

# Access to Innovation: Leveraging Network Ecosystems for Strategic Differentiation



by Jennifer Pigg | October 2009

## I. “Any Color as Long as It’s Black” or the Full Spectrum?

The network industry of the past 10 years is characterized by two seemingly contradictory trends. The first is the move toward consolidation and the accumulation of competitive mass. We see this in the merger of Alcatel and Lucent, the formation of Nokia Siemens Network and the acquisition lists of Ericsson, Cisco, Alcatel and Lucent (both before and after the merger). These vendors are focused on moving from box-based sales into solution sales—and they should be. Enterprises and service providers are not looking for another device; they are looking for a solution or service. To achieve this solution sale, networking vendors are providing vertically integrated product lines that would make Henry Ford proud. From chipsets and switches, to network applications and outsourcing, traditional networking vendors are intent upon doing it all and doing it themselves.

The second trend is exemplified by the Web 2.0 entrants to the market: Amazon, Google, Apple, eBay and a wide variety of consumer device manufacturers. These players are focused on providing highly customized services to the consumer and, to do so, they rely on a rapidly expanding ecosystem of third-party developers.

Are these trends compatible or will one dominate? Yankee Group believes that the near-infinite granularity in service customization that we see on the consumer application side has already worked its way into the enterprise and service provider markets.

In their book, “The New Age of Innovation: Driving Co-Created Value Through Global Networks,” authors C.K. Prahalad and M.S. Krishnan state that the transformation we see in all forms of commerce today is based on two basic pillars:

- “Value is based on unique, personalized experiences of consumers. Firms have to learn to focus on one consumer and her experience at a time, even if they serve 100 million consumers. *The focus is on the centrality of the individual.*”

- “No firm is big enough in scope and size to satisfy the experiences of one consumer at a time. All firms will access resources from a wide variety of other big and small firms—a global ecosystem. *The focus is on access to resources, not ownership of resources.*”

This is not a new concept. We have heard variations on this theme since Clay Christensen presented his theory of disruptive innovation in the 1990s. But the dominance of the Internet and mobile communications—what Yankee Group calls the Anywhere Network<sup>®</sup>—has accelerated the trend. Some network vendors are positioned to capitalize on the shift in network innovation from closed proprietary systems to an open, programmable and extensible ecosystem; some, for many reasons, are not.

## Benefits and Challenges of an Open Network Platform

For the service provider to constantly adapt services to the demands of the customer, network applications and infrastructure must be tightly integrated. In addition, this innovation must be accomplished at a lower cost. Overall network traffic is doubling every two years through 2013, yet average revenue per user is stagnant in most geographic regions. To survive, the service provider must develop new ways to monetize the network by dramatically decreasing both the network cost per bit and the time to market for new services. Tight integration is therefore critical to the infrastructure provider supplying these flexible solutions. The service provider must be able to drive revenue off of the network infrastructure, not just push bits.

The hardware infrastructure vendor can develop solutions internally, and by doing so, it maintains complete control over the development; integration is guaranteed, and the support and management chain is obvious. If we believe Prahalad and Krishnan’s thesis, however, no vendor by itself will ever be big enough to provide the diverse, innovative ecosystem of solutions that service providers must have in order to compete successfully.

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Opening the network platform to third-party development gives the hardware vendor access to an unlimited, innovative, highly motivated and talented resource pool. At the same time, it presents significant benefits to the ISV, including:

- Improved time to market
- Broadened market opportunity
- Expanded marketing and sales channels

However, this strategy also brings with it significant challenges, especially in the hardware vendor's relationship with the network service provider:

- Network applications are not consumer widgets. There must be a rigorous certification process before they are allowed on the service provider network.
- There must be a clear problem escalation procedure that gives the service provider a single point of contact for problem resolution.
- Changes to the network OS can and will impact third-party applications. The test period for a new release of the OS must include these applications.
- If the service provider demands completely redundant solutions, there must be a method in place for the hardware vendor to support redundancy or In Service Software Upgrades (ISSU) for third-party applications.

The service provider may want flexibility, but not at the cost of reliability and nonstop availability.

## II. The Current Landscape: Open Vistas and Secret Gardens

The history of each of today's leading router vendors—Cisco Systems, Inc., Alcatel-Lucent (ALU) and Juniper Networks, Inc.—is characterized by remarkable innovation. When it comes to third-party development efforts, however, their strategies diverge sharply. In this section, we briefly examine the development ecosystems of each of these vendors.

### Cisco

Cisco has an extensive internal network application development program. Its Software Application Support (SAS) program supports more than 100 Cisco software application products across a wide spectrum of network-centric technologies. In terms of third-party development, the company announced on Oct. 5, 2009, that it would combine its existing developer programs, Cisco Technology Developer Program (CTDP) and Cisco Compatible eXtension (CCX) program, to form the Cisco Developer Network (CDN). In addition to consolidating its existing partner programs, Cisco promises improved marketing, expanded sales support and streamlined management processes. Participation in the program is by membership. The membership is fee-based and runs between \$1,000 and \$5,000, based on level of partnership and geography. The CDN program focuses on compatibility and interoperability of Cisco products with third-party developed software. The applications are intended to run over a Cisco network, not to physically reside on a Cisco router.

Cisco also has a development program, the Application eXtension Platform (AXP), focused on its Integrated Service Router (ISR) family of enterprise routers. AXP was introduced in April 2008 and consists of open, Linux-based Cisco ISR hardware modules, APIs and an SDK. Cisco has not opened IOS, the network OS for the ISR, to third-party development; it has provided the hardware and software "hooks" into the ISR and IOS, enabling the router to host custom or third-party applications predominantly targeted at operational efficiencies. As of the end of 2008, more than three dozen applications, mostly custom applications developed by Cisco customers, had been written using the AXP.

AXP is the only Cisco program that allows a third-party developer to integrate directly with IOS. Yankee Group does not expect to see Cisco move aggressively to open up IOS, IOS-XR or IOS-XE for third-party development due to the company's focus on internal development for applications that reside on the routers and switches, and also due to the complexity of opening up IOS.

## ALU

Like Cisco, the majority of Alcatel's third-party development programs focus on its Enterprise products. The Alcatel-Lucent Alliance and Application Partner Program (AAPP) provides APIs and SDKs for third-party developers looking to deploy applications for Alcatel-Lucent's IP Touch, OmniPCX (both Enterprise and Office) and OmniTouch Unified Communication enterprise products.

On the service provider side, ALU is focused on the solution sale and is vendor-agnostic in the devices and products it will manage as part of a managed services contract. However, the company is focused on developing its own software ecosystem and states that it does not have plans to open up its network OS, via APIs and an SDK, to support a third-party development program. There are two areas in its service provider line of business, however, where the vendor actively pursues third-party collaborative development.

The first is ALU's Connected Partner Program. This program is targeted at the service provider operational support system (OSS). Its purpose is to remove the cost of OSS integration and reduce the time to market for service provider OSS. As part of the program, ALU works with OSS partners to make sure that scheduled releases of ALU software are backward-compatible with the OSS.

The second area of collaboration is in data warehousing. ALU takes the wide variety of information about traffic on the network, puts it all into a data warehouse and ties it into the ALU policy management framework. The warehouse is the repository of a wide variety of information about subscribers, security, applications and the network. To gather all of the data needed, ALU must be able to pull information from not only its own devices, but also third-party network devices (e.g., DSLAMs and media gateways), firewalls, deep packet inspection (DPI) devices and applications (e.g., Citrix, YouTube and SAP).

If this sounds more like integration and interoperability partnerships, well, it is. Nevertheless, it is a complex issue. ALU has considered opening up its policy manager for specific third-party development, notably application signature software. ALU currently writes the software that allows the policy server or DPI to differentiate between applications. Keeping these application signature identifier programs up to date, however, is not trivial and can become unwieldy as the number of applications grows.

## Juniper

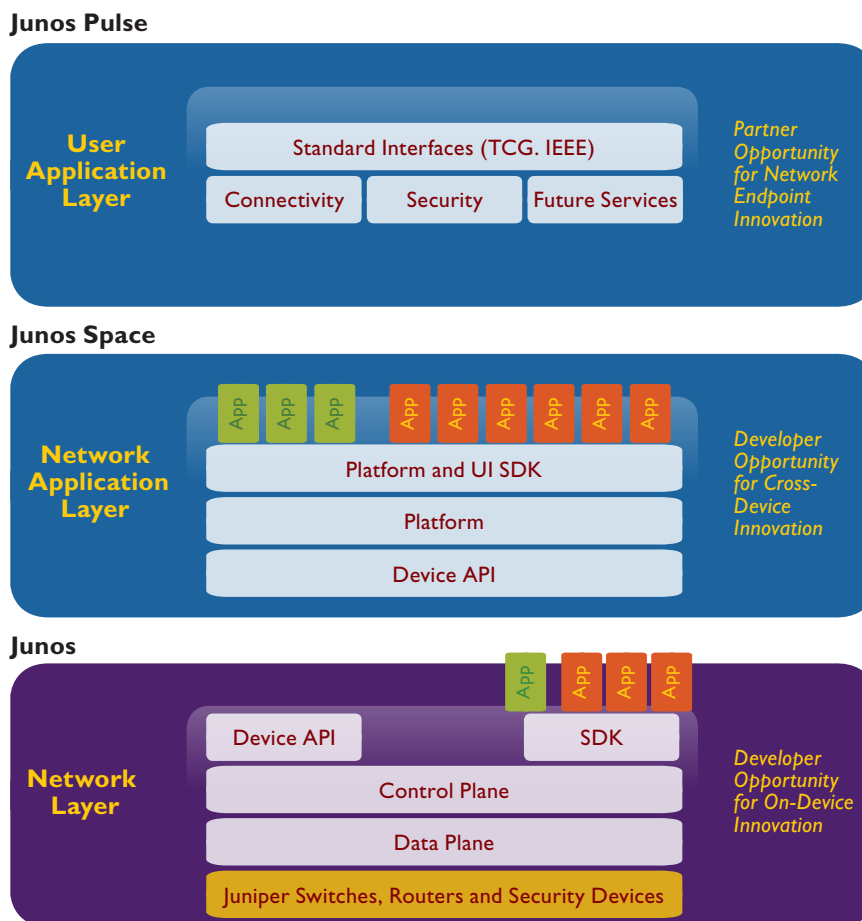
Juniper's path to innovation diverges sharply from that of its competitors. Up until now, network applications such as security, configuration and planning, and policy management have been tied to the specific hardware and chipsets to which they were written: firewalls, network routers and switches, and policy servers. As a result, while these network applications may be robust in their own right, they are difficult to integrate with each other or to customize or modify. In addition, because they are tied to the hardware on which they run, these applications cannot leverage advances in computing and development architectures. Observing the complexity and delay that characterized the network tasks its enterprise and service provider customers performed every day, Juniper saw an opportunity to make the network simpler, more open and smarter. It decided to provide a new suite of development platforms over which many network applications from many sources could run.

As a result, Juniper announced this October that it was introducing two new development platforms, Junos Space and Junos Pulse. Together with its existing Partner Solution Development Platform (PSDP), now renamed Junos SDK, these form Juniper's Junos Platform (see Exhibit I on the next page). In more detail, Junos Platform consists of:

- **Junos Space:** This programmable and extensible multipurpose Web 2.0 network application platform enables the rapid development and deployment of productivity, collaboration, SaaS and network operations applications.
- **Junos Pulse:** The only standards-based integrated network client available in the industry today, Junos Pulse provides an open-architected, dynamically provisioned identity- and location-aware software client that enables mobility, connectivity, security and application acceleration, offering continuous support for third-party application development and integration.

## Exhibit I: Moving Up the Value Stack

Source: Juniper Networks



Junos Space and Pulse build on the success of Juniper’s PSDP, or Junos SDK, introduced in December 2007. With the introduction of Junos SDK, Juniper became the first—and to this date, the only—leading routing vendor to open its OS to third-party development. The Junos SDK includes an SDK with APIs and Junos libraries within a Unix environment. Today, Juniper has more than 40 Junos SDK development partners, including IBM, NTT, Telecom Italia, NEC, France Telecom, Lockheed Martin and the three partners profiled later in this report, Harris Stratex, Triveni and Telchemy.

Junos Platform is targeted at a wide spectrum of third-party development partners including: Juniper’s existing service provider and enterprise customers, application vendors, OEMs, system integrators and the research community. Of course, Juniper

itself will also develop to Junos Space and Junos Pulse. With the introduction of Junos Platform, it is introducing three Juniper applications for Junos Space. These applications are designed using an agile Scrum development process and service-oriented architecture (SOA) with Java 2 Platform, Enterprise Edition (J2EE) process specifications. The resulting performance of Juniper’s new applications is impressive:

- **Ethernet Activator:** This is a simple-to-use Web 2.0 application for configuring and provisioning VPNs. Juniper tested a variety of configuration and provisioning tools to evaluate their performance. The Ethernet Activator was able to configure VPNs at 10 times the speed of the fastest configuration tool tested. VPNs can be provisioned over Juniper gear at introduction, but the Ethernet Activator will run on any standards-based platform.

- **Route Analyzer:** Acting as an MPLS peer, the Route Analyzer collects and records all network events. It aids in troubleshooting problems and allows the network operator to simulate network changes.
- **Service Now:** This automated diagnostic utility relies on in-device scripts for failure monitoring and delivery of information to the Service Now application at the enterprise or service provider network operations center. Initial deployments of Service Now at Juniper customer sites have demonstrated a 30-times reduction in the mean time to recover (MTTR).

Junos Platform is an intrepid move for Juniper, but does the company's current experience with development partners warrant this optimism? We spoke with three current partners in the Junos SDK or PSDP program to evaluate both their experience as a Juniper partner and the value they perceive in the partnership. The results of these interviews are detailed below, including comments excerpted from the interviews. The individuals interviewed included CEOs, VPs of engineering and product line managers.

### III. Harris Stratex Networks

Harris Stratex is a global supplier to service providers of end-to-end wireless solutions for mobility and fixed network applications. Its solutions enable service providers to extend triple-play broadband data services wirelessly to new subscribers in developing economies and in underserved rural areas. The company is publicly held and posted revenue of \$718 million in fiscal year 2008. Customers include global Tier 1 mobile carriers such as France Telecom/Orange and Vodafone, as well as key regional operators such as MTN Group and Zain in the Middle East and Africa. Harris Stratex is also a supplier to major North American carriers such as Verizon, Sprint and AT&T, and it has an extensive customer base in local, state and federal government, energy, utility and railroad companies.

#### Business Challenge

On March 2, 2009, Harris Stratex acquired WiMAX solution developer Telsima Corp. of Sunnyvale, Calif., for \$12 million in cash. Five months earlier, on Sept. 30, 2008, Harris Stratex announced a partnership agreement with Telsima for end-to-end 4G network solutions. Telsima had developed an Access Service

Network (ASN) IP gateway in its WiMAX platform, but Harris Stratex required a router platform to achieve its goal of an end-to-end 4G migration solution. The company says it recognized that "it's very difficult to develop a router platform." The time and effort required to develop such a platform would seriously impact the company's ability to address the 4G/WiMAX market. "For example, [competitor X] is 6 years behind the industry in the hardware platform and they are just now coming out with 10GigE," Harris Stratex notes.

#### Solution

Harris Stratex says it chose the Junos SDK for development of its WiMAX ASN gateway because its "engineers were able to take the SDK and the APIs and develop to them quickly." The common Junos source code across Juniper products "definitely" helped the development process and the utility of the solution. The company's WiMAX gateway will run on both the Juniper M and MX Series. Harris Stratex says this gives it "the opportunity to right-size the solution to the customer." Vendors with different OS modules for different platforms would have made the development process "tough."

Harris Stratex needed a partner that had an open platform with APIs and an SDK. Juniper was the only major router vendor with this type of development capability. The architecture of the Junos SDK puts Harris Stratex in the forwarding path of the router so that only information that needs to transit the router is forwarded. This is in contrast to vendors that rely upon scripting for third-party software integration. Scripting integrates with the router supervisor, so it may impact the router directly, and that is not an optimal solution for either the router vendor or the development partner.

#### Partnership Experience

Harris Stratex has spoken with Juniper about protocols and functionality in Junos that they would like exposed via APIs to the SDK, and according to Harris Stratex, Juniper has expressed no sensitivity about what it wants opened. Harris Stratex relates that it is "well protected and comfortable" with the framework agreement that it put together with Juniper, including the clauses for support, joint marketing and future development on the SDK. "There is no reason for us to move away from them," Harris Stratex says.

## Benefit

Harris Stratex points to a number of benefits to the development of the WiMAX gateway with Juniper. From a marketing perspective, Harris Stratex is realizing value in Juniper's willingness to assist in the development and marketing of the platform. From a development perspective, Harris Stratex says it has "been able to develop a product without developing a hardware platform, and that has been very cost-effective" for the company.

The best example of a benefit to Harris Stratex, however, is Bharat Sanchar Nigam Ltd. (BSNL) of India, the world's seventh largest telecommunications company. As a result of Harris Stratex's WiMAX contract with BSNL, recently expanded with the help of the Junos SDK-enabled WiMAX gateway, industry reports show Harris Stratex at 70 percent market share for WiMAX in India.

## Next Steps

Harris Stratex is in discussions with Juniper about other opportunities to expand the relationship, starting with porting the WiMAX gateway to the MX platform.

## IV. Triveni Digital

Triveni Digital, Inc. is a subsidiary of LG Electronics. The company develops systems that enable the management and distribution of data and metadata in digital television streams and other broadcast and multicast media. The systems are distribution mode-agnostic, supporting transmission over satellite, digital television, cable television, ATM switches and IP-based infrastructure. Due to the wide variety of modes and standards used in digital video transmission, Triveni focuses on developing data broadcasting, stream analysis and monitoring products that are open and standards-compliant, as well as easy to use and innovative.

### Business Challenge

Triveni's StreamScope product is a monitoring solution for video assurance. It can monitor, analyze and troubleshoot video stream quality on an enterprise-wide scale. The StreamScope solution can be deployed across a broadcast operation, on a local, regional or national scale. Prior to the development with Juniper, StreamScope was available in rack-mountable and portable models.

Triveni's most significant challenge is to prove the benefit and utility of its solution. As with many performance monitoring tools, Triveni's potential customers often do not actively seek out a dedicated video quality monitoring solution because they are not aware of the benefits, in terms of improved video quality, that can be achieved from the implementation of a solution such as StreamScope. At the same time, the number of players in the video distribution market, both intra- and extra-enterprise, is growing rapidly. Triveni was looking for a low-cost solution that could address smaller video distribution enterprises and perform as a Trojan horse for larger customers that were unaware of the benefits of a video monitoring solution.

### Solution

A typical environment for the implementation of StreamScope is to integrate the software on to a third-party probe. Triveni chose to leverage the Junos SDK and integrate the StreamScope software internally onto the MX router, eliminating the need for a rack-mountable or portable scope. "Juniper's strategy of having a single release [of Junos] across multiple platforms is attractive to third parties," remarks Triveni, adding that the "tools for integrating with CLI were straightforward."

### Partnership Experience

"From a business perspective, Juniper has been a pleasure to work with," Triveni says, noting that it "has pushed the SDK harder than anyone—so there have been some lessons learned." Still, "Triveni was trained on the SDK in October, and we were working on a contract for the product in July. One year from initiation to launch is very impressive."

When Triveni encountered a problem with implementing the StreamScope solution on the router, Juniper was quick to bring one-third of its engineering team to bear on the solution. The problem was resolved in the next release of Junos. Triveni says it found that this response was "indicative of how much Juniper is committed to the program and the quality of its support." Triveni also remarked that when an e-mail was sent to Juniper for support, it always received a response within 24 hours. Triveni notes that the SDK documentation was a little lacking, but that it has been steadily improving.

## Benefit

The primary advantage to the StreamScope customer is the elimination of the box, thereby saving footprint, power and a port on the router. This translates to an advantage to Triveni because it can enter an enterprise as a software solution integrated into the network router. This software license sale, in turn, lays the groundwork for a more extensive implementation of box-based StreamScope solutions, once the customer realizes the benefits derived from video monitoring. As Triveni says, “if customers enter through the Juniper route, we can parlay that to other uses.”

Triveni provides test and measurement solutions to the digital television industry and has significant market share in the broadcast space. The company also has a prominent cable business, mostly in the test and measurement area. Triveni is the market leader in Program and System Information Protocol (PSIP) solutions with its GuideBuilder PSIP Generator. By leveraging the Juniper relationship and the StreamScope product, Triveni is looking to command similar market leadership in video monitoring and assurance.

Triveni remarks that both it and Juniper took a leap of faith that the solution would have relevance in the market. Customers know that they have to route video, but they are not sure or have not articulated the advantage of doing it right. So the sales cycle is long and, Triveni says, the risk is that no one will notice “that we have some great stuff.” While there has been an opportunity cost, Triveni is confident of the upside potential. They are also assuming that the follow-on market from the router-based StreamScope will be good. The company says “Juniper has been generous in allowing Triveni to mention and market the other, stand-alone solution.”

## Next Steps

Currently, Triveni has implemented StreamScope on Juniper’s MX series router. The company also plans to implement the solution on the M series router. Triveni says other solutions can be placed on the same Juniper blade concurrently, something it plans to do next year.

## V. Telchemy

Telchemy, Inc., a privately held firm based in Duluth, Ga., provides voice and video over IP performance management technology via its service quality monitoring and analysis software products. Instead of deploying stand-alone probes, the strategy of most test and measurement vendors, Telchemy deploys agents that are embedded into network equipment ranging from CPE, to media gateways, to third-party test and measurement solutions. The company states that its products are marketed through over 120 product companies, including 36 test and measurement equipment vendors, which use the Telchemy solution to analyze delay-sensitive traffic in the core. The company’s solutions are deployed by telecom and mobile service providers, cable service operators and large enterprises.

Telchemy’s goal is to be the principal supplier of embedded voice and video over IP performance management technology. Its stated long-term vision is to enable “highly distributed autonomic (self-managing) networks, able to self-heal, self-protect and self-optimize.” Its largest competition is internally developed solutions within potential customers.

## Business Challenge

Telchemy wants a stronger presence in the large carrier market space. The majority of its existing partnerships are in the CPE, access, media gateway, and test and measurement space. The company observes that current solutions available to large carriers to manage voice and video infrastructure are expensive and yet limited in their ability to monitor the delay-sensitive traffic at each network segment. The carriers’ IP MPLS infrastructure is “quite complex,” relative to accessing subnets and tunnels. Telchemy reasons that a tightly integrated solution, while difficult to achieve, would be a benefit to large carriers.

## Solution

Telchemy says it had been talking to Juniper about integrating its products into Juniper’s core routers for “five years or so, but it was never quite the right time.” When Juniper introduced the Junos PSDP (now the Junos SDK), both companies recognized it as a good way to move forward with a partnership.

Telchemy uses the Junos SDK to integrate its voice and IP services monitoring, measurement and analysis technology on Juniper's M and MX series routers. The integrated Telchemy embedded Performance Monitor (TePM) application provides network-, session- and application-layer monitoring for IP voice and data services. TePM supports a wide variety of predeployment and postdeployment operations activities related to service rollout, health monitoring and troubleshooting.

## Partnership Experience

"With Juniper and Telchemy, there is much tighter collaboration than we've had with other partners," Telchemy says, noting that most of Telchemy's partner relationships have been for passive test technology, while the Juniper partnership is for active test technology. "We usually give the vendor software, and that's the last we see of it." Telchemy says that Juniper, in contrast, has been "immensely helpful" with the SDK and from a project management perspective, evaluating how the product will interoperate with the Juniper management platform.

Porting the software onto the Juniper router platform progressed more smoothly than usual for Telchemy. According to Telchemy, Juniper is "much more organized and proactive in anticipating what is needed to make porting easy. Juniper provided expensive routers, software and support to the labs to help get us up and running. [It is] very quick to ask us if we need anything: are there changes that we see they need to make or any limitations we've identified." The company also observes that follow-on support is good. In terms of the benefits of common Junos source code across platforms, Telchemy notes that there is no difference in porting the software onto the different Juniper routing platforms.

Telchemy suggests that the Junos SDK program would benefit from a distance learning, prerecorded format, since smaller developers find it difficult to send all engineers working on a project to a five-day training course. From a marketing and sales perspective, Telchemy says Juniper has been "extremely helpful," providing Telchemy with sales forecasts as well as opportunities for joint press releases and trade show activities.

## Benefit

Juniper has brought the core network to Telchemy, and the partnership will enable Telchemy to have a stronger presence in the large carrier market space. The company is currently selling its solutions to one Tier I carrier, independent of Juniper. Once the Telchemy-Juniper product is available, however, the carrier intends to buy the integrated router solution from Juniper.

Telchemy states that when it approaches a carrier today, it can offer Telchemy functionality any way carrier wants it: "It's integrated into anything, so the service provider can have it running on the IP phones, set-top boxes, or core or edge routers, and collate all info with middleware." Delivering these capabilities from within the routing infrastructure allows service providers to ensure quality IP service delivery on a wide scale, while reducing the cost and complexity that comes with stand-alone monitoring and measurement appliances.

## Next Steps

Telchemy's next step is to get the product out the door and then make it available across the Juniper M and MX product lines.

## VI. Conclusions

Service providers are interested in leveraging the router as a service delivery platform. "There is no revenue in a router, just cost. The revenue is in the services routers can deliver to my customers," remarks one service provider we spoke with. The question is, who develops these services? There are dozens of core services that the system vendors themselves are very adept at developing and maintaining. If they limit the tight integration of application and network infrastructure to their own, internally developed apps, however, they doom their customers to limited innovation or to performing the role of integrator themselves.

System vendors with closed systems are forced down the road of "Windowfication," where opening their systems in any controlled manner to third-party innovation is extremely difficult. Instead, multiple development tracks are created within the corporation to satisfy the development needs of different customer constituencies. As a result, the OS becomes bloated, the development process is arduous, software compiles take over 14 hours, software releases are buggy and the ability to innovate becomes more difficult and time consuming.

One of the critical dependencies of Yankee Group's Anywhere Network is open, standards-based systems. These systems facilitate innovation and are able to draw on a vast and fertile development ecosystem, in addition to their own development. We believe that companies with access to, not ownership of, resources will succeed in this age of innovation.

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The people of Yankee Group are the global connectivity experts—the leading source of insight and counsel trusted by builders, operators and users of connectivity solutions for nearly 40 years. We are uniquely focused on the *evolution of Anywhere*, and chart the pace of technology change and its effect on networks, consumers and enterprises. For more information, visit <http://www.yankeegroup.com/>.

Yankee Group has a global presence including operations in North America, Europe, the Middle East, Africa, Latin America and Asia-Pacific. Contact us at:

### Corporate Headquarters

One Liberty Square  
7th Floor  
BOSTON, MASSACHUSETTS 02109  
617-598-7200 phone  
617-598-7400 fax

### European Headquarters

56 Russell Square  
LONDON WC1B 4HP  
UNITED KINGDOM  
44-20-7307-1050 phone  
44-20-7323-3747 fax

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