



PLUGFEST REPORT

Results and Lessons from the Second
OPNFV Plugfest (December 2016)

Please direct any questions to info@opnfv.org





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EXECUTIVE SUMMARY

The second OPNFV Plugfest—hosted by University of New Hampshire InterOperability Laboratory (UNH-IOL) from December 5-9, 2016—was attended by 70 people from 23 organizations and also included participants from four non-member organizations.

This represents a sizeable increase in the number of participants and hardware resources—both on-site and remote—available during the Plugfest. This enabled exercising OPNFV on a more diverse set of platforms. In particular, two vendors provided Open Compute Project (OCP) hardware so that many OPNFV community members were able to deploy and test OPNFV for the first time on OCP-based hardware.

A contingent from the Open Orchestrator Project (Open-O) community attended the Plugfest and made great progress on integration with OPNFV and helped continue OPNFV's tradition of upstream collaboration. As was done at the first Plugfest in May 2016, many bugs and areas for improvement were identified during the week and work is already in progress by the community to address these issues.

An OPNFV Hackfest was co-located with the Plugfest, and provided an opportunity for breakout sessions for project teams and working groups. There were also sessions dedicated to topics such as the release process and the product lifecycle that are of interest to the OPNFV community.

The OPNFV Plugfest is a key venue to make progress both on interoperability of commercial solutions and the work of the community at large. Vendors are able to work with different installers, try out new scenarios, prototype important work areas, and interact with the OPNFV platform on their commercial hardware offerings.



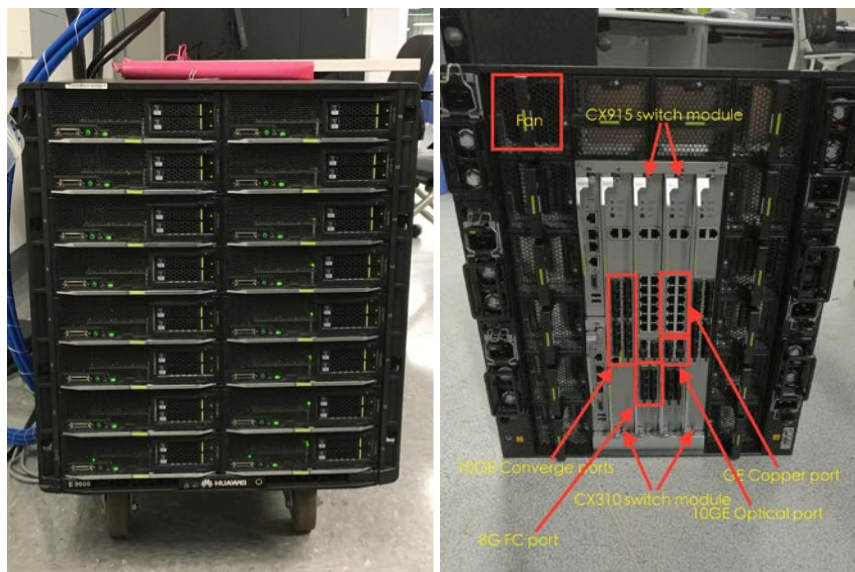
LAB AND HARDWARE RESOURCES

For this Plugfest, on-site hardware were provided by Huawei, Lenovo, and Nokia. Details on these hardware are listed below.

Huawei E9000

- 1 x Backplane Subrack, 12U high-powered integrative module
- 2 x CX915, 4*10GE Optical Port, 12*GE(RJ45) Copper Port, 8*8G FC Port, Switch Module
- 2 x CX310, 16*10GE Converged Switch Module
- 16 x Compute Node, CH121 V3
 - 2 x Intel® Xeon® E5-2683 v3, 14 Core
 - 24 x DDR4 RDIMM, 16GB
 - 2 x Hard Disk, 1000GB-SATA-7200rpm-2.5"-64M-hot-swap

[Figure 1: On-site hardware from Huawei (front & rear view)]

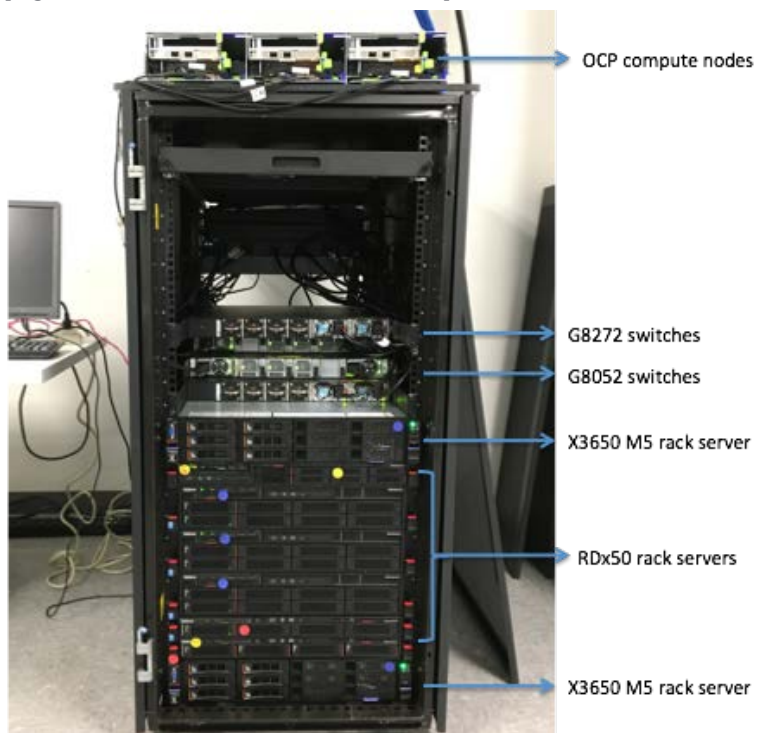




Lenovo OCP & Rack Servers

- 3 x OP@L OCP compute nodes
 - With two Intel® Xeon® E5-2600 v4, mSATA SSD, 6TB HDD, 256GB RAM, 2-port 25GbE Mezz, 2-port 25GbE PCIe
- 2 x System x3650 M5 rack servers
- 5 x ThinkServer RDx50 rack servers (3 x RD450 and 2 x RD350)
- 2 x Lenovo G8052 switches
- 2 x Lenovo G8272 switches

[Figure 2: On-site hardware from Lenovo]

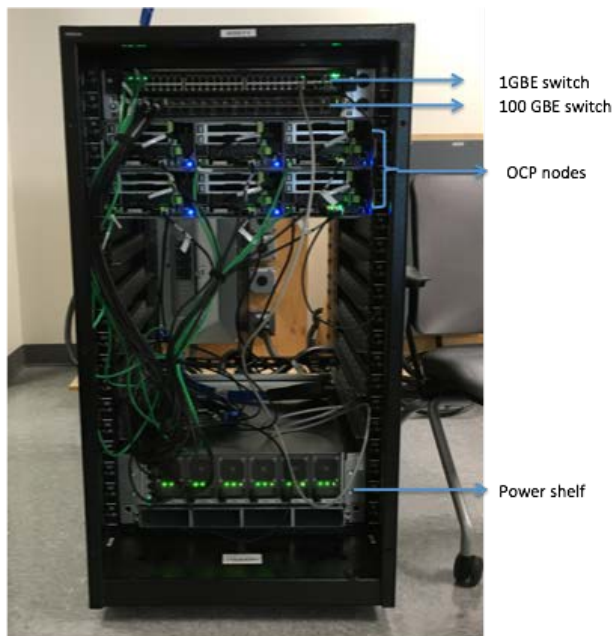




Nokia AirFrame servers (OCP-based hardware)

- 6 x AirFrame OCP Nodes (3 control, 2 compute, and one jump host)
- 1 x AirFrame OCP switch Z9100ON, 32x 100GbE
- 1 x AirFrame OCP switch S3048ON, 48x 1GbE
- 1 x AirFrame OCP PSU for power shelf
- 1 x OCP 20U rack

[Figure 3: On-site hardware from Nokia]





In addition to on-site hardware, the following off-site resources were utilized during the Plugfest:

ENEA Pharos lab: ARM-based hardware resource from the ENEA lab
(<https://wiki.opnfv.org/display/pharos/Enea-pharos-lab>)

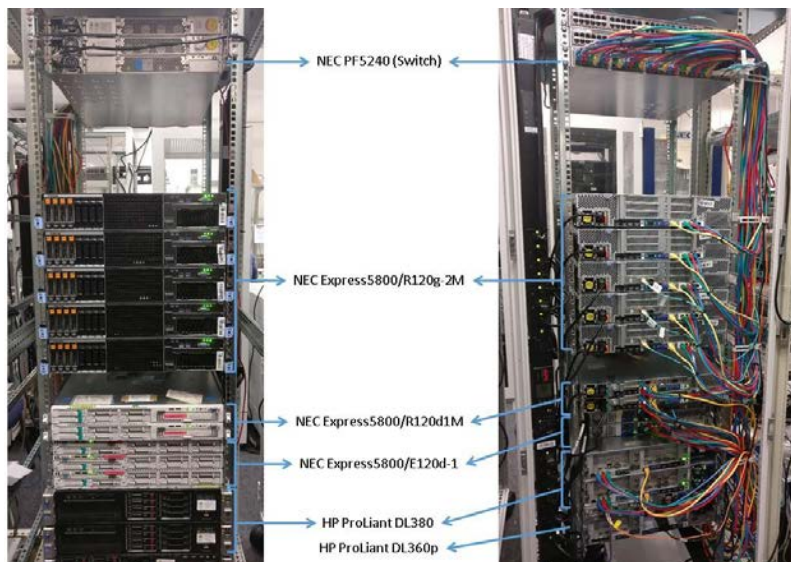
Huawei: Huawei's Xi'an Pharos lab
(<https://wiki.opnfv.org/display/pharos/Huawei+Xi%27an+Lab>) resources were utilized for the Open-O integration work with OPNFV.

Intel provided 3 pods from their Pharos lab
(<https://wiki.opnfv.org/display/pharos/Intel+Hosting>)

NEC provided the following hardware from NEC Laboratories Europe in Heidelberg, Germany

- 1x HP ProLiant DL360p (node 1)
- 2x HP ProLiant DL380 (nodes 2-3)
- 3x NEC Express5800/E120d-1 (nodes 3-6)
- 2x NEC Express5800/R120d1M (nodes 7-8)
- 5x NEC Express5800/R120g-2M (nodes 9-13)

[Figure 4: Off-site hardware from NEC Laboratories Europe (front & rear view)]





During this Plugfest, UNH-IOL also provided external VPN connectivity, so that participants could access the on-site hardware resources after hours. This allowed for greater productivity throughout the week, and is something we want to replicate at future Plugfests.

Each of the on-site hardware platforms were connected to a dedicated test network, which was accessible from the local wireless network available throughout the building. The VPN solution was based on OpenVPN, and participants were able to request a username / password for the VPN once they arrived on-site. Once connected to the VPN, participants were able to access their network as if they were connected directly to the local wireless network. In a few cases, additional VPN credentials were also provided to engineers providing support to their peers from off-site.



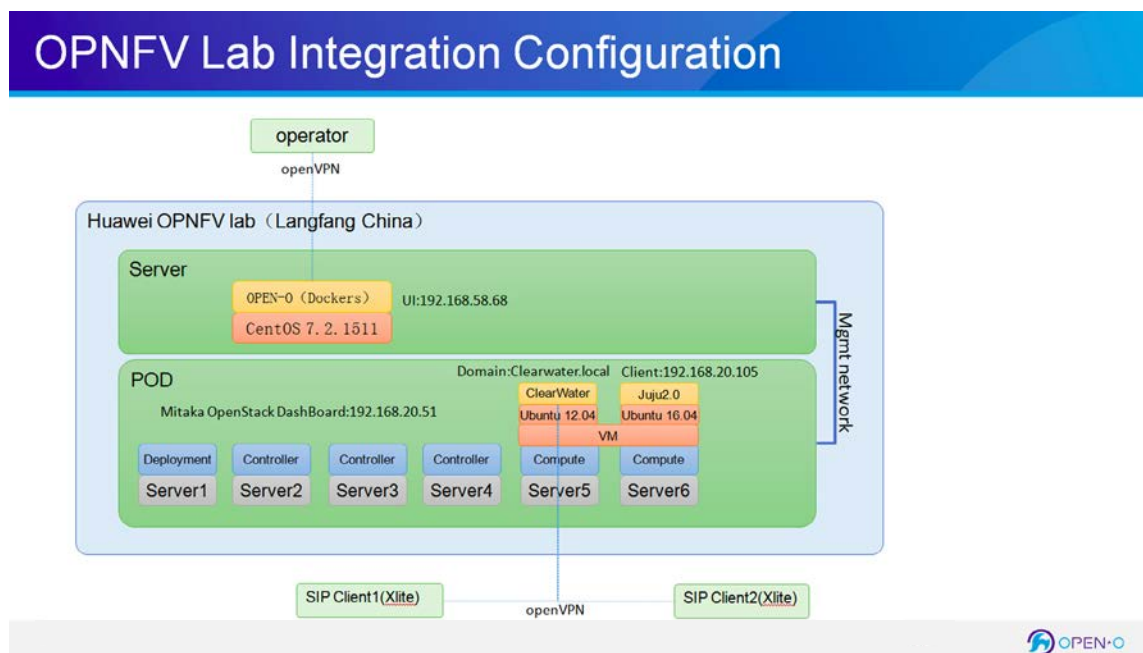
TESTING ACTIVITIES FROM THE PLUGFEST

Open-O integration with OPNFV

As MANO grows in importance to the industry, OPNFV and multiple upstream projects have launched work areas around integration and interoperability between orchestration platforms and NFV-I / VIM solutions. The Open-O team participated in the Plugfest with the goal of integrating their Sun release with OPNFV Colorado. Since the [Sun release](#) was based on OpenStack Kilo (vs. OpenStack Mitaka for Colorado), they had to first migrate to the Mitaka release. Once the migration was done, the Open-O team was able to proceed with OPNFV integration. The team was able to do much of this integration work, setting the stage for MANO capabilities in OPNFV Danube.

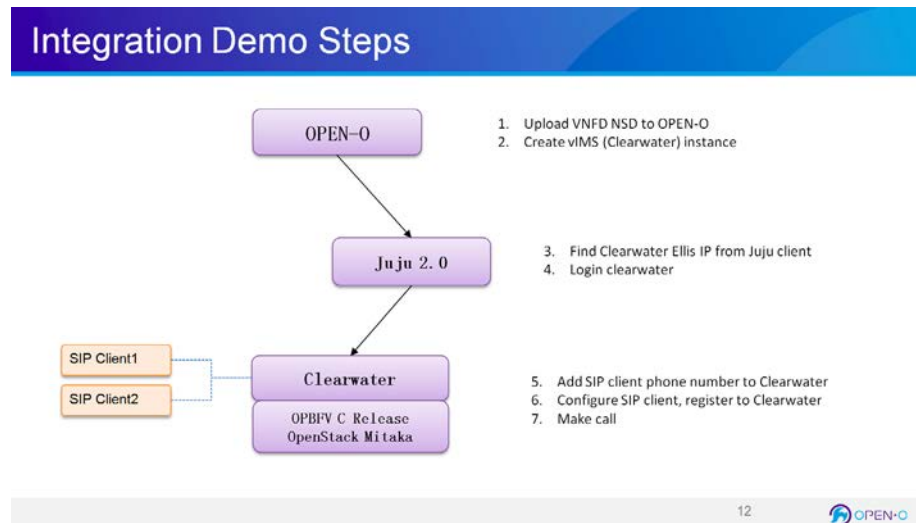
After Open-O integration was complete, the team showed a demo where a VNF Manager (Juju Charm) was deployed, and subsequently deployed the Clearwater vIMS. Finally, the Open-O team was able to place a call with SIP clients connecting to the provisioned vIMS infrastructure.

[Figure 5: Open-O integration demo at the Plugfest]





[Figure 5: Open-O integration demo at the Plugfest, cont.]



The Open-O team also had productive working sessions with the Functest team during the week, and there is an agreement to integrate the vIMS deployed with Open-O, with Functest, for the upcoming Danube release.

Dovetail Testing

The Dovetail project is working to develop a test framework for the future Compliance and Verification Program in OPNFV, and the project team was able to exercise their early prototype test suites on four different hardware platforms. The team also worked on (i) verifying that the Dovetail test report accurately reflects the results of the suites executed, and (ii) ensuring that the Dovetail tool is able to capture and record logs and test results.





OPNFV Deploy and Test across Hardware Platforms

One of the major activities that continued from the first Plugfest was the OPNFV deploy and test on multiple hardware platforms. The following table lists deploy and testing of the Colorado release that was completed during the week. This enables commercial hardware vendors across multiple hardware architectures to test and validate compatibility with OPNFV software deployments on their products. The deploy and test activities allow many participants to get hands-on experience with OPNFV software and also for install tools and testing projects members to identify improvement areas for future releases.

The Functest team set up a local test results database for the Plugfest and project team members helped push results to the database. There was a suggestion to explore utilizing the existing Functest dashboard to display Plugfest test results at future Plugfests.

[Table 1: OPNFV Colorado deploy & tests]

Hardware	Installers	Notes
ENEAA Pharos lab	Fuel	Enabled the Yardstick plug-in for Fuel (previously Yardstick on ARM ran from Jenkins only). Enabled Dovetail in ARMBand Continuous Integration (CI) infrastructure, and made good progress on Doctor integration for ARMBand. The Armband team also continued preparing for multi-installer support with Juju and TripleO/Apex teams.
Nokia OCP AirFrame	TripleO/Apex	Ran Functest and Dovetail. OCP integration
	Fuel	Ran Functest. OCP integration
Huawei E9000	TripleO/Apex	Ran Dovetail
	Compass	
Lenovo	TripleO/Apex	Ran Doctor, Functest, Yardstick, and Dovetail both on OCP and rack servers
NEC Laboratories	Fuel	Ran Doctor test
	TripleO/Apex	Ran Doctor test

In addition to deploying OPNFV, Wind River's Titanium Server was installed on multiple hardware platforms including Lenovo OCP & Rack Servers during the Plugfest and OPNFV tests such as Dovetail and Storperf were run on Titanium Server deployments.



Multi-site Deployment

The Wind River team worked with several Plugfest participants on a multi-site deployment. On one site, OPNFV Colorado was deployed on-site at the Plugfest using Fuel. On the second site, Titanium Server was deployed at the Wind River data center in Santa Clara, CA. The team was able to connect these heterogeneous environments to a common management/admin network. The systems were able to share OpenStack Glance, Cinder, and Keystone resources.

Enabling OPNFV Doctor

The Doctor project team worked with several Plugfest participants to successfully enable the Doctor feature (i.e. fault notification in less than one second) on the ENEA Pharos Lab (with Fuel), the Lenovo OCP & Rack Servers (with TripleO/Apex), and at NEC Laboratories (with Fuel & TripleO/Apex). Successful completion of this testing enables enhanced fault management on both ARM and x86 hardware architectures and on OCP hardware, ensuring OPNFV fault management capabilities across a large variety of commercially available hardware with multiple platform deploy tools.



CONTINUOUS IMPROVEMENT FOR OPNFV

The Plugfest provided a good opportunity to identify and discuss a number of improvement areas (including bugs) for OPNFV. Following the Plugfest, community members started working on these improvements as noted below.

Cross-community Continuous Integration (CI) Activities

There were productive sessions with two upstream communities on “Cross Community CI”.

OpenDaylight

The team created a prototype in OPNFV CI, to fetch an artifact from OpenDaylight, then install and test it. The installation, deployment and testing activities are done on resources provided by the OPNFV Pharos Project. The OPNFV deployment is brought up in minutes using snapshots provided by TripleO/Apex Installer, and the testing of the system is done using the OPNFV Functest framework.

This work will soon be completed, making it possible for OPNFV to start providing feedback to developers from both communities directly on OpenDaylight Gerrit for each OpenDaylight patch—potentially cutting the feedback times from months to hours. (See <https://build.opnfv.org/ci/view/Cross%20Community%20CI/job/odl-netvirt-verify-virtual-master/>).

There were further discussions on how OPNFV CI can fetch the autorelease artifacts from OpenDaylight automatically and run more extensive testing on a daily basis in order to catch issues early.

Open-O

There were also discussions and agreement with the Open-O team at the Plugfest on how Open-O artifacts can be fetched automatically and integrated into Compass in OPNFV CI. One of the goals of the collaboration was to ensure that the integration between the two projects was done in a fashion that will be scalable in the future.



BUGS/ISSUES REPORTED TO OPNFV PROJECT TEAMS

The following table summarizes bugs that were discovered during the Plugfest and the status of these issues.

[Table 2: Bugs/issues found during the Plugfest]

OPNFV Project	Description	Notes/Status
Doctor	There was a driver setup failure with the TripleO/ Apex installer	Fix is already in place for the Danube release.
Dovetail	Encountered a number of permission issues (e.g. getting access to the OpenStack controller node)	Work in progress on the fix.
Functest	Encountered Tempest failures on multiple systems (each using different installers)	Work in progress on the fix.
Functest & Storperf	Both projects teams discovered that their framework didn't support Keystone v3 (which is a default configuration in OpenStack Newton).	This has now been resolved for both projects.
OPNFV installer	Discovered one of the installers was missing a package that is needed for a successful cloud deployment	The work is in progress in the upstream community to address this issue.



HACKFEST SUMMARY

During the co-located Hackfest, a number of productive breakout sessions were organized by the attendees.

Topics for breakout sessions ranged from a Colorado release retrospective, a proposed common Pharos pod descriptor file, Danube release priorities, a MANO-related projects overview, OPNFV architecture, product lifecycle, testing activities, etc. In addition, team members from projects such as Bottlenecks, Functest, Pharos, Storperf, and Yardstick had opportunities to share their latest project demos with attendees.

With the co-location of the Hackfest, there were significantly more breakout sessions during the week and also more opportunities for organic discussions among community members. In addition, participants enjoyed the ability to seamlessly move between Hackfest and Plugfest activities. OPNFV will be looking to co-locate a hackfest again at future plugfests to continue collaboration between the project participants and product engineers that will enable rapid feedback and improvement in both the code base and community processes.





CONCLUSION

Similar to the first Plugfest, participants highlighted face-to-face collaboration as a major benefit of the event and this was especially the case with a co-located Hackfest.

The event provided an opportunity to deploy and test OPNFV Colorado on several different hardware platforms and, when issues were found, relevant project team members were often nearby to start debugging/fixing issues.

This Plugfest also provided an opportunity for many OPNFV community members to work with OCP-based platforms for the first time. The community is looking forward to more collaboration opportunities between Open Compute Project and OPNFV in the near future.

OPNFV's collaboration with upstream communities continued at this Plugfest with a strong contingent from the Open-O community who made great progress on integration with OPNFV Colorado. The Open-O members were able to cap off the week with a demo of their work. We welcome and look forward to further collaboration with Open-O, and other upstream communities, in the future.

The next Plugfest is tentatively planned for April 2017 following the Danube release. Announcements on the Plugfest will be made on the opnfv-tech-discuss mailing list (<https://lists.opnfv.org/mailman/listinfo/opnfv-tech-discuss>). Information on future Plugfest planning meetings will be available at <https://wiki.opnfv.org/display/EVNT/Plugfest>. The planning meetings are open to everyone regardless of OPNFV membership status, and we encourage anyone in the community to attend and participate in the future.



APPENDIX:

PLUGFEST PARTICIPANTS

The following companies participated in the second OPNFV Plugfest. Many thanks to all the participants who helped make the event such a success.

[Table 3: Plugfest Participants]

Name	Description	URL
ARM	Semiconductor company	www.arm.com
AT&T	Telecommunications service provider	www.att.com
Broadband Forum	Non-profit industry organization focused on broadband networks	www.broadband-forum.org
CableLabs	Nonprofit R&D consortium for cable providers.	www.cablelabs.com
Canonical	Producer of Ubuntu and associated commercial services	www.canonical.com
China Mobile	Telecommunication company; service provider	www.chinamobileltd.com/en/global/home.php
Dell Technologies	Provider of technology solutions and services	www.delltechnologies.com
ENEA	Information technology company	www.enea.com
Ericsson	Network equipment vendor providing communication technology and services	www.ericsson.com
HCL Technologies	Offshore IT & Software Development Outsourcing Company	www.hcltech.com
Huawei	Networking and telecom equipment vendor	www.huawei.com/en
Intel	Semiconductor and computing vendor	www.intel.com/content/www/us/en/homepage.html
Ixia	Provides visibility, test, security solutions across physical and virtual networks	www.ixiacom.com
Lenovo	Global technology company	www.lenovo.com/us/en



[Table 3: Plugfest Participants, cont.]

Name	Description	URL
Linux Foundation	Non-profit organization that accelerates open technology development and commercial adoption	www.linuxfoundation.org
Mirantis	OpenStack software vendor	www.mirantis.com
NEC	Provider of information technology services and products	www.nec.com
NetScout Systems	Provider of application and network performance management products	www.netscout.com
Nokia	Communications and information technology company	www.nokia.com/en_int
Rebaca Technologies	Outsourcing company focused on networking industry	www.rebaca.com
Red Hat	Provider of open source solutions	www.redhat.com/en
UNH-IOL	Independent interoperability testing lab at University of New Hampshire	www.iol.unh.edu
Wind River	Embedded and open source software	www.windriver.com

