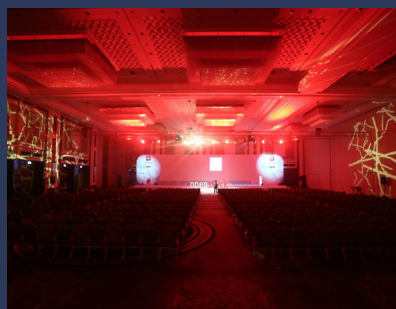


OPENSTACK FOUNDATION

2016 ANNUAL REPORT



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2016 BOARD OF DIRECTORS

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Edgar Magana, Workday
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(January - March)



CHAIRMAN'S NOTE



Alan Clark



Lew Tucker

As we sat in the opening sessions of the OpenStack Summit in Barcelona, it became clear that what we were witnessing was the result of several years' investment by the OpenStack Board and community—we often talk about open source providing interoperability, but demonstrating it is typically left as an exercise for the reader.

At the Barcelona Summit keynote, 16 companies on stage demonstrated the same application running on each of their OpenStack clouds. With this, we clearly showed that **OpenStack provides interoperability between different deployments and solutions to real world problems.**

As a board, we continually ask ourselves, "What is OpenStack?" Several years ago when we discussed that question, the discussion quickly centered on the need to define what was core to the project. Those early discussions turned into what we know today as the DefCore project.

Through many hours of community efforts, **we've achieved a board-approved set of capabilities, code and testing.** This not only gives a forward-looking answer to that question, but also helped us realize that the true value of the effort is not in just defining "what is OpenStack," but also in demonstrating interoperability using it.

To emphasize this point, the DefCore Work Group was renamed the Interoperability Work Group and through a continued and growing collaborative effort, we demonstrated this interoperability at the Barcelona Summit with even greater plans for the future. Defining what is core to OpenStack provides a solid basis for adoption and growth.

We have also witnessed dramatic growth in real world adoption and deployments this year. OpenStack is being deployed and used throughout the world in many different business markets and academic pursuits. With adoption comes new community participants, sponsors, increased event attendance, communication traffic and increased contributions. As a board, we have seen the growth in the approval of eight new Gold members, a healthy financial outlook, and lively board and member participation.

But even with success today, we, as a board, recognize the need to continue to ask ourselves "What is OpenStack?" Answering that question for the future brings additional challenges of scale, an obligation to facilitate effective alignment with adjacent open source efforts, and of course the urgency to change.

Open source drives innovation—and in our industry, innovation happens at a very fast pace. Our desire to make OpenStack **the platform of choice for the next decade and beyond** will guide us in addressing the competitive threats, technology opportunities and inclusive community needs. We have accomplished much this year and are preparing for much more in 2017.

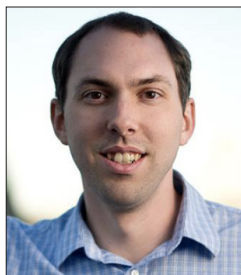
We look forward to serving you in 2017 and congratulate you on a successful 2016.

ALAN CLARK
OpenStack Board Chair

LEW TUCKER
OpenStack Board Vice-chair



FOUNDATION STAFF UPDATE



Jonathan Bryce

2016 was a big year for OpenStack. We had our biggest releases yet, our best-attended Summits yet, our broadest set of global OpenStack Days, reached our largest footprint of public cloud providers, and learned about bigger deployments and projects using OpenStack.

We saw organizations as varied as AT&T, Volkswagen Group, China Mobile, Banco Santander, and Cambridge University present how they are **driving change and innovation with the software our community develops**. And we saw new companies join our community effort to build open infrastructure technology.

But 2016 is also a year in which we saw changes in the industry and in our community. As we look forward to 2017, more change is on the horizon. The way we react and adapt in this period of change will have a huge impact on the role OpenStack plays in the future of IT.

If we look at the different programs the Foundation takes on, one of our primary activities is organizing and facilitating events that bring the community together. The marquee events have always been the OpenStack Summits that we organize twice a year. In 2016, we had 7,800 people in Austin, Texas, followed by 5,200 in Barcelona, Spain. These were our biggest Summits inside and outside of North America respectively, bringing in thousands of first-time attendees.

Next year, we'll be adapting the long-standing format of the OpenStack Summit, splitting parts of the software development planning into a new event called the Project Teams Gathering (PTG), while effectively dissolving the individual team mid-cycle meetups. The first PTG will happen in Atlanta in February, and will provide more

time for the upstream development teams to have in-depth, focused working sessions in a smaller setting.

At the upcoming OpenStack Summit in Boston, we will also introduce The Forum, a venue for upstream developers, deployers, and operators to **collaborate on planning the future of OpenStack with a longer-term strategic view**. These new events will no doubt need to be adjusted after we see the first few in practice, but I believe it is critically important that we enable productive, high-bandwidth collaboration to continuously improve the software.

Another development in 2016 was the growth of the global OpenStack Day events. For the first time, the combined OpenStack Day attendance surpassed our record combined Summit attendance. I was able to go to many of the events and interact with community members and prospective users all over the planet.

These events ranged in size from about 100 to 3,000 registrants and highlighted the amazing geographic diversity and range we have in our community. It was fascinating to see the use cases at these events from companies including JFE Steel in Tokyo, China Union Pay in Beijing, tech companies in Tel Aviv, a livestock management company in Amsterdam, and more.

We added several members to the Foundation team in 2016 to help us provide more support to the upstream development community, as well as supporting application developers who are building and deploying apps on top of OpenStack. We also added a technical ecosystem manager who can assist companies who want to get involved in open source but are still learning the ropes.





*Foundation staff
update, continued*

ADD IN INTEROPERABILITY

As we look beyond the Foundation, we've seen shifts in the ecosystem and industry at large. Within the OpenStack ecosystem, 2016 brought changes in strategy and investment at some companies who have long been players. This impacted some of our community members and the composition of some project teams.

At the same time, we've seen an **increase in investment, participation and usage globally**, especially in China. Overall, we wrapped up 2016 with more companies who are committed to the community than ever before, but the shifts in interest will require some adaptation to these new players. At the Foundation, we are closely watching the impact of these changes to ensure we rally resources where needed.

It's clear that 2017 will be an important one for our community. How will we absorb the changes from 2016 and face the natural evolution that will inevitably reshape our industry? The continuing **shift to cloud, the rise of containers, the retooling of the telecom industry, and the emergence of practical applications** for artificial intelligence, machine learning and VR/AR—all of these present opportunities to refocus on the areas where we can most effectively contribute.

The software-defined economy that we've been talking about for years is accelerating and will disrupt every industry, especially traditional IT. Our work in open infrastructure gives us the opportunity to build important technology that supports a successful transition for IT and other industries.

It's important to keep these varied use cases in mind and to remember that OpenStack can play a key role in ways that we might not have imagined a few years ago. Even still, the tools and services that OpenStack provides are not broad enough to support all these use cases alone, but we don't have to—and can't—do it all on our own. There are other emerging open technology stacks, and finding ways to engage productively with other communities will be a critical factor in ensuring that this next wave of innovation has strong, long-term open source options and software available.

In some of our demos this year, we started to see the **power of the "one platform" concept with virtualization, bare metal and containerization working together to run versatile workloads**. From the OpenStack and Kubernetes demos in Austin to the OpenStack and OPNFV telecom demo in Barcelona, we've glimpsed how these combinations deliver practical value. In 2017, let's make it real and ready to use for even more organizations.

Thank you to the community members, users, contributors, commercial companies, and Foundation staff members who put so much effort and passion into building an amazing collaborative innovation engine!

JONATHAN BRYCE
Executive Director



PLATINUM & GOLD MEMBERS

Thank you to the Platinum and Gold Members of the OpenStack Foundation, who help direct the community, contribute to the software platform and fund important activities to ensure sustainable growth.

PLATINUM MEMBERS



GOLD MEMBERS



NEW SPONSORS

Thank you to our newest corporate sponsors for supporting the OpenStack Foundation. Organizations who contributed new sponsorship funding in 2016 include:



USER SURVEY

Read the full survey report or watch a two-minute highlights video. Downloads and links are at openstack.org/user-survey

More than 1,100 organizations participated in OpenStack's seventh semi-annual User Survey, released in April, its **largest turn-out ever**. The 60-page report offered deep insights from users, including cloud size, deployment decisions, and which OpenStack projects and emerging technologies are of greatest interest to our community.

Foundation developers responded to requests from the community to dig more deeply into User Survey data by offering a **DIY platform to analyze survey data** at openstack.org/analytics. The site allows you to apply six global filters to each question's data set for a more granular view.

For the October edition of the User Survey, the foundation generated a "highlights report" featuring the ten most popular charts from the full survey. Users were encouraged to update their data in the survey, and a streamlined question set was offered.

Key findings from the User Survey include showing more than **two-thirds of deployments in production**; adoption of the latest releases is accelerating; most people list cost savings as their No. 1 reason for adopting OpenStack; and OpenStack's APIs have become the de facto standard for enterprise Infrastructure-as-a-Service.



COMMUNITY HIGHLIGHTS

COMMUNITY STATISTICS

Registered Community Members: **68,837**

Supporting Organizations: **649**

Countries Represented: **181**

Global User Groups: **116**

Top 10 Countries by Membership:

US	Brazil
India	France
China	Germany
UK	Russia
Japan	Australia

OUTREACHY

Outreachy helps people from underrepresented groups get involved by matching interns with established mentors working in open source communities. It has been an important program for OpenStack, resulting in six interns sponsored by the Foundation who contributed to the community. In 2016, the Foundation donated USD \$39,000 directly to the program which roughly translates to **funding for 7 interns**.

TRAVEL SUPPORT PROGRAM

The OpenStack Foundation helps key contributors who are unable to secure sponsorship to attend the Summit by subsidizing or covering the costs for travel and accommodations. The Travel Support Program expanded dramatically, sponsoring **more than twice as many people** in 2016 compared to 2015.

Austin Summit: 60 people (16 women and 44 men) from 19 different countries, spanning 6 continents; USD \$170,000

invested. Compare this to our Vancouver 2015 summit, with 28 people attending from 14 countries at a \$60,000 investment.

Barcelona Summit: 60 people (19 women and 41 men) from 24 different countries, spanning 6 continents; USD \$125,000 invested. Compare this to our Tokyo 2015 Summit, with 30 people from 15 countries attending at a \$65,000 investment.

UPSTREAM TRAINING

At each Summit, the Foundation supports the Women of OpenStack groups networking event and working session. The Foundation also helps organize and support Upstream University training, conducted the two days prior to each Summit.

The upstream training took many steps forward in the last year. Two day training events were held at both the Austin and Barcelona Summits. **Attendance increased 260%**, from about 25 students in Austin to around 90 students between the two days in Barcelona.

The format of the training has gone through an overhaul in an effort to move towards a more interactive and hands on series of sessions with many activities and even a session where students were able to ask questions in small groups to active contributors from a variety of areas spanning from big tent projects, to documentation, to working groups.

This shift goes hand in hand with the push to get more people involved in the training-guides project to help improve the course material and the push to collect more mentors willing to be present at the





training to help out and answer questions.

In the next year, training sessions will continue to be hosted at the Summits with more interactive sessions that better prepare students for active contribution to OpenStack. There are also tentative plans to create an abridged version of the training to host at smaller scale events to increase the number of new contributors given their continued importance to the overall community.

WOMEN OF OPENSTACK

The Women of OpenStack group maintains a vibrant and highly visible presence at Summit events and in the community. At both Summit events in Austin and Barcelona, women made up **11 percent of total attendees**. The Women of OpenStack had 365 subscribers as of November 2016, and the Women of OpenStack LinkedIn group had 719 members.

The group focuses on attracting, retaining and developing women contributors to OpenStack and its activities are focused on onboarding and mentoring members of the OpenStack community. The group also meets biweekly and has worked to include new topics to encourage and prepare new speakers to speak at global and local events.

The group started a subteam for mentoring this year. The mentoring team organized

Speed Mentoring sessions at the Austin and Barcelona summits as well as a long-distance mentoring program.

Response to both programs has been positive. More than 60 people attended the Austin Speed Mentoring breakfast and more than 40 attended the Barcelona event. The long-distance mentoring program is in its second round, with 10 mentor/mentee pairs currently matched.

Feedback from the first round of long-distance mentoring allowed the team to significantly improve the program for the second round. WOO also reached out to the mainstream attendees and organized a Men as Allies workshop conducted by NCWIT in Austin that was well attended and sponsored a panel discussion on the value of gender diversity and inclusion.

GLOBAL USER GROUP CELEBRATIONS

Each year, user groups around the world celebrate the anniversary of OpenStack in July. The events spanned 47 celebrations in **29 countries**, including 15 US cities.

These celebrations were funded in part by a \$23,500 investment from the Foundation.

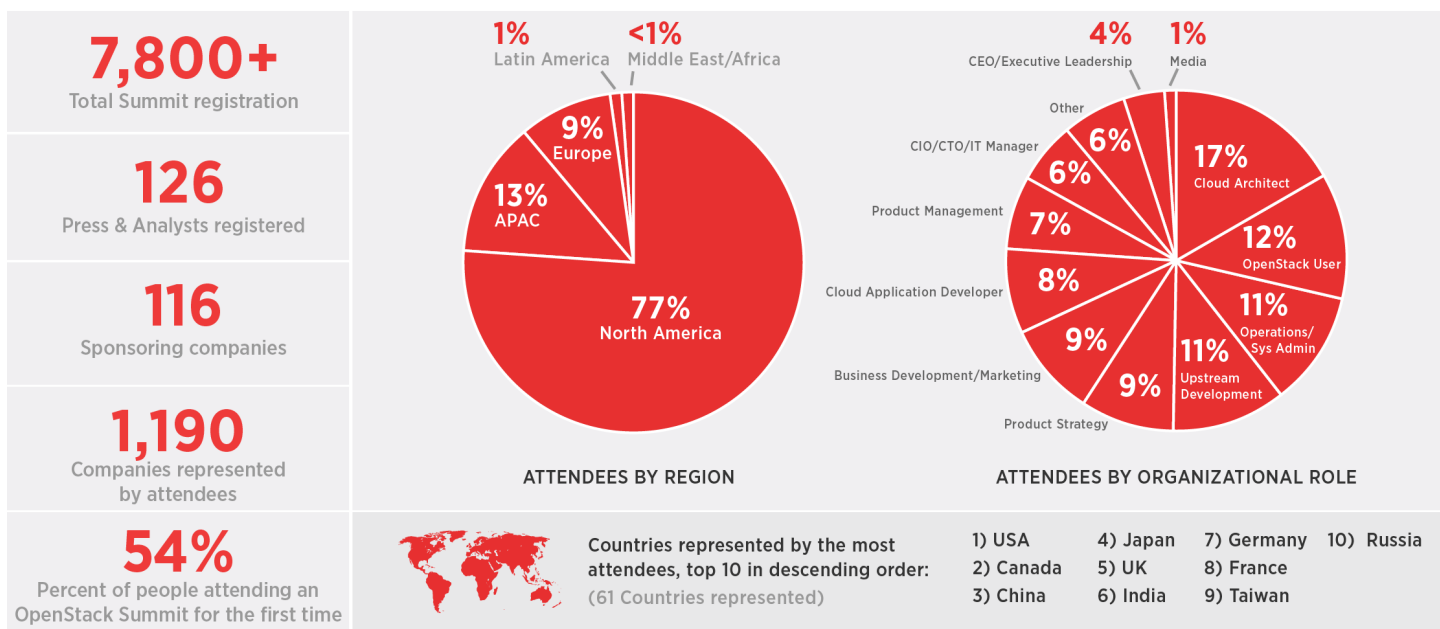
Learn more at https://wiki.openstack.org/wiki/Women_of_OpenStack



SUMMIT HIGHLIGHTS

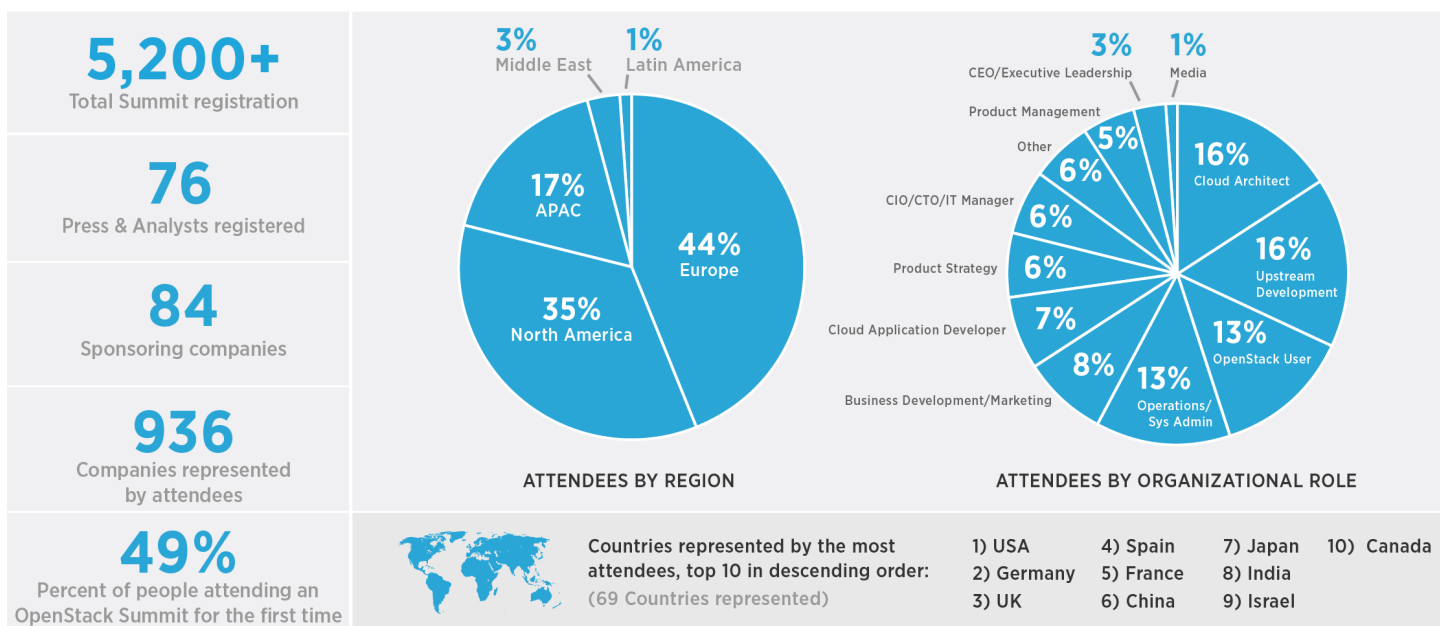
AUSTIN SUMMIT METRICS:

APRIL 2016



BARCELONA SUMMIT METRICS:

OCTOBER 2016



COMMUNITY INSIGHTS

UPSTREAM DEVELOPMENT COMMUNITY

By Thierry Carrez

During 2016 the overall development activity continued to grow. The number of changes merged in official OpenStack projects grew by 26% for a total of 102,855 changes. Looking solely at the main services (Keystone, Nova, Cinder, Swift, Glance, Neutron), activity was stable (1.1% more changes in 2016 than in 2015).

In terms of contributors, 3,479 individuals contributed to OpenStack in 2016, a 12% increase over 2015. However, most contributors propose fewer than four changes. 158 key developers end up authoring 50% of the changes, and 603 developers represent 80% of the changes. For our latest release, Newton, 309 different organizations contributed.

In terms of communication media, we noticed a 6% drop in openstack-dev mailing-list traffic compared to 2015, while communication on OpenStack IRC channels increased by 15%.

Our **project infrastructure is scaling up to accommodate that growth**. More than 6 million automated test jobs were run in 2016 to ensure proposed changes would not introduce regressions, generating more than 25TB of raw test log data as a result. The OpenStack project infrastructure is now a multi-cloud application that spans 13 cloud regions from 7 different OpenStack public and private cloud providers.

OPERATORS & USER COMMUNITY

By Tom Fifield, User Community Manager

This year marked a rise in prominence in the role of users in our community. Beginning with the hiring of David Flanders to dedicate

full time effort toward those working on top of the cloud, we saw the application developer community move from last year's fledgling status to something quite a bit more recognisable. Successful hackathons delivered exceptional software innovation built on OpenStack, training many, and working-group-led investigations into user experience brought some immediate benefits.

The **upstream community has been very supportive of users and receptive to feedback**, which resulted in delivering some key improvements to make the lives of cloud operators better. To name just two, the OpenStack client has solved long-standing inconsistency complaints, and the get-me-a-network feature from Newton makes it a lot simpler to get connectivity to a machine. Thanks to the developers on behalf of the users!

The OpenStack Operators Community is well-established, with working groups and teams facilitating collaboration across different areas—gathering among industries or around mutual pain points. A particular success of the year can be found in the Ops Meetups team, which organise events to share best practices, feedback and get more ops involved—see the report from team member Melvin Hillsman. The question and answer site reached a milestone just before the year finished, passing more than 20,000 questions since its inception.

Internationally, OpenStack's usage continues to grow. The User Group Portal (groups.openstack.org) tracked 57,000 members across 116 different user groups. 2016 brought new groups just about everywhere in the globe, including Bahrain, Bangladesh, Canada, Cote d'Ivoire, Ghana,





Senegal, Kazakhstan, South Africa and new regions in the US. Aside from getting new groups listed, our team of OpenStack Ambassadors reported a couple dozen groups have finished the mentoring process and became our first official User Groups.

As with past years, the User Committee (Edgar Magana, Jon Proulx, Shilla Saebi) has continued to ratchet in prominence and ever more effectively deliver representation for users. The committee's governed working groups and teams continue to complete a large body of work each month.

We established the "Active User Contributor" status to recognise those users who have contributed strongly to benefit the OpenStack community. It was fulfilling to see attendee badges with AUC in Barcelona. AUC is an important step to define the constituency of the User Committee, necessary for the Board approval of the new User Committee bylaws and charter. These changes will bring the first elected representatives and expand the User Committee to five members. Congratulations to our first 255 Active User Contributors.

The next exciting chapter for the user community comes with the Boston Summit's "Forum". The Forum is for the entire community to come together in a neutral space, rather than having separate "ops" and "dev" days, and kick-off the next OpenStack release cycle. Moving the release date months earlier than the Summit should dramatically improve the

feedback loop. Users will have more time to use the latest release, and changing the release cycle timing will mean ideas are arriving at the right time to act on them. See you there!

OPS MEETUPS TEAM

By Melvin Hillsman

The Ops Meetups Team came together early in 2016 to help the operator community drive mid-cycle and Ops Summit planning. In just over six months, the Ops Meetups Team successfully planned, organized, and executed a mid-cycle and the Barcelona Ops Summit.

During the August 2016 Ops Mid-cycle, held in New York City and hosted by Bloomberg, we had approximately 100 attendees. Sessions included discussing the physical hardware layer, NFV, containerizing the OpenStack control plane, and orchestrating with Kubernetes. Attendees not only considered the underlying technology driving *aaS, but also the supporting cast of logging, monitoring, and alerting tools.

Operators come away from these events with new energy, creative ways to address their day-to-day requirements, and exciting ideas about how they can offer more to themselves and their stakeholders using the robust OpenStack platform. OpenStack benefits from community collaboration among operators, engineers, application developers, and end users, all of whom drive momentum for OpenStack's future. The Ops Meetups Team is next planning an Ops Spring Mid-cycle, March 15-16 in Milan.





HACKATHONS

By David Flanders

The OpenStack community and sponsors hosted two robust hackathons in 2016, and generated substantial interest from the community to plan more.

At the Taiwan event in March, 38 teams with a total of 200 people participated in a Friday through Sunday event. Teams were tasked with developing apps with a future-city theme, and the winning team created a wearable device that measured muscle signals while playing the violin.

The grand prize was a trip to the Austin Summit, with other prizes including MacBook Airs, hoverboards, and (for the winner in the “best business potential” category) dinner with a venture capitalist.

At the Guadalajara hackathon in September, the foundation worked closely with the Universities in Mexico and the Intel Guadalajara teams to bring together a diverse range of “AppDev” and “DevOps” from University (students) to Enterprise (IT professionals).

More than 100 developers, 20 mentors and 5 judges sprinted over the long weekend to deliver inventive new cloud applications. The winner was brought to the Barcelona summit to demo their healthcare app.

In 2017, the Foundation plans to empower further communities to run hackathons worldwide, especially where Enterprise IT companies can be partnered with Universities to bring about the next generation of cloud application engineers. Stay tuned for Hackathons in the USA and AsiaPac!

Read about the Taiwan
hackathon in Superuser:
tinyurl.com/OS-TaiwanHack

See the Guadalajara
hackathon on YouTube:
tinyurl.com/OS-MexicoHack

...and in Superuser:
tinyurl.com/OS-MexicoHackArticle

ACTIVE USER CONTRIBUTOR

By Shamail Tahir

OpenStack community members contribute in a variety of ways, whether writing code to enhance OpenStack services, organizing local meetups, participating in working groups to raise awareness of user needs, or other functions.

However, the OpenStack community only had one designation to recognize its contributors, ATC (Active Technical Contributor), and it only recognized technical contributions to OpenStack projects. The OpenStack community recognized the need to expand the definition of what makes someone a “contributor,” and thus the AUC (Active User Contributor) designation was created. AUC includes contributors who support the User Committee charter through activities such as:

- Organizing official OpenStack user groups worldwide
- Actively participating in official UC working groups
- Sharing their knowledge through Superuser or AskOpenStack
- Helping to organize/moderate events by being track chairs or ops meetup moderators

The creation of the AUC designation is an important step in the evolution of our community as it recognizes that contributions outside of code are also necessary to help the community thrive.



COMMITTEE REPORTS

TECHNICAL COMMITTEE

By Thierry Carrez

The OpenStack Technical Committee was busy during 2016, holding 44 meetings on IRC and two in-person joint meetings with the Board of Directors and User Committee.

More than half of our members were renewed through elections over the course of the year: we welcomed John Garbutt, Emilien Macchi, Steve Martinelli, Mike Perez, Davanum Srinivas, Jeremy Stanley, and Matthew Treinish, while saying farewell to Jim Blair, Russell Bryant, Robert Collins, Anne Gentle, Mark McClain, Kyle Mestery, and Jay Pipes.

Ten new official OpenStack project teams were recognized in 2016, a significant portion of them (Zun, Octavia, Requirements team) as the result of the split of an existing OpenStack team.

As upstream development activities in OpenStack continue to grow, the Technical Committee members spent a lot of time **documenting key tenets** that hold the OpenStack community together. The Four Opens are now maintained as a governance document. We updated our mission statement to increase focus on interoperability and the cloud end users needs. We clarified the licensing requirements for OpenStack projects and dependencies.

More importantly, we started writing down the set of principles we operate under, a long-overdue task. This was triggered by some of the TC members (and other OpenStack Community stewards) attending a leadership training in June in Ann Arbor,

which helped us to take a step back and reassess our priorities, and look into improving our communication.

Another outgrowth of that training was the formation of a stewardship working group to continue the exploration of tools and frameworks we can apply to OpenStack governance, and formation of an architecture working group to document and refine the technical architecture of OpenStack as a whole.

The Technical Committee pushed for **definition of cross-project release goals**: one or more objectives that the whole OpenStack upstream development community sets for themselves, to pay back technical debt on a given topic or achieve visible and significant changes across all of OpenStack components over the course of a release cycle.

We hope that such goals will enhance cohesion among project teams and encourage developers to reach beyond their team and participate more to cross-project efforts.

We continued to drive other best practices through the definition of tags. We added a tag to describe which projects follow the OpenStack stable branch policy. We also added two tags to encourage projects to reach perfect upgradeability (beyond simple upgrade support and rolling upgrade support): one for zero-downtime upgrades, and one for zero-impact upgrades (no performance degradation at all).

Finally, we started some complex discussions where the proposed change has technical and social consequences





that need to be carefully weighed. The first considers under what conditions we could support OpenStack services to be written in another programming language, such as Golang. The second looks into vendor drivers, and under which conditions teams dedicated to writing them could be considered official OpenStack project teams. These discussions are ongoing, but should come to a conclusion in early 2017. We hope to address more of those hard questions throughout the year, continue documenting our culture, and define new goals for the Pike and Queens release cycles. Lots of work ahead!

USER COMMITTEE

By Edgar Magana

*The User Committee URL
is [https://governance.
openstack.org/uc/](https://governance.openstack.org/uc/)*

The User Committee had one of the best years ever, thanks to significant accomplishments and participation by the community.

Early in 2016, Subbu Allamaraju stepped down as committee member and the Board of Directors appointed Edgar Magana as a replacement. Shilla Saebi and Jon Proulx remained in their positions for the whole year. We ran biweekly IRC meetings with a significant increase in attendance, and we participated in two in-person joint meetings with the Board of Directors and the Technical Committee.

The User Committee formally created its own charter and new repositories were added to control content and logistics. After these important changes, the committee changed the official OpenStack Governance

site (governance.openstack.org) to become a more neutral space between the Board, Technical Committee, and User Committee.

The User Committee has ten active Working Groups (WGs) under its governance. The Product Working Group created user stories and blueprints to be consumed by the projects under the governance of the Technical Committee. One of the newest Working Groups is the Large Contributing OpenStack Operators (LCOO) that aims to define the use cases and prioritize requirements that are needed to deploy, manage, and run services on top of OpenStack. We expect awesome results from this work. All Working Groups have been collaborating online and gathering in person during the OpenStack Summits.

The highest-impact achievement from the User Committee during 2016 was approval for updates of the OpenStack Foundation's bylaws. The User Committee has moved **from being an advisory committee to an executive committee**, with the same level of rights and responsibilities as the Technical Committee. We also established **elected members**, instead of members only appointed by the board.

In February 2017, we will hold our first election for the two elected seats, expanding the committee to five people. In August 2017, we will have elections to replace the three appointed members, who will remain on the committee after the February election to ensure continuity of the committee's work.





INTEROP WORKING GROUP

Egle Sigler, Co-Chair

Mark Voelker, Co-Chair

Chris Hoge, Secretary

The Interop working group **changed its leadership structure and name** in 2016. Previously, two board members co-chaired the committee. To reflect the community's involvement, we now have one co-chair from community and one from the board.

To better align the working group's identity with our objective of producing interoperability guidelines, we renamed the "DefCore Committee" as the "Interop Working Group." One of the goals of this group is to create strong interoperability standards for OpenStack, and we are well on our way to fulfilling this goal by developing a steady cadence of board-approved interoperability guidelines that set base requirements to qualify for the OpenStack Powered trademark.

While creating bi-annual guidelines, we have continued to strengthen our relationship with PTLs and the QA team. We've also built more collaborations with the rest of OpenStack community. One example of this was with the Interop Challenge, driven by IBM, which **brought together 16 companies to show how different OpenStack deployments could run identical workloads**.

Looking forward, the Interop WG will add new components and add-on programs for OpenStack certification. Test coverage is

still an issue, particularly in testing APIs for capability discovery.

2016 Accomplishments:

- In 2016, over 30 OpenStack products were certified under current guidelines.
- Released 2 new guidelines, 2016.01 and 2016.08.
- Published first Interoperability Issues report.
- Close partnership with RefStack, with new management features added and all test results stored at refstack.openstack.org.
- Greater OpenStack Interop awareness, through collaborations with PTLs and new projects like the Interop Challenge.
- Creation of an interoperability test specification to guide test selection and development.

2017 Priorities:

- New components and add-on programs: OpenStack big tent offers various projects, and Interop guidelines should reflect that.
- Greater test coverage: some capabilities cannot be added due to the lack of test coverage.
- Expanding capability list to reflect frequently used OpenStack features.
- More direct involvement from OpenStack project teams in defining their interoperability guidelines, regardless of their official status within the approved guidelines.





PRODUCT WORKING GROUP

Carol Barrett, Co-Chair

Shamail Tahir, Co-Chair

The Product Working Group (PWG) works to document/aggregate user needs in the form of user stories. Developers from participating companies help make them a reality. We also aggregate release activities from various projects and build a community-generated roadmap.

We worked on **documenting 13 user stories and moving three towards implementation planning** (rolling upgrades, bare metal enhancements and high availability VMs) in 2016. The working group has also started efforts to simplify our user story submission workflow in order to increase the number of contributors. This simplified submission method will be crucial in the upcoming year as the PWG anticipates an increase in user story submissions from the User Committee (UC) working groups, operators meetup, and the Forum.

The working group also collaborated with the OPNFV (Open Platform for Network Function Virtualization) Polstar team to foster cross-community collaboration on OpenStack user stories and workflow best practices. The team **released two community-generated roadmaps** in 2016 that highlight the top (planned) user/ops-centric features and themes for more than 25 official projects over multiple releases.

As we look forward to 2017, the PWG plans to participate in the planning for the Forum as well as generate user stories from the

event itself. We will continue to participate actively in the operators meetup and work with the User Committee to help aggregate requirements from the other UC working groups. If you would like more information about the Product Working Group, or to join us, please visit our OpenStack wiki page at <https://wiki.openstack.org/wiki/ProductTeam> for additional details.

ENTERPRISE WORKING GROUP

Carol Barrett, Chair

The Enterprise Working Group's mission is to further the number of OpenStack enterprise deployments. We had strong participation from a broad cross section of companies in our community and the team continues to evolve based on the maturity of OpenStack and user needs—whether technical, business, or tactical.

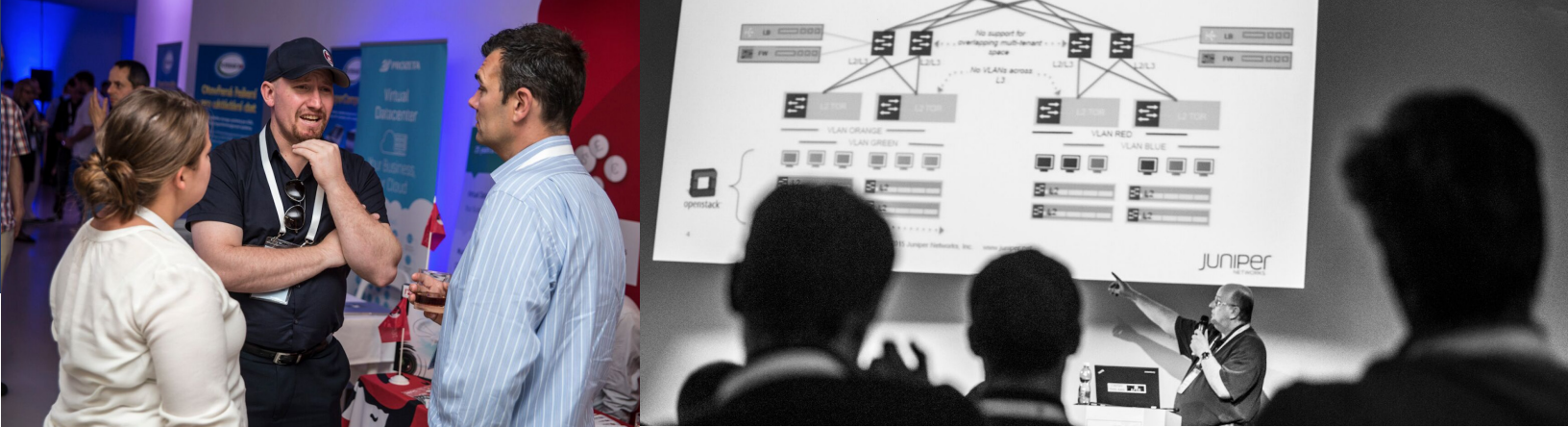
Significant technical progress on the implementation of rolling upgrades addresses a top pain point for Enterprise adoption and will be a continued focus for 2017.

The EWG **published its second ebook this year *OpenStack: The Path to Cloud***. This ebook follows *OpenStack: A Business Perspective*, which together offers a comprehensive strategy guide, covering both the why and how of getting started with OpenStack.

The EWG's third book, title to be determined, focuses on app development. Content development is underway and publication is anticipated for the Boston Summit.

These roadmaps can be found at <http://www.openstack.org/roadmap>.





The team also initiated development of Workload Reference Architectures to help assist Operators and End-Users in planning and deploying various workloads on their OpenStack cloud. The currently available reference architectures cover big data and web applications workloads. Additional reference architectures including eCommerce, container-based, and more, will be made available this year.

The ISV sub-team is working on a whitepaper to highlight a leading SaaS company that is running on OpenStack, we anticipate this will be released early this year. The Working Group kicked off a drive to engage new members. New companies have joined in 2016, including Unitas Global and other financial services companies, with more to come. We welcome people who can help us identify and remove barriers for Enterprise deployment of OpenStack Clouds.

SCIENTIFIC WORKING GROUP

Blair Bethwaite

2016 saw the establishment of the Scientific Working Group, following conversations (variously including Tim Bell, Tom Fifield, Stig Telfer and David Flanders) at the 2015 Tokyo Summit. The inaugural meeting was held at the Austin design summit, and attracted a level of **interest and participation beyond expectations**. The group meets weekly on IRC (in alternating time slots) to discuss and to coordinate. The group has predominant active representation from North America and Europe. Many members

simply participate in the shared forum/community of peers without being involved in an activity/focus area.

The Working Group's aim is to advocate for research computing use cases, and to share information about best practice. The group also performs outreach activities among the wider scientific computing community.

Examples of Working Group activities include the HPC/Research speakertrack at OpenStack design summits and a panel session and BoF on OpenStack at the Supercomputing 2016 conference. The OpenStack Foundation collaborated with the Working Group to create a book (drawing upon the use cases and experience of Working Group members) and landing page for **HPC and HTC workloads running on OpenStack**.

Working group meetings at the OpenStack Design Summit identify areas where there are gaps in capability (or knowledge) for research computing use cases. Four of these are selected as activity areas for focus in the following release cycle.

The current activity areas are Federation, GPUs, Metrics & Monitoring, and Datasets. At the Barcelona Summit, the group also hosted a Birds of a Feather/lightning-talk session followed by a social evening. Following Barcelona, there has been a noticeable increase in participation and momentum.

Find more information, including EWG meeting times, at https://wiki.openstack.org/wiki/Enterprise_Working_Group.



MILESTONES

SOFTWARE RELEASES: MITAKA AND NEWTON

Heidi Joy Tretheway

OpenStack released two software iterations in 2016. Mitaka, the 13th release which debuted in April, was designed and built by an international community of 2,336 developers, operators and users from 345 organizations. Newton, the 14th release (October), was designed and built by an international community of 2,581 developers, operators and users from 309 organizations.

Mitaka's release focused on offering enterprises and service providers greater **manageability, scalability, and end-user experience**. Its new features offer an integration engine to manage bare metal, virtual machines, and container orchestration frameworks with a single set of APIs. In fact, OpenStack has become the de facto standard, as 97% of OpenStack users reported in the April User Survey that standardizing on the same open platform and APIs that power a global network of public and private clouds is one of their top five business drivers for choosing OpenStack.

Newton, release in October 2016, **doubled down on the "one platform" message**, with features that help OpenStack users manage bare metal, virtual machines and containers through one seamless platform. Newton's enhancements also offer greater scalability, resiliency and user experience improvements to support a wider variety of workloads.

CERTIFIED OPENSTACK ADMINISTRATOR

Anne Bertucio

The Certified OpenStack Administrator (COA) program launched in April 2016 at the Austin Summit to overall positive reception from both community members and press. An ecosystem of reselling partners was launched at the same time, providing test takers 25 companies who agreed to supply the test.

As of the Barcelona Summit (October 2016), approximately **500 people had taken the COA from more than 50 countries**. The pass rate averages around 60%, which is a respectable number from testing standards, indicating that the test is neither too easy nor too difficult.

OPENSTACK DAYS

Denise Ridolfo

In 2016, the OpenStack Foundation supported the delivery of over 25 OpenStack Day events around the world, reaching more than 13,500 System Administrators, Cloud Developers, Cloud Architects, IT Managers and C-Level managers.

Total attendance exceeded the total attendance of two combined summits, and provided the opportunity for local users, developers and operators to congregate, learn more about OpenStack, and see leading-edge use cases from major organizations in action.

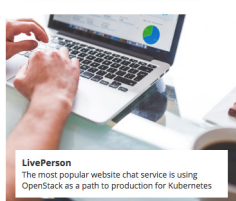
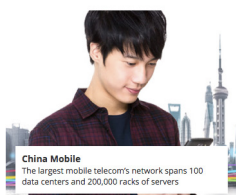
See Newton's key features at openstack.org/software/newton

Learn more about the COA program at openstack.org/coa

Find upcoming OpenStack Days at openstack.org/community/events/openstackdays/



MARKETING UPDATE



See the *Runs on OpenStack* campaign at openstack.org/user-stories.

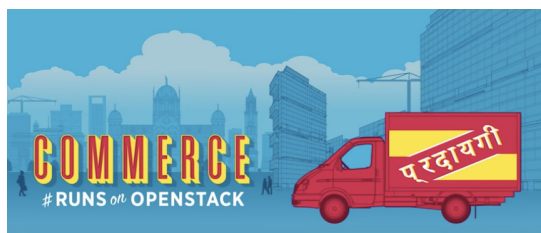
Download the *NFV report* at openstack.org/telecoms-and-nfv

View the *Heavy Reading* webinar at tinyurl.com/OS-HeavyReading

MAJOR MARKETING CAMPAIGNS

Allison Price

Encompassing the different industries and audiences that rely on OpenStack, the Foundation partnered with the ecosystem marketing community to launch *The World Runs on OpenStack* campaign at the OpenStack Summit Barcelona. This included a refresh to the OpenStack user stories page and the creation of collateral to support the campaign and showcase the many industries and global users that run on OpenStack. This campaign will extend to 2017 with greater focus on supporting the community with materials to promote the campaign, including OpenStack Days and general campaign use.



OpenStack also demonstrated its deep penetration in the enterprise with a Foundation-sourced survey of the US Fortune 100 companies, which revealed that more than 50% of these companies use OpenStack.

Targeting Telecom and NFV

An expanded telecom/NFV focus prompted the creation of the NFV Foundation Report in February, which became the most-downloaded piece of content ever published by Foundation with more than 17,726 downloads. Additionally, the Foundation commissioned a survey and webinar by Heavy Reading, resulting in impressive stats

(86% of global telecoms report OpenStack is “important” or “essential” to their success) that were shared in the Barcelona Summit keynote and added to Foundation marketing materials.

We saw major growth of OPNFV collaboration at all levels, including face-to-face joint board meetings, joint collateral and web presence, mutual Summit sponsorship and sessions, a joint messaging paper, and OPNFV speakers at OpenStack Days. We leverage this partnership for insights on carrier-grade requirements and feature extension, and created a “buzz-worthy” fault management keynote demo in Barcelona—a collaboration between OPNFV Doctor and OpenStack, featuring the Vitrage project.

At the Austin Summit, we hosted a telecom user luncheon for an open requirements discussion among telecoms, which included key OpenStack project leaders, core contributors, and Foundation staff. The community formed an active Telecom/NFV Operators Working Group, as well as a Large Contributing OpenStack Operators group, which is not limited to telecom but closely related, and focuses on driving large-scale (distributed scaling) OpenStack features.

Security Focus

A security brief paper grew from a collaboration with the security team to discuss frequently asked questions and risks around OpenStack. In June, the security team was awarded the Core Infrastructure Initiative Best Practices badge by the Linux Foundation and was bylined article in several publications.





BRANDING & IDENTITY

Heidi Joy Tretheway

Six years is a lifetime in tech, so it's no surprise that as OpenStack evolved and matured, its visual identity needed to do so as well. An effort to **modernize OpenStack's logo** focused on maintaining the iconic mark, while making it more flexible and easier to reproduce throughout the community in all formats.

The result is a transition from OpenStack's three-dimensional logo to a streamlined, two-dimensional "stacked O" logo. Proposed in June, this new mark was vetted through trademark review and then unveiled to the community at the Barcelona Summit. A transition period supported by assets for community use is ongoing through the Boston Summit in May 2017.

OpenStack's "big tent" model now includes more than 60 projects in various stages of maturity, but a major challenge is ensuring they all work together. As developers solve this technical hurdle, the Foundation's marketing design team focused on the visual communication problem: only a minority of big tent projects had logos, but none looked like they belonged to the same "family" of projects.

The Foundation sponsored an opportunity for teams to choose their own mascots—plant, animal, insect, or anything from the natural world—and **a team of illustrators created a suite of logos representing each mascot** in a stylistically consistent way.

See the new logo at openstack.org/brand

Final revisions of team logos are in progress, with release targeted for the Project Teams Gathering in February.



See the sneak peek video at tinyurl.com/OS-MascotVideo

PR & ANALYST HIGHLIGHTS

Robert Cathey, Jennifer Fowler

Public relations efforts in 2016 focused on supporting the Foundation's core messages:

- Interoperability across OpenStack clouds
- Support for diversity compute methods: VMs, bare metal, containers
- Use by organizations large and small
- Enterprise use cases
- Public cloud growth
- Global community

Efforts are led by a distributed team of professionals in the US, Europe and APAC. This team engaged analysts and journalists worldwide in dialogue, both proactively delivering Foundation news and responding to requests for information. Key initiatives surrounded the Mitaka and Newton releases, the Austin and Barcelona Summits, and the release of commissioned research reports from Heavy Reading (telecom survey) and 451 Research (enterprise adoption). The team also supported Hackathons in Taipei, Taiwan, and Guadalajara, Mexico, as well as numerous OpenStack Days, including a summer tour of events held in India, China, Taiwan and Japan.

A Trendkite analysis shows that OpenStack coverage was more than 98% neutral or positive, distributed globally (15% Europe, 26% Americas, 34% APAC, by volume). News highlights available at openstack.org/news.





For more information about analyst coverage of OpenStack, visit openstack.org/analysts.

Likewise, analyst coverage of OpenStack in 2016 was widespread and predominantly positive, as illustrated by the following excerpts:

451 Research: "Of those respondents who said that their company has private cloud ... 80% currently use OpenStack."

Crisp Research: "OpenStack has managed to make its way from a rather unknown project to one of the most important open source projects and de-facto standard when implementing an infrastructure-as-a-service."

Forrester: "almost every public, private, and hosted private cloud ... is in the process of developing ... support for the OpenStack APIs. Why? OpenStack's powerful ecosystem ... [has] driven customer demand for OpenStack API support."

Gartner: "I&O leaders should seek complementary deployment patterns for

OpenStack and container technologies as they look to provide agility for their application development users."

Goldman Sachs: "There is strong interest around OpenStack, with 80% of CIOs polled expecting to use OpenStack in three years, up from 60% using the technology today."

Heavy Reading: "86 Percent of Global Telecoms Report OpenStack Important or Essential to Their Success. ... Also impressive is the large number of organizations using or testing NFV solutions on OpenStack; this number has grown considerably in comparison to similar studies we conducted only a year and a half ago."

IDC: "... a number of regional public cloud services have emerged in the last two years. A majority of these are based on OpenStack, which has lowered the barrier for creation and set up of new cloud services."

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