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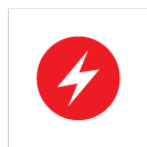
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Internet2 Implements First Large-Scale Deployment of ONOS on a Live Network

NEWS WIRE FEED
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6/15/2015

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WASHINGTON DC -- Internet2, the Open source SDN Network Operating System (ONOS) community, and the Internet2 NOC at Indiana University today announced they have actively deployed ONOS on Internet2's nationwide research and education (R&E) network. Five higher education institutions — Duke University, Florida International University, the Indiana GigaPoP, MAX and the University of Maryland – College Park, and the — are connected to a virtual slice of the Internet2 nation-wide network that is piloting this next-generation advanced network technology.

Internet2 operates the largest and fastest research and education (R&E) network in the U.S., at speeds of more than 100 Gbit/s and at 8.8 Tbit/s of capacity, built atop an SDN substrate. More than 200 major research universities and 100 countries connect to one another using advanced broadband connections over Internet2.

With this effort, Internet2 is using the capabilities of its SDN substrate to provision virtual networks based on FlowSpace Firewall. An ONOS cluster is deployed in a virtual network slice on the Internet2 network, controlling 38 OpenFlow-enabled Brocade and Juniper switches. The SDN-IP Peering application deployed atop ONOS peers with other, traditional networks. An SDN-based network like Internet2 provides benefits such as network programmability, lower TCO and removal of vendor lock-in. In this particular case, the centralized control plane leads to significant improvements in network operation efficiency for the Internet2 network.

The ONOS project worked with the Internet2 NOC at Indiana University to validate the ONOS/SDN-IP solution as one of the first virtual SDN networks deployed in production on Internet2's nationwide network substrate. This deployment has allowed the ONOS community to show the platform and the application's ability to work with heterogeneous hardware devices, at scale, in a real network scenario. Early work in this space also generated useful feedback that is now included as part of the requirements for upcoming ONOS releases.

"A primary feature of the Internet2 Network is its ability to serve as a 'playground' for piloting new advanced networking capabilities in a real-world environment with demanding users and advanced applications capabilities," said Rob Vietzke, vice president of network services at Internet2. "The ONOS and SDN-IP peering deployment is another demonstration of how Internet2 and the academic community continue to be a large scale platform in which pre-market innovations can be prototyped at scale."

"ON.Lab, the ONOS Project and Internet2 have a very synergistic collaboration. At ON.Lab we develop interesting open source SDN platforms and Internet2 is a keen early adopter bringing new capabilities to its customers," said Bill Snow, vice president of Engineering for ON.Lab. "With the deployment of ONOS on Internet2's nationwide network, we get to validate and demonstrate ONOS's scalability, performance and high availability in a production setting and learn from this experience to make ONOS better."

During ONS2015, there will be a live demonstration of this deployment. Please come join us in the SDN Solutions Showcase for a live walk-through.

Industry Takeaways

In addition to having ONOS deployed in a large production network, there are other significant takeaways of this solution that are worth the industry's attention.

The solution is simple and yet very powerful. It delivers a migration solution, whereby new SDN capabilities can be deployed alongside existing IP-based

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networks so that industry adopters can allow the two to coexist while accelerating SDN adoption in real networks. The operators now have a choice to start the SDN deployment in any isolated environment and then leverage an SDN-IP Peering type of application to connect this SDN island to the rest of the network. Following that, they will be able to apply the SDN technology to the whole network gradually at their own pace.

This solution may also be useful when operators want to build an SDN based transit network, where high capacity is needed and lower CAPEX/OPEX is desired. This SDN-IP Peering app along with ONOS is an optimal choice to help build such a cost-effective transit network.

As of today, the use of this app on the Internet2 Network has already expanded, peering with additional deployments of ONOS at other universities and National R&E Networks around the globe, including European R&E network GEANT/GARR and South American R&E Network AmLight/FIU.

Technical Details

The SDN-IP Peering application developed by the ONOS project team and leveraging the open source Quagga BGP suite, runs over ONOS, enabling peering among the SDN-based Internet2 network with traditional IP-based networks and other SDN-based networks. The SDN-IP Peering application establishes an iBGP connection with a traditional router (or multiple connections when needed) in the SDN domain. This traditional IP router will then build an eBGP peering relationship with the targeted IP network. Through the BGP protocol, ONOS gains the knowledge of how to reach the external IP network.

Based on the BGP routing information received, ONOS makes forwarding decisions for the SDN-based domain and then downloads the OpenFlow forwarding information to the switches. With this application, a communication channel is established between the traditional IP network and SDN network and yet all switches in the SDN domain do not need to support any routing protocol and remain pure SDN OpenFlow-based devices.

ON.Lab announced the availability of ONOS last December. The main partners include AT&T, China Unicom, Ciena, Cisco, Ericsson, Fujitsu, Huawei, Intel, the U.S. National Science Foundation, NEC, NTT Communications and SK Telecom.

ON.Lab

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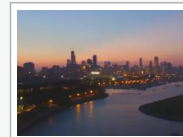
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Gigabit Europe 2015 – a 2-Day Event	September 29-30, 2015, The Westin Grand Müchen, Munich, Germany
Telecom Analytics World 2015	October 6, 2015, The Westin Peachtree Plaza, Atlanta, GA
Carrier IoT: Making Money From Machines	October 6, 2015, Westin Peachtree Plaza, Atlanta, GA
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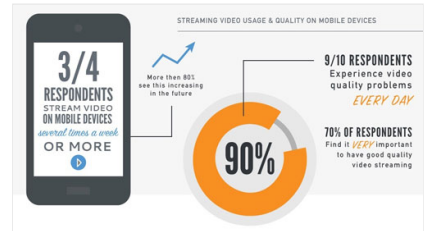
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The New IP Agency Is Born at BTE
11
Ray Le Maistre, Editor-in-chief, 6/11/2015

Our Windy City Diaries: Sightseeing at BTE
9
Eryn Leavens, Copy Desk Editor, 6/12/2015

Fuzzy Outlook for Ultra HD
9
Alan Breznick, Cable/Video Practice Leader, 6/12/2015

Cox: Cable Will Band Together Out of Market
8
Mari Silbey, Senior Editor, Cable/Video, 6/11/2015

The Best of BTE: Highlights From the Show
7
Eryn Leavens, Copy Desk Editor, 6/10/2015

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CEO to CEO With Saar Gillai, SVP & GM for NFV at Hewlett-Packard

Steve Saunders, founder and CEO of Light Reading, drilled into the "pains and gains" of NFV with Saar Gillai, SVP & GM for NFV at Hewlett-Packard. Gillai has defined a four-step NFV model describing a sequence of technology innovation. It's a must-read doc for any network architect looking to get to grips with their NFV migration strategy. Check out the audio interview here.

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