

SDN/NFV:
Market Update

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Prior to joining Light Reading, Iain was a successful freelance writer and editor who had been covering the telecoms sector for the past 15 years. His work has appeared in publications including

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CAROL WILSON

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Carol Wilson is Editor-at-Large for Light Reading, where she also serves as Dean of Light Reading University.

She has covered the telecom industry for 28 years, including 14 years at Telephony, eight of those as editor-in-chief. Wilson also was a founding editor of Inter@ctive Week and founding editor-in-chief of The Net Economy, both for Ziff-Davis Media, and also founded a news and information Web site, Broadband Edge. Prior to covering telecom, Wilson wrote about higher education, business, politics, the arts and sports for newsletter and newspaper companies.

She holds a BA in Journalism from the University of North Carolina at Chapel Hill. Wilson's work has been recognized by the Computer Press Association, the American Society of Business Press Editors, the Jesse H. Neal Awards of the American Business Media and the North Carolina Women's Press Association.

introduction

NFV & SDN: A Weather Report

The telco cloud is a bit darker in late 2016 than most had hoped.

When software-defined networking (SDN) and network functions virtualization (NFV) became an item and created a virtualization dream team for the telecom operator community, the future looked bright.

Together, these two critical and market-changing developments fueled telecom operator dreams of operational and capital efficiencies, new service generation and revenue opportunities and an end to vendor lock-in.

This was the telco cloud, but it looked like it was going to have one hell of a silver lining.

Yet here we are in late 2016 and, well, the virtualization weather chart has a few more low-pressure areas than everyone hoped for. SDN as we know it has been with us for about six years now, and NFV just had its fourth birthday. But with maturity comes a set of challenges, though fortunately not insurmountable ones.

In meteorological terms, the SDN/NFV chart looks more like a UK weather report – changeable, unpredictable, with sunny spells and the occasional storm – rather than the California sunshine that many expected.

So what's causing the telco cloud to be darker than anticipated? Well, SDN met a new set of challenges as it migrated from the data center and into the sometimes stormy conditions of the wide-area network (or should that be the wild west network?). But it's bearing up and showing great signs of promise.

With NFV, it's been a real learning curve. Taking hardware functions and creating software versions that can run on a standard commercial server was not enough. But now we all know that and cloud-native virtual network functions (VNFs) are demanded and being delivered.

The key hurdle that SDN and NFV need to overcome is in the management domain – you'll find that to be the dominant theme in this report. Onboarding VNFs into a hybrid (mix of legacy and cloud) networking domain and then managing a combination of existing and virtual assets (and being able to bill for the resulting services) has proven to be a massive challenge.

But as we can also see in this report, progress is being made, challenges are being met, and yes, further issues will emerge but they'll also be met head on. This was never going to be easy, but we now have a healthier dose of realism to add to the virtualization mix.

So what's the forecast? Conditions will improve – of that there's little doubt. Will that happen fast enough? For some, yes, yet maybe not for all. But the sun's breaking through the telco cloud for sure – just make sure you're basking in the light.

– Ray Le Maistre
Editor-in-Chief

Can ECOMP Grease the Virtualization Skids?

AT&T exec says open source MANO platform will include common approach to basic functions to reduce friction for vendors and operators alike.

As it moves into open source, AT&T's ECOMP platform will be able to reduce friction for telecom providers and equipment vendors alike, speeding up their shift to virtualization and the cloud, according to Chris Rice.

The senior vice president for Domain 2.0 design and architecture made a strong public pitch for AT&T's internally developed solution to network management and orchestration in a radio chat audience at our sister site, Telco Transformation. Rice said that just by replacing vendor-proprietary interfaces with common approaches, the Enhanced Control, Orchestration, Management and Policy architecture will make life easier for vendors and enable service providers to more rapidly deploy virtual network functions.

As previously reported, ECOMP is in the process of becoming an open source community project, alongside other open source MANO efforts. Rice also has previously promoted its ability to make network functions more like Lego blocks in their ability to easily connect.

In today's radio chat, Rice pointed out that whether vendors built VNFs from the ground up, as cloud-native, or just ported existing functions into software, "almost all of them left their vendor-proprietary APIs and interfaces" in place. For example, he said, there is a standard command within every VNF to put it into a "suspend state" so that it doesn't do workloads while it is being upgraded to a new version.

"If I brought in 20 VNFs today, I can guarantee you I'd have 20 different answers to 'What command do I give you to go into suspend state?'" Rice said. Yet those different commands add no value to the VNFs – they are simply different.

What AT&T has developed within ECOMP is a "kernel set of commands that VNFs need to listen to and respond to in a common way," he said. "That's something we have in our VNF guidelines – hopefully this next version we'll just make open and they will have very specific information around these kinds of kernels as well as what the data modeling should look like, the data telemetry and the kind of functionality we expect in the data layer and the VNFs themselves. Things that should be common and standard will be common and standard and we will help drive that."

By adopting that common set of commands, vendors can make it easier on network operators but also on themselves, Rice added, because they don't have to develop a different version of their software for every network operator. They can focus on differentiating their VNFs where it counts and not in the way they interface to the existing infrastructure.

"There is no value today to that kind of thing for them or us," he said. "We don't make buying decisions based on the suspend command."

Rice also encouraged service providers considering other open source MANO platforms such as Open Source MANO Community (OSM) or OPEN-Orchestrator Project (OPEN-O) to evaluate what ECOMP has today in an objective way.

"I would suggest that folks who are looking at those evaluate them based on some set of objective criteria – like architectural integrity and completeness, lines of code, time in production, breadth and scope of the effort, willingness to expose in detail information about the solution that has been put out there in the industry," Rice said. "If you look along those criteria – then, yes, I

think you'll find ECOMP stacks up well against the other options in this space."

AT&T is still working with the Linux Foundation on getting the ECOMP open source community up and running, he said. And while Rice didn't offer a specific timeframe, he did make a reference to January 2017, when explaining why AT&T announced its open source intentions back in July but haven't yet completed the process.

"People ask us, 'Why in July did you say you were going to open source if you are not going to be ready until January 2017?'" Rice commented. The announcement was made to explicitly state AT&T's intent to release the 8.5 million lines of code that comprise ECOMP into open source, ahead of committing to the community, he said.

There will be service providers who are part of the ECOMP open source community when it launched, Rice added. Thus far, Orange has committed to trialing ECOMP and others are interested but haven't yet committed to be named publicly, he said. (See Orange First to Test AT&T's ECOMP and Orange Preps ECOMP Trial in Poland, Broadens AT&T Collaboration.).

– Carol Wilson
Editor-at-Large, Light Reading

OPEN-O Going Beyond the MANO

Open source orchestration effort aiming for broader end-to-end service approach that also addresses brownfield deployments.

Among the multiple open source MANO projects, OPEN-O is hoping to distinguish itself for going beyond network management and orchestration to tackle end-to-end service delivery, across both legacy and virtualized networks, its director tells Light Reading.

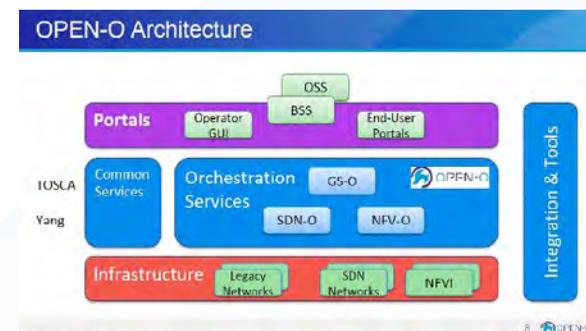
Marc Cohn also says OPEN-Orchestrator Project (OPEN-O)'s first software release is expected in November or December, about six months after an organizational meeting in June and ten months after the group was announced last February, led by Asian operators China Mobile, China Telecom and HKT.

The organization's ultimate value proposition is "any service over any network," says Cohn, who is a familiar face in the open source community, having been a central figure at the Open Networking Foundation and other groups as a representative from various vendor members, including Ciena. He now works for the Linux Foundation, which is supporting OPEN-O.

"We have a very ambitious charter – it is a charter that goes beyond supporting NFV MANO, which is one of the differences between OPEN-O and other open source MANO groups," Cohn says. "Our objective is to address the brownfield set of applications, because every major carrier has to deal with some legacy technology," and that even applies to some virtualization technology, he notes. "It's not just about open source – there are [vendor-specific] things, like VMWare, as an example."

Key to that is creating a modular framework that allows for multiple different components to sit both above and below the OPEN-O end-to-end service delivery framework, say Cohn, who'll be a panelist in a discussion of open source efforts at Light Reading's upcoming event, OSS in the Era of SDN & NFV. That includes multiple vir-

tual infrastructure managers, or VIMs, including open source versions such as OpenStack, but also VMWare, or other VIMs needed by specific member projects. It also includes VNF managers, he adds, as well as controllers and network management systems.



"We are going to have to be very flexible to adapt this platform into the environment," Cohn says. "So what we did was we created this layer that allows us to integrate with different... we call them components, even though it's hard to think of OpenStack as a component. In a broader more abstract sense it is a component, a very sophisticated one."

That doesn't mean operators will have an infinite choice of components that OPEN-O will support – at least not out of the box, he hastens to add. That would be impractical.

A couple of things OPEN-O is immediately addressing is a design-time environment, including a graphical user interface, modeling and service catalogs, and portals that enable user interaction.

"In other words, how you actually design a service and do it in such a way that you don't need to create new

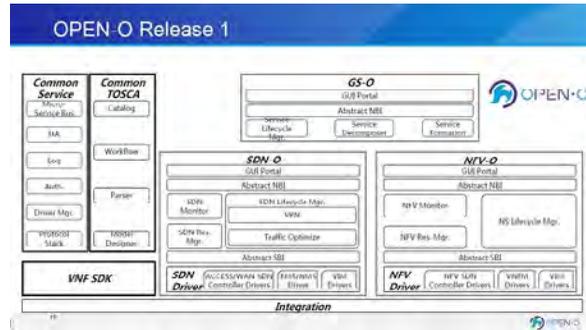
software to actually realize that service," Cohn explains. "That is what the design-time environment and model-driven automation allows us to do."

The OPEN-O approach is focused on developing a modular framework that allows operators to pick and choose what they want, tailored to their legacy networks, business models or service demands, Cohn says. The design-time environment then allows them to create their own services, in a differentiated fashion, and not rely on vendors to do that for them.

The portals are all about delivering user interfaces, which Cohn says become even more important in the future as operators have to deliver more truly on-demand services that give users genuine control. "In the past, the operator was responsible for that. They may have exposed something, at some level, but it was primarily just a front end to operator processes," he says. "It is the on-demand services we are going to have to address moving forward."

OPEN-O is enabling this commonality by being model-driven, Cohn says. And while he admits it would be better for everyone if the industry agreed on common information and data models, as a couple of different initiatives have tried to create, no one is waiting for that to happen. OPEN-O is moving forward using Tosca as its service modeling language and Yang for device modeling.

OPEN-O's first software release, details of which are shown below, will include code for each of the group's initial seven projects. Those projects include a global service orchestrator, an NFV orchestrator, SDN orchestrator, a VNF software development kit API, Common Services, Common TOSCA and integration across the software platform.



The organization is already actively engaged in working with other open source groups, including OpenDaylight and Open Platform for NFV Project, both of which are also under the Linux Foundation banner. But that list also includes the European Telecommunications Standards Institute (ETSI), to assure it stays aligned with the general NFV framework, the ONF and the MEF, for the latter's Lifecycle Service Orchestration initiative.

OPEN-O also is pursuing a new project, focused on creating a generic VNF manager, and is hoping for broad industry participation in that effort, Cohn says. The idea is to avoid having to create VNF-specific managers, since that smacks of the existing issues around the element management systems needed for each vendor's network elements.

"This is a new project in OPEN-O, to look at this issue in a more systematic way," he says. "We want to reach out to anybody who wants to get in on this, including other open orchestration projects, to work with the VNF community to package up their VNFs in a way to make it easier, no matter whose open orchestrator the operator wants to use."

— Carol Wilson
Editor-at-Large, Light Reading

Orange Preps ECOMP Trial in Poland, Broadens AT&T Collaboration

Orange is going to put ECOMP, AT&T's NFV management system, through its paces in Poland, according to senior executive.

Orange is preparing to put AT&T's network management and orchestration platform, ECOMP, through its paces at its operation in Poland, a senior executive from the giant French operator announced Thursday.

Talking at the SDN World Congress in The Hague, Jehanne Savi, executive leader of Orange's All-IP & On-Demand Networks Programs, said the operator will use its Orange Poland business to test AT&T's Enhanced Control, Orchestration, Management and Policy platform. Orange had previously announced its intentions to test ECOMP having evaluated AT&T's code.

And there's a very good reason Orange is checking out a next-gen management system from a fellow network operator – the French operator, along with its peers, is finding the MANO (management and orchestration) sector increasingly tough to engage with and vendor offerings not yet mature enough. "We're concerned about open source initiative fragmentation... Especially in the MANO domain, which is so sensitive. It is a key component in delivering agility," noted Savi.

She added that partnerships, such as the one that Orange has struck with AT&T, are very important and that the "open source spirit" – which AT&T has embraced by offering up ECOMP to the open source community – is "very appropriate ... it leads to faster innovation" and helps with interoperability efforts.

To speed up Orange's own developments, the operator is adopting a "test and learn" approach and is aiming to use its operations in 28 different countries to try out different use cases, with Poland getting the honor of the ECOMP trial. The AT&T platform is "very comprehensive, addressing the whole cycle from design to execution."

But Savi also noted that having an appropriate technology product to work with for its virtualization strategy is just the tip of the iceberg: What is hidden away, below the virtual water line, is the much larger and potentially dangerous transformation process that needs to happen around working processes, skills and corporate culture.

The collaboration with AT&T doesn't end with ECOMP, she added. The two Tier 1 operators are working together to develop standard APIs for a "digital platform" model, applicable to all network operators, that would enable the federation of SDN and NFV assets, a move that would ultimately enhance customer engagement and experience.

That sounds very similar to the SDN interoperability collaboration that Colt has underway with AT&T.

It's clear that AT&T and Orange have decided they can't wait for the rest of the market to keep up and are spearheading certain developments that, they believe, can accelerate broader virtualization efforts. That could be seen as something of a risky strategy as it could, arguably, alienate some of the very companies they'd like to get involved. What's needed now is for other operators to join in and make this look like an ensemble initiative and not a two-piece band.

— Ray Le Maistre
Editor-in-Chief, Light Reading

Open Source Getting on My Nerves

Don't worry, they say, the code will work it out. There's apparently nothing open source can't tackle.

Open source people can be so annoying.

I realize that is not a politically correct thing to say right now, especially as I sit on an airplane headed for Seattle and the OpenDaylight Summit, which will be swarming with open source people and/or those singing the praises of the open source community and its processes.

Speaking selfishly, however, open source processes can take the fun out of everything, particularly technology wars.

Take the current MANO wars, for instance. There is a critical need for management and network orchestration capabilities in the virtual world, because once you have broken everything down into functions and virtualized those functions as software that can run anywhere, on commercial off-the-shelf hardware, you must be able to knit all those functions back together into something that resembles services and network operations.

But there is little agreement on how that happens. A specific panel on this topic at Light Reading's recent NFV & Carrier SDN event in Denver produced total agreement on only one thing: that there isn't much agreement where MANO is concerned.

Enter the open source folks. No fewer than four open source MANO projects are currently in process, each with its set of carrier advocates. Open Orchestrator (Open O); Open Source MANO Community (OSM); ECOMP (Enhanced Control, Orchestration and Management Platform); and Open Baton all are addressing some aspect of the MANO challenge – and that's in addition to groups such as Open Platform for NFV Project and the TM Forum.

This is therefore a great time to be talking to folks about these processes and getting them to dish the dirt on each other. That's the way it goes when there are competing answers to a telecom industry problem. Or at least the way it used to go.

Open source people are generally not dirt dishers, however. Take Phil Robb of OpenDaylight, where he is senior technical director. Robb was on that MANO panel in Denver, and he spoke to me shortly afterward in an interview on ODL's new Boron software release. I specifically asked him about the "messy MANO situation" right now.

His response was frustratingly calm. "I would equate the MANO space with where the controller space was three years ago," he says. "One of the great things about open source is that real code is going to be up, going to be used, stuff will work or it will fall over. But we'll fail fast and move on."

So having multiple versions in process isn't a bad thing, Robb says, because it might be that one approach works better for a set of use cases than another. What the industry will come around to "sooner rather than later" is that one approach likely addresses the broadest set of use cases and will be more widely adopted, while others address niches and either are used alongside the major approach or incorporated into it.

It all comes down to whose code works, he said. That's probably true but also really boring.

ODL Executive Director Neela Jacques sees the same scenario in the SDN controller space today where both his organization and ONOS have developed open source controllers that are finding market acceptance,

alongside vendor solutions from companies such as Cisco and VMware.

The two open source projects can "learn from each other" and co-exist in the market, even if there is some overlap between them, he says. As proof of this, he cites work by ODL with OPNFV to deliver CORD – the Central Office Redesigned as a Data Center project created by ONOS – using an ODL controller.

"Overlap will happen – we seek to be collaborative as possible, but different people want to take two different paths to solving a problem," he says.

That's about as non-newsworthy an answer as you can get, which brings me back to the opening premise of this blog.

Contrast that to what Margaret Chiosi, former AT&T executive, said on the Light Reading MANO panel. "Divide and we will be conquered," she stated, referring to the different MANO open source groups. If the telecom industry can't come to an agreement on a MANO approach sooner rather than later, its ability to compete against web-scale giants is at risk.

That's what I call a good quote, and I'm going to be wandering around Seattle – well, Bellevue, actually – the next couple of days looking for more drama like this and less of this "Hey, we're open source, we all get along" nonsense.

– Carol Wilson
Editor-at-Large, Light Reading

It's OpenStack or Vendor Lock-In, Says AT&T

Telco resistance to OpenStack is crumbling, says AT&T's Sorabh Saxena, as companies realize there is no realistic alternative.

Telco resistance to OpenStack is ebbing away as doubters come to realize there is no viable alternative to the open-source cloud platform, according to Sorabh Saxena, AT&T's senior vice president of software development and engineering.

The US operator, widely seen as a pioneer in the software and virtualization area, has warmly embraced OpenStack while a number of other Tier 1 carriers, such as the UK's BT Group plc (NYSE: BT; London: BTA), have continued to eye it with some degree of skepticism, seemingly out of concern it is not "carrier-grade."

Saxena concedes that OpenStack is "not 100% complete" but says that if operators wait for a "clear, guaranteed, cookie-cutter solution" they will find themselves back in the "old world of long cycle times and vendor lock-in."

"There are no other private clouds out there," he says. "The performance demands and need for network functions customization cannot be addressed by another solution, quite frankly."

Even so, in an effort to drum up support for OpenStack, AT&T has recently been involved in setting up a large-scale operators and carriers (or LCO) group within the OpenStack Foundation, the association that promotes OpenStack, to address some of the concerns about the technology, such as its integration with existing operational tools. French telco Orange, Japan's NTT Group and US retailer Walmart are other high-profile members of the LCO, according to Saxena.

Such initiatives, combined with the contributions AT&T has been making to OpenStack development, are helping to overcome the remaining resistance to the open-

source technology, says the AT&T executive. "There are quite a few companies now joining hands and accepting OpenStack as a private cloud," he tells Light Reading.

The US telco has used OpenStack to develop its AT&T Integrated Cloud (AIC), a reference architecture that is to shape the design of more than 100 data centers, under current plans. Among other things, AT&T has been working to address service chaining and performance problems related to OpenStack. "We are making improvements in OpenStack and across our own implementation," says Saxena.

Service chaining was one of six key challenges described by Peter Willis, BT's chief researcher for data networks, during a presentation at the SDN & Openflow World Congress in November last year. At the time, BT had threatened to drop OpenStack and use an alternative technology – which could potentially have been a proprietary solution from VMware – unless the OpenStack community tackled those problems.

Five months later, during the MPLS/SDN/NFV World Congress in Paris, Willis highlighted satisfactory progress in four of those areas but said there was still work to be done on backwards compatibility and the connection of virtual network functions.

Nevertheless, other major operators outside the US have dismissed concern about OpenStack technology during conversations with Light Reading. "In my view, carrier-grade is an old expression," said Yogesh Malik, the chief technology officer of VimpelCom, when asked in April if he was worried about OpenStack immaturity. The European service provider, which operates networks in Russia and across a number of emerging mar-

kets, is keen to make use of OpenStack as part of its investment in virtualization technology.

In February, Middle Eastern telco giant Saudi Telecom also threw its weight behind OpenStack, saying it would use the technology to support all new virtual network functions and that alternatives did not match up in terms of cost benefits.

Recent research carried out by Heavy Reading also indicates that operators now see considerable value in OpenStack, although many plan to follow their vendors' lead when it comes to implementation.

AT&T, however, is determined to continue shaping the agenda when it comes to software and virtualization technologies. "We're not dependent on big vendors," says Saxena. "We are collaborating with open source communities and innovating ourselves and working with key service providers to solve these problems."

Those remarks chime with comments made by Greg Stiegler, AT&T's assistant vice president of the cloud, during a presentation at the OpenStack Days Silicon Valley event last month. "We're making great progress with OpenStack but we can't do it alone," said Stiegler, as previously reported by Light Reading. "The velocity we really need requires collaboration and joint development with other, like-minded participating companies. Large operators, really."

Under its current strategic plan, AT&T is looking to virtualize 75% of network functions by 2020, and Saxena says the operator is on track to reach a threshold of 30% by the end of this year.

It has already launched a number of on-demand offerings that take advantage of these technologies, including this week's AT&T FlexWare package, and it plans to make services more widely available and feature-rich as the network overhaul gathers pace.

"You will see us entering many more markets and you will see services continue evolving in 2017," says Saxena. "As AIC nodes are deployed, you will see us providing more network functions, even in areas where we don't have access networks. We'll also bring together various SDN [software-defined networking] services to offer the full package of solutions to the end customer."

— *Iain Morris*
News Editor, Light Reading

Telco's Got Talent? It's Audition Time for SDN/NFV Startups

Three of Europe's national telcos have teamed up to court virtualization startups with a 'Call for Innovation' that suggests carrier SDN and NFV might currently be stuck at the launch pad.

Eager to engage with a new breed of hot virtualization startups, three of Europe's telecom operator old guard have taken inspiration from TV talent shows to issue a "Call for Innovation" to SDN and NFV startups.

The telco trio – Sweden's Telia Company, Swisscom and Belgium's Proximus (formerly Belgacom) – appear to be frustrated with the current pace of next-gen functions and apps development and so have created a comms industry virtualization talent show in order to engage with virtualization startups.

The three national operators have developed an online portal simply titled Call for Innovation that asks "Next Gen Virtual Telco Functions & Services Startups (SDN/NFV 2.0)" to help them "solve actual problems and help us with innovative solutions to create greater value for our customers."

They want the startups to build on the groundwork already done with the open source code developed for OpenStack, OPNFV and CloudFoundry and propose "new networking functions, cloud-native implementation of existing network functions, and new Telco services we could offer in the market."

The sky, it seems, is the limit for the telcos, as they are using rocket-launch imagery to attract the attention of startups: "You've got the rocket, we've got the fuel – let's go" they proclaim in their marketing campaign.



Further details are available on the website, but basically the startups are being asked to come up with ideas in four key areas:

- Cloud-native OSS and BSS systems: None of the old stuff running on a centralized server, please.
- Cloud-native Telco Functions: These include next-gen deep packet inspection (DPI), carrier-grade NAT, broadband network gateway (BNG) and other functions. Again, these need to be built from the ground up for a cloud environment, rather than be a legacy tool juiced up with some extra APIs.
- New 'End-to-End' Apps/Services: Enterprise applications designed to work across the cloud, from the data center to the customer premises, and suitable for use with all sizes of companies, including SMEs.

- Access Network Hardware: The telcos want a new breed of boxes for the edge of the network, making use of open source hardware, that have separate data and control plane functionality. In an interesting detail, the telco trio are asking for these new boxes to support mobile edge computing (MEC) deployments.

SDN and NFV startups have been around for a few years now, but it seems clear that operators believe the current, already established startups aren't being innovative enough and they're looking for something more – they're looking for SDN/NFV 2.0, to put a label on it.

And while neither Telia, Swisscom or Proximus has the scale and heft of a Deutsche Telekom, all three are important, influential operators that, combined, offer a fantastic opportunity for any startup to put themselves in the limelight and make a break from obscurity to becoming a hot startup.

Let's see who comes out of the woodwork and makes it through the auditions...

– Ray Le Maistre
Editor-in-Chief, Light Reading

Can Carriers Open Source New Biz Processes?

At one moment during the recent Light Reading NFV & Carrier SDN event in Denver, the three largest US operators were very agreeable to the idea of open sourcing APIs to make business easier.

DENVER – NFV & Carrier SDN – One of the more telling moments of our NFV & Carrier SDN event actually happened before the conference itself had formally started, at an Oracle-sponsored breakfast session Tuesday morning.

Appearing on a panel with my Heavy Reading colleague Jim Hodges were Bill Walker, director of network architecture at CenturyLink and Paul Boland, managing partner, solutions at Verizon Enterprise Solutions. Sitting in the front row of the session was Tom Anschutz, distinguished member of technical staff at AT&T Services Inc., who would later deliver a keynote.

The conversation had turned to how each of those companies, the three largest US incumbent telecom companies, wanted to streamline their internal processes and make it easier and faster for their customers to turn up services, hopefully on a portal, and in plain English terms that focused on business objectives.

But standing in the way of their efforts are layers of legacy network elements, each with its own element management systems, and decades of business practices and regulatory processes that need to be broken down or rationalized, not to mention organizational silos.

The thought arose – I think it originated with Anschutz – that today's open source efforts should include a community of network operators who would contribute developers to work together to define a common approach including applications programming interfaces, for the layers of network stuff that they all use.

"We are all working on layers of the network that are not business differentiating," he said. "What if we had developer teams from each operator working on this?"

There was general agreement among the panelists on that idea, that open source for carriers should wind up with each company contributing but the community getting big things done in short periods of time that none of them could accomplish on their own.

Walker returned to this theme in his keynote speech on Wednesday, challenging those present to rethink how telecom operates today, particularly in doing business with each other.

That may be work happening to some degree within the open source groups that already count carriers among their number, and that includes the Open Networking Foundation, OPNFV, and others. In his keynote address, Walker mentioned the Next Generation Enterprise Network Alliance (NGENA) as one such effort. But over the course of our two-day conference, I didn't hear that thought articulated again quite as well as it had been at this one moment.

Thursday's announcement by AT&T and Orange that the latter is going to test AT&T's ECOMP management and network orchestration platform seems to me to be another step in the direction of getting the folks who own and operate the networks to come together and more specifically define what they think it takes to tackle the thorniest issues on the way to meeting virtualization's number one goal, and that is to bring services to market more quickly

– Carol Wilson
Editor-at-Large, Light Reading

A10 Networks on Service Providers' Industry Needs

Light Reading's Steve Saunders hears how A10 enables service providers to accelerate, secure and optimize their application delivery to drive down costs, enhance service availability, and better respond to customer requirements, so they can improve customer satisfaction, monetize their network, and grow revenues.



TABLE

A10 Networks has pioneered a new generation of application networking technologies. Our solutions enable enterprises, service providers, Web giants and government organizations to accelerate, secure and optimize the performance of their data center applications and networks. Our Advanced Core Operating System (ACOS®) platform is designed to deliver substantially greater performance and security relative to prior generation application networking products. Our software-based ACOS architecture provides the flexibility that enables us to expand our business with additional products to solve a growing array of networking and security challenges across cloud computing and mobility. A10 Networks has a portfolio of application-layer networking products that assure user-to-application connectivity is available, accelerated and secure.

APPLICATION AVAILABILITY – ensuring that application servers and networks are reliably accessible regardless of user, device type, location or connectivity; shielding network resources from volumetric resource attacks intended to deny service; and bridging the accessibility gap so that legacy services using IPv4 address space can be accessible to devices using the new IPv6 standard, and vice versa.

APPLICATION ACCELERATION – improving website and application performance with extremely high-performance application-aware load balancing, including server offload functions like content caching, connection multiplexing, compression, and SSL (encryption) offload, delivered at massive scale up to 1 Tbps with our aVCS™ virtual chassis system.

APPLICATION SECURITY – delivering a range of security features that decrypt, authenticate and inspect application flows, and then detect and mitigate the growing array of sophisticated cyber security attacks that threaten availability of the largest websites and networks around the world.

AGILITY TODAY WINS TOMORROW

In a data-driven, app-hungry world, the pressure on service providers has never been greater. Scale faster. Reduce costs. Develop new services. Exceed customer needs.

But with a move to modern cloud and open-source solutions, you can build efficient and scalable infrastructure that reduces costs and management complexity.



ADD MORE SERVICES
WITH SPEED



REDUCE
INFRASTRUCTURE
COSTS



EXCEED CUSTOMER
EXPECTATIONS

Win tomorrow. Visit get.a10networks.com/win-with-agility

