services — an area that still provides 90 percent of carrier revenues — and that supports the technologies and protocols necessary for evolution to new advanced services in the next generation network of tomorrow. You also require a platform that scales incrementally in many dimensions to optimize your capital expenditures (CAPEX).

What's more, this platform must aggregate and mediate many services, including frame relay, asynchronous transfer mode (ATM), private lines, voice, Internet protocol/multiprotocol label switching (IP/MPLS) and Ethernet, for transport directly over an intelligent optical core. And the consolidation of many disparate network elements and many traffic flows onto one network platform will also require carrier grade reliability. Finally, the platform must be able to take advantage of the sophisticated traffic management capabilities of ATM and provide those to MPLS to deliver true quality of service (QoS) for IP services, support the migration of legacy traffic, and provide the reliability and scalability of a carrier grade network.

Where do you find a platform to meet all these requirements?

How do you remain competitive, evolve your network architecture, and reduce capital expenditures and operating expenditures?

"Bell Canada believes that ATM, MPLS and IP will continue to coexist in the network core. The availability of non-stop routing on the 7670 RSP supports our vision of a multiprotocol core that protects our network investment."

JUAN MANUEL RAMOS, GENERAL MANAGER, BROADBAND TECHNOLOGY, BELL CANADA

THE SOLUTION

The Alcatel 7670 Routing Switch Platform delivers the flexibility to develop new service offerings, accommodates the migration of voice to packet, and supports the revenue-generating services of today and tomorrow.

The Alcatel 7670 Routing Switch Platform (RSP) is truly a next generation system for the heart of tomorrow's multiservice, multiprotocol networks. The platform scales incrementally in multiple dimensions: protocols, ports, and fabric capacity. This versatile switching and routing platform supports any service and provides the flexibility and investment protection you need when building your infrastructure.

From edge to core, you preserve your profitable data, video and voice services through industry-leading traffic management. At the same time, you can scale your network — while in service — to meet the exploding growth of IP traffic. Alcatel's unique product architecture lets you migrate to your chosen type of core network at your own pace. The Alcatel 7670 RSP meets the need for core and core-edge data networking applications, while providing superior availability and reliability with uncompromised performance for IP packet and cell-based services.

"Alcatel's IP/MPLS/ATM platform, offering unparalleled traffic management, high performance and carrier class reliability, is the foundation of Hanaro's network. We need solutions that are future-proof, and only Alcatel can provide that level of carrier class performance, in-service upgradability, in a highly scalable platform. By deploying the Alcatel 7670 RSP throughout our backbone now, we are preparing for higher speed connectivity and new technologies in the future."

YUN-SIK SHIN, PRESIDENT OF HANARO TELECOM, INC.

THE **BUSINESS CASE**

With the Alcatel 7670 RSP, Alcatel has leveraged a pedigree in building in-service scalable data networking platforms with carrier class reliability and availability. These unique attributes enable a much flatter network architecture and offer significant operational and capital savings for network operators. Support by the industry-leading Alcatel 5620 Network Manager (NM) for rapid end-to-end provisioning of services further minimizes time to revenue and enables reduced operating costs.

The business benefits of the Alcatel 7670 RSP are shown in Table 1.

"We believe the Alcatel 7670 RSP…will provide us with the scalability, reliability and capacity necessary to meet the current and future demands of our growing customer base."
FRANCE TELECOM

Table 1: Business Benefits of the Alcatel 7670 RSP

Feature	Benefit
Scalability and flexibility	• Reduces CAPEX; minimizes initial system costs with the capability to rapidly expand in response to changing market demands
	• Maximizes asset utilization and defers CAPEX
	• Platform scales from a single shelf to a multishelf, multiservice system, without service disruption
	• Universal card slots enable service providers to install a mix of interfaces or service cards based on business needs
New service capabilities	• Provides a simple evolution to new broadband services
	• Offers advanced IP/MPLS services that take advantage of the proven traffic management capabilities of the Alcatel 7670 RSP
State-of-the-art traffic management	• Provides service differentiation through enhanced QoS capabilities
	• Helps to maintain network performance objectives
	• Reduces operating expenditures (OPEX) by promoting efficient use of network resources
	• Ensures that service level agreements (SLAs) are honored, resulting in greater customer satisfaction and reduced expenses for violations
Carrier class reliability, availability and serviceability	• Improves service availability of the network for greater customer satisfaction and retention
	• Enables a non-stop networking environment for critical traffic, such as voice and financial transactions, over a packet network
	• Increases customer retention with faster problem detection and resolution
	• Improves network reliability by reducing the amount of operator intervention required
Standards compliance and interoperability	• Ensures service transparency in a multivendor network
	• Allows easy integration with existing network and operational systems, due to open solutions
	• Gives freedom to select the best-of-breed products at each functional layer of the network
Network and service management	• Reduces time required to provision new services or expand existing services, thereby improving time to revenue and reducing repair time
	• Provides service providers and their end customers with better control and visibility of their network resources

WORLD-CLASS CUSTOMERS

The Alcatel 7670 RSP has proven itself in some of the world's largest multiprotocol, multiservice networks.

The Alcatel 7670 RSP provides carriers with the scalability, reliability and performance to meet their customers' demanding requirements, now and in the future.

Alcatel 7670 RSP customers include British Telecommunications, Bell Canada, Deutsche Telekom, Belgacom, France Telecom, Guangdong Telecom, NetCologne, Hanaro Telecom, Cable & Wireless, 1-Net (Singapore), Telekom Austria, Telecom New Zealand, and TELUS (Canada).

They have chosen the Alcatel 7670 RSP for its:

> Standalone or multishelf platform for evolutionary growth with in-service upgrades
> Carrier class scalability from 2.4 Gb/s at the multiservice edge to 450 Gb/s (bidirectional) in the multiprotocol core while in service
> Wire-speed IP forwarding, scaling from 60 Mpps to 610 Mpps
> Backbone interface speeds from DS3 through to OC-192/STM-64 (ATM, IP over ATM, packet over SONET/SDH) as well as Gigabit Ethernet

> Low-speed multiservice interfaces (Ethernet, cell relay, frame relay and circuit emulation) and channelized T1/E1, DS3/E3 and OC-3/STM-1 rates, in addition to g.SHDSL and 10/100Base-T Ethernet
> ATM signaling and protocols, including UNI 4.0, Q.2931, PNNI QoS routing, PNNI hierarchy and AINI
> IP/MPLS protocols, including BGP-4, OSPF-TE, ISIS-TE, CR-LDP and RSVP-TE
> IP class of service (CoS) and ATM QoS, including DSCP classification, IP traffic shaping, per VC queuing, and all ATM service categories
> Service flexibility with advanced traffic management for absolute QoS-based SLAs
> Carrier class reliability: fully redundant platform with 99.999 (five 9s) percent availability
> Advanced network and service management for automated service provisioning and maintenance
> Hot redundant BGP, OSPF, IS-IS routing protocols

"The Alcatel 7670 RSP is a new generation best-of-breed product which combines IP/ATM/MPLS implementation with optimum performance data and future-proof technological opportunities. Combined with Alcatel's comprehensive network management system, the Alcatel 7670 RSP provides Telekom Austria with the prerequisites necessary to continue delivering revenue generating services while meeting the targeted operating expense reductions outlined in our business plan."

RUDOLF FISCHER, CTO, TELEKOM AUSTRIA AG

TECHNICAL **LEADERSHIP**

Optimized for the next generation multiprotocol core and multiservice edge, the Alcatel 7670 RSP has integrated both IP/MPLS and ATM control planes in a system that can scale without service disruption.

Table 2: Technical Features

Feature	Benefit
Unrivaled carrier class performance and scalability	• In-service scalability from 2.4 Gb/s at the edge to 450 Gb/s in the core • High density line interfaces • 610 Mpps packet forwarding performance • Industry-leading call performance: sustained rate of 3,000 calls/sec

Superior IP feature set	• Pool of dedicated redundant processors are utilized for the full suite of control plane functions, including:
	  – BGP-4, IS-IS, OSPFv2 routing protocols
	  – CR-LDP and RSVP-TE signaling
	  – TE extensions for IS-IS and OSPF
	• Eight user-defined system-level IP classes of service (CoS) with CoS-to-QoS mapping for guaranteed IP service delivery
	• DiffServ support

Support of low speed multiservice data interfaces	• Private lines • Frame relay • Cell relay • Ethernet • Point-to-point protocol • Voice • IP • g.SHDSL
Non-stop networking	• Hot redundant IP routing protocols • Hitless software upgrades • True carrier grade reliability • Hitless system expansion • Full redundancy of common equipment and control complex • Optional 1+1 and 1:N automatic protection
Assured QoS-based SLAs	• Eight service categories, with multiple QoS classes per service category • Absolute guaranteed QoS of all connections • Enables service differentiation based on service categories and QoS class

Automated service provisioning	• Integrated with the market defining Alcatel 5620 NM, which:
	  – Provides rapid end-to-end provisioning of Layer 2 and Layer 3 services, thereby minimizing time to revenue
	  – Simplifies configuration process for QoS plus service category
	  – Provides statistics collection and billing
	• Monitors and enforces SLAs
	• Also fully interoperable with other OSSs via SNMP, CMIP and CORBA

CAPEX-OPTIMIZED **GROWTH**

The Alcatel 7670 RSP offers carriers choice and flexibility, so that the network can evolve in the direction and time frame that fits the market. And the evolution path can be refined without loss of investment.

The Alcatel 7670 RSP is designed to scale while in service from a single-shelf standalone configuration at the multiservice edge to a multishelf configuration at the multiprotocol core. This scalability enables a pay-as-you-go approach to network expansion.

Scalability is complemented by the ability to increase the port density and embedded control infrastructure. Multiple peripheral shelf types allow optimization between high port density and the equipment footprint. The Alcatel 7670 RSP provides 320 Gb/s of bidirectional, fully APS protected user I/O.

This platform also provides redundant or nonredundant provisioning of the following channels:
> 1760 OC-3c/STM-1/DS3
> 440 OC-12c/ STM-4/GigE
> 124 OC-48c/STM-16
> 31 OC-192c/STM-64

In addition, each multiservice edge shelf can support a wide range of service types and speeds, including frame relay, cell relay, circuit emulation and 10/100Base-T Ethernet. Finally, control plane features — IP/MPLS and ATM — operate and scale independently in proportion to traffic growth.

The Alcatel 7670 RSP is the product of Alcatel's substantial experience in developing and implementing protocols and technology for traffic management and signaling. The Alcatel 7670 RSP takes advantage of the QoS features inherent on the platform to provide the best path management for MPLS available today. This lets you move beyond best-effort IP implementations to the much more lucrative, value-added IP services — services that are based on definable QoS levels. The end result: you can offer a range of flexible, advanced services, backed up with stringent SLAs.

FUTURE PROOF CORE EVOLUTION

Service providers need a reliable, scalable multiprotocol core network: it's about maximizing profits with the least risk.

There is an evolution underway toward IP-based services such as IP VPNs, IP Centrex and IP conferencing. The challenge facing service providers lies in forecasting the service mix and growth rates — in other words, the rate of adoption — and in making a network investment decision according to the services to be delivered.

Given the economic imperative to maximize profits over a fixed-cost network, capturing the broadest range of services is essential. A reliable, scalable multiprotocol core network captures today's high revenue generating services like frame relay, cell relay and private lines as well as the evolving and high growth rate IP/MPLS services.

The Alcatel 7670 RSP provides the best network evolution strategy because it generates revenue from multiple services while removing the risks associated with service adoption and forecasting.

"The technology challenge for service providers today is to build a network with the flexibility to meet current traffic and service requirements and respond to future traffic demands. The Alcatel 7670 RSP offers the on-demand scalability, versatility and management we need to ensure we can continue to accommodate our network demands."

YIN PEISHENG, GENERAL
MANAGER, BUSINESS
DEVELOPMENT DEPARTMENT,
CHINA TELECOM GROUP
GUANGDONG CORPORATION

Figure 1: Multiprotocol Core Evolution
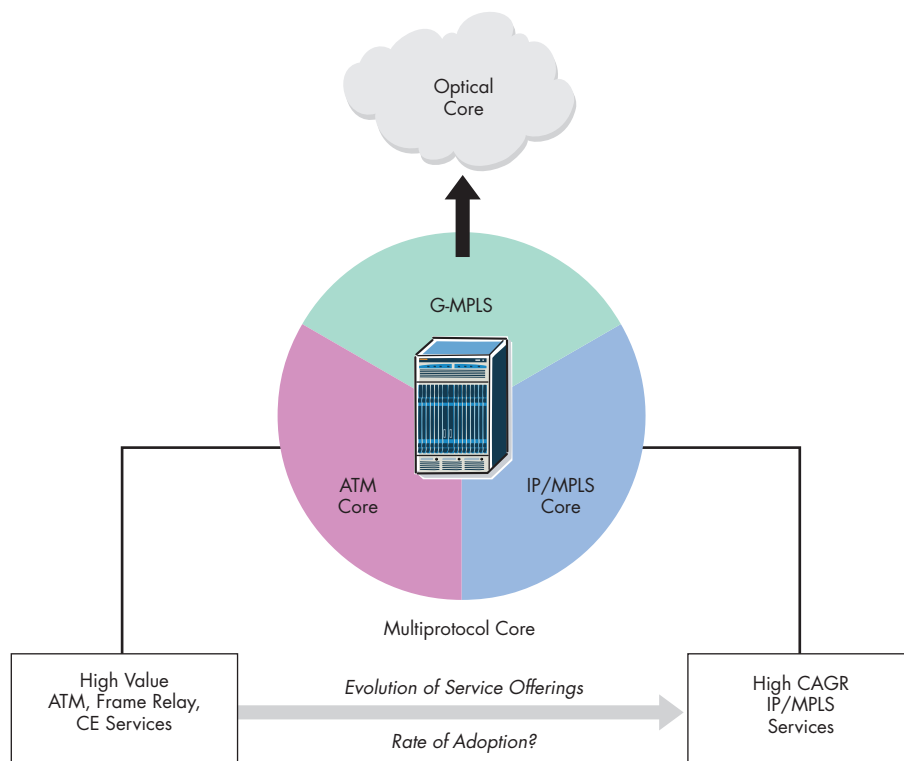
NON-STOP ROUTING

Meeting the demands of the multiprotocol core, the Alcatel 7670 RSP is the first multiservice routing switch to provide real hot redundant BGP, OSPF and IS-IS routing protocols.

Years of engineering experience invested in data networks have resulted in an assured 99.999 percent (five 9s) reliability for data transmission. The same expectation for reliability and transmission quality is driving IP networks to achieve equivalent levels of availability that will allow service providers to deliver mission-critical IP-based services, such as voice, video and VPNs, within the SLAs guaranteed to their customers.

Routers used in a typical IP network today do not currently have the ability to continue updating the routing database and forwarding packets when a route-processing engine experiences a failure. For this reason, most current network implementations rely on a dual-node architecture to provide the required redundancy and network reliability.

The Alcatel 7670 RSP non-stop routing supports hot redundant BGP, OSPF and IS-IS routing protocols, based on the Alcatel Carrier Environment Internet System (ACEIS) technology breakthrough. These hot redundancy capabilities are key requirements for carrier class IP networks.

Non-stop routing builds on the Alcatel 7670 RSP's system architecture, which separates routing and forwarding functions, and improves the reliability of the IP network. Separating the forwarding engine from the routing engine dramatically improves the robustness of the router architecture. A hot redundant routing plane eliminates the need for routing re-convergence, since the routing database is not affected in a failure condition. The recovery time from a failure of the route-processing engine is reduced

"We selected the Alcatel 7670 RSP for its ability to combine multiprotocol core implementation on a single platform with optimum performance and future-proof technological opportunities. The introduction of non-stop IP routing to the 7670 RSP further enhances the attractiveness of the platform and supports Telekom Austria's vision of a scalable, reliable converged network architecture."

HELMUT LEOPOLD, MANAGING DIRECTOR, PRODUCT AND TECHNOLOGY MANAGEMENT, TELEKOM AUSTRIA

from minutes to milliseconds, thus ensuring that no data session interruptions occur and that TCP session state and routing update messages are maintained.

Using the Alcatel 7670 RSP with non-stop routing enables a new network model that offers CAPEX and OPEX advantages over a dual node architecture. The new model requires fewer routers, interfaces and IP addresses and, therefore, has fewer points of failure.

The left side of Figure 2 shows a typical implementation at one point of presence (PoP) of an IP network with two routers in redundant configuration, and the right side depicts the evolution of the PoP with the Alcatel 7670 RSP and non-stop routing.

**Figure 2: Alcatel 7670 RSP Non-Stop Routing**

CR	Cell Relay
FR	Frame Relay
CE	Circuit Emulation
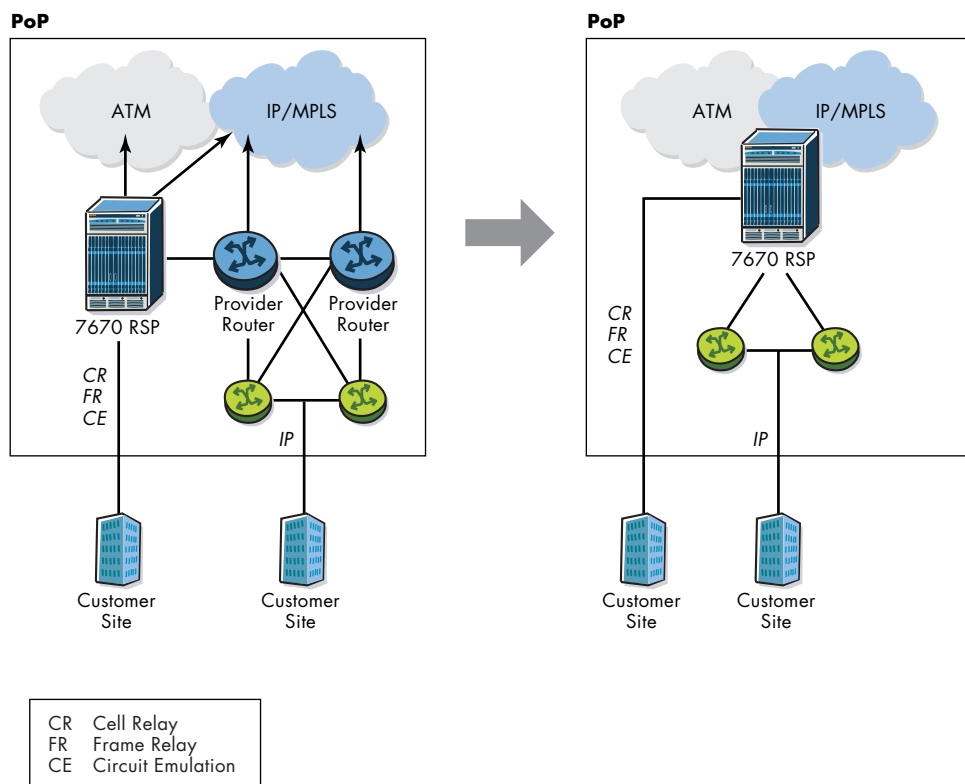
MULTI-APPLICATION

The award-winning Alcatel 7670 RSP offers unmatched flexibility, carrier class performance, and cost efficiency.

Flexible, and proven in the field, the Alcatel 7670 RSP can be used in a number of edge and core applications:

> Multiprotocol core
> Managed data services — private lines, frame relay, ATM, transparent LAN services
> Broadband access aggregation
> Mobile aggregation and core consolidation
> Next generation voice infrastructure
> Optical core node

Figure 3: Multiservice Networks
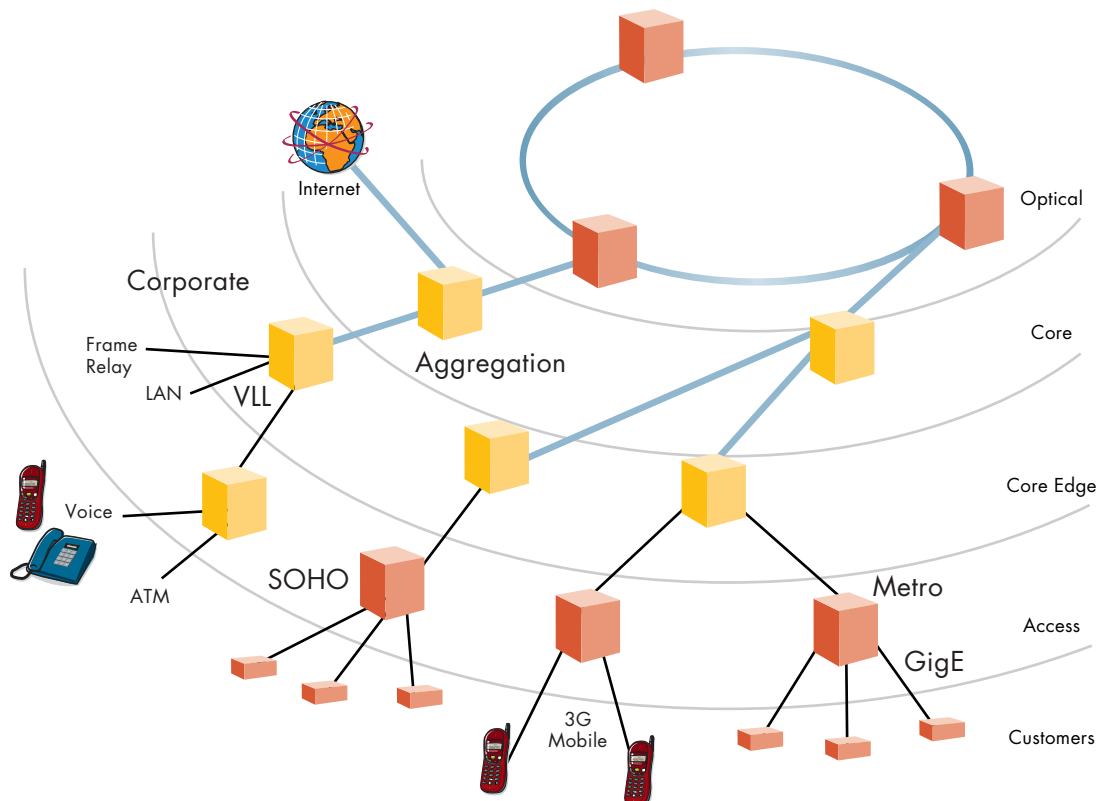
"Alcatel's solution allows NetCologne to address both the residential and business markets. Our services are based on future-proofed technology and enable users to enjoy high bandwidth at low cost — wherever they are."

WERNER HANF, CHIEF EXECUTIVE OF NETCOLOGNE

MULTIPROTOCOL CORE

The Alcatel 7670 RSP supports ATM, MPLS and native IP forwarding. With the Alcatel 7670 RSP, Alcatel combines its expertise in carrier-grade switching with state-of-the-art IP routing technologies to create the ultimate multiprotocol core solution for next generation networks.

Integrating IP, MPLS and ATM on the same platform mitigates risk associated with any one technology. The Alcatel 7670 RSP provides full control and data plane support for PNNI routing, signaling, hierarchy and QoS routing as well as OSPF, BGP4, IS-IS, CR-LDP and RSVP-TE. The integration of ATM, MPLS and IP makes the Alcatel 7670 RSP a strategic investment and creates an extremely versatile product.

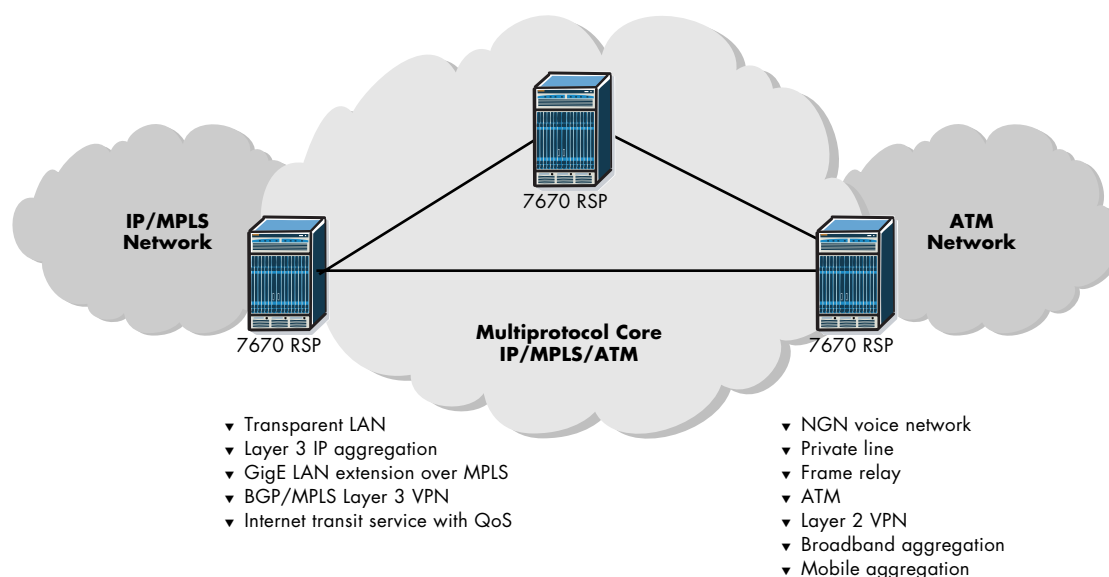The Alcatel 7670 RSP acts as an ATM multiservice switch, including frame relay (one of the most profitable service offerings), voice over packet trunking and media gateway, and 3/1/0 circuit grooming for private line and DCS applications. It also performs concurrently as an MPLS label edge router, label switch router and IP router, allowing an operator to migrate at their pace to these evolving services. Combined, these attributes define the next generation of scalable, multiprotocol core and multiservice routing switch platforms. It's all about aggregating and mediating all services for transport across the intelligent optical core.

MPLS brings much needed network and traffic engineering capabilities to the pure hop-by-hop routing approach used in large-scale IP networks. These traffic engineering capabilities allow service providers to meet the growing demand for business class IP services.

KEY BENEFITS
- Investment protection with multiprotocol integration that enables core convergence at the carrier's own pace
- Ability to offer existing services seamlessly with new MPLS-based services
- Deployment of carrier class IP/MPLS networks (five 9s availability) with the unique non-stop routing feature
- Deployment of trusted SLAs while enabling new Layer 3 IP base services

Figure 4: Multiprotocol Core

IP/MPLS Network

7670 RSP

Multiprotocol Core IP/MPLS/ATM

7670 RSP

ATM Network

7670 RSP

- ▾ Transparent LAN
- ▾ Layer 3 IP aggregation
- ▾ GigE LAN extension over MPLS
- ▾ BGP/MPLS Layer 3 VPN
- ▾ Internet transit service with QoS

- ▾ NGN voice network
- ▾ Private line
- ▾ Frame relay
- ▾ ATM
- ▾ Layer 2 VPN
- ▾ Broadband aggregation
- ▾ Mobile aggregation

MANAGED
DATA SERVICES

KEY BENEFITS
- Wide range of interface speeds, from DS0 to OC-192/STM-64
- Superior end-to-end monitoring and diagnostic capabilities
- Advanced traffic management capabilities that support a flexible pricing structure

The Alcatel 7670 RSP enables differentiated services that make the most of the platform's best-of-breed service offerings and operating efficiencies.

The Alcatel 7670 RSP helps you generate revenue today with ATM, frame relay, private lines, and transparent local area network (LAN) services.
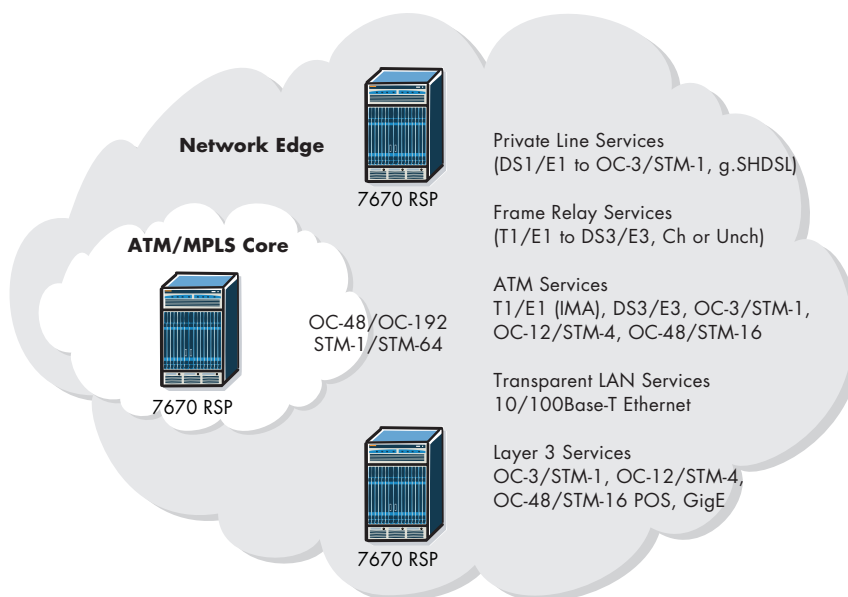
The private line capability of the platform means you can deliver leased-line services directly to customers. And digital cross-connect system (DCS) functionality is integrated, so you can seamlessly integrate your private line networks with the broadband backbone.

The Alcatel 7670 RSP is a flexible, multiservice, multiprotocol platform that accommodates frame relay growth without affecting current services. Award-winning frame relay performance addresses the demand for this service, which continues to grow, particularly among small- to medium-sized enterprise customers. Also, support for seamless interworking with ATM addresses increasing bandwidth demands, especially from large enterprise customers.

It all adds up to developing your network capabilities from single to multiservice over a common infrastructure.

Figure 5 shows the Alcatel 7670 RSP as part of a broadband network that delivers multiple services.

Figure 5: Multiservice Delivery

Network Edge

7670 RSP

ATM/MPLS Core

OC-48/OC-192
STM-1/STM-64

7670 RSP

7670 RSP

Private Line Services
(DS1/E1 to OC-3/STM-1, g.SHDSL)

Frame Relay Services
(T1/E1 to DS3/E3, Ch or Unch)

ATM Services
T1/E1 (IMA), DS3/E3, OC-3/STM-1,
OC-12/STM-4, OC-48/STM-16

Transparent LAN Services
10/100Base-T Ethernet

Layer 3 Services
OC-3/STM-1, OC-12/STM-4,
OC-48/STM-16 POS, GigE

BROADBAND
ACCESS AGGREGATION

Alcatel is the undisputed global leader in broadband access solutions, with a commanding lead in the digital subscriber line (DSL), digital loop carrier (DLC), and local multipoint distribution system (LMDS) markets.

Deployment of wireline and wireless last-mile access solutions are growing in response to increasing demand for high speed Internet access and services.

The Alcatel 7670 RSP platform complements broadband access solutions by concentrating the traffic coming from the access network. This aggregation enables the efficient trunking of digital subscriber line access multiplexers

(DSLAMs), DLCs or wireless digital base stations (DBSs) over a high speed link to the network core.

While aggregating last-mile traffic, the Alcatel 7670 RSP can also deliver classic data, advanced IP and voice services. In addition, this versatile platform can aggregate traffic from mobile networks. The bottom line: increased revenues, service margins and profitability.

Figure 6 illustrates the use of the Alcatel 7670 RSP in the edge to aggregate traffic from DSLAMs and DLCs to an Alcatel 7670 RSP in the core. Aggregation provides a significant cost benefit by maximizing the efficiency of the links to the core.

KEY BENEFITS
- Highest available number of virtual connections
- High port density
- Elimination of incremental equipment purchases
- End-to-end service provisioning
- Capability to deliver new services, including multimedia and voice over DSL

Figure 6: Broadband Access Aggregation
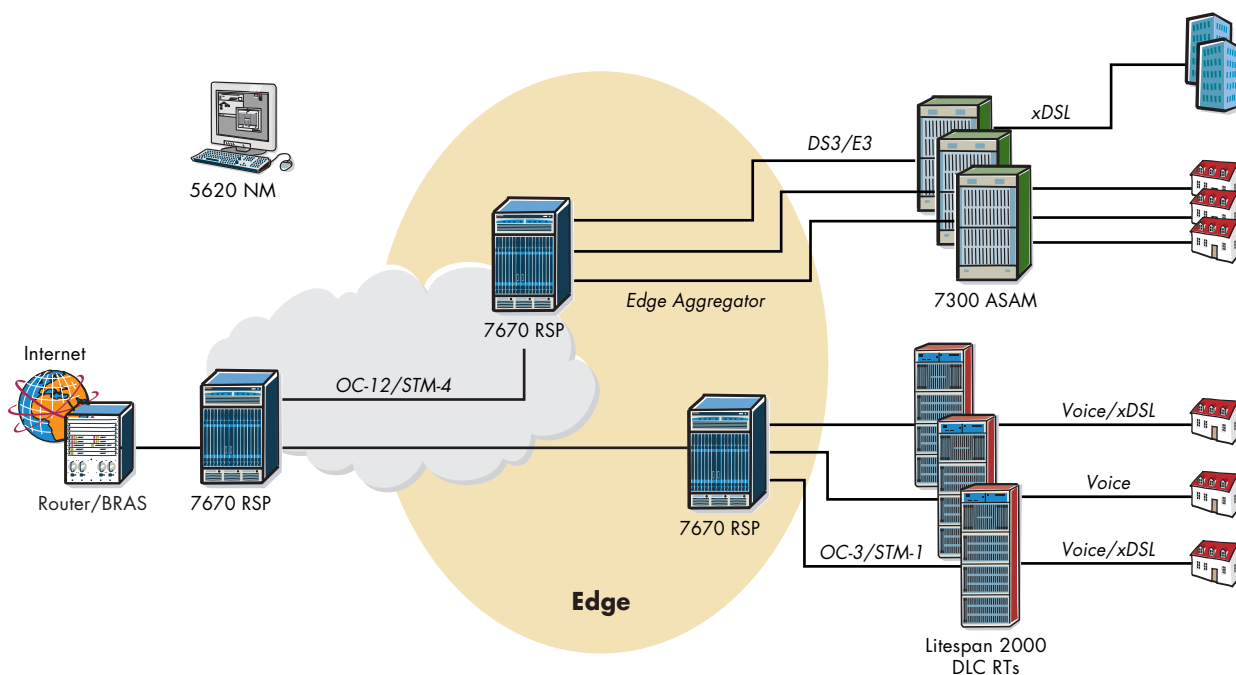
AGGREGATION AND CORE CONSOLIDATION OF
MOBILE TRAFFIC

Alcatel supplies global systems for mobile communications (GSM) networks worldwide. Only Alcatel offers a managed, single-platform solution that supports aggregation and core consolidation of all generations of mobile traffic.

As mobile networks grow and evolve, consolidation will be required to realize economies of scale and simplify service delivery.

Mobile operators are seeking competitive, future-proof solutions that will support all types of mobile voice and data traffic over 2G, 2.5G and 3G networks and accommodate current services while supporting an evolution to 3G networks.

The Alcatel 7670 RSP supports the current time division multiplexing (TDM)-based mobile network, and can add higher speed data capabilities. Circuit emulation supports 2G traffic while frame relay facilitates 2.5G services. ATM and MPLS provide broadband aggregation and core consolidation to support all generations of mobile networks including 3G.

Figure 7 illustrates the use of the Alcatel 7670 RSP to aggregate traffic from the base transceiver station (BTS) to connect via ATM to the base station controller (BSC). ATM transports voice traffic between the BSC and the mobile switching center (MSC). The connection between the BSC and the data network is based on ATM, or MPLS for the IP traffic. The Alcatel 7670 RSP forms the backbone of the network.

Figure 7: Mobile Network
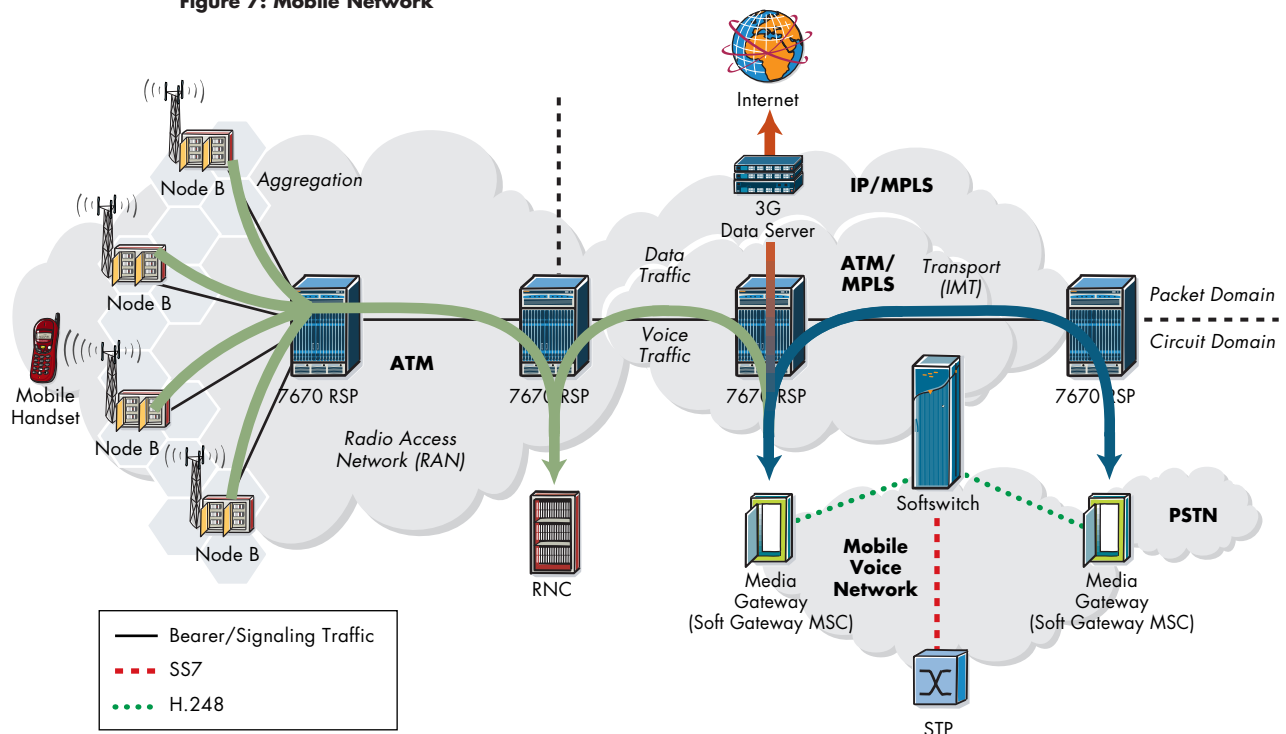
NEXT GENERATION
VOICE INFRASTRUCTURE

Although IP traffic is growing exponentially, voice services still represent the lion's share of a service provider's revenues. The challenge today is to converge lucrative voice services onto a broadband network that supports emerging IP revenue opportunities. This is the converged voice and data network.

Deploying a multiservice platform enables you to effectively deliver integrated voice services. A proven carrier class platform, the Alcatel 7670 RSP is a key component of Alcatel's voice strategy.

The Alcatel 7670 RSP provides a reliable and cost-effective aggregation and transport technology for delay and jitter-sensitive voice traffic. PSTN and mobile operators can immediately begin to realize the benefits of aggregating their

voice traffic for provisioned trunking over a packet network today as a first step toward an NGN. The strength of beginning with the Alcatel 7670 RSP for point-to-point VoATM transport is that it can provide immediate cost savings while enabling a migration toward a softswitch-controlled network at a pace and timeframe established by the operator. The benefit of additional bandwidth savings in the provisioned network can also be achieved with voice compression over ATM adaptation layer 2 (AAL2) and voice activity detection (VAD).

Figure 8 depicts the Alcatel 7670 RSP providing aggregation and transport within a PSTN network. Tandem switch interconnection is indicated, though the application is equally applicable to an end office switch.

KEY BENEFITS
- Density scaling to 24,000 DS0s per shelf
- Per channel configuration AAL1, AAL2, voice detection (VAD), G.711, G.726 and echo cancellation
- Carrier class end-to-end QoS
- Multivendor interoperability
- Converged voice and data network enables new revenue-generating services

Figure 8: Aggregation and Transport in a Typical PSTN Network
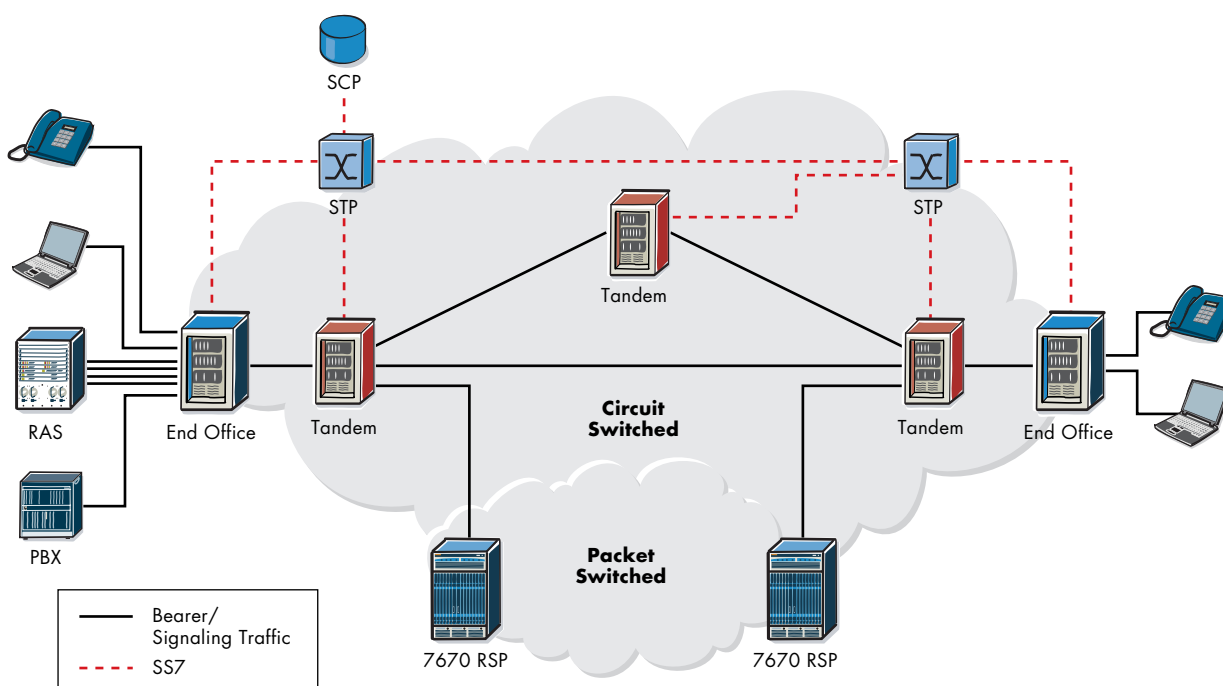
OPTICAL **CORE NODE**

The convergence of optical and data layers will provide significant benefit to network operators.

Intelligence in the network is now expanding into the optical domain where the transport layer can be dynamically controlled and operated in conjunction with the data layer. This is accomplished by equipping the optical network with a common control plane, G-MPLS, and an optical interface, O-UNI. The Alcatel 7670 RSP is a key data networking element (DNE) that will serve as client of the intelligent optical network.

The end result is a network that is now capable of rapid service provisioning and streamlined protection.

Alcatel has created the Core Node, a modular, scalable solution that combines the assets of Alcatel's core products into a unified solution. It comprises the Alcatel 7770 Routing Core Platform (RCP) core IP router, the Alcatel 7670

RSP switch router, the Alcatel 1660 Cross Light Photonic Cross-Connect and the Alcatel 1674 Lambda Gate. These products are coupled using G-MPLS and O-UNI for optical channel or SONET/SDH switching over DWDM or dedicated fiber. The management platform consists of the Alcatel 5620 NM for ATM and IP management and the Alcatel 1354 for optical network management. Cross-layer traffic engineering is added using the Alcatel ALMA Vision Traffic Engineering tool.

**Figure 9: The Optical Core Network**
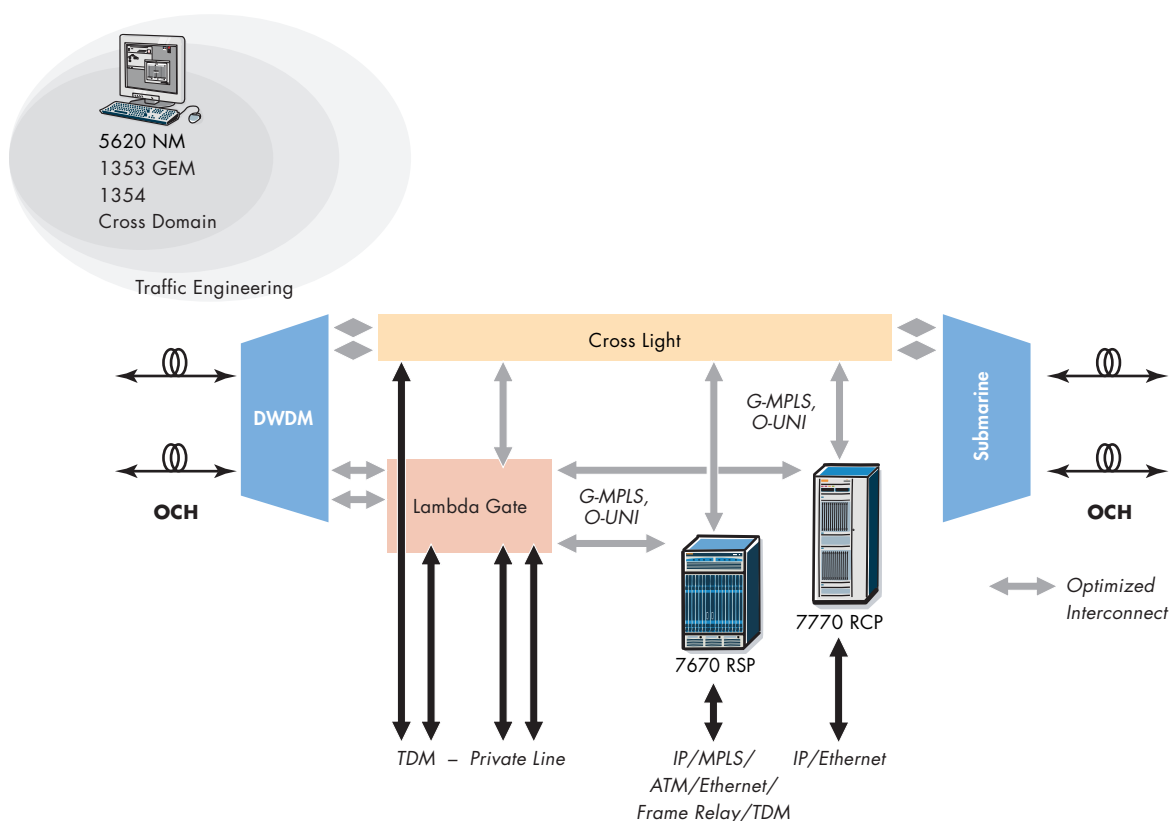
ABOUT **MANAGEMENT**

Getting the management right is key to network and business success

Recent studies indicate that more than 40 percent of the cost of a network is attributable to network operations, as shown in Figure 10.

As you strive to meet the challenges of network consolidation, you can use the multi-access, multi-technology capabilities of the Alcatel Network and Service Management (NSM) portfolio to add new services without the overhead of new management systems or staff retraining. And because the Alcatel 5620 NM can integrate other vendors' equipment into its management realm, the complexity of the network is also reduced. This results in lower overall operating costs, reduced provisioning times, and greater efficiency in the use of the network infrastructure. By facilitating the integration of multi-vendor devices, the Alcatel 5620 NM enables network operators to reduce costs and consolidate their networks, as well as meet their contracted service levels.

Figure 10: Distribution of Costs Over a Three-Year Period

Capital
Equipment
25%

Network
Operations
42%

Fixed
33%
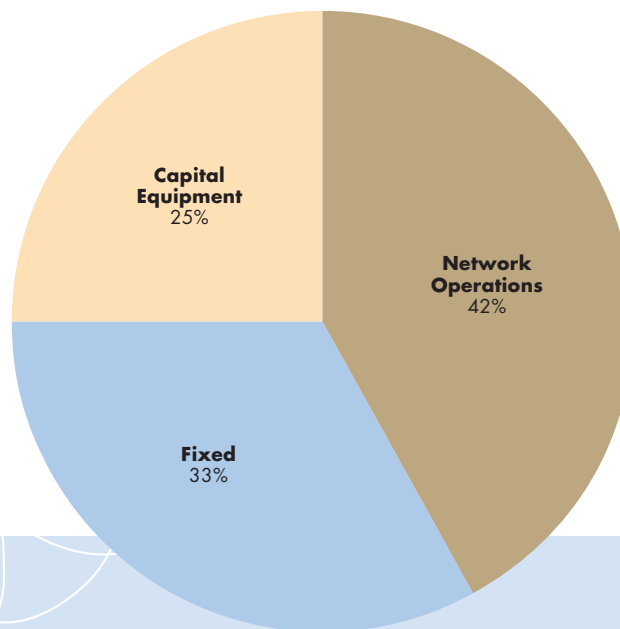
Source: Ernst & Young and The Yankee Group studies

The Alcatel 5620 NM also builds on Alcatel's industry-leading expertise in managing traditional Layer 2 services, and extends these capabilities to support IP/MPLS. The Alcatel 5620 NM also supports Layer 3 configuration and interconnectivity, topology discovery, label switched path (LSP) provisioning, MPLS traffic engineering, and IP fault management and diagnostics.

Full support for common management information protocol (CMIP), common object request broker architecture (CORBA) and simple network management protocol (SNMP) — essential when a platform is to be managed within a carrier's existing OSS environment — are also provided.

"Another factor in our decision was Alcatel's 5620 network management system — it makes end-to-end provisioning very easy and the network views really simplify management issues."

PHIL GREEN, SENIOR VICE PRESIDENT, GLOBAL OPERATIONS, NETWORK PLAN, DESIGN AND BUILD, AT CABLE & WIRELESS

PLAYING IN THE **BIG LEAGUES**

The award-winning Alcatel 7670 RSP has proven itself in some of the world's largest networks, providing carriers with the scalability, reliability and performance to meet their customers' demanding requirements, now and in the future.

The Alcatel 7670 RSP is truly a next generation system for the heart of tomorrow's multiservice networks. A platform that scales incrementally in multiple dimensions: protocols, ports, and fabric capacity. This versatile switching and routing platform supports any service and provides the flexibility and investment protection you need when building your infrastructure.

The Alcatel 7670 RSP has the power to deliver today's profitable services and supports the technologies and protocols necessary for evolution to new advanced services in the next generation networks of tomorrow.

"We looked at several of the leading networking companies before selecting Alcatel because we wanted to make sure we were getting best-of-class products to support our network infrastructure. Alcatel not only offers the highest capacity switch available on the market today, but it also offers a complete end-to-end solution that fits our needs."

BART VOETEN, CTO, 1-NET (SINGAPORE)

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