Report da
OpenStack Summit
Austin 2016

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INFN-CNAF
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Few Notes

• From 75 attendees to 7,500, the OpenStack Summit is back in Austin
• Kick off Certified OpenStack Administrator
  https://www.openstack.org/coa
• Where’s next
  ○ Barcelona October 25th 2016
  ○ Boston May 8th 2017
  ○ Sydney November 6th 2017
• Catch up refs
  (Schedule)
  https://www.openstack.org/summit/austin-2016/summit-schedule/
  (Videos)
  https://www.openstack.org/videos/summits/show/6
Intro

- Keynotes
  (snapshots of realities and foresee the upcoming)
- Speeches
  (some interesting things)
- Hands-on
  (YAHO)
- Surveys
  (Numbers!)
Keynotes - Day 1 TOC

- **Embracing Datacenter Diversity**  
  (Jonathan Bryce - OpenStack Foundation, Executive Director)
- **Bimodal**  
  (Donna Scott - Gartner, Vice President and Distinguished Analyst)
- **AT&T's Cloud Journey with OpenStack**  
  (Sorabh Saxena - SW Dev & Engineering)
- **Mirantis Sponsor Keynote**  
  (Boris Renski - Co-founder CMO at Mirantis)
- **How SAP runs IoT on top of OpenStack**  
  (Nayaki Nayyar - Global head of IoT, SAP)
- **Trusted Cloud Solutions**  
  (Chris Wright - Chief Technologist Red Hat)
- **Driving the Future of IT Infrastructure at Volkswagen Group**  
  (Mario Mueller - Corporate Director IT)
Embracing Diversity

“In this time of disruption you need to take advantage of diversity in IT. If you can embrace it, manage it, you can do incredible things.” (Jonathan Bryce)

- diversity in term of:
  - community, contributors and companies
  - user categories
  - flexibility
3 keys of embracing diversity:

1. Pick standard platform
2. New Apps, need old apps
3. Culture > Technology.
Pick standard platform

- **Cloud Native Framework**
  (Environments to build applications as K8S, Cloud Foundry, Mesos)
- **Application primitives**
  (Less concerned about single server, but thinking a raw application unit)
- **Infrastructure primitives**
  (providing basic compute storage and network)

OS is not the answer for all levels, but OS is a flexible framework ties into platforms that are open source standards widely available.
New Apps, need old apps

- **Cloud hosted systems** move from dedicated, manually administered hardware to cloud provisioned bare metal and virtual servers.
- **Optimized services** use cloud capabilities to support the availability and performance of the system, such as allowing the software to repair and scale its own resources.
- **Cloud native systems** have other abstractions as part of the application architecture, such as Platform-as-a-Service (PaaS) or container frameworks.

Refer to bimodal, new apps can need legacy data from legacy database. Different models to deployed different system. Successful OS users have diverse way of buildings apps, Openstack is able to underlay for all of them.

Austin Openstack Summit Recap
Bimodal IT is the practice of managing two separate, coherent modes of IT delivery, one focused on stability and the other on agility. Mode 1 is traditional and sequential, emphasizing safety and accuracy. Mode 2 is exploratory and nonlinear, emphasizing agility and speed.
Culture > Technology.

Problems encountered by 95% of private clouds

- Nothing is going wrong: 31%
- Failure to change the operational model: 13%
- Doing too little: 19%
- Doing too much: 11%
- Failure to change funding model: 13%
- Focusing on the wrong benefits: 10%
- Using the wrong technologies: 5%
- Something else: 5%
- Other: 0%
Openstack success is 1 part technology, 9 parts people-process. Jonathan Bryce message, echoed by Boris Renski
Keynotes – Day 1 bonus


Simon Anderson
@S1monAnd

"We like Gartner at Mirantis now that they are not saying that OpenStack is cr@p" - the Mirantis bear emerges :)

5:06 PM - 25 Apr 2016
Keynotes - Day 2 TOC

- **Not Invented Here: Collaborate or Die in the Billion Device, Billion Core Era** (Mark Collier - Openstack Foundation, Chief Operating Officier)
- **Apache Mesos on OpenStack at Time Warner Cable** (Tim Pletcher - Time Warner Cable, Engineering Director)
- Running Kubernetes on OpenStack at LivePerson (Koby Holzer - Liveperson)
- **Building a SmartCity with IoT** (Jakub Pavlík - Tcp Cloud a.s.)
- **OpenStack and Kubernetes: Inception**  
  (Craig McCluckie - Google, Group Product Manager)  
  (Alex Polvi - CoreOS, CEO)
- **OpenStack and the Power of Community-Developed Software** (Lew Tucker - CISCO, VP/CTO)
- Improving UX with OpenStackClient (Dean Troyer - Intel)
- Underhyped but Changing the World: OpenStack for Universities & Research (Dan Stanzione TACC Texas Advanced Computing Center)
- **Intel Sponsor Keynote** (Imad Sousou, Intel)
- **OVH: Building a Public Cloud that Scales** (Maxime Hurtrel, OVH)
Demand is very growing in IaaS (5 billions connected devices in 2020). This will require 400 million servers in 2020 -> how to satisfy that demand?

"We can’t do it alone" Collier said. Naming "big dogs" of the industry that use OpenStack -- AT&T, Walmart, China Mobile and VW -- underscoring his point that to survive and thrive they need to be part of open community.
Collaborate or Die

What's next? He envisions there will be a LAMP stack for OpenStack but says the community should remove its blinders.

"Whatever our LAMP stack is it will be OpenStack and__. I'm counting on you to help me fill in the blanks."
Collaborate or Die

What's next? He envisions there will be a LAMP stack for OpenStack but says the community should remove its blinders.

"Whatever our LAMP stack is it will be OpenStack and__. I'm counting on you to help me fill in the blanks."

[Image: HOW STANDARDS PROLIFERATE: (SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC)]

<table>
<thead>
<tr>
<th>SITUATION: THERE ARE 14 COMPETING STANDARDS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>14?! RIDICULOUS! WE NEED TO DEVELOP ONE UNIVERSAL STANDARD THAT COVERS EVERYONE'S USE CASES. YEAH!</td>
</tr>
<tr>
<td>SOON: SITUATION: THERE ARE 15 COMPETING STANDARDS.</td>
</tr>
</tbody>
</table>

Austin Openstack Summit Recap
Where is OS going next?

Surveys, surveys, surveys.

- Containers: 70%
- SDN/NFV: 52%
- Bare metal: 50%
- Hybrid cloud: 44%
- Platform as a Service: 35%
- Internet of Things: 31%
- Hardware accelerators: 29%
- Other: 3%

\textit{OpenStack} @OpenStack : 26 apr

The latest \#OpenStack user survey identified containers, NFV / SDN & bare metal as the top emerging technologies
Apache Mesos on OpenStack at Time Warner Cable

- Their stack: mostly providing general purpose multi-tenant container runtime for the engineering group and providing services as elasticsearch, kafka, cassandra (TSDB)
- Openstack - Mesos. They mostly use Ironic as long as Mesos is usually deployed on BMs
- Architecture explanation plus demo https://goo.gl/pxqBM9
Building a SmartCity with IoT

http://goo.gl/exKzdQ
Building a SmartCity with IoT

Actual floor 1 CO₂ levels

Actual floor 4 CO₂ levels

Global CO₂ levels

Historical CO₂ levels

http://austin.tcpcloud.eu

Austin Openstack Summit Recap
OpenStack and K8S: Inception

- Tectonic (CoreOs distribution for K8S) is managing 5 BMs in which they deployed all services needed for hosting openstack (nova-compute, libvirt, neutron agent, etc..)
OpenStack and K8S: Inception

- Tectonic (CoreOs distribution for K8S) is managing 5 BMs in which they deployed all services needed for hosting openstack (nova-compute, libvirt, neutron agent, etc..)

1. added a role for compute to an host and showed the hypervisor was added to the cluster (and used to launch a CoreOS instance).
2. self healing: killing Horizon service. Then Nova 
3. rolling upgrade for horizon v2 to v3 via Blue-Green Deployment
Speeches
Speeches (Followed by Alessandro)

- Flat No More! Hierarchical Multitenancy and Projects Acting as Domains in OpenStack
- Autonomous Network Management – Leverage Observability Metrics to Achieve Automation Nirvana
- Canonical - Using containers to create the World's fastest OpenStack
- CERN and Science Clouds in Europe with TOSCA, OpenStack Heat and the Heat Translator
- Lockless Upgrades - How to Upgrade OpenStack Without Locking Up Your DB
- Scientific Working Group Inaugural Meeting
- Multi-cloud Networking
- Deploying OpenStack Using Docker in Production*
- Scientific Community Clouds: Five Directors of Community Clouds Responsible for a Quarter Million Cores Worldwide
- Monitor Openstack Environments from the Network to the Apps
- Ceph and The Future of Storage
- Dive into The Migration of Stateful Application to DCOS Platform - the Practice in China Mobile
- Cephfs in Jewel: Stable at Last*
- Monitoring a Multi-Region Cloud Based on OpenStack: The FIWARE Lab Case Study
- Integration of Neutron, Nova and Designate: How to Use It and How to Configure It*
- Networking-Calico, a Routing-Based Implementation of IP-Only Connectivity Between VMs - What, Why, How and the Future
- App Development in a Dockerized Universe
- Containerizing Network Services

Bold = in this presentation
* = very meaningful
In any case I advise you to go to schedule and search for the video you are interested in!

Austin Openstack Summit Recap
Hierarchical Multitenancy

- Flat No More! Hierarchical Multitenancy and Projects Acting as Domains in OpenStack
  - Available from Kilo
    - Tenant became a project
    - Domain is a container of projects
    - Project may have subproject
    - User belong to Domain (role could be inherited from subproject)
  - Use Keystone APIv3
  - Resources
    - Cloud Admin creates domain and set quota
    - Controlled by Project Manager
  - Nested quota for projects
    - Works in Cinder
    - Under review in Nova
LXD Linux Hypervisor

- Canonical - Using containers to create the World's fastest OpenStack
  https://www.openstack.org/videos/video/canonical-using-containers-to-create-the-worlds-fastest-openstack
  - LXD Linux Hypervisor
    - Provide machine containers
      - API driven application
    - Boot a full OS on their filesystem
    - ZFS support
      - Considered stable
    - LDX plugin for Nova
CERN and Science Clouds in Europe

- CERN and Science Clouds in Europe with TOSCA, OpenStack Heat and the Heat Translator
  

- Heat Translator in Mitaka
  - CERN 2nd contributor in commits

- TOSCA Parser in Mitaka
  - UVP 2nd contributor in commits

- INDIGO DataCloud highlights
  - TOSCA as a viable common denominator among topology definition and end user application

Current Use Cases

- Deploy simple VM with a given image
- Elastic cluster for batch processing (infrastructure)
  - Supported systems: torque, slurm, condor
- Deploy a Mesos cluster (infrastructure)
- Galaxy portal (end user)
  - Data intensive application for biomedical research
- Indigo specific jobs (infrastructure / end user)
  - Package and deploy applications in docker containers, on Mesos/Marathon/Chronos

- First usecase covered
- Work going on on Newton
Lockless Upgrades

- Lockless Upgrades - How to Upgrade OpenStack Without Locking Up Your DB
  - [https://www.openstack.org/videos/video/lockless-upgrades-how-to-upgrade-openstack-without-locking-up-your-db](https://www.openstack.org/videos/video/lockless-upgrades-how-to-upgrade-openstack-without-locking-up-your-db)

  - Liberty to Mitaka upgrade DB
  - Updating the schema to store new data structures
    - no downtime on data nor control plane
      - **Nova** - in place
      - Heat - under test
      - Cinder - on preview
      - Keystone - DB locks
      - Neutron - DB locks
    - MySQL - at least 5.6 + python script
    - PostgreSQL - manual upgrade altering the table
The Scientific Working Group
- Dedicated to representing and advancing the use-cases and needs of research and high-performance computing atop OpenStack
- Forum for cross-institutional collaboration

Four main topics:
- Parallel FS on Openstack (Giuseppe A.)
- Baremetal
- User Stories for research computing and HPC (Riccardo)
- Resource Accounting (Alessandro)
Scientific working group

- Mailing list:
  a. user-committee@lists.openstack.org
  b. openstack-operators@lists.openstack.org
- Meetings:
  a. Every two weeks on even weeks, 2100 UTC on Tuesday in IRC channel #openstack-meeting
  b. Every two weeks on odd weeks, 0700 UTC on Wednesday in IRC channel #openstack-meeting

Full details (including a calendar file and logs) are available at eavesdrop.openstack.org
Scientific Community Clouds: Five Directors of Community Clouds Responsible for a Quarter Million Cores Worldwide

- Purpose of this panel is to bring together key stakeholders and computation center decision makers from the research community
  - Paul Calleja - Head of Research Computing Services, Cambridge Uni
  - Paul Rad - UTSA Open Cloud Institute (OCI)
  - Lyle Winton - NeCTAR Research Cloud
  - Tim Bell - CERN
Scientific Community Clouds: Five Directors of Community Clouds Responsible for a Quarter Million Cores Worldwide

- Large use of container in production
- Data Center federation
  - Policy problems
- Strategies for data growth
  - Multilevel architecture for data storage
  - Policy enforcement
- Security in OpenStack
  - Got DC specific security solutions on top of Openstack
CEPH

- Ceph and The Future of Storage
  - Video not available from the Summit Web site
  - [https://www.openstack.org/summit/austin-2016/summit-schedule/events/7230](https://www.openstack.org/summit/austin-2016/summit-schedule/events/7230)

Jewel release

- CephFS considered stable
  - Snapshots and multiple active MDS servers
- Scrubbing tools
  - Ensure consistency
  - Run manually right now
- Disaster recovery for damaged journals
  - Rebuild metadata that exists in journal but lost on disk
- RADOSGW
  - Improved compatibility with Swift
  - OpenStack Keystone v3 API is now supported
Networking-Calico

- L3 approach to data center networking to enable secure IP communication between virtual machines, containers or bare metal workloads
  

- Face-to-Face with main developer (Christopher Liljenstolpe)
  - HTMesos usecase covered by Calico
  - Docker network drivers (libnetwork) policies still got issues
    - https://github.com/projectcalico/calico-containers/blob/master/docs/calicoctl/profile.md
      - Will be fixed in future releases
    - Instead it could be used Universal containerization
  - Geographically distributed cluster
    - Sync problems among ETCD clusters
      - Policies published on each ETCD cluster
Speeches (Followed by Riccardo)

- App Development in a Dockerized Universe*
- Application CI/CD on OpenStack - Building a Solution Using Jenkins and OpenStack Solum*
- CERN and Science Clouds in Europe with TOSCA, OpenStack Heat and the Heat Translator
- Cinder Project Update
- Introduction to Container Security*
- Leveraging OpenStack IaaS to Run Mesos/Marathon at Time Warner Cable
- Lockless Upgrades - How to Upgrade OpenStack Without Locking Up Your DB
- Mesos and OpenStack: The Perfect Tag Team for Containers
- Multi-cloud Networking
- Networking For Nested Containers: Magnum, Kuryr, Neutron Integration
- OpenStack Infrastructure for Beginners* (for development chain)
- **Persistent Storage for Containers Using Cinder**
- **Scalable Heat Engine Using Convergence**
- Scientific Community Clouds: Five Directors of Community Clouds Responsible for a Quarter Million Cores Worldwide
- Scientific Working Group Inaugural Meeting
- Troubleshoot Cloud Networking Like a Pro*

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Scalable Heat Engine Using Convergence

Refactoring heat-engine adding worker/observer

Motivations:

- Robustness - stack restart create failures
- Scalability - stacks provisioned by single heat-engine process
- Availability - take right action when user action is not needed. Stack update
Scalable Heat Engine Using Convergence

Phase 1: Design evolution

Convergence engine

- Template
- Heat-API
- AMPQ
- "worker"
- Heat-Engine-1
- "worker"
- Heat-Engine-2
- "worker"
- Heat-Engine-3
- DB

Stacks
- Stack-1
- Stack-2
- Stack-3

Done Resources
- A B
- A B

Austin Openstack Summit Recap
Scalable Heat Engine Using Convergence

Phase 2: Observer

Stack update <stack id> <template with new resource>

1. Get resource inform DB
   - DB state matches template data, no update required

2. Get live state of the resource

3. Merge DB data with live state
4. Compare merged data with template data
5. Bring resource in sync
Scalable Heat Engine Using Convergence

Developed in three phases:

1. Design change in engine (Liberty)
2. Observer/Fault tolerant engine (Mitaka)
3. Continuous Observer (Newton)

https://www.youtube.com/watch?v=cz7Yguv_hDw
Persistent Storage for Containers Using Cinder

REX-Ray By EMC {code}

- Abstraction layer between storage endpoints and container platforms. The administration and orchestration of various storage platforms can all be performed using the same set of commands.

http://rexray.readthedocs.io/
https://goo.gl/sYtYJK
Persistent Storage for Containers Using Cinder

Why REX-Ray?
(Amazon EC2, Google Compute Engine, Open Stack, EMC, Virtual Box)
(Docker, Mesos)

```yaml
rexray:
  storageDrivers:
    - openstack
  volume:
    mount:
      premt: true
  openstack:
    authUrl: http://172.24.4.1:35357/v2.0
    username: admin
    password: [redacted]
    tenantName: alt_demo
    regionName: RegionOne
```
Persistent Storage for Containers Using Cinder

Why REX-Ray?
(Amazon EC2, Google Compute Engine, Open Stack, EMC, Virtual Box)
(Docker, Mesos)
Persistent Storage for Containers Using Cinder

Polly By EMC {code}
Centralized storage scheduling service that integrates with popular container schedulers of different application platforms for containerized workloads. (Docker Swarm, Mesos, Kubernetes, Cloud Foundry)

http://polly-scheduler.readthedocs.io/
Hands on
Hands-on (Followed by Riccardo)

- **Configure Your Cloud for Auto-Recovery**
  - https://www.openstack.org/videos/video/configure-your-cloud-for-auto-recovery
  - https://github.com/wbentley15/os-summit-wkshop-austin-autorecovery

- **Meta-Do's and Don'ts A Hands-On Exploration of OpenStack Metadata**
  - https://github.com/madorn/cloud-init-guide

- **Best Practice for Deploying Application with Heat in Production by Deployment Modules and Patterns**
  - https://github.com/lynic/templates/tree/master/austin

- **Writing an AngularJS plugin for Horizon**
  - https://github.com/doug-fish/sample-horizon-angular-plugin/

- **Install and Configure OpenStack Octavia**
  - bit.do/octavia-slides
Configure Your Cloud for Auto-Recovery

This workshop will walk attendees through the process of linking a monitoring system such as Nagios to an automated recovery system such as StackStorm to produce auto-recovery OpenStack cloud actions.

https://www.openstack.org/videos/video/configure-your-cloud-for-auto-recovery
https://github.com/wbentley15/os-summit-wkshop-austin-autorecovery
Configure Your Cloud for Auto-Recovery

**Stackstorm** (recently bought by Brocade) is the “IFTTT for DevOps”
- Automated Remediation (what about CM?)
- ChatOps
- Continuous Deployment

Very flexible (right or wrong?)

YAML defined - graph tools for workflows

List of plugin (packs, +50): [https://github.com/StackStorm/st2contrib](https://github.com/StackStorm/st2contrib)
Hands-on (Followed by Alessandro)

- Configure, Deploy and Troubleshoot Distributed Virtual Routers with DVR SNAT HA in a Multi-Node Environment

- Designate: Interactive Workshop - Install and Operate, Hands-On Lab

- Configure, Deploy and Troubleshoot Distributed Virtual Routers with DVR SNAT HA in a Multi-Node Environment
Configure Your Cloud to Charge Your Users

- Hands On to Configure Your Cloud to Be Able to Charge Your Users Using Official OpenStack Components!
  - Selling the services provided by a Cloud
  - Define the various prices and policies

- Reminder of gnocchi and cloudkitty
- Installation of gnocchi
- Installation of cloudkitty
- Configure cloudkitty to use gnocchi
- Define a standard pricing policy using horizon
Designate workshop

- Designate: Interactive Workshop - Install and Operate, Hands-On Lab
  - installation and configuration of Designate on a virtual machine

- Designate Architecture
- How to Install and Configure Designate
- How to set up the newly merged Nova and Neutron Integration
  - Assigning domains to neutron networks
  - Reverse DNS
  - Assigning dns_names to neutron ports and floating IPs
- End user usage of the API, CLI and Horizon UI
Distributed Virtual Routers

- Configure, Deploy and Troubleshoot Distributed Virtual Routers with DVR SNAT HA in a Multi-Node Environment
  - Configuring, deploying, and troubleshooting Distributed Virtual Routers with DVR SNAT HA in OpenStack Neutron
- Multi-node installation of devstack.
- Enable DVR support on the Controller as well as on the Agents.
- Configure different nodes such as DVR enabled Compute Node and Service Node.
- Deploy distributed Routers.
- Configure FloatingIP and walk through the iptables rules in the FIP namespaces.
- Walk through the OVS flow rules.
- Configure DVR SNAT HA.
- Walk through the fail over of SNAT from master to slave
Surveys
https://goo.gl/GHfQMQx
Top business drivers

- **Standardize** on the same open platform and APIs that power a global network of public and private clouds. 71% (97%)
- **Avoid vendor lock-in** with an open platform, including flexibility of underlying technology choices. 47% (92%)
- Accelerate my organization’s ability to **innovate** and compete by **deploying applications faster**. 48% (79%)
- Increase **operational efficiency**. 54% (75%)
- **Save money** over alternative infrastructure choices. 66% (66%)
- **Attract top technical talent** by participating in an active global technology community. 50%
- **Achieve security and/or privacy** goals with control of platform. 41%
How likely are users to recommend OpenStack?

2016

- Promoters: 52%
- Passives: 37%
- Detractors: 11%

2015

- Promoters: 47%
- Passives: 31%
- Detractors: 22%

Note: survey role participants wasn’t significantly changed
In what stage are OpenStack deployments?

- **Production/Full Operational Use (Production)**
  - April 2016: 59%
  - October 2015: 33%
  - April 2015: 32%
  - November 2014: 46%
  - May 2014: 49%
  - November 2013: 65%

- **Under Development/In Testing (Dev/QA)**
  - April 2016: 27%
  - October 2015: 27%
  - April 2015: 30%
  - November 2014: 33%
  - May 2014: 34%
  - November 2013: 32%

- **Proof of Concept**
  - April 2016: 14%
  - October 2015: 14%
  - April 2015: 22%
  - November 2014: 27%
  - May 2014: 34%
  - November 2013: 34%
Which projects do OpenStack deployments use?

- Nova (Compute): 97% (Production), 31% (Testing)
- Keystone (Identity Service): 93% (Production), 30% (Testing)
- Glance (Image Service): 91% (Production), 29% (Testing)
- Neutron (Networking): 90% (Production), 33% (Testing)
- Horizon (Dashboard): 90% (Production), 31% (Testing)
- Cinder (Block Storage): 83% (Production), 26% (Testing)
- Heat (Orchestration): 68% (Production), 29% (Testing)
- Ceilometer (Telemetry): 60% (Production), 30% (Testing)
- Swift (Object Storage): 53% (Production), 21% (Testing)
- Ironic (Bare Metal): 22% (Production), 14% (Testing)
- Trove (Database Service): 17% (Production), 14% (Testing)
- Sahara (Data Processing): 17% (Production), 14% (Testing)
- Designate (DNS Service): 17% (Production), 14% (Testing)
- Magnum (Containers Service): 12% (Production), 11% (Testing)
Domande