

Mobile Network Densification with Juniper Mobile Backhaul Solution

Efficiently Scale Backhaul Networks to Deliver Superior QoE While Containing OpEx through Universal Edge and Access Architecture

Challenge

To take advantage of hyper growth and the huge revenue opportunities that brings, mobile operators need enabling technology that helps them overcome significant challenges such as rapid technology evolution, ever higher customer expectations, and the need to support mission-critical use cases.

Solution

Juniper Networks mobile backhaul (MBH) solution is designed from the ground up to address these challenges, helping operators capture the revenue and innovation opportunities associated with the migration to LTE-A and beyond.

Benefits

- Provides aggregation, transport services, and analytics to enable next-generation backhaul architecture for LTE-A
- Reduces costs and accelerates revenue growth
- Enables best-in-class security with SRX Series Secure Gateways, which scale to more than 100 million concurrent sessions and 300 Gbps of firewall throughput
- Offers centralized management of network devices and orchestration of services through a single pane of glass

Mobile operators are deploying LTE and LTE-A networks to deliver a remarkable customer experience through advanced services, as well as to cost-effectively meet the demands of increased traffic volumes. A mobile backhaul (MBH) solution built with a highly scalable and programmable control plane and a low-latency data plane—one that is easy to deploy and manage—can achieve these objectives.

The Challenge

The mobile industry is experiencing a period of hyper growth where the pace of technology in the radio access, mobile core, and smart device realms has created huge revenue opportunities. Despite the fact that there are currently more than 4.5 billion unique global mobile subscribers generating revenues of \$1.1 trillion, smartphone penetration is still less than 25 percent¹, representing a huge untapped market.

Before mobile operators can take advantage of these opportunities, however, they must first overcome a number of challenges.

- **Rapid growth and technology evolution:** Operators are forced to invest more than \$100 billion of CapEx per year to simply keep up with the data demand and technology evolution on their networks.² Capacity and coverage requirements are forcing densification of the network through the addition of more than 2 million small cells in 2015³ to augment the existing macro cellular footprint. The growth in the number of cell sites and their capacity has created major operational issues, leading to higher OpEx. Furthermore, radio access technologies are evolving rapidly, making it difficult to recoup investments before assets are fully depreciated.
- **Change in service-level agreement (SLA) expectations:** Thanks to higher data rates and lower latency, users have come to expect high-quality service. A recent study shows that more than 40 percent of subscribers are ready to change carriers due to poor quality of experience⁴ (QoE). The same study suggests that dissatisfaction is growing with the increasing adoption of smartphones and 4G, as poor network quality becomes quite obvious when subscribers have seen the device and network capabilities.
- **Mission-critical use cases:** To enable the Internet of Things (IoT), mobile networks now also carry mission-critical device and sensor data from automobiles, homes, and enterprises. By 2020, it is projected that the number of these connected devices will surpass human connections, making them a major source of future revenue growth. To support these new mission-critical use cases, high availability and security will become essential requirements.

¹ <http://www.emarketer.com/Article/Smartphone-Users-Worldwide-Will-Total-175-Billion-2014/1010536>

² "Service Provider Capex, Revenue and Capex by Equipment Forecast," Infonetics, November 2013

³ "Small Cell Equipment Forecast," Infonetics, March 2014

⁴ <http://nsn.com/news-events/press-room/press-releases/dissatisfaction-with-mobile-broadband-key-driver-for-changing-operator-mwc12>

The Juniper Networks MBH Solution

Juniper Networks MBH solution is designed from the ground up to address these challenges. With flexible architecture and strong partnerships, it helps operators capture the revenue and innovation opportunities associated with the migration to LTE-A and beyond.

The Juniper MBH solution includes:

- Juniper Networks® ACX Series Universal Access Routers, which provide small and macro cell routing functionality. With industry-best scale, performance, and integrated network timing features, the ACX Series aggregates residential and business services in addition to mobile backhaul to minimize the cost and complexity of the access network. Support for seamless MPLS and carrier Ethernet connectivity provides the most flexible service architecture.
- SDN-ready Juniper Networks MX Series 3D Universal Edge Routers, which provide the necessary aggregation and transport services such as L2-VPN, L3-VPN, IPsec, deep packet inspection (DPI), and analytics to enable next-generation backhaul architecture for LTE-A. MX Series routers, powered by the programmable Trio chipset, are based on an advanced architecture that separates control, management, services, and forwarding planes for cost-effective scaling and virtualization.
- Juniper Networks SRX Series Services Gateways, which act as LTE security gateways to protect mobile network and user traffic from internal and external threats. SRX Series devices also act as Stream Control Transmission Protocol (SCTP) and GPRS tunneling protocol (GTP) firewalls to protect the network from signaling storms.

- Juniper Networks TCA Series Timing Appliances, which act as Precision Time Protocol (PTP) grandmaster clocks and clients to provide highly accurate frequency and phase synchronization within the radio access network.
- Juniper Networks Junos® Space Network Management Platform, which offers centralized management of network devices and orchestration of services through a single pane of glass for real-time visibility. Junos Space Services Activation Director is a set of multiple Junos Space applications that facilitates an automated and streamlined approach to the service design and provisioning process.
- Partnerships with industry-leading microwave vendors provide a comprehensive set of wireless backhaul solutions for both macro-cell and small-cell installations. Integrated management and network timing are key attributes of the joint solution.

Features and Benefits

The Juniper MBH solution enables profitable growth—perhaps the most important business objective of any mobile operator—by increasing revenue and minimizing cost. It enables revenue growth by providing high QoE that attracts new subscribers and reduces churn. The Juniper MBH solution also minimizes total cost of ownership (TCO) by providing a comprehensive set of planning, design, and provisioning tools that streamline the operation brand and management of the network. And, it protects the operator's brand reputation by securing both network and subscribers from internal and external threats.

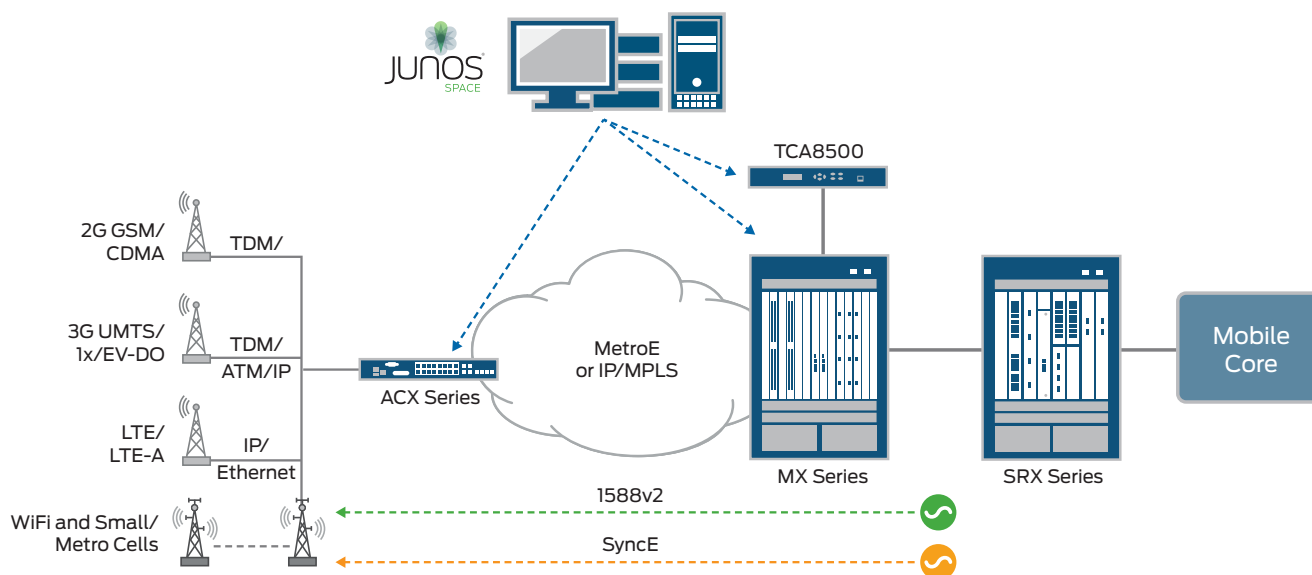


Figure 1: Juniper Networks mobile backhaul solution

Reducing Costs, Increasing Revenues

The Juniper MBH solution is based on highly scalable and future-proofed platforms that extend the usable life beyond the point the assets are fully depreciated. Operational costs are further minimized through Junos Space Services Activation Director, which reduces truck rolls. The Junos Space-enabled rapid deployment model reduces operational costs by more than 25 percent in a typical deployment scenario, while the fanless cooling design of the ACX Series routers delivers an additional OpEx reduction, which accounts for 15%-25% of CapEx.

Using high precision hardware-based timing, built-in SLA management, and rapid service restoration result in enhanced QoE. Integrated PTP technology, based on Juniper intellectual property, can provide frequency accuracy of less than 1 ppb and phase accuracy of less than 500 nanoseconds to meet the most stringent LTE-A requirements. Proactive SLA management through built-in service engines in the ACX Series routers also eliminates the need for a separate network interface device, reducing CapEx by 40%.

The Juniper MBH solution enables best-in-class security through SRX Series gateways, which scale to more than 100 million concurrent sessions and 300 Gbps of firewall throughput. The solution also offers LTE security gateways to terminate IPsec-enabled S1 and X2 interfaces, SCTP firewall, and GTP firewall on a high availability platform with continuous uptime guarantee.

Summary—Mobile Network Densification and Superior QoE with Juniper Mobile Backhaul

Today's mobile operators are using LTE and LTE-A networks to deliver a remarkable customer experience through advanced services, as well as to cost-effectively meet the demands of increased traffic volumes. Juniper offers a mobile backhaul solution that has been designed from the ground up to meet these challenges. By combining a highly scalable and programmable control plane with a low-latency data plane, Juniper's MBH solution helps operators sustain profitable growth with best-in-class security and management efficiency. With flexible architecture and strong partnerships, operators can confidently capture the revenue and innovation opportunities associated with the migration to LTE-A and beyond.

Next Steps

To find out more about Juniper Networks products and solutions, please visit www.juniper.net.

To read a Juniper MBH success story, see [DQE Communications Create Next Generation Mobile Backhaul Through Juniper Solution](#)

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

Corporate and Sales Headquarters

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or +1.408.745.2000
Fax: +1.408.745.2100
www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.
Boeing Avenue 240
1119 PZ Schiphol-Rijk
Amsterdam, The Netherlands
Phone: +31.0.207.125.700
Fax: +31.0.207.125.701

Copyright 2015 Juniper Networks, Inc. All rights reserved. Juniper Networks, the Juniper Networks logo, Junos and QFabric are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners. Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

JUNIPER
NETWORKS