RED HAT FORUM
Europe, Middle East & Africa

redhat

MAKING INFRASTRUCTURE BORING

Tony Scully
Senior Solution Architect
3rd October 2017

HYBRID SERVICES

RED HAT OPEN INNOVATION LABS | RED HAT CONSULTING | RED HAT TRAINING | RED HAT SERVICES

APPLICATIONS AND BUSINESS PROCESSES

MIDDLEWARE AND APPLICATION SERVICES

DEV

3scale BY RED HAT

RED HAT JBOSS BPM SUITE

RED HAT JBOSS FUSE

RED HAT JBOSS DATA GRID

RED HAT JBOSS DATA VIRTUALIZATION

RED HAT JBOSS BRMS

RED HAT JBOSS AMQ

RED HAT MOBILE APPLICATION PLATFORM

RED HAT JBOSS ENTERPRISE APPLICATION PLATFORM

OPS

RED HAT JBOSS DEVELOPER STUDIO

RED HAT CONTAINER DEVELOPMENT KIT

RED HAT APPLICATION LIFECYCLE TOOLS

SOFTWARE-DEFINED DATACENTER

CLOUD-NATIVE INFRASTRUCTURE

RED HAT VIRTUALIZATION

RED HAT OPENSTACK PLATFORM

RED HAT OPENSHIFT Container Platform

RED HAT ENTERPRISE LINUX ATOMIC HOST

RED HAT ENTERPRISE LINUX

RED HAT STORAGE

PHYSICAL AND CLOUD INFRASTRUCTURE

RED HAT CERTIFIED CLOUD AND SERVICE PROVIDER PROGRAM

RED HAT REGISTRY

RED HAT INSIGHTS

RED HAT ANSIBLE Automation

RED HAT SATELLITE

RED HAT CLOUDFORMS

HYBRID SERVICES

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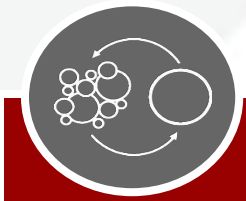
APPLICATIONS AND BUSINESS PROCESSES



DEV

MIDDLEWARE AND APPLICATION SERVICES

3scale BY RED HAT

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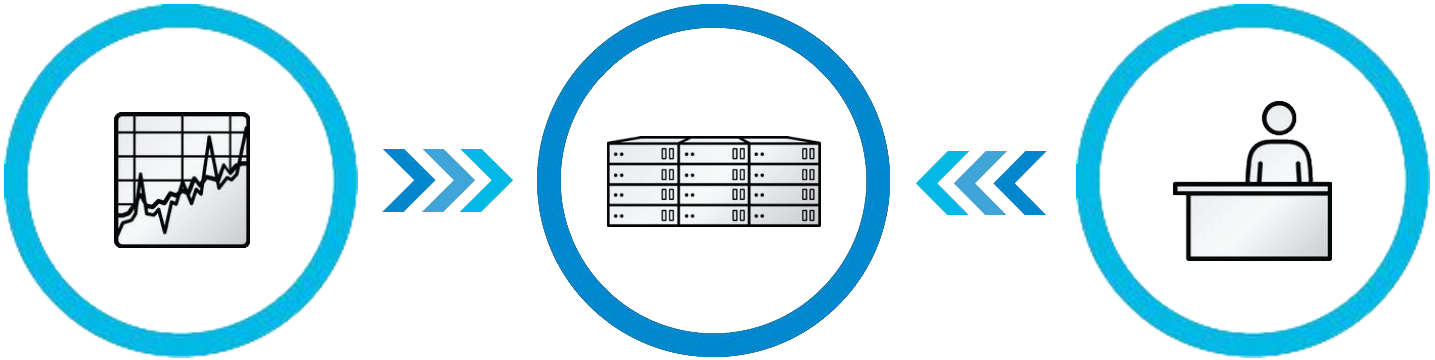
I.T. OPERATIONS IS BEING CHALLENGED

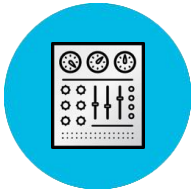


INTERNAL BUSINESS

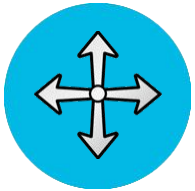
I.T. OPERATION CHALLENGES

DEVELOPERS

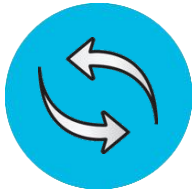
MODERN APPS & IAAS ENABLE THE DIGITAL BUSINESS



Streamlined
and automated

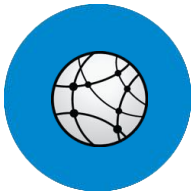


Elastic
and scalable



Agile
and responsive

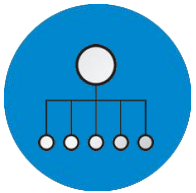
Utility-like



Orchestration

Massive, fault-tolerant
infrastructure

Rapid deployment



Managed, policy driven
& always on

THE VIRTUE OF BORING

The virtues of boring

Spontaneous
Unpredictable
Puzzling
Suspenseful
Complex
Unique

Constant
Dependable
Clear
Routine
Simple
Repetitious

Principles

Everything can be rebuilt

Everything is disposable

Everything is consistent

Avoid Fragility, Embrace Simplicity

There is no ‘end state’

Methods

Automate all the things

Version Control all the things

Test all the things

CI all the things

Practice all the things

When things go wrong...

“Ways in which things go right are special cases of the ways in which things go wrong”

John Allspaw

When things go wrong...

Know things have gone wrong:

- White box monitoring
- Black box monitoring

Know your system:

- Have a method
- Be open and transparent

Count things that matter:

- Service MTTR and MTBF

Things do go wrong...

Menu aws Products Solutions Pricing Getting Started Documentation Software Support Customers Partners Enterprises More English My Account Sign in to the Console

Summary of the Amazon S3 Service Disruption in the Northern Virginia (US-EAST-1) Region

We'd like to give you some additional information about the service disruption that occurred in the Northern Virginia (US-EAST-1) Region on the morning of February 28th, 2017. The Amazon Simple Storage Service (S3) team was debugging an issue causing the S3 billing system to progress more slowly than expected. At 9:37AM PST, an authorized S3 team member using an established playbook executed a command which was intended to remove a small number of servers for one of the S3 subsystems that is used by the S3 billing process. Unfortunately, one of the inputs to the command was entered incorrectly and a larger set of servers was removed than intended. The servers that were inadvertently removed supported two other S3 subsystems. One of these subsystems, the index subsystem, manages the metadata and location information of all S3 objects in the region. This subsystem is necessary to serve all GET, LIST, PUT, and DELETE requests. The second subsystem, the placement subsystem, manages allocation of new storage and requires the index subsystem to be functioning properly to correctly operate. The placement subsystem is used during PUT requests to allocate storage for new objects. Removing a significant portion of the capacity caused each of these systems to require a full restart. While these subsystems were being restarted, S3 was unable to service requests. Other AWS services in the US-EAST-1 Region that rely on S3 for storage, including the S3 console, Amazon Elastic Compute Cloud (EC2) new instance launches, Amazon Elastic Block Store (EBS) volumes (when data was needed from a S3 snapshot), and AWS Lambda were also impacted while the S3 APIs were unavailable.

S3 subsystems are designed to support the removal or failure of significant capacity with little or no customer impact. We build our systems with the assumption that things will occasionally fail, and we rely on the ability to remove and replace capacity as one of our core operational processes. While this is an operation that we have relied on to maintain our systems since the launch of S3, we have not completely restarted the index subsystem or the placement subsystem in our larger regions for many years. S3 has experienced massive growth over the last several years and the process of restarting these services and running the necessary safety checks to validate the integrity of the metadata took longer than expected. The index subsystem was the first of the two affected subsystems that needed to be restarted. By 12:26PM PST, the index subsystem had activated enough capacity to begin servicing S3 GET, LIST, and DELETE requests. By 1:18PM PST, the index subsystem was fully recovered and GET, LIST, and DELETE APIs were functioning normally. The S3 PUT API also required the placement subsystem. The placement subsystem began recovery when the index subsystem was functional and finished recovery at 1:54PM PST. At this point, S3 was operating normally. Other AWS services that were impacted by this event began recovering. Some of these services had accumulated a backlog of work during the S3 disruption and required additional time to fully recover.

We are making several changes as a result of this operational event. While removal of capacity is a key operational practice, in this instance, the tool used allowed too much capacity to be removed too quickly. We have modified this tool to remove capacity more slowly and added safeguards to prevent capacity from being removed when it will take any subsystem below its minimum required capacity level. This will prevent an incorrect input from triggering a similar event in the future. We are also auditing our other operational tools to ensure we have similar safety checks. We will also make changes to improve the recovery time of key S3 subsystems. We employ multiple techniques to allow our services to recover from any failure quickly. One of the most important involves breaking services into small partitions which we call cells. By factoring services into cells, engineering teams can assess and thoroughly test recovery processes of even the largest service or subsystem. As S3 has scaled, the team has done considerable work to refactor parts of the service into smaller cells to reduce blast

Things do go wrong...

Encapsulate all this in a ‘platform’

Look at high performing IT organisations

Look at the way public cloud is architected

Look for commonality in your infrastructure tools

Aim to provide IaaS, IaaS+ and IaC

What does Red hat bring?

Automation with Ansible and OpenStack Heat

Iaas and IaaS+ with Red Hat OpenStack Platform

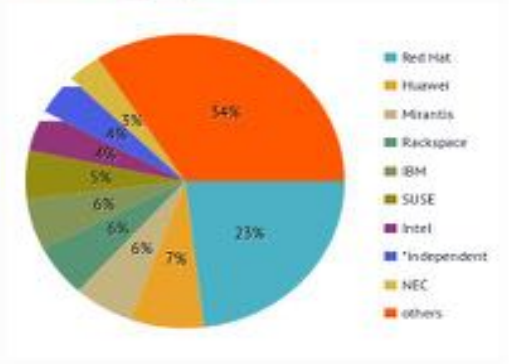
Scale out distributed storage with Ceph

Hybrid Cloud management with CloudForms

(Plus lots of other products and services)

FROM COMMUNITIES TO ENTERPRISE

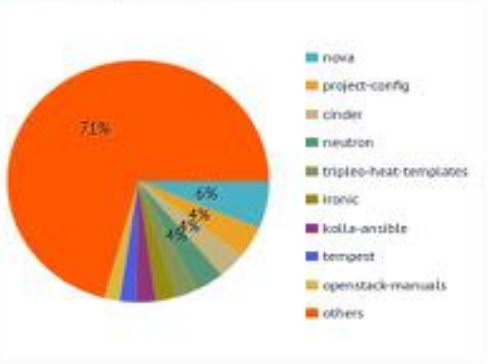
Contribution by companies



Show 10 entries Search:

#	Company	Reviews
1	Red Hat	33918
2	Huawei	10917
3	Mirantis	8945
4	Rackspace	8490

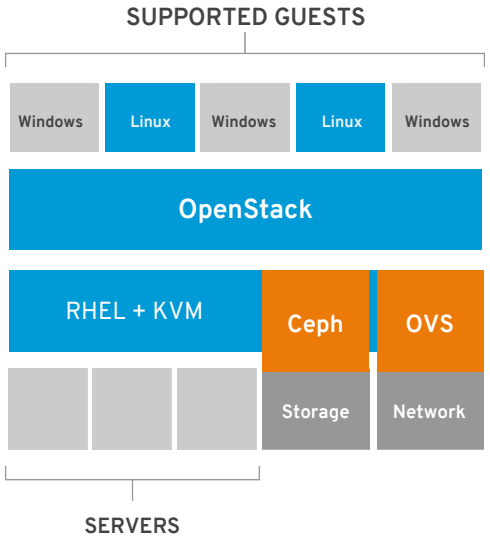
Contribution by modules



Show 10 entries Search:

#	Module	Reviews
1	nova	9234
2	project-config	6194
3	cinder	5147
4	neutron	5140

Co-engineered with RHEL



Virtualization | Security | Ecosystem | Network | Storage

Security Enhanced Linux (SELinux)

KVM | Network Stack

Device Drivers

LINUX KERNEL

LIFECYCLE CONSUMPTION OPTIONS

CUSTOMERS DESIRING LONGER LIFE VERSION	CUSTOMERS DESIRING LATEST FEATURES
Long life evrsions offered every 3rd release	Offered on each release
Offers standard 3-year lifecycle, with optional 1-2 years of ELS (extended lifecycle support)	Supported for 1 year
Will offer long life → long life tooling for migrations	Utilize director for automated upgrades and updates continuously
Customers staying on Red Hat OpenStack Platform 10	Customers moving to Red Hat OpenStack Platform 11

LIFECYCLE SUPPORT

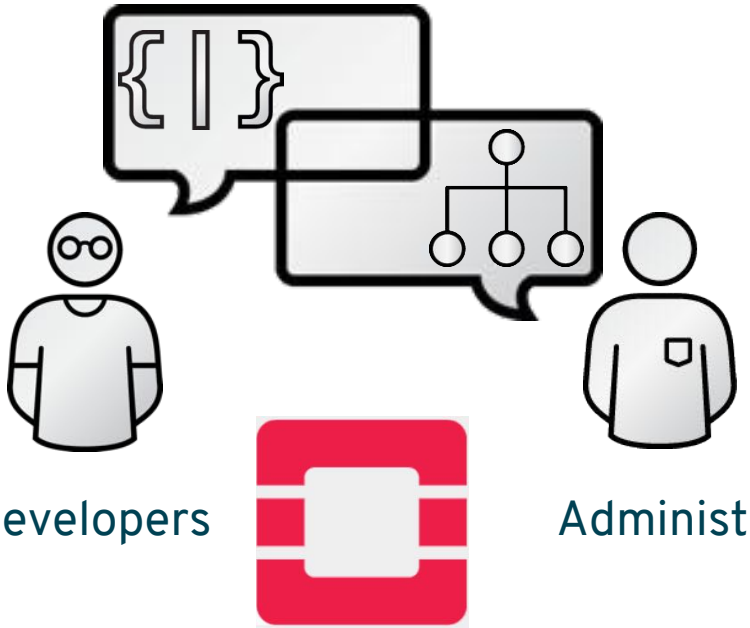
Every 6 months we release a version of Red Hat OpenStack Platform supported for 1 year

Every 18 months we produce a “long life” version, which customers can opt to have support for up to 5 years

		Long life			Long life		
RHOSP 8 Liberty	RHOSP 9 Mitaka	RHOSP 10 Newton	RHOSP 11 Ocata	RHOSP 12 Pike	RHOSP 13 Queens	RHOSP 14 R....	RHOSP 15 S....
3 years	3 years	3 years (+2 years)	1 year	1 year	3 years (+2 years)	1 year	1 year

OpenStack connects two worlds

Tenant view

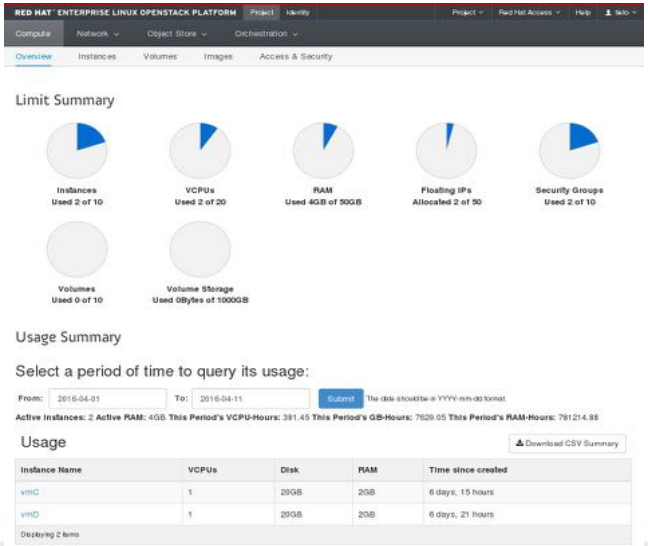


Operator view

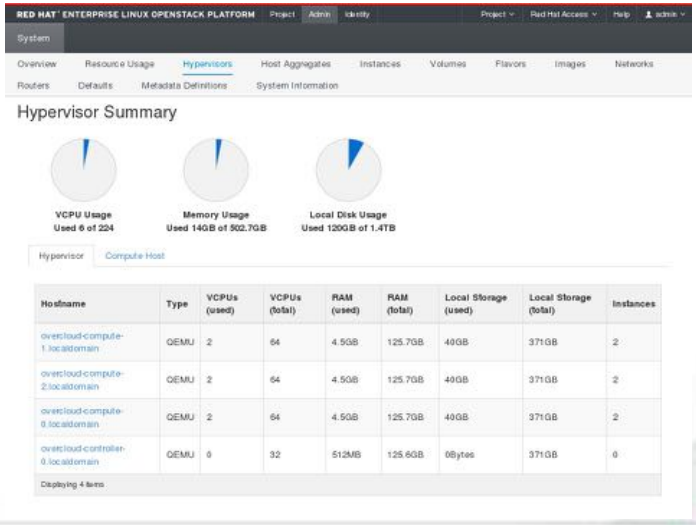
OpenStack connects two worlds

Tenant view

Tenant view – the actual OpenStack IaaS user
Limited by what the Operator decides to offer in that cloud

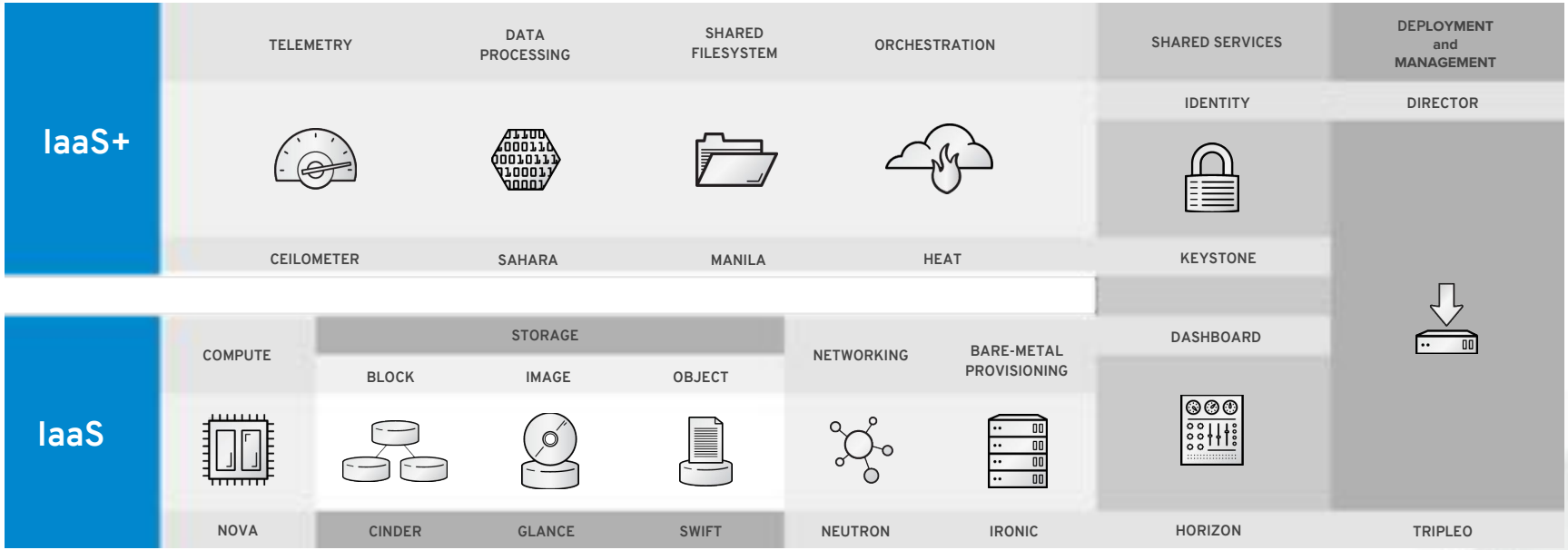


Operator view – often the same role that has root access to the systems
Combines configuration files and API actions to create a working environment for his tenants.



Operator view

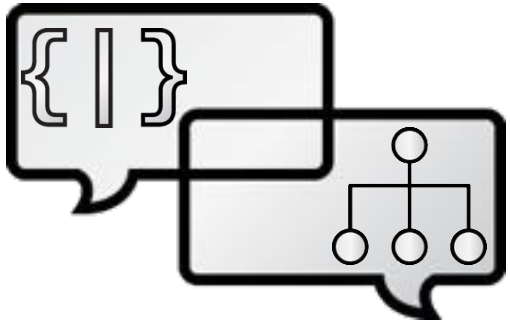
Core Components in version 11 (Ocata)



Compute (Nova)

Tenant view

- I need VMs, anytime
- How many can I have?
- It must be secure
- SSH and VNC please?

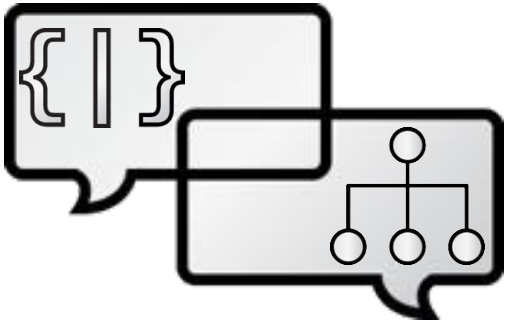


Operator view

- I have hardware capacity available
- This is how you consume it
- I set usage quotas
- I design for performance and scalability

Networking (Neutron)

Tenant view



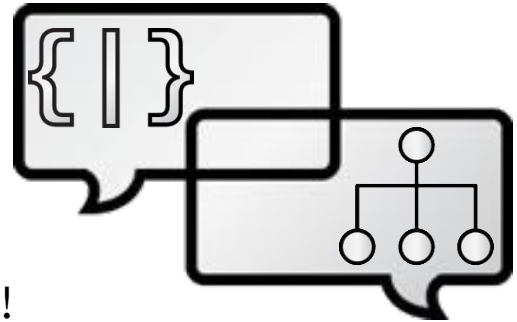
- I need my own network, isolated from others
- Some private IPs, some public IPs
- These are my QoS specs
- Let me share networks with others

Operator view

- I design a network overlay and provide external access
- I have very few Public IPs
- I set rules, policies, quotas
- With SDN, I can centrally manage and monitor it all

Block Storage (Cinder)

Tenant view



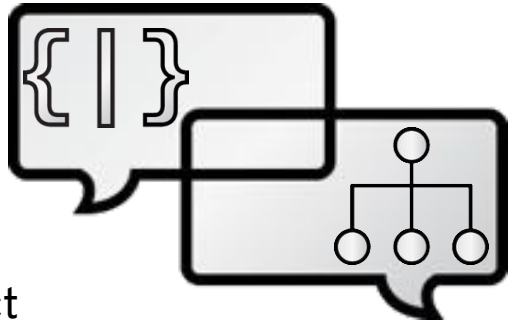
- Too much data in my VMs!
- I need permanent storage
- Can I snapshot and backup/rollback?
- Encrypted, please!

- I constantly buy storage
- I must allocate space to tenants
- I can combine different tiers of technologies (NAS, SAN, NFS)
- I set rules, policies, quotas

Operator view

Object Storage (Swift)

Tenant view



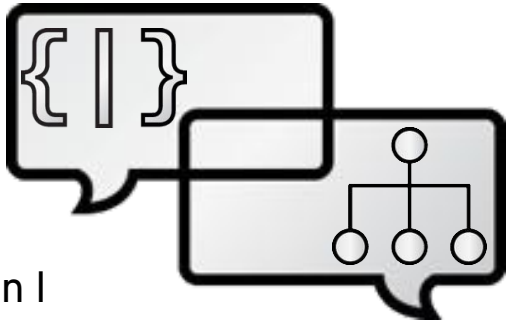
- My application needs object storage (files, media)
- I can use HTTP(s)
- Stateless please! No time for mounting filesystems

- I will offer a private S3-like experience
- I must scale without limits
- I want advanced features

Operator view

VM Image Storage (Glance)

Tenant view



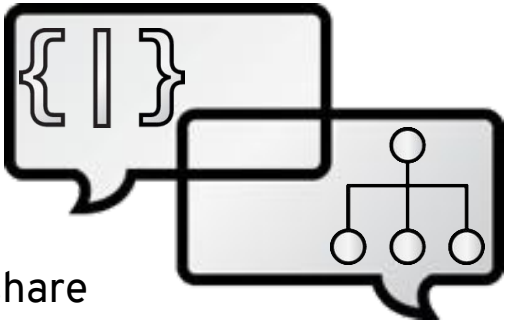
- What operating systems can I use?
- This is my own version, store it just for me
- Is the OS image genuine?
- Take this VMWare template and import it

- Only approved OS can be used in my cloud
- Centrally offer updated OS
- Leverage storage integration to reduce network usage

Operator view

Shared File System (Manila)

Tenant view



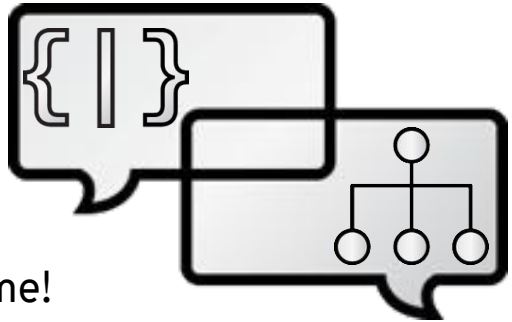
- I need a network folder to share files between VMs
- Sometimes I'll share it with other users in my team
- I don't want to manage the folder (permissions, quotas)

- I don't have the time to create temporary shares and enable network security
- I prefer to automatically leverage OpenStack users and groups

Operator view

Identity and Access Control (Keystone)

Tenant view



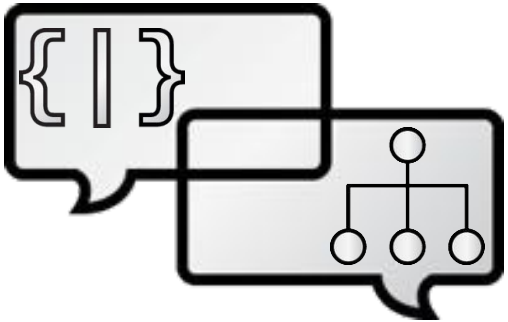
- I am not a hacker, believe me!
- My boss just gave me permission to ask for VMs
- Where are all the services?
- I am a project lead, I must be admin of my project

- Who are you?
- Let me validate with LDAP
- I must integrate with my company's SSO
- I must secure entry points with TLS Certificates

Operator view

Dashboard (Horizon)

Tenant view



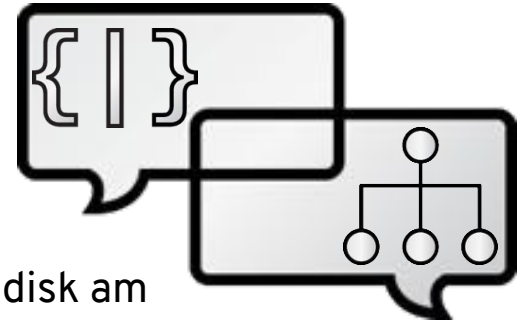
- I need a UI to manage my workloads or troubleshoot
- I don't like the CLI
- I want to see my Heat topologies
- Quickly display my quota usage and default options

- I want an admin panel
- I want a quick access to my Red Hat Access account
- I want to see all Neutron networks and routers

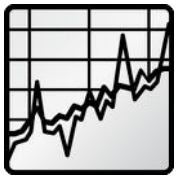
Operator view

Telemetry (Ceilometer)

Tenant view



- How much CPU, RAM, and disk am I using, i.e. per hour, per week?
- Allow me to set alarms and use my own infra to react

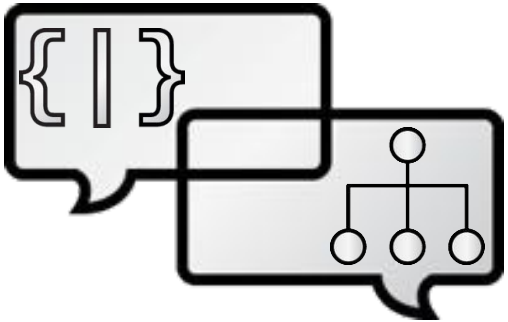


Operator view

- I wish I could charge back / show back how much every user is consuming
- This is useful for my own internal usage!

Orchestration engine (Heat)

Tenant view



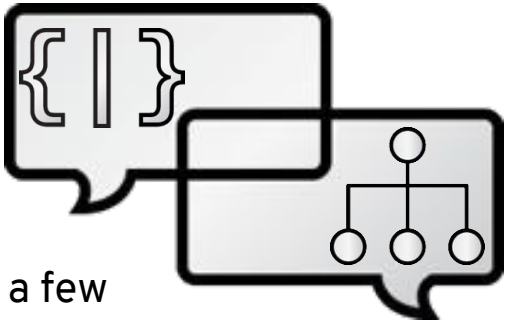
- This is the blueprint of my application deployment: dependencies, config, etc
- Can you run this for me?
- Scale it out when this threshold is reached

- I want to automate as much as I can and offer public-cloud-like efficiency
- Auto-scaling, load balancers and quotas allow me to monitor and predict demand

Operator view

Data Processing (Sahara)

Tenant view



- I need a Hadoop cluster for a few hours
- I need to try different Big Data platforms
- I want my clusters to scale automatically

- I don't have the manpower to customize big data platforms to all my tenants
- I will get 3rd party providers and deliver their stack as a service

Operator view

PADDYPOWER. betfair

- https://betsandbits.wordpress.com/
- https://betsandbits.files.wordpress.com/2016/10/openstackreferencearchitecturewhitepaper.pdf
- https://www.openstack.org/videos/summits/boston-2017

PADDYPOWER. betfair

- World’s largest online betting exchange
- 135M+ daily transactions, 3.7B+ daily API calls
- Simplified development to help developers focus on improving product quality and customer experience
- Automated testing and infrastructure provisioning, reducing time to deployment for new products from days or weeks to hours or minutes
- Hjggh
- Ghjgjgh
-

“We now have the capability to alter our infrastructure based purely on code. This ability allows our developers to make changes and use infrastructure at a pace that suits them. We can deliver products to market more quickly than our competitors. It’s a game-changer.”

- **Paul Cutter,** CTO, Betfair

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