VSM (Virtual Storage Manager)

- Simplify Ceph Management and foster adoption

Wang, Yaguang/Ferber, Dan

Intel Corporation

Legal Notices and Disclaimers

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Learn more at intel.com, or from the OEM or retailer.

No computer system can be absolutely secure.

Tests document performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit http://www.intel.com/performance.

Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

This document contains information on products, services and/or processes in development. All information provided here is subject to change without notice. Contact your Intel representative to obtain the latest forecast, schedule, specifications and roadmaps.

Statements in this document that refer to Intel's plans and expectations for the quarter, the year, and the future, are forward-looking statements that involve a number of risks and uncertainties. A detailed discussion of the factors that could affect Intel's results and plans is included in Intel's SEC filings, including the annual report on Form 10-K.

The products described may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

No license (express or implied, by estoppel or otherwise) to any intellectual property rights is granted by this document.

Intel does not control or audit third-party benchmark data or the web sites referenced in this document. You should visit the referenced web site and confirm whether referenced data are accurate.

Intel, Xeon and the Intel logo are trademarks of Intel Corporation in the United States and other countries.

*Other names and brands may be claimed as the property of others.

Risk Factors

The above statements and any others in this document that refer to plans and expectations for the first quarter, the year and the future are forward-looking statements that involve a number of risks and uncertainties. Words such as "anticipates," "expects," "intends," "plans," "believes," "seeks," "estimates," "may," "will," "should" and their variations identify forward-looking statements. Statements that refer to or are based on projections, uncertain events or assumptions also identify forward-looking statements. Many factors could affect Intel's actual results, and variances from Intel's current expectations regarding such factors could cause actual results to differ materially from those expressed in these forward-looking statements. Intel presently considers the following to be important factors that could cause actual results to differ materially from the company's expectations. Demand for Intel's products is highly variable and could differ from expectations due to factors including changes in the business and economic conditions; consumer confidence or income levels; customer acceptance of Intel's and competitors' products; competitive and pricing pressures, including actions taken by competitors; supply constraints and other disruptions affecting customers; changes in customer order patterns including order cancellations; and changes in the level of inventory at customers. Intel's gross margin percentage could vary significantly from expectations based on capacity utilization; variations in inventory valuation, including variations related to the timing of qualifying products for sale; changes in revenue levels; segment product mix; the timing and execution of the manufacturing ramp and associated costs; excess or obsolete inventory; changes in unit costs; defects or disruptions in the supply of materials or resources; and product manufacturing quality/yields. Variations in gross margin may also be caused by the timing of Intel product introductions and related expenses, including marketing expenses, and Intel's ability to respond quickly to technological developments and to introduce new features into existing products, which may result in restructuring and asset impairment charges. Intel's results could be affected by adverse economic, social, political and physical/infrastructure conditions in countries where Intel, its customers or its suppliers operate, including military conflict and other security risks, natural disasters, infrastructure disruptions, health concerns and fluctuations in currency exchange rates. Results may also be affected by the formal or informal imposition by countries of new or revised export and/or import and doing-business regulations, which could be changed without prior notice. Intel operates in highly competitive industries and its operations have high costs that are either fixed or difficult to reduce in the short term. The amount, timing and execution of Intel's stock repurchase program and dividend program could be affected by changes in Intel's priorities for the use of cash, such as operational spending, capital spending, acquisitions, and as a result of changes to Intel's cash flows and changes in tax laws. Product defects or errata (deviations from published specifications) may adversely impact our expenses, revenues and reputation. Intel's results could be affected by litigation or regulatory matters involving intellectual property, stockholder, consumer, antitrust, disclosure and other issues. An unfavorable ruling could include monetary damages or an injunction prohibiting Intel from manufacturing or selling one or more products, precluding particular business practices, impacting Intel's ability to design its products, or requiring other remedies such as compulsory licensing of intellectual property. Intel's results may be affected by the timing of closing of acquisitions, divestitures and other significant transactions. A detailed discussion of these and other factors that could affect Intel's results is included in Intel's SEC filings, including the company's most recent reports on Form 10-Q, Form 10-K and earnings release.

Rev. 1/15/15

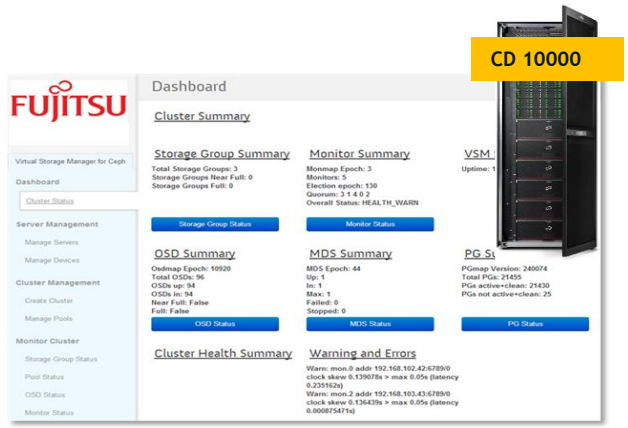
Agenda

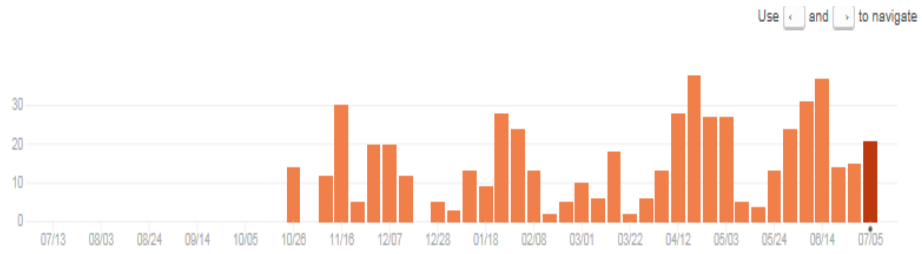
- Overview
- Concepts
- Architecture
- Major Features
- Current Status

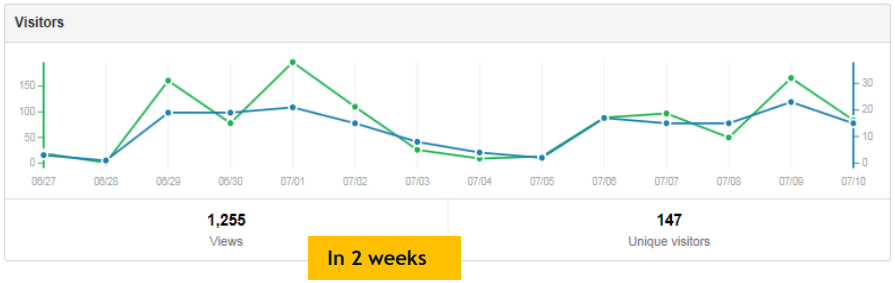
General Information

- VSM (Virtual Storage Manager) is an open source ceph management tool developed by Intel, and announced on 2014 Nov's Openstack Paris summit. It is initially positioned as ceph cluster management tool for administrator to lower the barrier for adoption of Ceph.

- The project earns a lot of interests from community, a few companies decided to adopt in production.







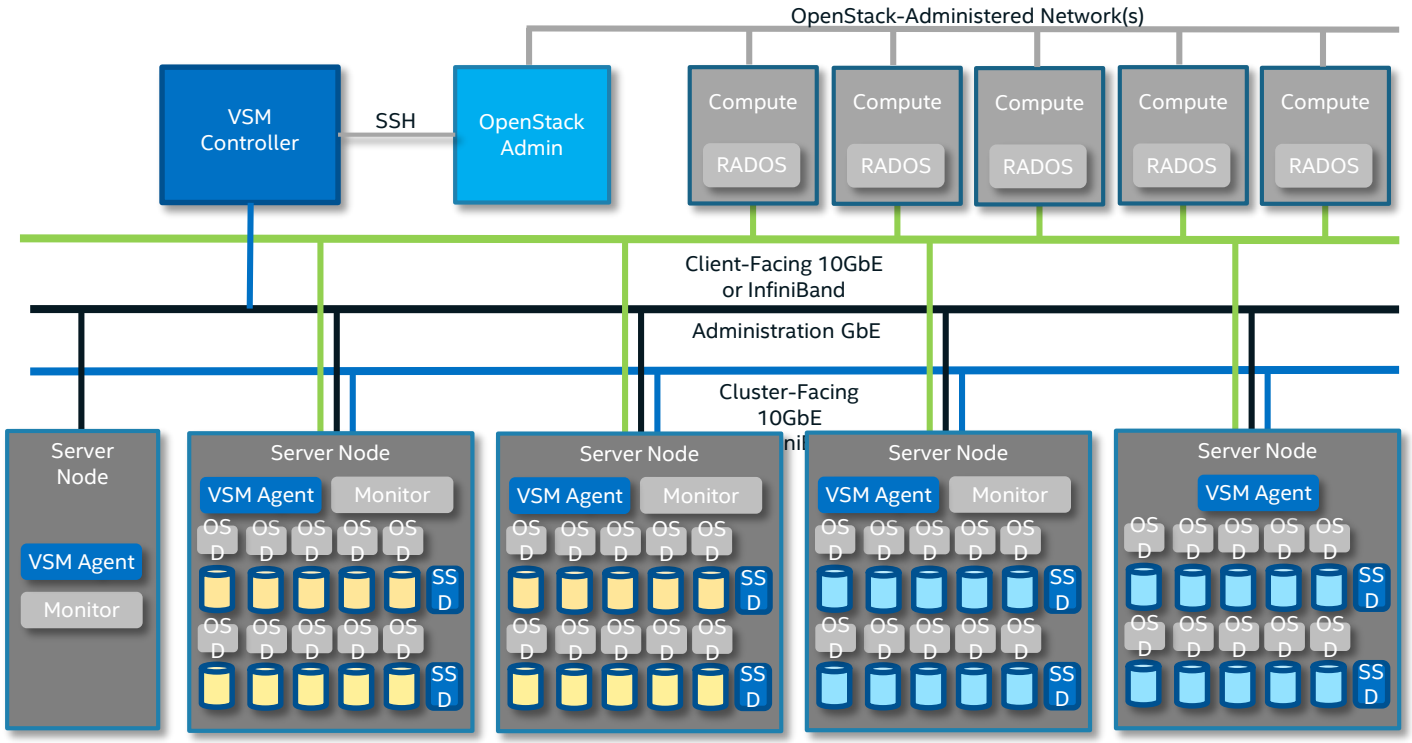
What it is …

VSM Controller

- Connects to Ceph cluster through VSM agent
- Connects to OpenStack Nova controller (optional) via SSH

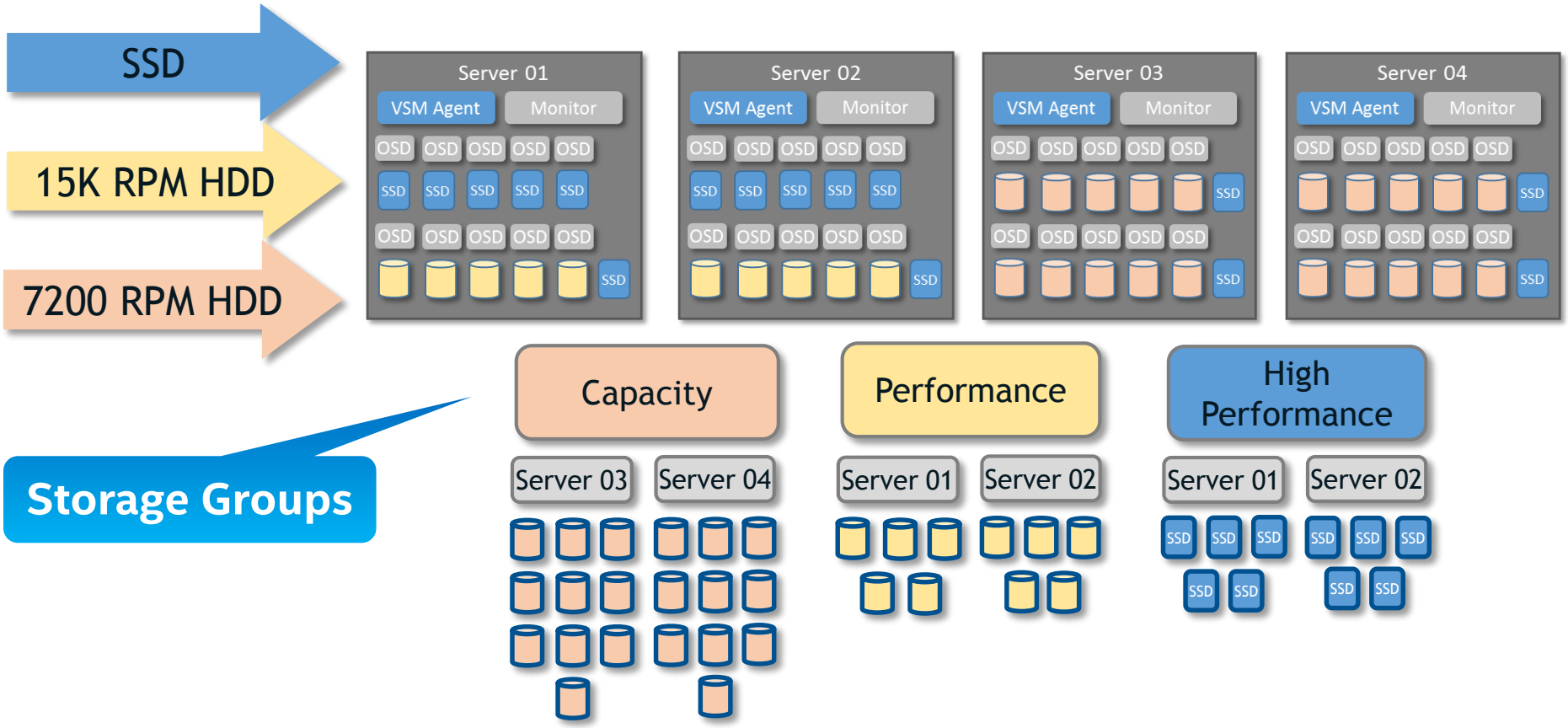
VSM Agent

- Runs on every server in the Ceph cluster
- Relays server configuration & status information to VSM controller



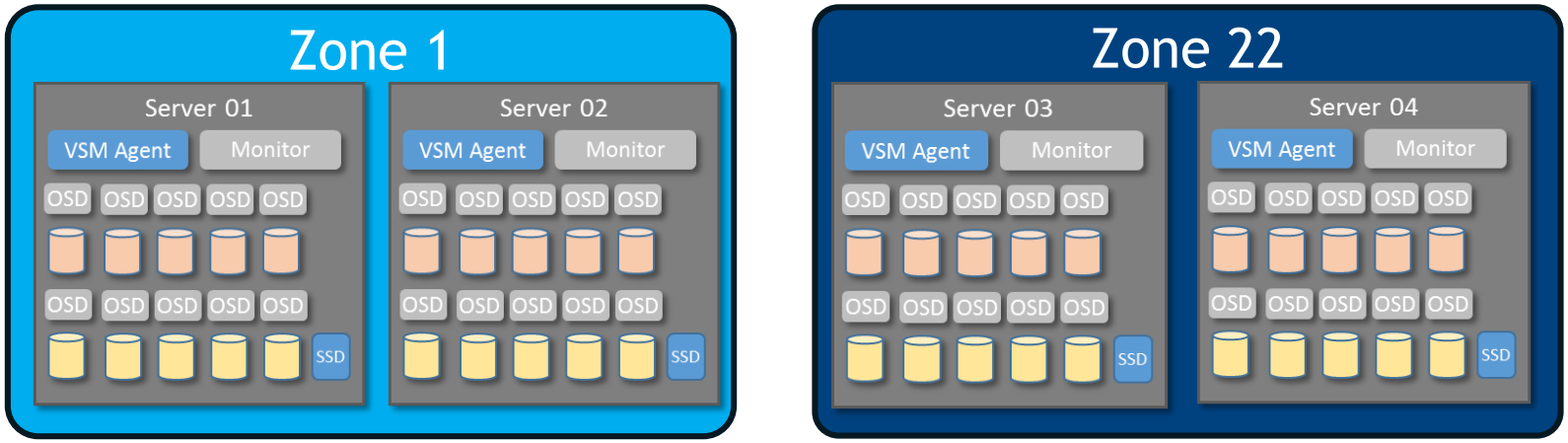
Concept

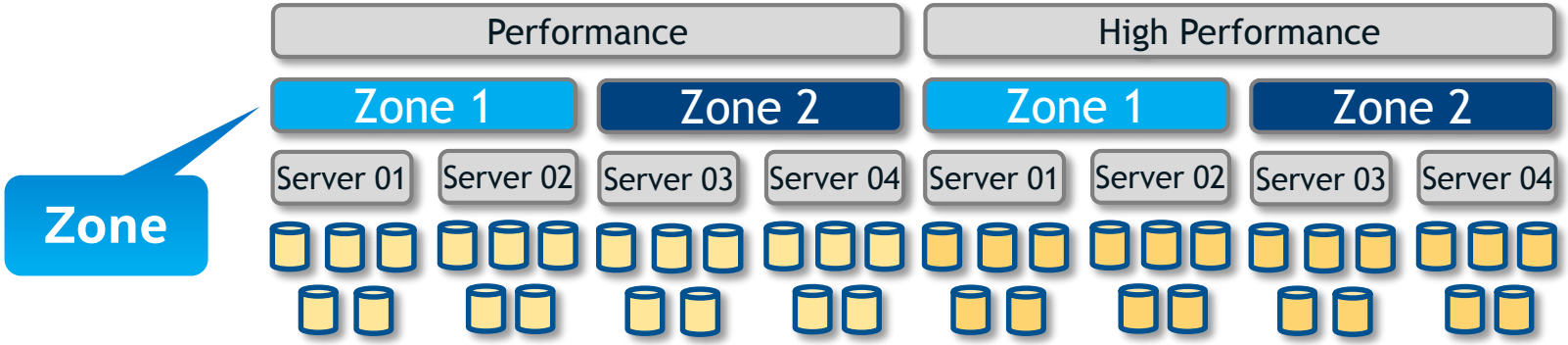
Organizing Storage with Storage Groups



Concept

Managing Failure Domains with Zone





Architecture

Python-vsmclient

- This is a client for the vsm API, it consists of
- a Python API (the vsmclient module),
- a command-line script (vsm). Each implements 100% of the vsm API.

Vsm

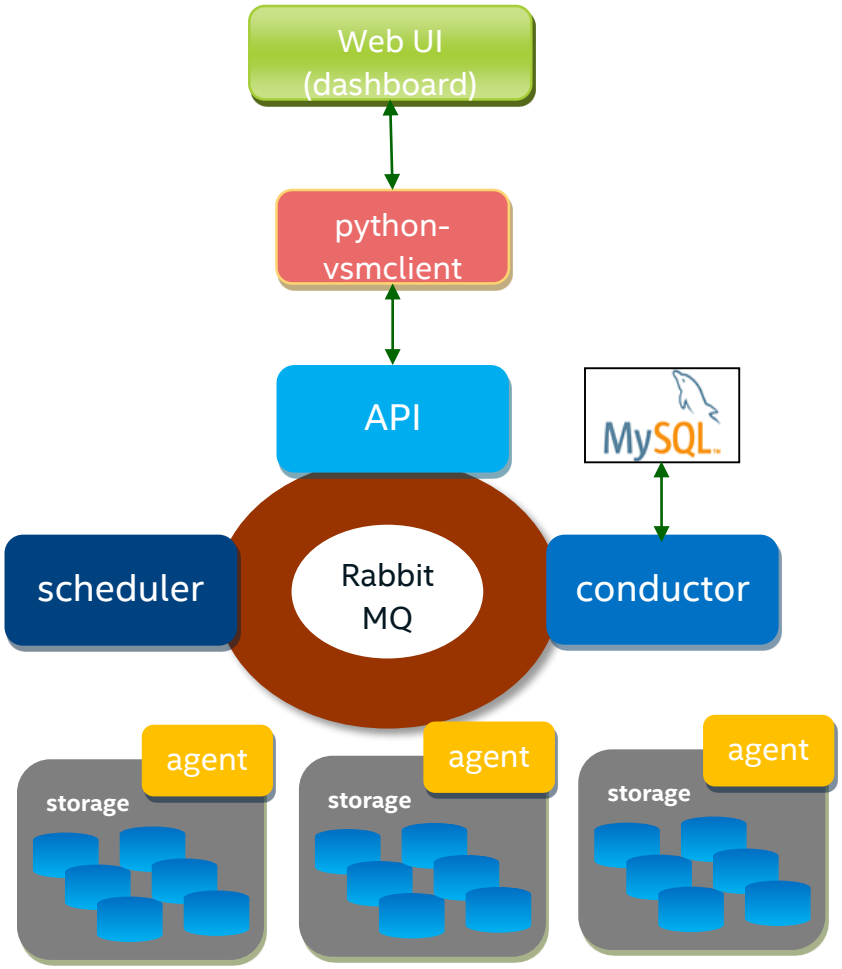
- A major module for ceph management

Vsm-dashboard

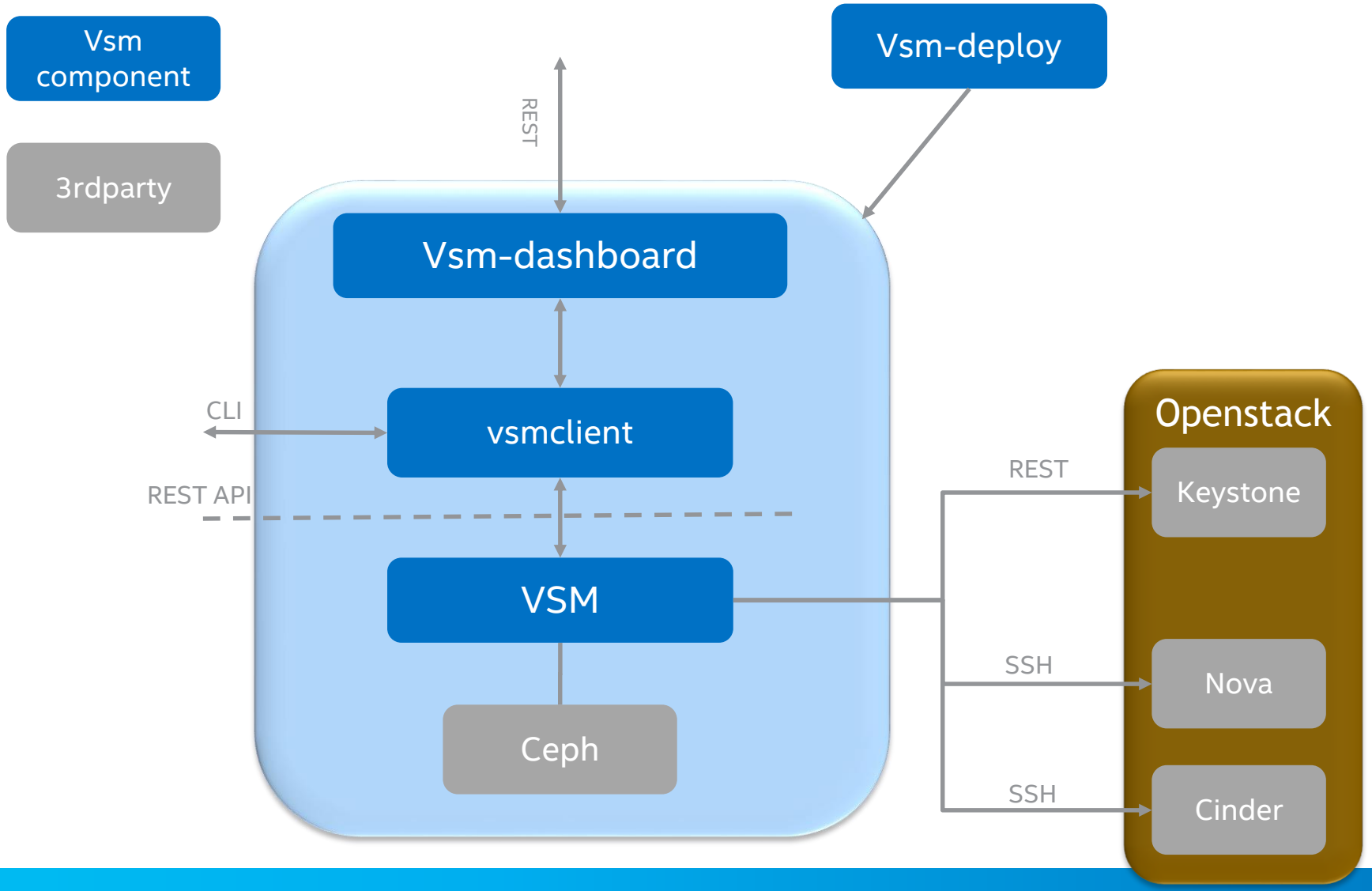
- web based management interface for VSM.

Vsm-deploy

- The ceph deployment tool kit provided by VSM .



Component Relationships

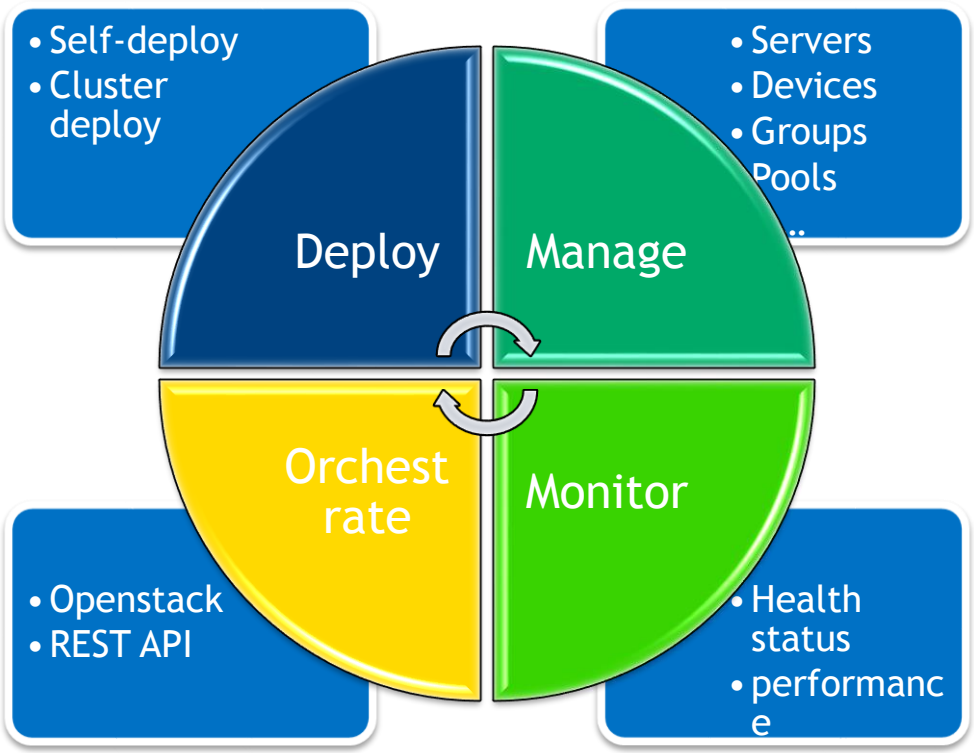


Major Features

Support Matrix:

- OS:
  - CentOS 6.5/7
  - Ubuntu 14
- Ceph
  - Firefly,
  - Giant,
  - Hammer
- Openstack
  - Havana
  - Icehouse
  - Juno

Apache License 2.0



Feature

Major Features

❑**VSM & Ceph Deployment**

- ✓ Automatically deploy controller and agents
- ✓ Visually deploy initial Ceph cluster

❑**Cluster Management & Maintenance**

- ✓ Add/remove monitors
- ✓ Add/remove OSD servers
- ✓ Bring servers up/down
- ✓ Replace failed disks/servers
- ✓ Manage failure domains
- ✓ Add/modify storage groups
- ✓ Add/remove replicated/Erasure-coded/cache-tier pools
- ✓ Support separate storage group at pool creation and pool quotas

❑**Cluster Monitoring**

- ✓ Monitor cluster health
- ✓ Monitor capacity and performance

❑**Orchestration**

- ✓ Presenting storage pools to cloud orchestrator (OpenStack)

❑**Self Management**

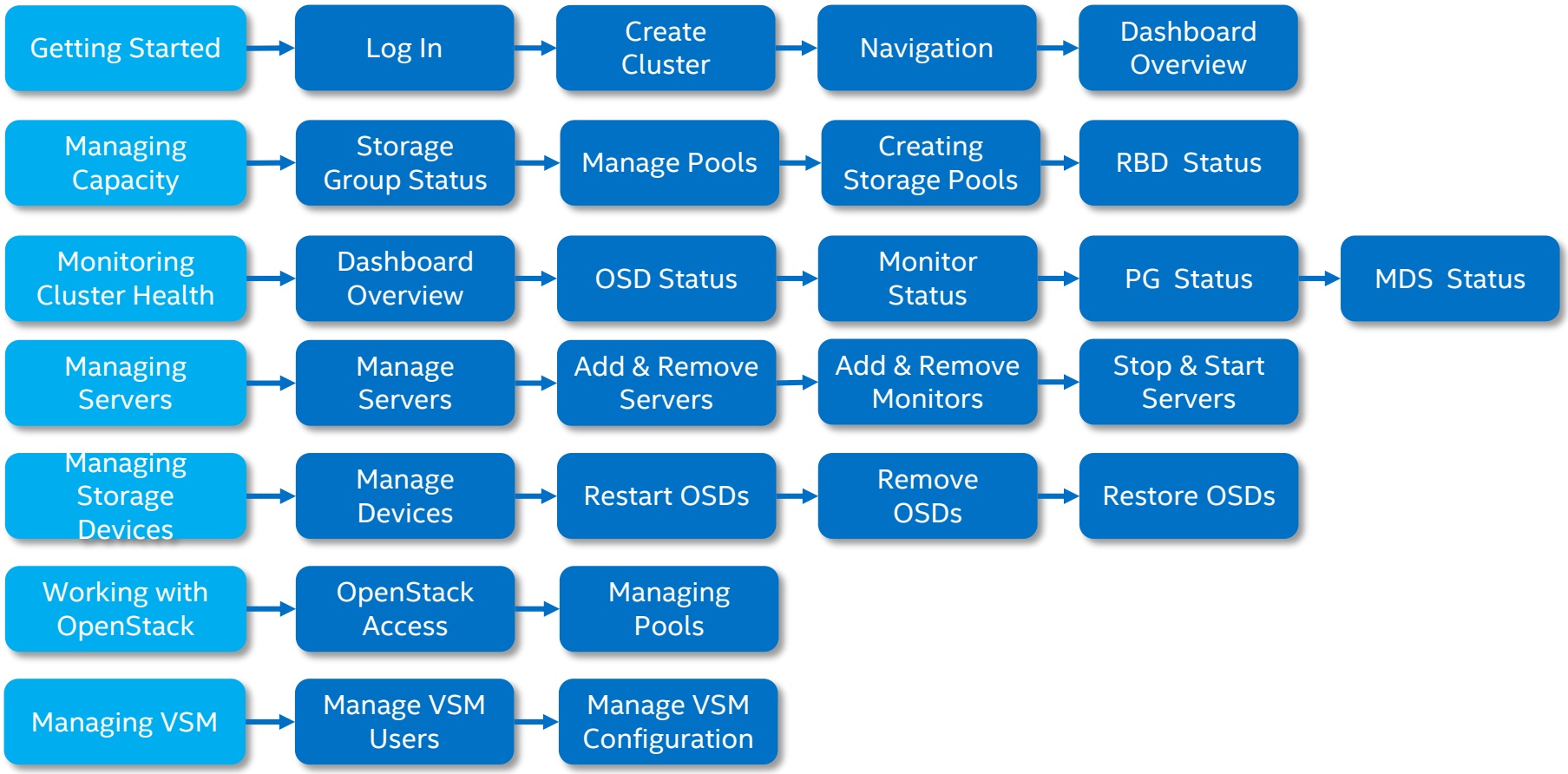
- ✓ Secure access to VSM Web UI
- ✓ Secure Communication channel between VSM processes
- ✓ Backup and restore VSM

❑**Extensibilities**

- ✓ Exposed REST API for integration with 3rd-parties
- ✓ CLI based process enables the possibility with automation tools.

Feature

Operations in one page



How VSM can help:
- Easy deployment

Story: An storage administrator knows little about Ceph, and expect to have a quick try to deploy Ceph cluster

Step 1: the administrator prepares a few storage nodes and devices.
Step 2: the administrator defines the possible storage layout like OSDs in manifest files
Stpe 3: the administrator installs VSM
Step 4: the administrator deploys ceph cluster through VSM UI

Objective: to demonstrate the capability to easy deploy Ceph cluster from ground

How VSM can help:
- Easy management & Monitoring

Story: An Storage operator expects to know cluster health status and operate cluster for disk/server failure.

Step 1: the operator looks at Dashboard to identify down OSDs
Step 2: the operator identifies the failed physical disks and then isolates them for replacement
Step 3: the operator replaces those failed disks in servers.
Step 4: the operator brings those OSDs back into cluster, and trigger data recovery.

Objective: to demonstrate the capabilities of cluster diagnosis

How VSM can help:
- Scaling Cluster

Story: As business goes up, an storage operator expects to scale storage cluster

Step 1: the operator prepares one node with standard OS installed,
Step 2: the operator executes a node provision tool to deploy vsm agent on the node,
Step 3: the operator goes to VSM controller console to identify the node, then add it into cluster
Step 4: after data rebalanced, the operator can work on the upgraded cluster.

Objective: to demonstrate the ease-to-use for scaling Ceph Cluster.

How VSM can help:
- Orchestrating with OpenStack

Story: An Cloud platform operator expects to have a storage volume for VM use

Step 1: the operator grant VSM permissions to access Openstack controller node,
Step 2: the operator sets Openstack controller address in VSM controller console,
Step 3: the operator creates pools in VSM, then presents the pools to openstack,
Step 4: the operator now can see those pools in openstack for VM use.

Objective: to demonstrate the capabilities of storage provision between Ceph and OpenStack

New Features in 2.0

- **Environment**:
  - Multiple OS supporting: CentOS 7, Ubuntu 14.04 LTS
  - Support Ceph Hammer
  - Support Openstack Juno
- **Deployment**
  - Auto deployment tool for VSM (deploy with one command line)
  - Provision new storage nodes on demand
- **Management & Maintenance**
  - Add new disks into Cluster
  - Ceph upgrade
- **Monitoring**
  - Visual dashboard
  - OSD device health status check
  - Disk space full monitoring
  - Disk health status check
  - Ceph performance metrics Monitoring
- **Orchestration**
  - Present pools to multi-node openstack cluster
  - Share one keystone instance with openstack cluster
- **Misc.**

NOTE: 2.0 was just released in the end of Sept.

Live Demo


Virtual Storage Manager
Logged in as: admin
Sign Out
VSM
Dashboard
Cluster Status
Server Management
Cluster Management
Cluster Monitoring
OpenStack Integration
VSM Management
VSM Status
VSM Version: 2.0.0
Uptime: 0days, 4 hours
Ceph Version: 0.94.2
Cluster Status
vsm-cluster01
warning
200 pgs degraded
200 pgs stuck degraded
200 pgs stuck unclean
200 pgs stuck undersized
200 pgs undersized
recovery 2743/5202 objects degraded
Capacity
58.41%
Storage Group
Updated at: 3 minutes ago
Normal
Near Full
Full
3
0
0
OSD
Epoch: 36
Updated at: 44 seconds ago
Up
Down
In
Out
3
0
0
0
Monitor
Epoch: 1
Updated at: 44 seconds ago
0
1
2
MDS
Epoch: 1
Updated at:
Data
In
Up
Metadata
Failed
Stopped
0
0
0
0
0
0
PG
Updated at: 44 seconds ago
Active+Clean
Clean
IOPS
Latency (MilliSeconds)
Bandwidth (MB/s)
CPU