

FIXED MOBILE CONVERGENCE SOLUTION

Smooth Transitioning to Next-Generation FMC-Based Networks

Challenge

The only way service providers and content providers can fulfill FMC's promise is to replace the vertical silos of the legacy architectures that have comprised their networks and supported their services to date.

Solution

Juniper Networks delivers infrastructure solutions that enable three key elements service providers require of the FMC environment: service velocity, network monetization, and operational efficiency.

Benefits

- Flexibility to support converged networks that accommodate both IP and legacy services (leveraging proven circuit emulation techniques)
- Scalability to support emerging data-intensive technologies
- Cost-effectiveness to compensate for rising levels of backhaul traffic

The Challenge

Fixed Mobile Convergence (FMC), one of the most important trends taking place in the telecommunications industry today, promises to unify streaming media, multimedia, legacy public switched telephone networks (PSTNs), IP Multimedia Subsystem (IMS), and Web services onto a common network infrastructure. The resulting network environment will offer rapid and inexpensive application enrollment across a common IP infrastructure.

While all players benefit from FMC, end users are the ultimate beneficiaries because FMC promises access to voice, video, and data services from any location, at any time, using any mobile or wireline device, and any available access method or network. With that said, the only way service providers and content providers can fulfill FMC's promise is to replace the vertical silos of legacy architectures that have comprised their networks and supported their services to date.

The challenges facing service providers as they replace their legacy silo architectures can be overcome using open service delivery architectures, and by defining a unified policy and identity management layer on top of the IP transport layer. Open, standards-based interfaces between those layers can make this possible.

Service providers must meet several requirements with their next-generation FMC networks. Ensuring high service quality and subscriber quality of experience (QoE) will require intelligent admission control, while session quality of service (QoS) and efficient network utilization will require real-time bandwidth management. In addition, dynamic bandwidth adjustment will be necessary to enable policy-based dynamic traffic engineering, including the ability to create and resize MPLS label switched paths (LSPs) in response to subscriber and application requests.

These same features form the core of the policy and resource admission control subsystem that plays a major role in Juniper's strategy for building next-generation FMC-based networks. These features are under definition by leading standards bodies including Third-Generation Partnership Project (3GPP), European Telecommunications Standardization Institute (ETSI), TISPAN, and PacketCable 2.0.

Historically, the old networking model had a hierarchy with well-defined roles between four players: content providers, handset providers, service providers, and customers. While these players and many more will continue to exist and interact in the next-generation, user-driven converged world, the revenue sharing between them is going to be much less distinct as FMC evolves. To remain part of the revenue chain, service providers must offer differentiated value that helps ensure an enhanced, assured, end user experience. To that end, network intelligence will play a key role in helping service providers continue to have a relevant role in the delivery of next-generation services.

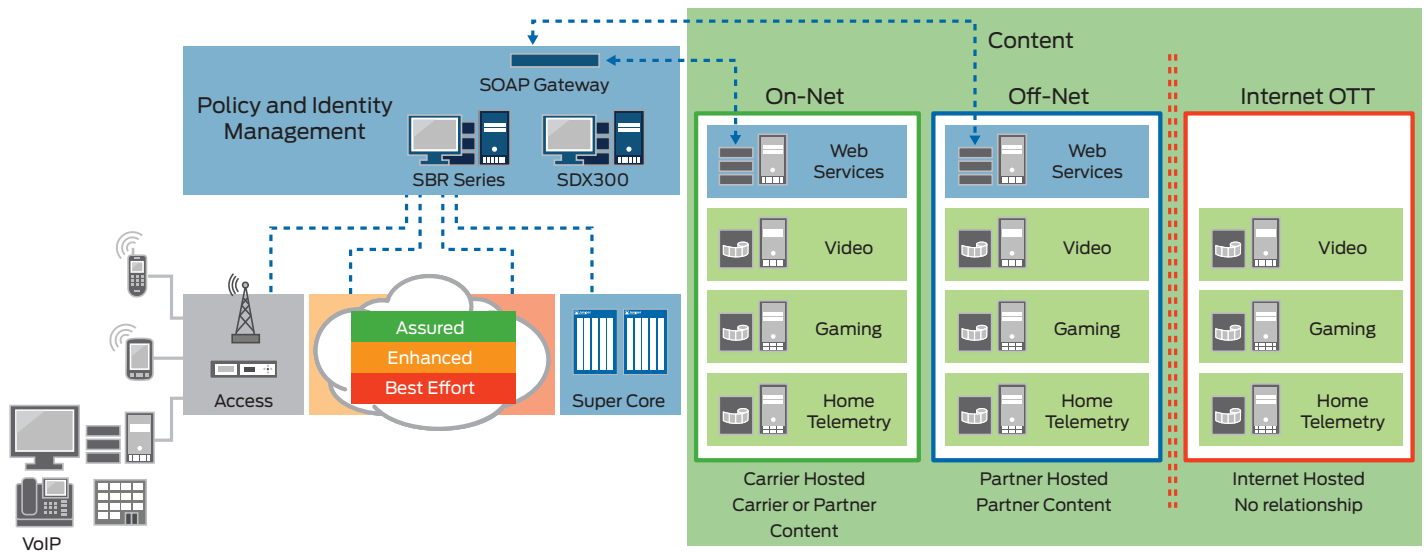


Figure 1: Network monetization: converged identity and policy

Network intelligence will drive the leap from third-generation hierarchical, hybrid networks to next-generation open and distributed all-IP networks. This new model moves away from the legacy operator-controlled and operator-specific environments towards neutral, dynamic, and flexible environments in which users are able to exercise more and more control over their services. To enable this type of environment, service providers must equip their networks with the necessary intelligence that enables them to control identity management and security while designing unified policy management.

As service providers meet the above requirements, their efforts will spawn ubiquitous broadband services that take only days or weeks to develop. These services will be launched into social networks and open Web 2.0 or IMS environments. This in turn will enable service providers to increase average revenue per user (ARPU), customer loyalty, and service velocity.

The Juniper Networks® FMC Solution

Juniper delivers infrastructure solutions that enable three key elements that service providers require of the FMC environment:

- **Service Velocity**—inserting new services in days rather than years
- **Network Monetization**—providing service providers with the network intelligence and identity management they need to be part of new emerging revenue sharing models
- **Operational Efficiency**—using a common operating system and carrier-grade reliable equipment

Service providers require all of the above in order to increase their profitability in an environment in which transport and access technologies and devices are expected to continue to rapidly evolve for the foreseeable future.

For years, Juniper Networks has been helping its customers build intelligent and adaptive networks that ensure high QoS and high subscriber QoE with real-time label switched path (LSP) awareness, and liquid LSP creation/resizing. All these capabilities enable application-driven resource control over multivendor networks. Juniper Networks' service provider infrastructure solution enables carriers to meet all of the requirements described above and increase their profitability in rapidly evolving technology environments.

Service Velocity

Juniper has developed two programs to help speed the process of developing and bringing new services to market. The Open IP Service Creation Program (OSCP) and the Junos SDK Partner Program help service providers achieve their service velocity goals. The OSCP provides a northbound interface, which sits on top of a policy and identity layer, to an open plane that enables service providers to work with any service or application they desire to build a new service in a matter of days.

The Junos SDK Partner Program enables customers and partners to develop new, specialized Juniper Networks Junos® operating system applications using a powerful set of development resources, including a software development kit (SDK) that offers intelligent and secure interfaces to routing and service functions. Both the OSCP and Junos SDK Partner Programs are open, which means that for the first time ever, service providers and application developers who work with Juniper are free to innovate and build open applications in a secure environment for new third-party applications to run or to integrate into Junos OS.

Both programs enable Juniper customers and non-Juniper customers to create new applications for download onto their network routers without having to add specific hardware blades that work only with specific applications. This in turn enables carriers to take more than just one approach when implementing their applications.

Expanding Opportunities

Service providers consistently seek to maintain a competitive edge by devising new service revenues while maintaining operational and capital costs afforded by network management functionality. They also need innovative, intelligent service applications that bring ongoing profitable value to their networks. OSCP participants can expand their market reach and deployment opportunities by developing advanced policy control and service management applications that use Juniper Networks SRC Series Session and Resource Control Modules.

They can leverage the power of SRC Series Session and Resource Control Modules with products such as the Juniper Networks SDX300 Service Deployment System to help them cost-effectively utilize and manage network resources, implement service controls based on specific content/applications delivery requirements, and expand service control to additional networking elements. Application developers who use the platform to build interfaces or applications can capitalize on SRC Series' robust features and intelligent flow-through service controls. As the market-leading policy and resource management platform, the SRC Series ensures that multiplay services are successfully delivered over a variety of broadband access networks.

Profitable Partnering

Juniper is offering its Junos SDK partners an SDK that includes APIs, Junos OS libraries, and more—all within a UNIX environment. Partners can use the kit to create their own custom applications and their own source code. Partners can directly upload their slow path, protocol, or management Junos SDK applications into the routing engine, or they can load their fast packet processing applications onto a Juniper Networks Multiservices PIC IP services blade to support additional hardware for applications such as deep packet inspection or intrusion detection. The SDK's flexibility enables multiple PSDP applications to be uploaded, talk to each other, and talk to other Juniper routers, products, and network servers.

The Junos SDK Partner Program offers secure functionality because of the modular nature of its routing software, a key feature of Junos OS that Juniper's customers have enjoyed and appreciated over the years. Because the Junos SDK API has been created for Junos OS, customers have a wide choice of Juniper platforms that can support their new PSDP applications.

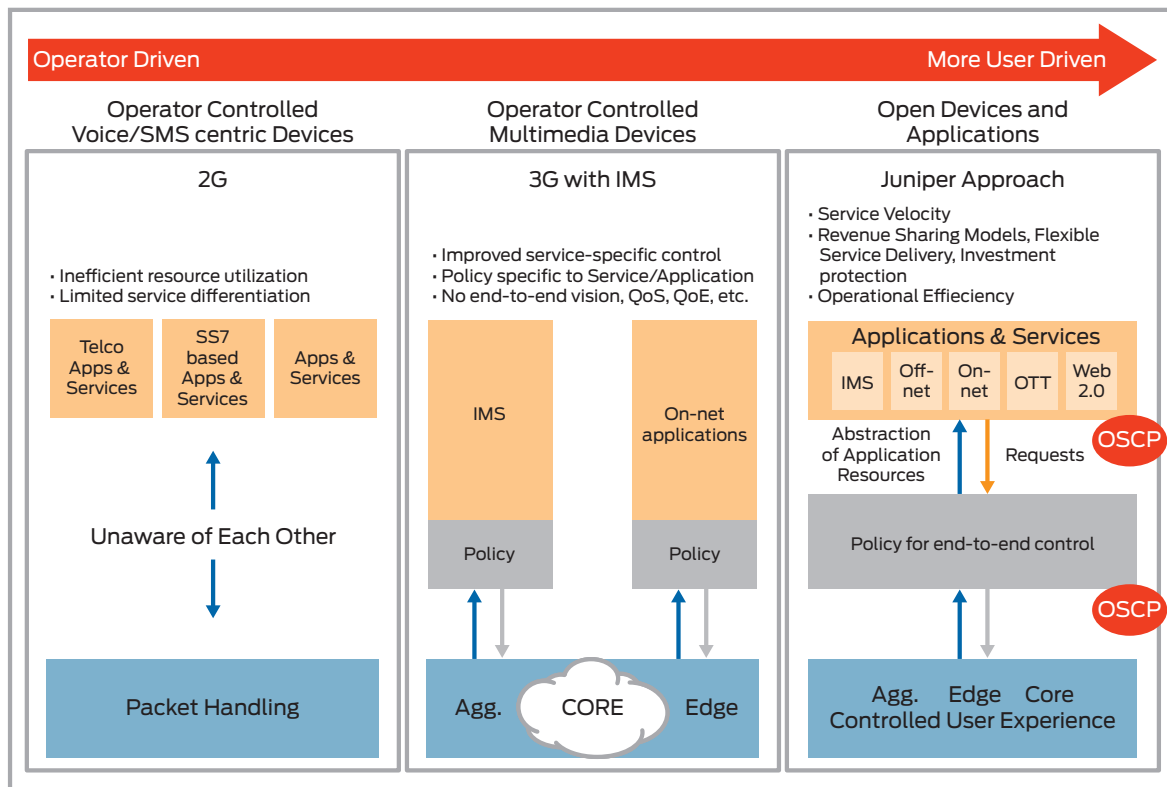


Figure 2: Juniper solutions enable service velocity, network monetization, and operational efficiency

Network Monetization

Juniper is answering the network monetization challenge by enabling revenue sharing models, flexible service delivery, and investment protection. The key to achieving all three is designing network intelligence with converged, logically centralized identity and policy management.

Operational Efficiency

Junos OS is set apart from other available network operating systems because of the way it is built—one operating system, enhanced through one release, developed from one modular architecture. These strategic differences are the foundations for delivering long-standing Junos OS value, including:

- **Accelerated Innovation**—which enhances flexibility to deliver new services and applications through the open, standards-based philosophy and graceful extensibility of Junos OS, including tools that open development to partners and customers.
- **Continuous Systems**—which improve network availability and the delivery of applications and services through high-performance software design, high availability (HA) features, prevention of human errors, and proactive operations measures.
- **Automated Operations**—which drive efficiency to lower operational expenses by reducing complexity with consistent feature implementation, error-resilient configuration, automated scripts for operational tasks, and the upgrade ease of one software release train.

In legacy networks, the delivery of traffic across the core network is best-effort in an over-provisioned core network. In addition, utilization in that core network is kept very low to avoid congestion, even in failover. Junos OS leverages service and policy intelligence to control flows across the core network, making the core network an active participant in the delivery of the user experience.

This allows end-to-end control of flows and allows guarantees for services such as video-on-demand and voice, which are sensitive to jitter and latency. In addition, Junos OS supports service awareness in the core, which enables service providers to avoid making the costly mistake of leaving their subscriber experience with new applications to chance. Service awareness also helps service providers avoid the higher OpEx costs involved in reengineering the network when new services demand guaranteed delivery.

Junos OS constitutes the most flexible and cost-efficient solution on the market today for next-generation network service providers. The software operates from the edge to the core across all Juniper routing platforms. Its modular design ensures maximum stability and feature velocity, with minimal inter-process dependencies. The result is a single train, carrier-class operating system that provides the greatest breadth of features and most stable network operating system in the industry.

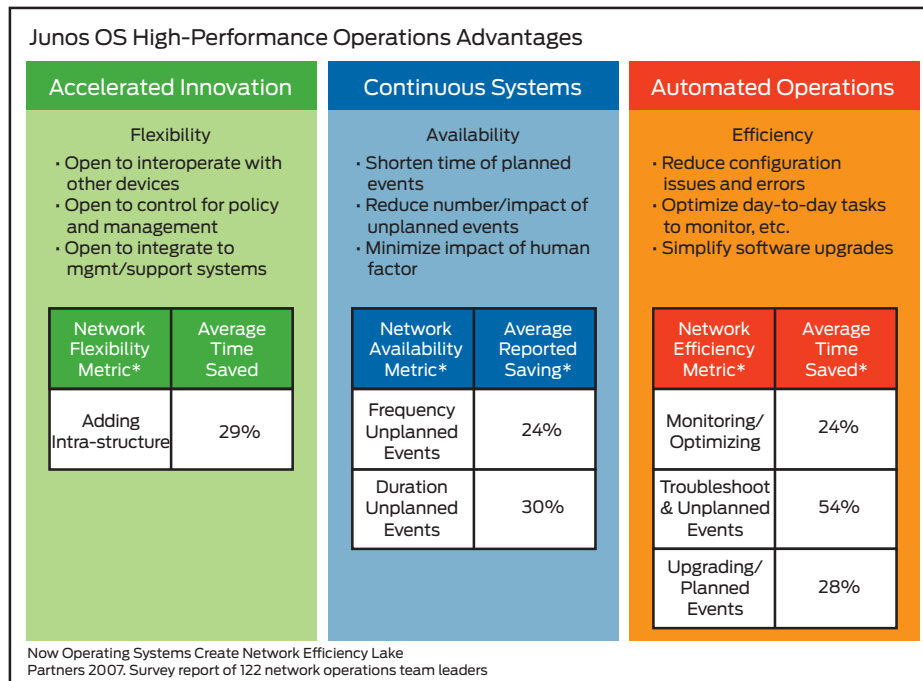


Figure 3: Junos OS high-performance operations advantages

IP/MPLS

In addition to the strategic benefits of Junos OS, Juniper Networks is the leader in IP/MPLS technology and extending IP/MPLS as far as possible into the access network. IP/MPLS networks are key to the service provider's ability to reliably and cost-effectively offer subscribers a wide variety of profitable next-generation voice, data, and multimedia services.

Carriers that work with Juniper Networks can implement a complete solution that leverages Juniper's core competencies of IP/MPLS, QoS prioritization, flexibility, scalability, and reliability to reduce their OpEx costs. They can create new revenue streams by building new IP/MPLS-based services using Juniper's end-to-end capabilities.

Features and Benefits

- Flexibility to support converged networks that accommodate both IP and legacy services (leveraging proven circuit emulation technologies)
- Scalability to support emerging data-intensive technologies
- Cost-effectiveness to compensate for rising levels of backhaul traffic

Solution Components

Juniper's current solutions include:

- AAA for UMA/GAN, CDMA, 3GPP, IMS, WiMAX, and femtocell
- Diameter and SOAP gateways
- Access Resource Admission Subsystem (A-RACS)
- AAA and policy engines

Juniper's policy management solutions (SDX300/SRC Series) are serving an ever-expanding base of more than 100 customers. More than 120 service providers worldwide rely on Juniper Networks SBR Series Steel-Belted Radius Servers for AAA to accelerate service model innovation.

Summary—Juniper Networks: Uniquely Qualified to Lead the FMC Evolution

Juniper Networks is uniquely qualified to lead the FMC evolution because the company serves the world's top 65 service providers: wireless, wireline, cable, and content providers; major defense, intelligence, and civilian agencies; and top research and educational institutions. In addition, Juniper's service provider infrastructure solutions enable operators to realize the most important promises of FMC—service velocity, operational efficiency, and network monetization.

Juniper's OSCP and Junos SDK Partner Program offer service providers the openness and intelligence they need to move profitably into the FMC future. For all of these reasons and more, service providers across the world are looking to Juniper Networks to help them move smoothly from silo-based, service-specific networks to converged, next-generation networks that are capable of delivering profitable multiplay, business, and mobile services.

Next Steps

To learn more about Juniper FMC solutions, please visit www.juniper.net or contact your local Juniper Networks sales representative.

About Juniper Networks

Juniper Networks, Inc. is the leader in high-performance networking. Juniper offers a high-performance network infrastructure that creates a responsive and trusted environment for accelerating the deployment of services and applications over a single network. This fuels high-performance businesses. Additional information can be found at www.juniper.net.

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