

## WHITE PAPER

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### The Junos SDK: A Market Update on Innovation

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#### IDC OPINION

Operator networks are in the midst of a transformation to IP that is leading to the convergence of service platforms within fixed and mobile networks. This transformation introduces technical challenges for the network and is clearly challenging the service and operational domains as well. We are just beginning to see how operators can deliver services that may be shared, personalized, and monetized, resulting in unexpected innovation and application creation from system vendors, network operators, content providers, and end users. New tools, however, are required to deliver this innovation, and new vehicles are also needed to accelerate the time to market of these applications.

Juniper Networks has been pushing the boundaries of innovative design ever since it introduced the Partner Solution Development Platform (PSDP), recently renamed Junos SDK, in December 2007. Junos SDK application development has expanded to include multiple partner types such as customers, outbound OEMs, systems integrators, independent software vendors (ISVs), and research and development partners. This cross-functional collaboration is truly unique to Juniper and is a key differentiator for the company.

- ☒ Delivering new and innovative applications requires a robust platform that is receptive and open to enable market-leading applications. The Junos SDK is that platform, and venture capitalists should keep a close eye on this collaborative area. The Junos SDK brings to market applications that are clearly being enabled at an earlier stage and that require far less funding.
- ☒ No single vendor can offer and deliver all these new applications. But having an open API that operates within a trusted routed network enables many of those applications to get to market faster. To date, Juniper has more than 35 partners signed for Junos SDK application development, and many more are in process.
- ☒ Applications being developed today include a multitude of security features as well as voice and video latency monitoring. However, the future possibilities will impact the market — applications such as anomaly detection, ad insertion, policies for fair usage, and datacenter virtualization. These future applications will bring interesting and profitable services, which will ultimately assist in extracting more value from the network for operator and enterprise alike.

## IN THIS WHITE PAPER

The benefits and value of the Junos SDK to Juniper partners are tangible as well as intangible. We describe the type of customers and partners using the platform as well as the value proposition it has for them and for Juniper.

## SITUATION OVERVIEW

There is much discussion in the networking industry about how operators and large businesses need to extract and capture more value from their network. Operators are experiencing the increasing cost of expanding their network to handle the growing fixed and mobile data traffic with minimal additional revenue contributing to the bottom line. This conundrum is forcing operators to search for tools to assist them in delivering new services and to control the traffic at lower cost points in order to reverse this negative trend.

The industry is also extremely competitive today, and operators are searching for ways to maximize their competitive position. Operators require a reliable and robust network that can scale appropriately to deliver new IP services. Large Fortune 100 companies such as financial institutions are also reliant on their networks for minimal latency and high performance in order to deliver ticker numbers in real time because their network *is* their competitive advantage. In order to mobilize these applications while continuing to reduce the cost per bit as well as the marginal contribution of each service instance, providers need a new tool within a flexible platform to assist them.

While there is no silver bullet to assist either segment, the optimal approach seems to be as follows: One, new services reside on a platform within the network that is robust enough to handle the scale and performance required to enable the delivery of the services. Two, it is vitally important that applications be drawn from the outside market into the network and then delivered within a secure environment. Some vendors have addressed this need organically by developing applications on their own platform or integrating (through acquisition) an appliance vendor's application into the router. This process is dependent on the time to develop and/or integrate the application and can be slow to market as well as potentially lock the application into that platform.

Juniper's approach is to invite applications that are already developed to run within the routing code, enabling faster time to market for those applications as well as a solid platform on which to operate. An open platform for development is very different from a proprietary platform where development may be locked in with fewer options available. The top operator networks that deliver video and voice services today are looking for these types of tools to assist them. One example already deployed is video and VoIP monitoring to avoid potential network latency issues. IDC believes an open platform through partner collaboration is one of the best approaches to solving the conundrum discussed above because it increases the value of the network and places the operator in a position to offer revenue-generating services.

## THE JUNOS SDK: HOW IT WORKS

The Junos SDK creates an opportunity to design, develop, and deploy specialized applications that partners or operators can then publicly monetize. This flexibility enables multiple Junos SDK applications to be uploaded; they can interact with each other, with other Juniper products, and with network servers in real time. In addition, the Junos SDK allows customers and partners to incorporate their own unique application that runs on the Juniper platform.

- ☒ The Junos SDK is a software development kit that includes APIs, Junos libraries, and more within a Unix environment. It is provided to established partners along with support, consulting, integration, and quality control.
- ☒ Those partners then create their application with the Junos SDK and their own source code and compile the data, which then creates a custom Junos SDK application, a piece of software that is completely self-contained in the Junos platform. If the application is an inline protocol or management application, it is uploaded directly into the routing engine for maximized performance and signaling velocity. Or, in the case of fast packet processing applications, it is loaded onto a multiservice PIC (an IP services module) that has optimized high-performance hardware assist for those applications.
- ☒ This is not just a simple open API or an open source software approach. Juniper has a rigorous process to determine if a partner is a viable candidate for Junos SDK development. Once that process is complete, the partner must have a valid signature and an authorized administrator to run the application. Then, the modularity of Junos inherently protects not only the applications running on that network but the underlying network as well. This secure approach is extremely important for any mission-critical network, as liability and risk factors can have catastrophic effects. No vendor in the IP market has a solution this intimately integrated into the control plane and data path of the router. This approach is not complicated or excessively restrictive; the process simply ensures that applications that run within the router are completely secure.

Juniper targets high value-add partners, so the combination provides synergy for Juniper as well as its partners and customers. With these relationships, a provider can move beyond simple packet processing/transfer and deliver new services in a turnkey fashion. This flexibility is vital, as no one particular direction will satisfy the millions of users today.

## SIX PARTNER TYPES USING THE JUNOS SDK

Juniper customers and partners come from the service provider, content provider, and enterprise markets and to date have created unique and differentiated applications. Today, the six types of application partners are as follows:

- ☒ Customers such as tier 1 operators and federal government agencies want to create their own tailored security applications. This is a very typical use case for the Junos SDK and has resulted in custom network protocols and a plethora of security applications. One example is where the Junos SDK is used to look at unusual

patterns or IP flows to identify potential security risks. Other customer-built applications extend to traffic management, sophisticated QoS, multicast extensions, and path computation. IDC has no doubt that content providers must also be interested in this type of approach to continue to differentiate themselves and deliver new applications to market. Juniper has several customers in this category.

- ☒ ISVs typically put their product on appliances that require qualification and add to the already constrained network operating space. The benefit to an ISV is that the application can now run on a high-performance platform with added access to the extensive Juniper customer base. The application can then be sold by the application vendor or by Juniper itself. *When you have targeted applications that can reach key markets quickly, everyone benefits from the additional revenue.* Announced vendors in this segment include Triveni Digital and Telchemy and several others. Triveni Digital uses the Junos SDK to integrate its video monitoring solution for MPEG analysis to identify video quality issues. Telchemy is using the Junos SDK to integrate IP service monitoring, measurement, and analysis technology on a per-flow basis and in real time. Many signed partners in this segment are actively using the technology. IDC believes that Juniper should consider the format of testing and preintegration an excellent way to migrate potential acquisition targets quickly into the company. This also mitigates the risk of an M&A purchase because due diligence and performance testing have already taken place.
- ☒ Systems integrators are another key segment using the Junos SDK. A systems integrator can create mindshare and stand out as an innovator if it can offer differentiated and competitive applications. Lockheed Martin is using the Junos SDK for defense applications that are designed to meet specific federal government requirements. IDC believes the Juniper-IBM relationship will be a huge benefit to both partners over time, as the partnership already has shown itself to be a success. Juniper has several active signed partners in this segment and acknowledges that these relationships provide a very large opportunity. The Junos SDK provides systems integrators with a distinct advantage to customize services, installations, and upgrades and also provides Juniper with an extensive and growing customer base.
- ☒ Outbound OEMs benefit from the Junos SDK because they can go to market on a proven and robust platform right away. Faster time to market provides additional revenue for OEMs and a wider market opportunity for Juniper. OEMs are partners that build product by adding unique capabilities to the Juniper platform itself. Harris Stratex is using the Junos SDK as a wireless services gateway to control data traffic at the aggregation layer. Because LTE networks will require lots of bandwidth, close integration with the routing and switching control plane helps provide policy management for the emerging mobile data networks. It is also an alternative to deploying a separate gateway box. Based on our discussions with multiple Juniper partners and service providers, IDC believes that no other vendor has an open system like this. Harris Stratex also discussed the benefits of working with Juniper; it said the process of application development was synergistic and working with Juniper was easy. Juniper currently has other signed partners in this segment, Harris Stratex being one of them.

- ☒ Research partners can innovate on the Junos SDK given their already open and academic environment. These partners can provide proof points for their creation on the Juniper platform as well as create a "buzz" in the marketplace. Juniper has several signed partners in this segment.
- ☒ The last segment for development is internal to Juniper, but it is important because it allows Juniper engineers to utilize the Junos SDK to develop and test their own applications. This increases the value within Juniper and allows engineers to see a faster time to market for their applications.

Many more customers and partners are in discussion with Juniper. While several customers are signed up in any given segment, a single systems integrator or outbound OEM may result in large returns for the partner as well as Juniper. In other words, one major partnership can have profound implications on the market for application delivery as well as integration. IDC believes that with the current and future potential customer base (see below), Juniper will see its success and market penetration increase in the next few years.

## THE FUTURE

While we discussed some of the applications within the segments above, further discussion may be warranted to break out some of the applications on which we did not elaborate, as a growing set of potential partners could build them. Juniper customers should be aware of these applications because they might eventually be deployed on existing Juniper routers. Application vendors and outbound OEMs should be aware of the robust and high-performance platform available to them to get their applications to market faster. Moreover, operators should take note that these applications await them and will add tremendous value to their networks.

- ☒ Most of the applications fall into the security segment, where visibility and controlling what goes into a packet stream are applicable to the federal government, large financial institutions, and operator networks. IDC believes the most interesting security application comes in the form of "security forensics," an increasingly common application in operator and federal networks and potentially one of the most fertile grounds for development and enhancement. It is also very applicable in financial networks, as abnormal banking transactions, withdrawals, or transfers that are anomalies can be caught by sophisticated algorithms to identify mischievous behavior. In fact, IDC believes that anomaly detection (any transaction/pattern or flow behavior out of the ordinary) can become a key application in numerous vertical segments. Other security applications include extensions to DPI, malware and antivirus applications, as well as private or custom protocol developments.
- ☒ Personalization applications such as targeted ad insertion will provide another revenue opportunity for operators. Targeted ad insertion on handheld devices using location-based services can increase and extend the opportunity beyond fixed networks to next-generation wireless networks. IDC believes "opt-in" models will become the norm in order to overcome privacy issues, increasing the potential growth in this market.

- ☒ Applications that enable the "fair usage" model in mobile and fixed networks are another key application. The challenges for operators today are the network management and policy arrangements for the increasingly capable devices that are creating an explosion in data traffic. One vagabond gamer using excessive bandwidth on the mobile network cannot cause other customer voice calls to drop. The fair usage model addresses this imbalance and is often tied to the billing systems. Ultimately, it allows an operator to take better control of the network so that all of the customers get a specified amount of bandwidth and the priority they have purchased. This also requires a significant level of intelligence and IP competency in mobile networks where this essential tool could be of value in the operator's arsenal to ensure quality of experience for all subscribers.
- ☒ Probe technology is being used in numerous sites and products today to isolate problems. It will soon produce a fine-grained analysis of performance metrics and be able to initiate failover in the event that a problem occurs. It can also assist in eliminating new purchases of test equipment, a costly capital outlay in itself.
- ☒ Datacenter virtualization is the underlying foundation of cloud computing. The Junos SDK may be able to assist in virtualization of the network to intimately understand what efficiencies can be derived. This could be a huge area of development for the Junos SDK in the next few years as this market takes off.

It is valuable to note that there will be new expanded elements of software that are extensions to Junos. The regularity and consistency of the Junos platform will be leveraged across the network using the same paradigm as extending applications across the network. Network orchestration tools are already under development to assist in this cross-network extension, and the Junos platform is extending SDK innovation to a larger client-based community with an extensive base of ideas and creativity.

The Junos platform allows customers and partners to unlock the value of their network by deploying a rich set of Juniper applications, third-party developments, and custom network design. The components of the Junos platform will include:

- ☒ **Junos** is a modular and extensible network operating system that includes the Junos SDK for the development of intelligent onboard applications. Junos integrates routing, switching, and security into a single operating system built to reduce complexity and automate operations.
- ☒ **Junos Space** is a programmable and extensible multipurpose Web 2.0 application platform that enables development of software as a service (SaaS) and network operations applications on an SDK.
- ☒ **Junos Pulse** is a standards-based, dynamically provisioned identity and location-aware software client that enables mobility, connectivity, security, and application acceleration and offers support for third-party application development and integration.

## **CHALLENGES/OPPORTUNITIES**

IDC believes that managing the increasing number of partner relationships the Junos SDK is attracting will be a challenge for Juniper. Can the product scale with additional applications, and how many will it ultimately be able to support? Juniper will need to grow internally to support the expansion of this platform and its partners.

There are many opportunities to create SDKs for other parts of the network where consumers may play a role, but these are new and different types of relationships still to be worked out. IDC believes that Juniper might create other SDKs for other end-user markets, broadening the range of innovation on all the Juniper platforms.

## **CONCLUSION**

Juniper's competitive advantage is the architectural freedom it offers its partners while simultaneously securing them on high-performance platforms. Junos operates across all Juniper platforms, an advantage for operators when deploying multiple Juniper products in the network. The same operating system, same CLI, and same feature implementations exist across all platforms. Juniper customers have told IDC that the regular releases of Junos provide consistency and reliability for the network and that the Junos SDK brings to market innovation and collaboration for a multitude of applications.

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