Deploying a Private OpenStack Cloud at Scale

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Time Warner Cable®

Introduction

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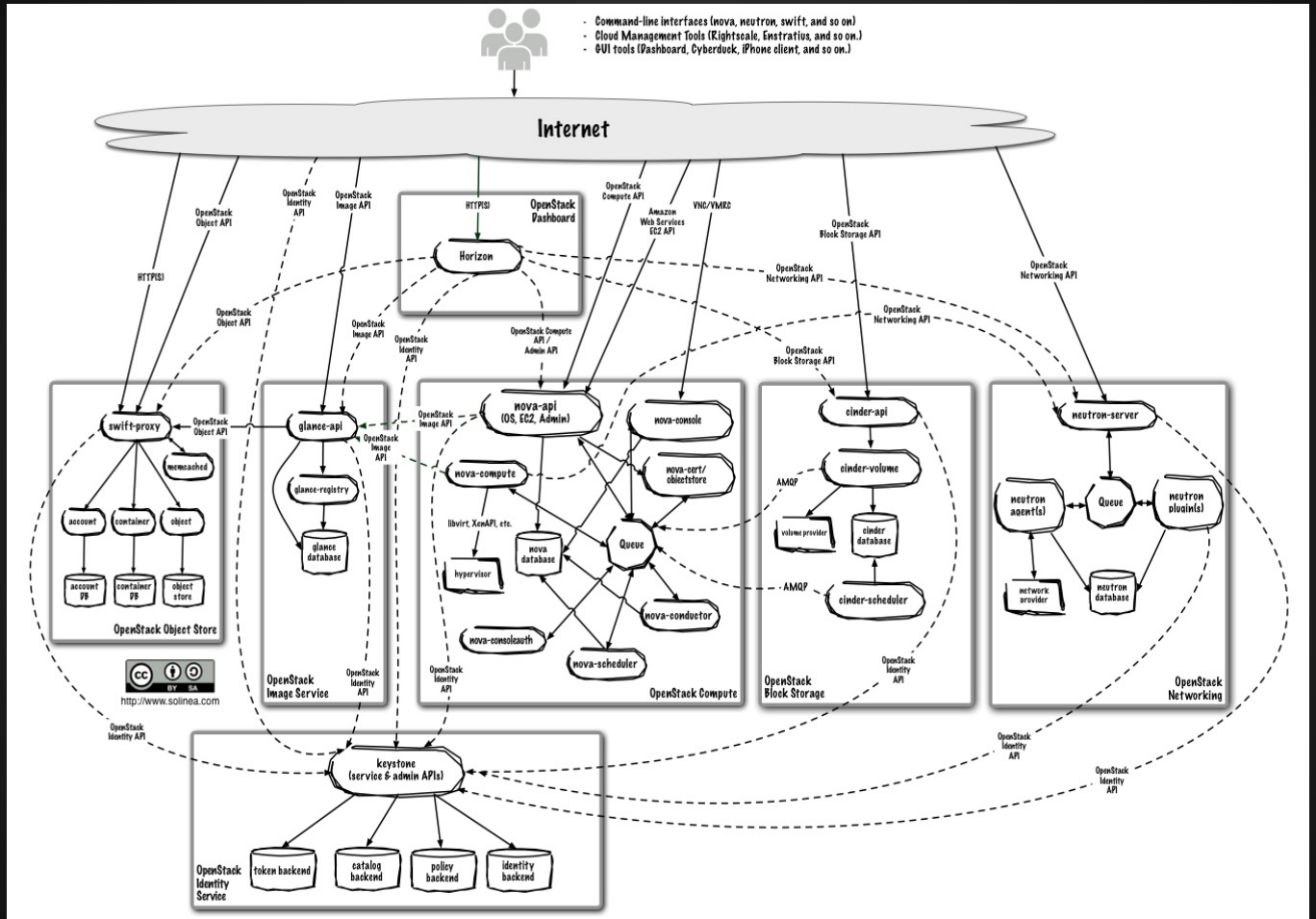
What Is This Talk About?

- Learn about our OpenStack deployment
- Share thoughts that we think you should consider when planning your deployment


- Command-line interfaces (nova, neutron, swift, and so on)
- Cloud Management Tools (Rightscale, Enstratius, and so on.)
- GUI tools (Dashboard, Cyberduck, iPhone client, and so on.)
Internet
HTTP(S)
OpenStack Dashboard
Horizon
OpenStack Object API
OpenStack Identity API
OpenStack Image API
OpenStack Compute API
Amazon Web Services EC2 API
VNC/VMRC
OpenStack Block Storage API
OpenStack Networking API
OpenStack Compute API / Admin API
swift-proxy
memcached
account
container
object
account DB
container DB
object store
OpenStack Object Store
glance-api
glance-registry
glance database
OpenStack Image Service
nova-api (OS, EC2, Admin)
nova-console
nova-cert/ objectstore
nova-compute
libvirt, XenAPI, etc.
hypervisor
nova database
Queue
nova-conductor
nova-consoleauth
nova-scheduler
OpenStack Compute
cinder-api
cinder-volume
volume provider
cinder database
cinder-scheduler
AMQP
OpenStack Block Storage
neutron-server
neutron agent(s)
Queue
neutron plugin(s)
network provider
neutron database
OpenStack Networking
http://www.solinea.com
keystone (service & admin APIs)
token backend
catalog backend
policy backend
identity backend
OpenStack Identity Service

Why OpenStack @ TWC?

- Innovation
- API Focused
- Self-Service Culture
- Open
- DevOps Philosophy
- Platform

Release Naming

- Named after places
- Alphabetical, starting at Austin
- Current: Juno
- Next: Kilo

About Our Deployment

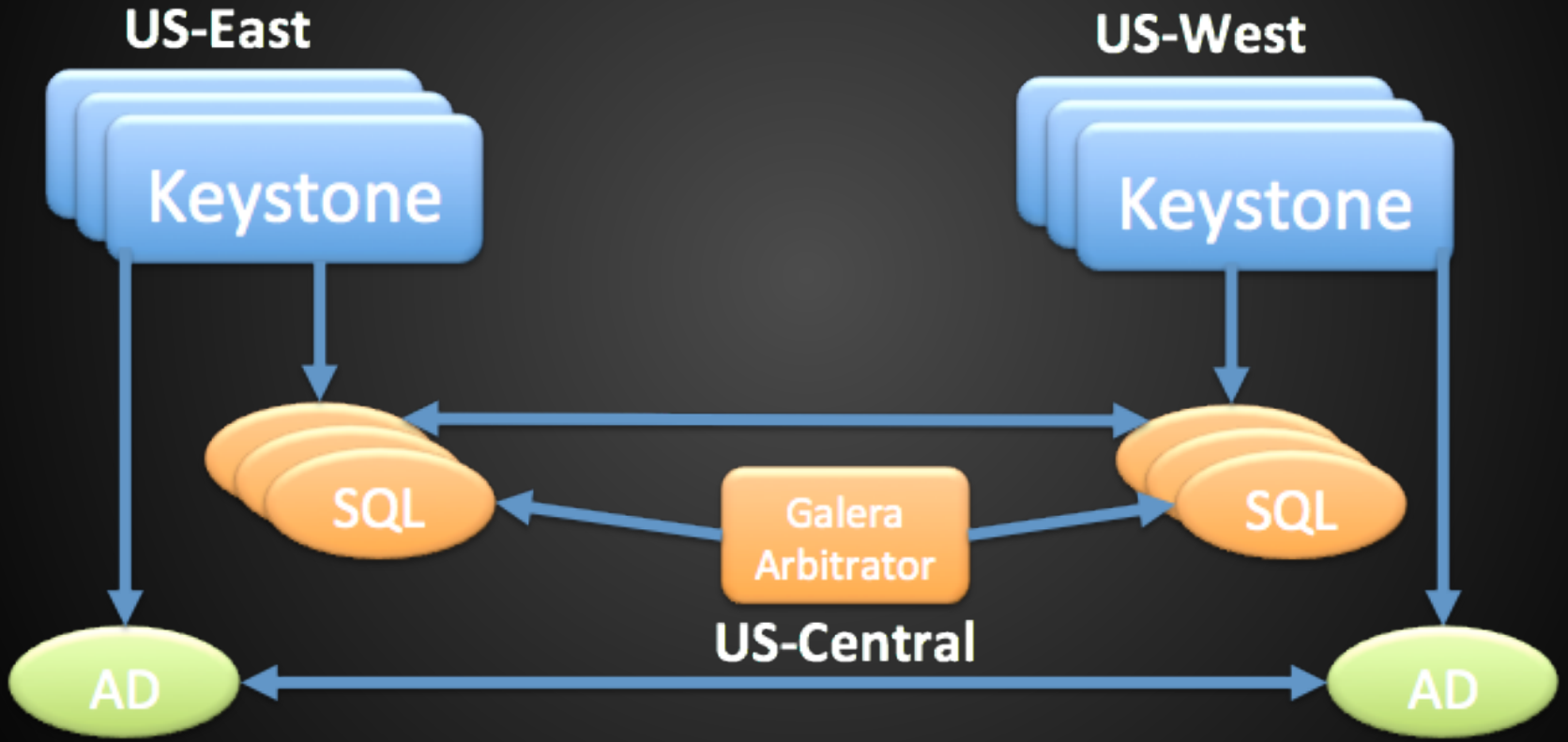
Environment & Scope

- OpenStack deployed in two data centers
- Capacity for 5000 vms
- 1 PB usable object & block storage
- In production since July 2014

Key Decisions

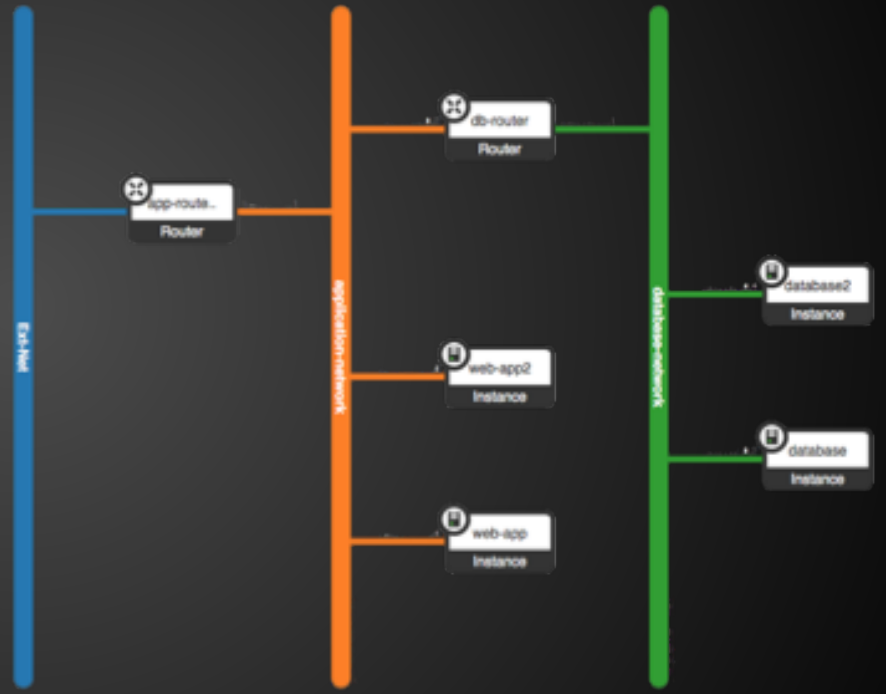
- Identity
  - Global
  - Leveraging existing systems
- Network Architecture
  - Self-service
- Storage Architecture
  - Live-migration
  - Cross-site replication

Identity Architecture



Network Architecture

- VXLAN Tenant networking
- Provider network with Floating IPs



Storage Architecture

- Object Storage - cross-DC Swift
  - DR - images/backups
  - Used for a “DropBox” like app

- Block Storage - intra-region Ceph
  - Multi-tier storage with SolidFire SSD storage option
  - Enables live migration

Live Migration

- Move virtual machines without interruption
- Simplifies operations
- Requires more expensive shared storage
- Enables less-cloudy applications

Tools

What 7 Things Do You Need to Consider for Your OpenStack Deployment?

1. No Snowflakes

Automation

- OS Installs: Cobbler + Ubuntu Preseed
- Config Management: Puppet
- Orchestration: Ansible

External Dependencies

- Mirror & version external dependencies
  - package repositories
  - GPG keys
  - puppet modules
- Upgrades should be intentional

Environments

- Virtual environment using vagrant-openstack
- Useful for development
- Proves rebuilding nodes will work

2. HA

HA Type - Active/Active

- Cluster of peers
- More complex
- Faster failover
- Easier maintenance
- More hardware
- Works well with OpenStack

HA Active/Passive

- Only requires two nodes
- Better tested
- More configuration

HA Everywhere

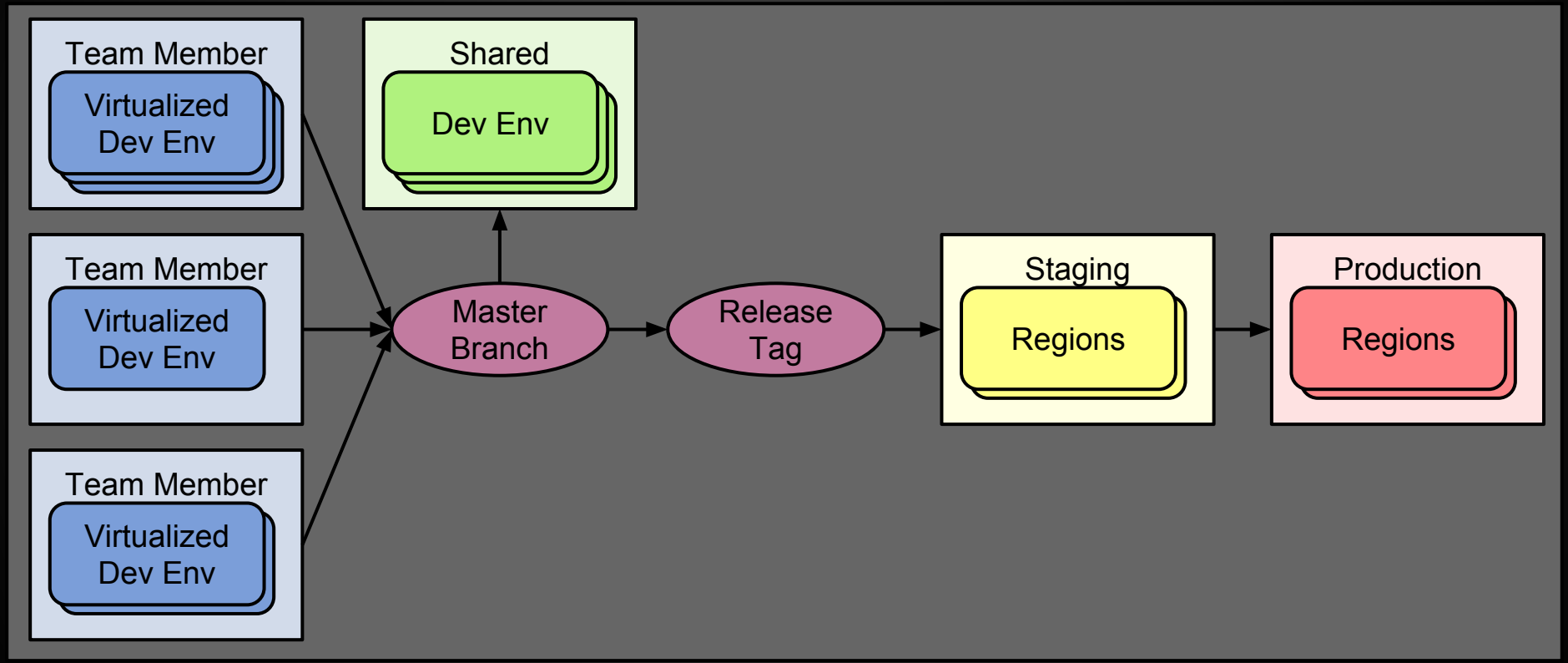
- All environments should be HA
- Unified configuration
- This is important for testing

3. Deployments

Deployment Process

- Have one!
- Transition manual to automated
  - Automation enables higher frequency
- Automate one-off deploys (upgrades/etc)

Development to Production



4. Community

Working With the Community

- Plan on joining the mailing lists
- Get familiar with community processes
- Participation in a community is currency

Community and Tooling

- Take advantage of community tools
- There’s value in the work of thousands of other developers

5. Upgrades

Upgrading OpenStack

- Waiting makes it worse
- Automate your upgrades
- Test your upgrades
- Database migrations lead to downtime

Upgrading Related Services

- Don’t forget other services when doing upgrades

6. Monitoring

Monitoring

- Start small
- Actionable alerts
- Someone needs to be responsible
- Don’t configure monitoring by hand

7. Pain Points

RabbitMQ

- Message broker used by OpenStack
- Failures are difficult to detect
- This is a focus area

Neutron

- Neutron problems lead to angry customers
- Stay up to date on Open vSwitch
- Only the brave use new features

Kernel Panics

- Have a plan to handle kernel upgrades
- How do you plan on debugging?

Users

- May require education
- Cultural shift
- Tooling

What’s Next?

Process and Tools

- Better integration testing
- Deployment tool improvements
- Python virtual environments

New Features

- DNS as a Service
- Load Balancer as a Service
- Monitoring as a Service

Summary

Plugs

- Real World Experiences Upgrading OpenStack at Time Warner Cable
- A CI/CD Alternative to Push and Pray for OpenStack
- Deploying OpenStack Clouds with Puppet Modules
- DNS with Designate in Production

Plugs

- Neutron in the Real World
- Growing OpenStack at TWC
- Changing Culture at TWC
- A Year With Cinder and Ceph at TWC

Q&A

8. Code Review

Code Review

- Code Quality
- Mentoring
- Shared Ownership
- Pre-merge Testing