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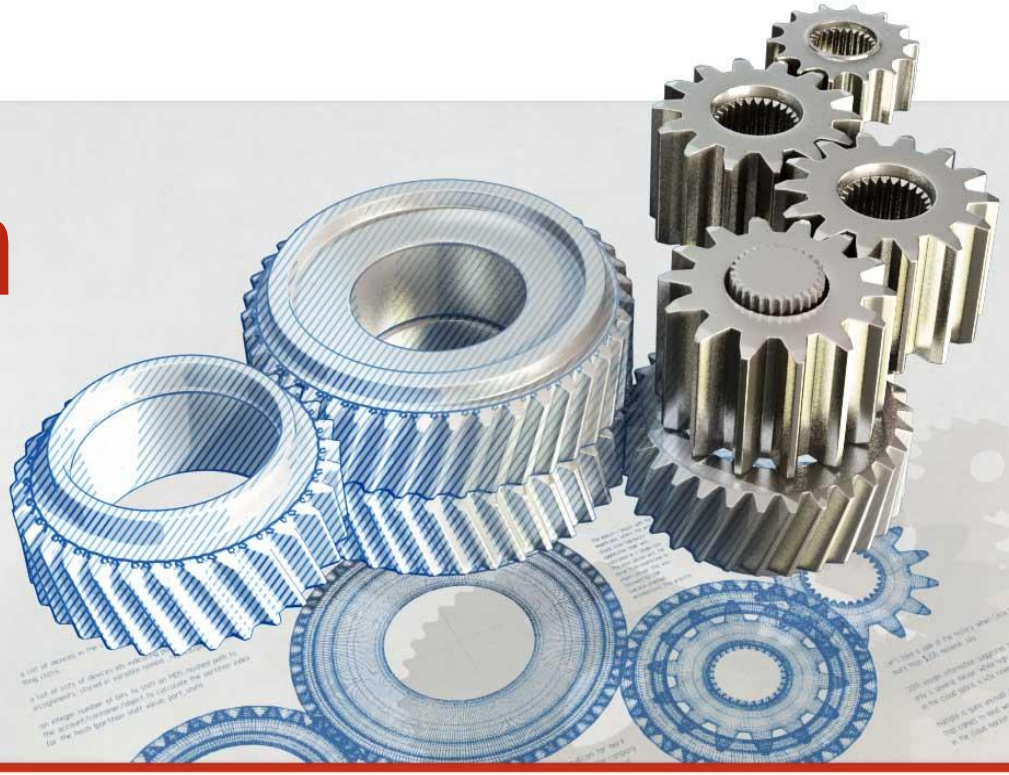
What's New in OpenStack Icehouse



Mirantis, 2014

Introduction

Jay Pipes | Principal Technical Architect

Jay is a Principal Technical Architect at Mirantis. He works to develop core and ecosystem projects in the OpenStack cloud computing platform community. Before Mirantis, he worked at AT&T, focusing on OpenStack development and operations. Previously, he was a Director of Engineering in HP's Open Source Cloud Services team, a development manager and software engineer at Rackspace Cloud, a software engineer at Sun Microsystems and the North American Community Relations Manager at MySQL.

Nick Chase | Technical Product Marketing

With 20+ years' experience as a developer and author, Nick has written several books and hundreds of articles as an IBM developerWorks Certified Master Author. He also founded NoTooMi.com and has done Web application development for companies such as Alcatel-Lucent, Sun Microsystems, Oracle, and the Tampa Bay Buccaneers.

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Viewing this webinar

- You'll see a window like this; it's a little different on a Mac .You can see a list of participants.
- Please can submit questions on the bottom window:
  - If we can answer during the webcast, we'll do so
  - Questions of broader interest will be saved and curated for the end
- We'll provide a link where you can download the slides at the end of the webcast.
  - If you ask about slides during the webcast, you will get **the same answer**: "A link will be provided at the end of the webcast".

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A Little Housekeeping

- Who this webinar is for
- Yes, it's being recorded
- Yes, we'll get you the slides at the end

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Agenda

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Agenda

- Direction for this release
- Compute
- Storage
- Networking
- Other Services (Identity, Dashboard, etc.)
- Database as a Service
- Upgrading
- Coming Next
- Q&A

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Direction For This Release

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The Obligatory Statistics

- 1202 contributors (+32%)
- 2902 bug fixes
- 350 features
- Top contributing companies: Red Hat, IBM, HP, Rackspace, Mirantis, SUSE, OpenStack Foundation, eNovance, VMware, and Intel.

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Development Focus

- Focus on the user
  - Top contributors include customers Samsung, Yahoo!, Comcast
  - Focus on operators
  - Upgradability
  - Manageability
- Bug fixes and stability

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Compute

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OpenStack Compute (Nova)

Rolling Upgrades

1. Critical functionality to allow upgrading from one OpenStack release to another with little user-facing downtime
2. Icehouse continues to build on the work in Havana release to version all objects and RPC API calls in Nova

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OpenStack Compute (Nova)

Rolling Upgrades

1. Controller nodes upgrade first
2. Controller nodes continue to service compute workers on prior release
3. Upgrades of compute worker nodes are done in a “rolling” fashion, with the controller nodes able to work with both upgraded and non-upgraded worker nodes seamlessly

Set `[upgrade_levels] compute=icehouse-compat` configuration option during upgrade of compute nodes, remove after

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OpenStack Compute (Nova)

Server instance groups

- Allows a user to launch an instance that is “near” or “not near” some other instances
  - Affinity / Anti-affinity scheduling
- Gives one more level of control to the user over where a particular class of virtual machines ends up in the cloud

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OpenStack Compute (Nova)

Server instance groups

1. First, create an instance group:

   ```
   nova server-group-create $GROUP_NAME --policy anti-affinity
   ```

2. Then, when launching an instance, specify the group ID to enforce the policy the group specifies:

   ```
   nova boot --group $GROUP_UUID …
   ```

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OpenStack Compute (Nova)

Stability and performance improvements

- Nova and Neutron now communicate more effectively, as Nova is able to respond to events from Neutron
  - Removes a number of race conditions and generally improves compute networking setup
- A caching scheduler driver has been introduced to avoid re-querying host information

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OpenStack Compute (Nova)

API

- XML support now deprecated
- Lots of work on the v3 API to improve consistency of return codes in the v2 API is currently in a bit of limbo
- nova-network deprecated, then un-deprecated, will be kept for at least another cycle

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OpenStack Compute (Nova)

Hypervisor testing

- Big push from hypervisor vendors in conjunction with the QA community to stand up linked CI systems
- Has already paid off big in terms of preventing regressions and reporting bugs
- XenServer, VMWare and Hyper-V CI systems vote on the check queue for each commit

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OpenStack Compute (Nova)

Hypervisor odds and ends improvement

- Support for RDP consoles in Hyper-V
- Support for virtio-scsi for better performance of block devices in libvirt
- Support for the nova diagnostics call in VMWare drivers
- Some initial support for PCI passthrough in XenServer driver

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Storage

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OpenStack Block Storage (Cinder)

Storage tiers

- Use for performance or Quality of Service
- Achieved through volume "types"
- Ability to retype
- Host will handle the conversion if possible
- Otherwise volume can be migrated, depending on the driver

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OpenStack Block Storage (Cinder)

Disaster recovery

- Backups just copy data
- Restoring a volume requires the metadata
- Exporting metadata

  `cinder backup-export` *`backup_id`*

- Metadata can be imported to an entirely new system

  `cinder backup-import` *`metadata`*

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OpenStack Block Storage (Cinder)

New testing requirements

- All drivers must pass a series of tests to be included
- Currently a wrapper around current Temptest tests
- Target is for companies to have their own external CI system
- Several dozen systems already in place

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OpenStack Block Storage (Cinder)

Drivers certified for Icehouse

SolidFire

IBM XIV

IBM GPFS

NetApp 7-Mode (iSCSI)

NetApp 7-Mode (NFS)

NetApp C-Mode (iSCSI)

NetApp C-Mode (NFS)

NetApp E-Series (iSCSI) **

IBM NAS (SONAS & Storwize V7000 Unified) **

HP 3PAR StoreServ(FC)

HP 3PAR StoreServ (ISCSI)

HP LeftHand StoreVirtual

HP MSA (FC) **

IBM Storwize/SVC (FC)

IBM Storwize/SVC (iSCSI)

EMC SMI-S (FC)

EMC SMI-S (iSCSI)

Dell EqualLogic

EMC VNX Direct (iSCSI) **

VMware Vmdk Driver

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OpenStack Block Storage (Cinder)

Additional features

- Scheduler (Simple/Chance => FilterScheduler)
- Multiple API workers
- Ability to delete Quota
- Fibre Channel Zone manager
- Ability to update a volume type encryption
- Advancing to the latest TaskFlow support

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OpenStack Object Storage (Swift)

SSYNC

- Swift currently uses RSYNC, but large clusters are slow
- SSYNC looks at directory hashes for changes
- Currently a wrapper around RSYNC
- Will use Swift commands in later versions
- **DO NOT USE IN PRODUCTION**

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OpenStack Object Storage (Swift)

Discoverability

Get a list of capabilities for the cluster

`http://<swift-proxy>/info`


```
{
    "formpost": {},
    "bulk_delete": {
        "max_failed_deletes": 1000,
        "max_deletes_per_request": 10000
    },
    "container_quotas": {},
    "crossdomain": {},
    "swift": {
        "max_file_size": 5368709122,
        "account_listing_limit": 10000,
        "max_meta_count": 90,
        "max_meta_value_length": 256,
        "container_listing_limit": 10000,
        "max_meta_overall_size": 4096,
        "version": "1.13.1.rc1.45.g068dfb4",
        "max_meta_name_length": 128,
        "max_header_size": 8192,
        "max_object_name_length": 1024,
        "max_account_name_length": 256,
        "strict_cors_mode": true,
        "max_container_name_length": 256
        ...
```


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OpenStack Object Storage (Swift)

Sync Realms

1. Container-to-container sync
2. Operators can accept sync requests from other clusters
3. Requests are signed
4. Local devices scanned for x-container-sync-to and x-container-sync-metadata
5. swift-container-sync sends updates to the remote machine

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OpenStack Image Service (Glance)

- Image location selection strategy improvements
- Add VMware datastore as storage backend
- Split `image_size` and add `virtual_size`
- Deleted images excluded from storage quota

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Networking

OpenStack Networking (Neutron)

OVS and Linux Bridge move to ML2

1. ML2 introduced in Havana
2. Open vSwitch and Linux Bridge now work in ML2 through MechanismDrivers
3. OVS and Linux Bridge standalone plugins deprecated

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OpenStack Networking (Neutron)

SR-IOV Passthrough in ML2

1. Supported in the Mellanox MechanismDriver
2. Enables PCIe card to behave as multiple physical NICs
3. Offloads networking to the card rather than the host
4. Avoids performance issues
5. Specify Neutron port as pci-passthrough

```
binding:vnic_type=direct
```

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OpenStack Networking (Neutron)

New drivers and plugins

- IBM SDN-VE
- Nuage
- OneConvergence
- OpenDaylight
- Brocade, Big Switch Networks, Embrane, Midonet, Mellanox, Nuage, Radware, Ryu, IBM and more

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OpenStack Networking (Neutron)

New LBaaS drivers

- Embrane
- NetScaler
- Radware

New VPN driver

- Cisco CSR

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OpenStack Networking (Neutron)

Additional Notes

- Integration with Nova
- Nova-Network lives on
- Improved router scheduling
  - chance
  - leastrouter

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Other Services

OpenStack Dashboard (Horizon)

- New UI for better, cleaner look-and-feel
- Inline editing
- Wizards for complicated setups
- Translated into 16 different languages (including 700,000 strings)
- Now with JavaScript
- Dynamic plugin loading from external files

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OpenStack Dashboard (Horizon)

Nova

- Live Migration Support
- HyperV console support
- Disk config option support
- Host aggregates and availability zones improved
- Set flavor extra specs

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OpenStack Dashboard (Horizon)

Cinder

- Role based access support for Cinder
- v2 API support
- Extended volume support

Neutron

- Router rules support

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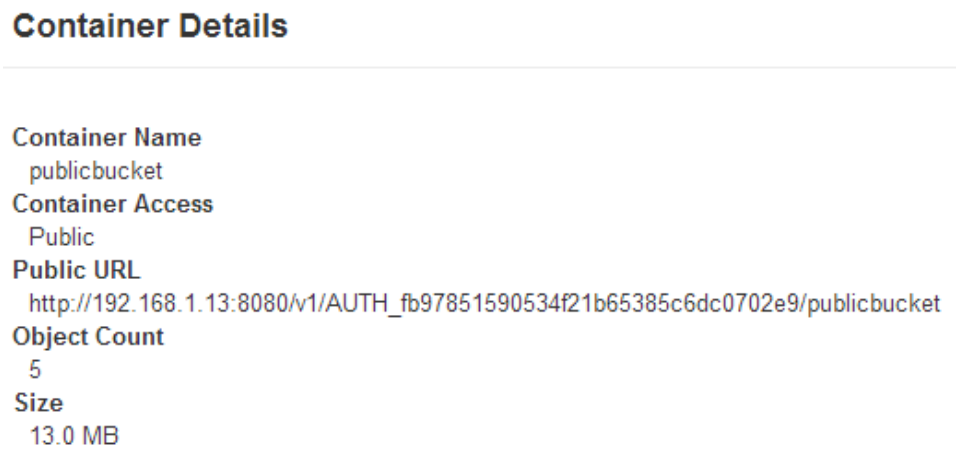
OpenStack Dashboard (Horizon)

Swift

- Support for creating public containers and providing links to those containers



- Support explicit creation of pseudo directories

Self-service password change

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OpenStack Dashboard (Horizon)

Heat

- Ability to update an existing stack
- Template validation
- Support for adding a environment files

Ceilometer

- Daily usage reports per project across services.

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OpenStack Identity (Keystone)

Federated Identity

- Part of the V3 API
- Uses Shibboleth
- Consume identity from multiple providers
- Map attributes onto OpenStack groups
- One step closer to hybrid cloud

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OpenStack Identity (Keystone)

Additional notes

- Backend split between identity and authorization
- LDAP driver supports group-based role assignment operations
- Driver interfaces implemented as Abstract Base Classes
- Default `etc/policy.json` in easier to read format

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OpenStack Orchestration (Heat)

HOT Template Format

- Native template format
- Orchestrate any OpenStack resources

OS::Heat::CloudConfig

OS::Heat::MultipartMime

OS::Heat::SoftwareConfig

OS::Heat::SoftwareDeployment

OS::Heat::StructuredConfig

OS::Heat::StructuredDeployment

OS::Heat::RandomString

OS::Heat::ResourceGroup

OS::Heat::AutoScalingGroup

OS::Heat::ScalingPolicy

OS::Neutron::SecurityGroup

OS::Neutron::MeteringLabel

OS::Neutron::MeteringRule

OS::Neutron::ProviderNet

OS::Neutron::NetworkGateway

OS::Neutron::PoolMember

OS::Nova::KeyPair

OS::Nova::FloatingIP

OS::Nova::FloatingIPAssociation

OS::Trove::Instance

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OpenStack Orchestration (Heat)

Scaling

- Autoscaling arbitrary resources through OS::Heat::AutoScalingGroup and OS::Heat::ScalingPolicy
- Scale heat-engine

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OpenStack Orchestration (Heat)

Additional notes:

- Operator API for performing operations on stacks
- Stack domain users enable non-admin users to work with stacks

```
openstack --os-token $OS_TOKEN --os-url=$KEYSTONE_ENDPOINT_V3 --os-identity-api-version=3 domain create heat --
description "Owns users and projects created by heat"
```

```
oppenstack --os-token $OS_TOKEN --os-url=$KEYSTONE_ENDPOINT_V3 --os-identity-api-version=3 user create --password
$PASSWORD --domain $HEAT_DOMAIN_ID heat_domain_admin --description "Manages users and projects created by heat"
```

- Abandon and adopt stacks
- Preview stacks

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OpenStack Telemetry (Ceilometer)

New capabilities (API)

- Capabilities API for discovery of storage driver specific features
- Selectable aggregates for statistics, including new cardinality and standard deviation functions
- Direct access to samples decoupled from a specific meter
- Events API, in the style of StackTach

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OpenStack Telemetry (Ceilometer)

Notifications from other services

- Alarm improvements
- Integration touch-points
- Storage drivers
- New sources of metrics

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Notifications

Nova

- Keypair creation and deletions, compute host enabled, disabled, etc.

Keystone

- Role, group and trust creation, deletion, and update, Cloud Audit Data Federation (CADF)

Heat

- RPC notifications for stack state changes and autoscaling triggers

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Database as a Service

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OpenStack Database Service (Trove)

What it does and how it works

- Database as a Service
- Users can request and work with database instances
- Creates OpenStack instances and volumes as necessary
- Instantiates appropriate database

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OpenStack Database Service (Trove)

Behind the scenes

- CRUD management through the Trove API
- Flavor / Cinder Volume resizes
- Multiple datastore support
  - MySQL, Percona, MongoDB, Redis, Cassandra, and Couchbase
- Configuration groups for instances
- Full and incremental backups and restore to swift
- Optional DNS support via designate

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What's Next?

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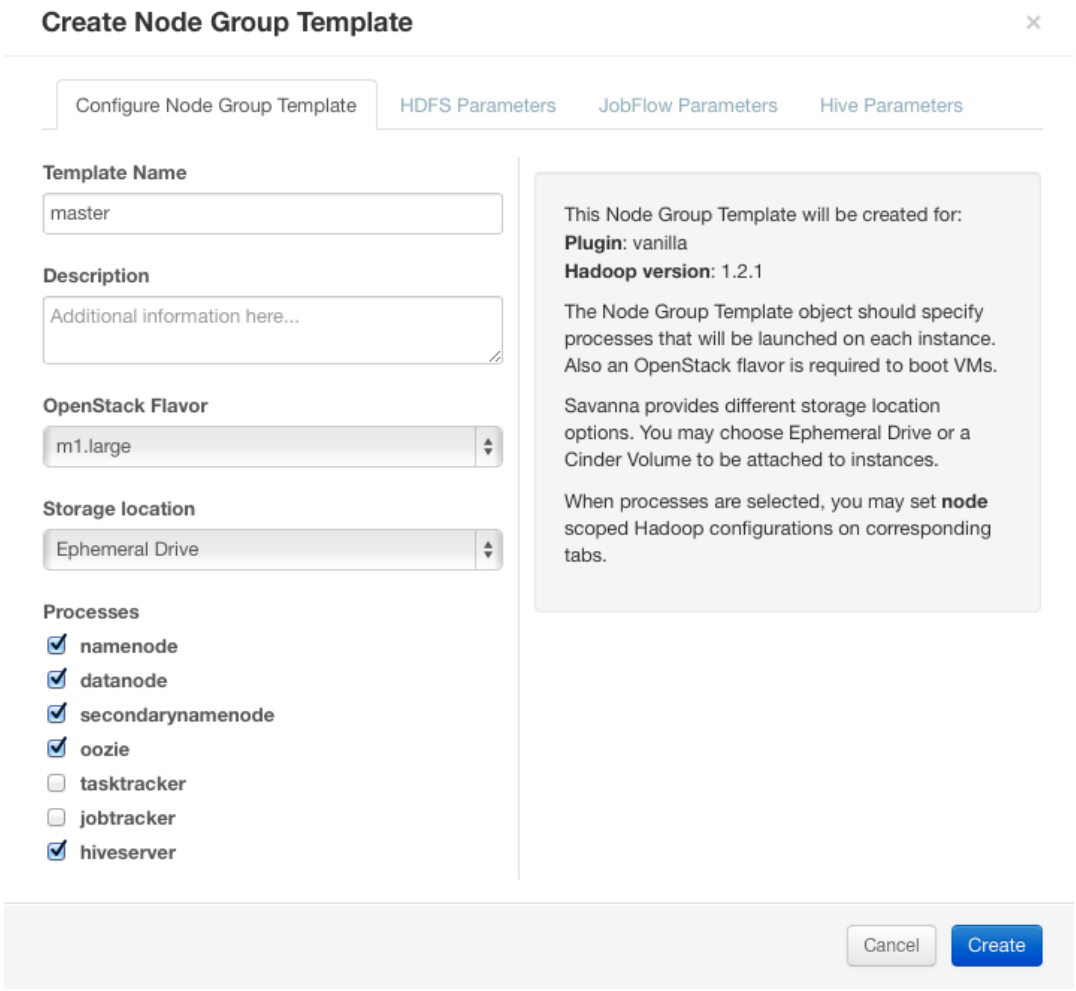
Projects to be Integrated

OpenStack Data Processing: Sahara (formerly Savanna)

- Deploys Hadoop
- Facilitates running jobs
- Available API for scripting



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Projects in incubation

- **Ironic**
  - Replaces bare metal driver
  - For provisioning and managing hardware rather than VMs
- **Marconi**
  - Web-friendly message queuing system

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Thank You!

Download the slides from:

http://bit.ly/icehouse-webcast

A recording will be posted by Monday.

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Q&A

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