

MOBILE CASE STUDY

Challenge:

To implement a mobile backbone strategy to support the growth of mobile data services and the need to consolidate existing, multiple, separate networks

Action:

Deploy Juniper Networks M40e platform for consolidating and expanding the network

Advantage:

- An established migration strategy which preserves investment in existing ATM infrastructure through interworking with IP/MPLS VPNs
- Future-proofed technology to support layering of advanced services, including voice and IPv6 multimedia
- Established low risk integration and lowest total cost of ownership

After considering the alternatives, the operator selected Juniper Networks fully redundant M40e M-series router as the platform of choice for consolidating and expanding the mobile backbone network.

In today's rapidly expanding mobile marketplace, operators are facing an extensive list of services and technologies that must be supported: 3G, wireless LANs, MMS, mobile data VPNs — and the list continues to grow. Leading operators have come to the realization that building separate networks for each new service is simply not financially sustainable.

Juniper Networks recently partnered with a leading global mobile operator to build a single mobile backbone network capable of supporting both current and future applications.

The operator, based in Europe, carefully considered their options for the evolution of their backbone network. Through the 2G and 2.5G years, the operator had built multiple data networks, each designed to support a limited range of services. Faced with the need to transport increasing volumes of IP traffic, the

operator concluded that consolidating their separate networks onto a single IP/MPLS backbone would provide a robust, scalable solution for meeting current and future needs.

After considering the alternatives, the operator selected the fully redundant M40e M-series router as the platform of choice for consolidating and expanding their network.

According to Eddie Minshull, Juniper Networks VP and GM Operations for EMEA, "This customer has built a powerful brand image linked with delivering high-quality services. They are currently offering GPRS consumer services, MMS, and corporate e-mail access. The Juniper mobile backbone network provides an optimized cost base for these services, and the capability to support additional layered services in the future."

Over a dozen separate sub-networks were identified that could be consolidated onto the Mobile Backbone Network.

Consolidating Multiple Separate Networks

As with many mobile operators across the globe, the European operator had installed multiple wide area networks over the years. An IP network overlaid on an ATM network was used for supporting the mobile infrastructure, and another IP network was used to meet internal corporate requirements.

The impending rollout of 3G offered an opportunity to assess their operations, and to consider the alternatives to building an additional network or expanding their existing networks. Continued expenditures across multiple networks was recognized as unsustainable, since it would increase capital and operational costs and limit growth of ARPU from new services. As a result, the decision was made to migrate to a single-backbone network.

Requirements for the Mobile Backbone Network

IP Routed, Not ATM

The operator recognized that a major part of its future business would be IP-based, and developed a strategic initiative to transition to a single backbone, IP/MPLS environment. The operator felt the technologies currently in use had been appropriate when they were deployed, but that technology had evolved in the IP area. They concluded that the Juniper Networks purpose-built IPv4/IPv6/MPLS packet infrastructure was best suited for meeting future business needs because of its ability to support mixed traffic types and make efficient

use of the wide area transmission network. In addition, the IP/MPLS solution protected the operator's existing ATM infrastructure investments and operations by delivering a graceful migration strategy.

Juniper Networks has separated the routing and forwarding functions in the M-series and T-series routing platforms. The forwarding path uses custom ASICs for IPv4/IPv6 and MPLS, providing a low-latency, low-jitter solution. When combined with end-to-end QoS tools delivered by the JUNOS operating system this approach enables the network to support advanced services, including voice and multimedia. In addition, MPLS enables VPNs to separate traffic from multiple service networks, and provides mechanisms for traffic engineering and high availability.

Layer 2 Consolidation

Support for non-IP traffic was a key consideration in the decision to migrate to an IP/MPLS backbone. Significantly, Layer 2 MPLS VPNs allow any ATM cell, or Layer 2 Frame, to be transported transparently across the IP/MPLS backbone. The QoS requirements of the encapsulated Layer 2 traffic are guaranteed by the QoS mechanisms of the MPLS VPN. This approach enables existing ATM traffic, and new 3G radio equipment with standards-defined ATM interfaces to be transported transparently across the converged IP/MPLS backbone. In the European operator's evaluation of competing vendors, only Juniper Networks was able to transport Layer 2

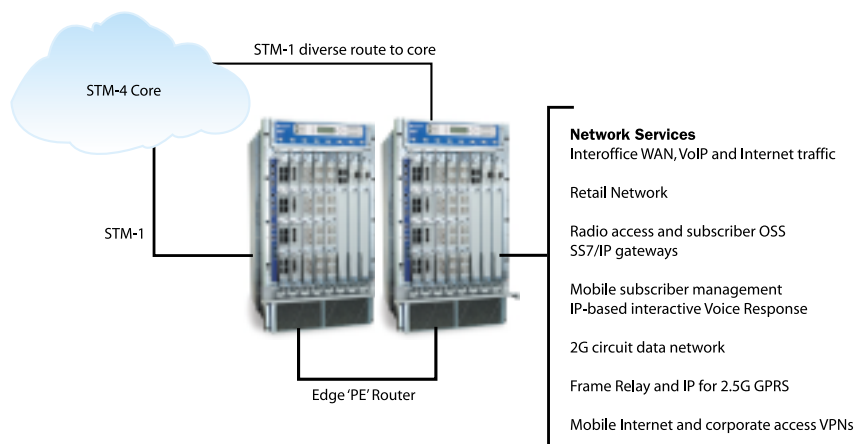


Figure 1: Standard POP configuration using Juniper Networks M40e routers

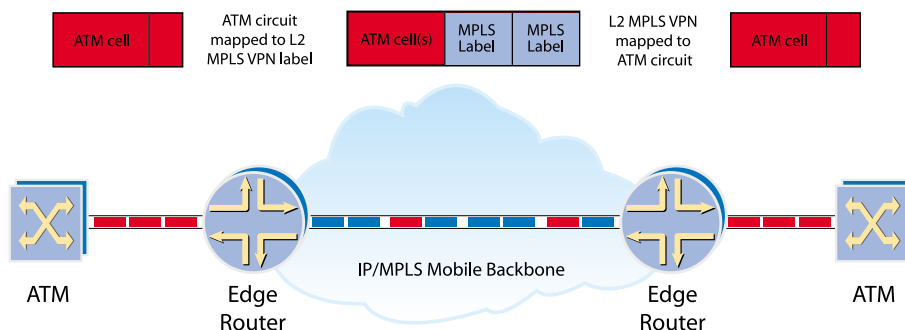


Figure 2: Layer 2 MPLS VPNs can consolidate Frame Relay, ATM, Ethernet, and PPP traffic onto a converged IP/MPLS backbone

traffic across all their platforms — a key factor in the selection process.

IPv6 Future-proofed Architecture

IPv6 was required from the outset, and all Juniper Networks M-series and T-series routers have supported IPv6 routing protocols and hardware-based forwarding of IPv6 traffic since 2001. While Juniper Networks is recognized as the industry leader in scalable RFC 2547 MPLS VPNs or “IP VPNs”, the operator wanted to launch IPv6-based IP VPNs. In a remarkable demonstration of the flexibility of Juniper’s modular JUNOS operating system support was added for IPv6-based IP VPNs in time for deployment — without compromising system scalability or stability.

Low-risk Integration and Operation

To ensure system viability, the operator evaluated the proposed design at the Juniper Networks Proof of Concept (PoC) Labs. Performance claims were tested, and the redundant, high-availability design was put through its paces. In the hands-on PoC environment, the operator experienced the stability of the M-series platform on a first-hand basis.

Joint design workshops included engineers from Juniper Networks Professional Services, as well as a Resident Engineer who participated in the implementation and operational phases. For operational simplicity the network was integrated into existing fault and performance monitoring systems. “Juniper Professional Services took the raw information and requirements and created a comprehensive proposal for each phase. As a result, the network was operational within the required

timescale,” said Richard Holben, Juniper Networks Consulting Engineer for Mobile.

Lowest Total Cost of Ownership

Performance, stability, and functionality of the packet backbone are key considerations, but total cost of ownership is frequently the deciding factor. Juniper Networks understands the cost/performance relationship, and has developed a unique approach for collapsing multiple networks onto a single backbone to deliver capital and operational savings. The European operator made a comprehensive cost analysis of competitive offerings, including upgrades, operations, efficient use of bandwidth, environmental, and sparing costs. The result? Juniper Networks came out as the best qualified to complete the project successfully.

Conclusion

A global operator looked at its future business opportunities and at the operational demands that would be placed on the backbone. As a result of the current explosive growth in IP flows and mixed traffic loading, they decided to build a packet-based, single-backbone network using Juniper Networks. The Juniper IP/MPLS mobile backbone is a shared resource which provides a reduced cost base and supports multiple layered services. Fine-grained control delivers an assured user experience for all services. As a result of working with Juniper Networks, the operator now has the flexibility to continue delivering existing services, while introducing profitable differentiated services over the converged IP/MPLS network.

Compared to expenditure in spectrum licenses and radio base station equipment, the investment to build a routed backbone is minimal. However, the evaluation process is as thorough because the IP/MPLS network touches every customer packet and directly determines the ability to deliver a high-quality user experience.



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