Alcatel-Lucent
7705 Service
Aggregation Router

Alcatel·Lucent

Bringing IP/MPLS Benefits
to the Mobile Radio Access
Network and More…

Overview

The Alcatel-Lucent 7705 Service Aggregation Router (SAR) is an edge aggregation platform providing superior IP/MPLS and pseudowire capabilities. It addresses your need for a cost-effective, scalable mobile radio access network (RAN) transport solution. The 7705 SAR excels at concentrating traffic at cell and hub sites, and adapting it to a normalized IP/MPLS infrastructure leveraging available media, especially scalable, cost-effective Ethernet. It is also extremely effective at the transport of legacy traffic such as T1/E1 private line transport over a modernized infrastructure. The 7705 SAR's quality of service, traffic management, provisioning, troubleshooting and billing features make it possible for you to provide consistent, superior services to your customers. Its flexible, future-proof architecture will enable you to address evolving aggregation requirements. Built on the same architectural software base as the highly successful Alcatel-Lucent Service Router products, the 7705 SAR enables the creation of an end-to-end solution for supporting and capitalizing on the growing mobile aggregation market.

Market Requirements

Traffic is steadily increasing on mobile networks, as the volume of mobile data and video traffic grows alongside voice. Unfortunately, the revenue per bit is not keeping pace with this growth. To make sure your business remains profitable, you need to find a new networking approach — one that enables you to reduce operating overhead and scale services cost-effectively. You need a solution that allows you to move forward with a next-generation infrastructure, while ensuring that you retain all the capabilities (and customers!) from your legacy services. In a highly competitive market, you must be able to meet customers' expectations and offer a full range of differentiating services, backed with stringent service level agreements. Fortunately, by transitioning to an IP/MPLS infrastructure and an Ethernet-centric RAN, you can reduce costs while expanding services.
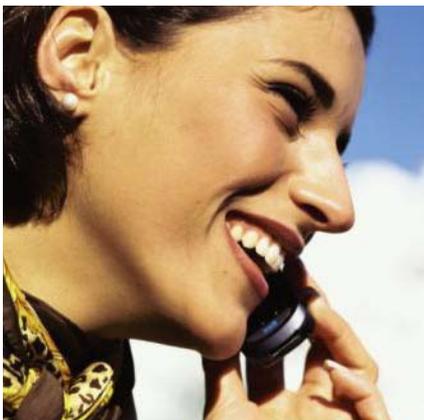
The access network presents some unique challenges, as you need to be able to integrate diverse first mile media, including traditional n x T1/E1 copper, microwave, DSL and fiber. You can't limit yourself to a subset of the options: you need to be able to support whatever access media can be most cost-effectively deployed in a given geography.

And most importantly, you need a solution that can be readily integrated with your existing operations support system — a solution that makes that transition from a TDM-based RAN to a fully packetized model as painless as possible. You'll want a partner with the know-how and experience to help you bring all aspects of your operations up to speed quickly.

Finally, the transition you undertake in the RAN must be in keeping with your overall, long term evolutionary goal towards a flattened, all-IP mobile transport network, securely supporting a wide range of services.

7705 SAR: The Newest Star in an All-Star Lineup

The 7705 SAR is an essential component of a pre-tested, pre-qualified, end-to-end managed and verified RAN networking and transport solution. Built on the same foundation as the Alcatel-Lucent Service Router platforms, the 7705 SAR features include:

- A proven software architecture offering scalable, industry-leading Ethernet and pseudowire services support.
- Support for a rich range of access and uplink media.

- Service-aware tools to facilitate operations, administration, maintenance and provisioning (OAM&P) tasks.
- Differentiating high availability features.
- End-to-end QoS and traffic management capabilities to ensure appropriate treatment of different traffic types.
- Flexibility, to ensure your network can take advantage of technological innovations and new service possibilities as they develop.

Built to Deliver

The Alcatel-Lucent 7705 SAR delivers IP/MPLS and pseudowire capabilities in a high-density, future-proof architecture that will enable you to address evolving aggregation requirements. It is architected to provide superior service delivery through effective provisioning, traffic management, troubleshooting and billing features.

The 7705 SAR platform delivers strong convergence capabilities in the mobile RAN. With native service processing of 2G, 3G and 4G traffic, it has the ability to groom multiple media and transport protocols onto a normalized, economical packet transport infrastructure. Industry-leading scalability and density is provided in a compact unit offering a flexible mixture of multiport T1/E1, 10/100 Ethernet, and Gigabit Ethernet interfaces, along with ATM/IMA, TDM and Ethernet pseudowires over MPLS for legacy service support.

On the network side, media connectivity options are: Fast Ethernet, Gigabit Ethernet and n x T1/E1 (MLPPP). The platform can be optionally configured with a redundant core module and uplinks.

The 7705 SAR is ideally suited to these applications:
- Radio access network aggregation and backhaul
  - ¬ Convergence at the cell site or hub (point of concentration)
- T1/E1 private line services
  - ¬ Modernized, normalized transport of legacy services
  - ¬ Fixed-mobile convergence over a packet backbone

The 7705 SAR extends the intellectual property and field-hardened service capabilities of the 7750/7710 Service Router platform.

Table 1. Features and Benefits

| FEATURE	BENEFIT
A solution based on the 7705 SAR and 7750/7710 SR Ethernet-centric platforms delivers **industry-leading IP/MPLS and pseudowire capabilities** based on Ethernet interfaces. This allows cost-effective migration from E1/T1-based backhaul to packet-based transport leveraging Ethernet services over a wide range of first mile media.	The 7705 SAR inherits and builds upon the same rigorously proven development base as the 7750/7710 SR line of products. Alcatel-Lucent's in-service experience in high quality Ethernet services and pseudowire deployments is unmatched in the industry. Transition from PDH-based connectivity to Ethernet-based can reduce recurring operational expenses (OPEX) such as leased line costs.
The solution leverages advanced multilink point-to-point protocol (MLPPP), inverse multiplexing over ATM (IMA) and Ethernet uplinks. Also, modern adaptive point-to-point microwave access is available via the Alcatel-Lucent 9500 Microwave Packet Radio, to **extend your reach at attractive cost points.**	The 7705 SAR is part of an end-to-end managed and verified solution that includes a wide range of first mile solutions. Technology sharing across platforms brings pre-integrated, pre-qualified solutions, with simplified upgrade paths.
Powerful, service-aware OAM capabilities complemented by the 5620 management portfolio for GUI-based network and element configuration, provisioning, fault and performance management are available. Alcatel-Lucent brings a strong service/deployment organization that can greatly assist in network design, rollout and even operations.	The Alcatel-Lucent services organization has deep experience in high profile IP transformation projects. The Alcatel-Lucent 5620 Service Aware Manager (SAM) management platform is recognized as industry-leading for its simple GUI and powerful task integration. Rapid fault detection and powerful commissioning and troubleshooting tools can improve productivity of operations staff and reduce network downtime.
IP/MPLS networking and platform attributes are available to **drive reliability to 99.999 percent levels and beyond.** Resiliency and redundancy features include: one-for-one hitless control and switch card failover, synchronization redundancy, network uplink resiliency and redundancy of power feeds.	Advanced resiliency features lead to improved network uptime. This can positively impact customer retention and allow critical services to be offered for increased revenue.
The flexibility of the solution enables investment decisions to be made according to longer term trends such as long term evolution (LTE), IP multimedia subsystem (IMS), and fixed-mobile convergence (FMC), and enables you to avoid stranding investment.	The solution brings fully IP/MPLS networking capable platforms to the hub and cell site. This allows great flexibility for supporting LTE networking and also wireline business services on the same infrastructure. As a leading mobility and IMS vendor, Alcatel-Lucent is uniquely positioned to assist in long term planning.

IP/MPLS RAN Transport

7705 SAR – 8-Slot Version

A complete Alcatel-Lucent IP/MPLS RAN transport capability can be built around the Alcatel-Lucent IP/MPLS portfolio (see Figure 1). Each product has undergone rigorous testing to ensure that the network you build provides you with unparalleled reliability, so your service offerings stand out in this highly competitive market. In order to provide the most efficient transport solution, the 7705 SAR employs pseudowire (PWE3) encapsulation methods to map services end to end. The use of pseudowires ensures that the key attributes of the transported service are maintained, while a cost-effective packet environment is used to perform aggregation.

Figure 1. IP/MPLS RAN Transport Capability
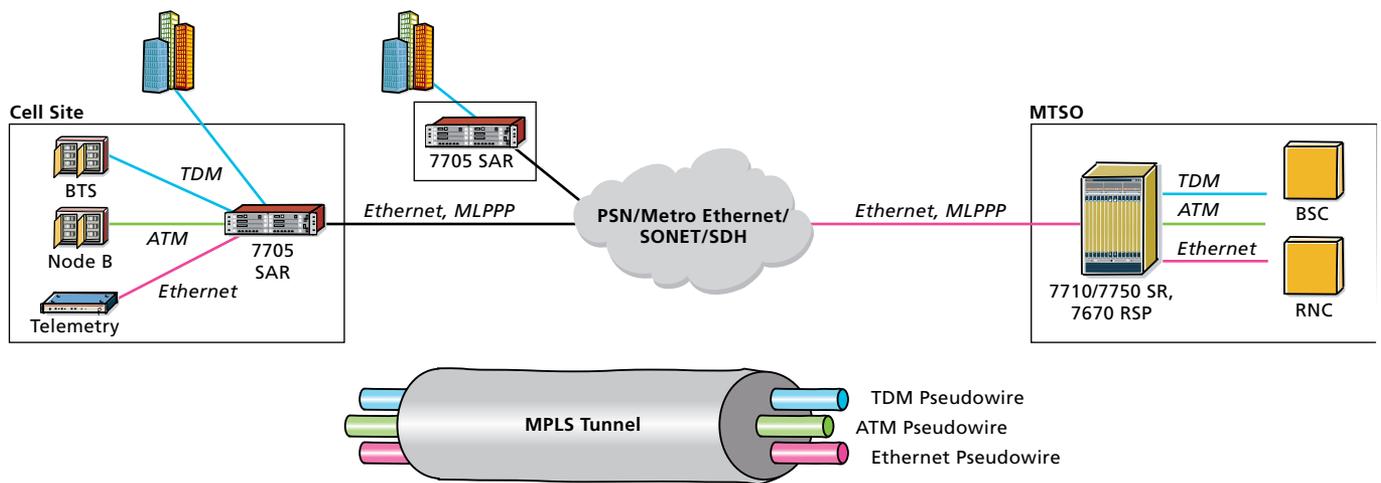
MPLS Pseudowires Allow Convergence and Dynamic Bandwidth Allocation
Over Multiple Media, Enabling Low Cost Backhaul

Note: The 7670 RSP supports ATM and Ethernet pseudowires. The 7710/ 7750 SR also supports ATM and Ethernet pseudowires, support for TDM pseudowires will be added in R 6.0.

T1/E1 Private Line Transport Capability

The 7705 SAR can provide a T1/E1 private line capability using circuit emulation over a packet switched network, such as an IP/MPLS network. This can be an example of fixed-mobile network convergence, where the same transformed IP/MPLS infrastructure can be used for both mobile RAN backhaul and efficient support of legacy private line services.

The 7705 SAR brings a structured mode of operation according to the IETF RFC CESoPS where individual 64 kb/s timeslots within a single T1/E1 can be sent to different destinations. TDM traffic is packetized and encapsulated in MPLS with configurable packetization, delay and jitter buffer sizing. Traffic is then uploaded to the core network via 10/100 Mb/s Ethernet, Fast Ethernet, Gigabit Ethernet or n x T1/E1 MLPPP. A typical T1/E1 private line deployment configuration is depicted in Figure 2.

Figure 2. T1/E1 Private Line Transport Capability
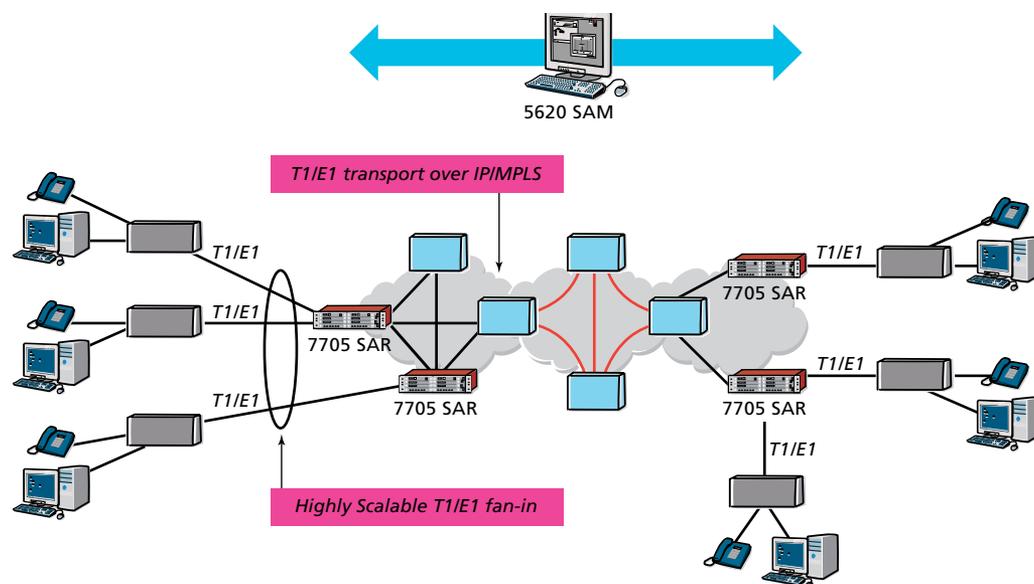
The Alcatel-Lucent Advantage

Alcatel-Lucent offers you a complete, end-to-end solution based on best-in-class IP/MPLS networking products and offers an extensive breadth of services and deployment experience to support the transformation of your mobile RAN. Each product within the solution is right-sized for its job within the network. For example, the 7705 SAR relies on the same software architecture as the highly successful 7750 Service Router, but at a price and form factor that is appropriate to the cell site and smaller hubs. The Alcatel-Lucent IP/MPLS products offer high availability and service-aware traffic management and quality of service.

With support for all access media, including microwave, DSL, fiber and traditional n x T1/E1 copper in the first mile, you don't have to make compromises due to technological limitations. This flexibility ensures that you get a solid return on your capital investments, as quickly as possible.

The Alcatel-Lucent RAN solution also offers you the critical advantage of unprecedented scalability, both in terms of network scale and the scale of projects that can be accommodated. By scaling effectively and economically, the Alcatel-Lucent solution ensures that the current unprecedented growth in mobile traffic is good for your bottom line, rather than eroding your profitability.

As a committed project partner, Alcatel-Lucent offers valuable global experience and local support in network design, deployment and ongoing operations. By relying on Alcatel-Lucent experience and the Company's superior products, you can be assured that your transition towards an IP/MPLS-based transport network will be as smooth as possible, so you retain your existing customers and can build solid relationships with new ones.