

Unified Virtual Storage Manager UVS 2.0

OVERVIEW

Unified Virtual Storage (UVS) Manager is a web-based graphical user interface (GUI) enabling administrators to manage Ceph software defined storage (SDS) on Ambedded Technology's Mars series appliances. Ceph is open source software implementing SDS object storage on a single distributed cluster, providing interfaces for object-, block- and file-level storage. Ceph aims for distributed operations without single points of failure, scalable to the Exabyte capacities.

Ceph replicates data making it fault tolerant, using commodity hardware. As a result of its design, the Ceph system is both self-healing and self-managing, minimizing administration and associated costs.

Ambedded's Mars series integrate decentralized ARM-based microservers with open source Ceph software and web-based UVS, distributing the device as an SDS appliance. This perfect integration enables customers to easily use, scale and manage storage.

Manage the Ceph SDS Cluster

Ceph is a powerful product, providing a unified SDS platform with scalability and high availability. However, Ceph management is very complicated. UVS manager provides system administrators a straightforward GUI to automate the sophisticated command line interface (CLI) to avert human error. System administrators can manage the Ceph cluster after just a few hours of training. Compared to other Ceph products – many of which provide only CLI or limited dashboard functionality – UVS reduces administration dramatically. This results in lower operating costs through greater administrative productivity.

Performance & Stability Tuning

In addition to the management interface, the UVS backend optimizes Ceph parameters on the Mars platform to drive performance with stability. This saves administration time on tuning, expediting new Ceph cluster deployment.



AT A GLANCE

- Web-Based Ceph appliance management tool
- Clear Dash board
- Deploy a Ceph cluster
- Cerate & manage NTP
- Create MON
- Cerate and manage OSD, MDS
- Replica and Erasure code
- CRUSH Map, Bucket, Rule set
- Pool management
- Cache tiering
- RBD image
- Snapshot, clone & flatten
- Create CephFS
- CephX key and user capability
- OSD and pool usage
- Audit log and notification.
- Rados gateway & users
- Multi-site DR
- OpenStack pools
- iSCIS Gateway and LUN
- Live migration

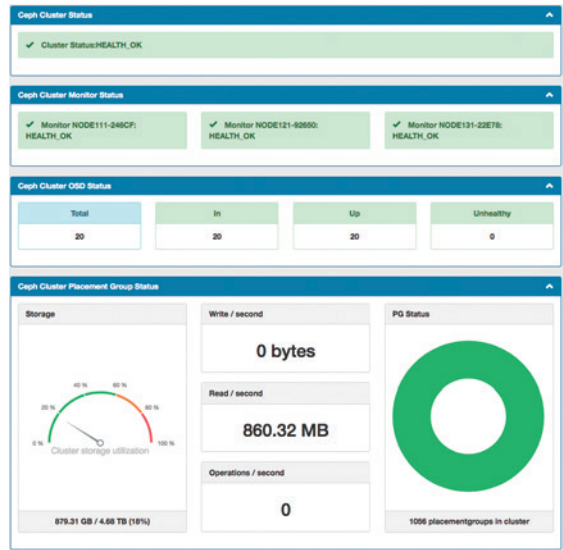
KEY FEATURES

Cluster & NTP Server Deployment

- Deploy the first Monitor and OSD to bring up Ceph cluster from scratch.
- Setup NTP server: Ceph allows very small clock skew between nodes.
- NTP options may create an NTP server on MON node or use an existing NTP server.
- A single click can push the NTP setting to each Ceph nodes.

Dashboard

- The dashboard provides a graphical cluster informations.
- Ceph cluster status
- Warning and error messages
- OSD and MON status
- Placement group healthy status
- Cluster capacity usage
- Throughput metrics



MON

Rank	Node Name	IP Address	Status
mon.0	node111-246cf	↑ 192.168.1.111	Up
mon.1	node121-92650	↑ 192.168.1.121	Up
mon.2	node131-22e7e	↑ 192.168.1.131	Up

Showing 1 to 3 of 3 rows

OSD

Rank	Class	Node Name	IP Address	Status	Data SMART	Journal SMART
osd.0	ssd	node112-5055c	↑ 192.168.1.112	Up	Info	Info
osd.1	ssd	node113-5d7f8	↑ 192.168.1.113	Up	Info	Info
osd.2	ssd	node114-98a24	↑ 192.168.1.114	Up	Info	Info
osd.3	ssd	node115-1c30e	↑ 192.168.1.115	Up	Info	Info
osd.4	ssd	node116-5547e	↑ 192.168.1.116	Up	Info	Info
osd.5	ssd	node117-4a144	↑ 192.168.1.117	Up	Info	Info
osd.6	ssd	node118-4a30b	↑ 192.168.1.118	Up	Info	Info
osd.7	ssd	node122-09861	↑ 192.168.1.122	Up	Info	Info
osd.8	ssd	node123-4f910	↑ 192.168.1.123	Up	Info	Info
osd.9	ssd	node124-05006	↑ 192.168.1.124	Up	Info	Info

Showing 1 to 10 of 20 rows. 10 records per page

MON/OSD Management

Monitor and OSD are two important daemons forming a Ceph cluster. With UVS, administrators can easily manage these daemons with following functions.

- MON create, restart and reboot
- OSD creates, restart, reboot and remove
- Add multiple OSDs
- MON and OSD network and healthy status
- OSD disk SMART information

Pool Management & Cache Tiering

The Pool is the basic storage resource, storing objects written by clients. Administrators create Pools with data protection either via replication or erasure coding. CRUSH rules configure the Pool's failure domain.

- Pool create/delete
- Pool configuration: Name, Replica/Erasure Code, Quota, CRUSH Rule, Placement Group
- Cache tiering: with different speed pools, a faster pool can be set as the cache tier of a slower pool.

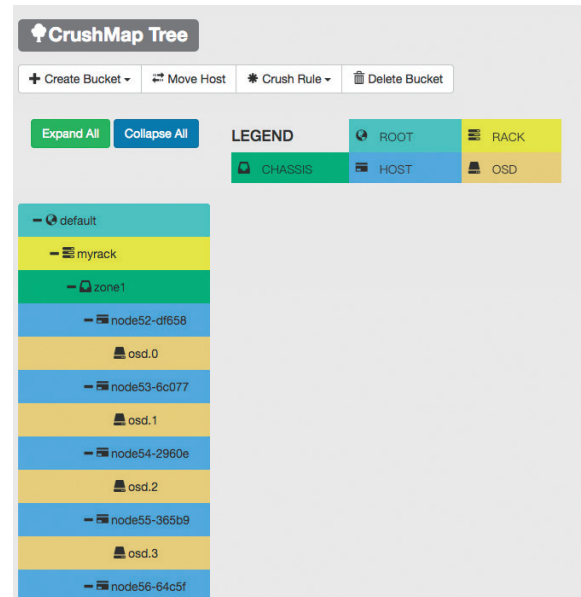
Ceph Pools

Pool Name	Type	Size	EC Profile/Crush Rule	Placement Groups	Quota	Action
lccsirep	Replica	3	replicated_ruleset	1024	Unlimited	Edit Cache Tier
lccsire	Replica	3	zonerule	1024	Unlimited	Edit Cache Tier

CRUSH Map Configuration

Ceph uses CRUSH algorithm to distribute and store replicated data and erasure coding chunks to the configurable failure domain. CRUSH requires a map to avoid single point of failure, performance bottleneck and scalability limitations. UVS enables configuration of the CRUSH map and rule sets.

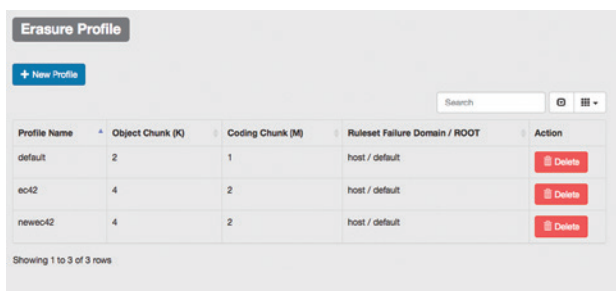
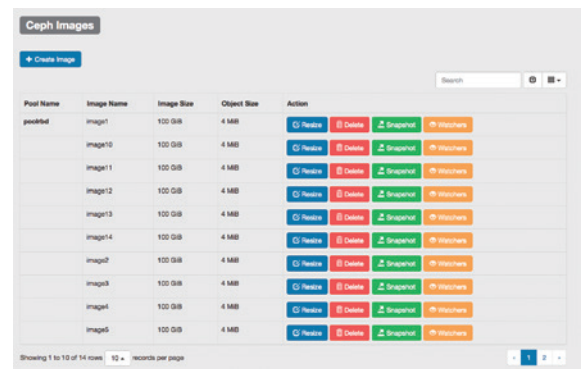
- Create/Delete bucket: root, rack, chassis
- Move host: Assign hosts to their chassis
- List and create CRUSH Rules
- Graphical CRASH map



RBD Images Management & Snapshot

RBD images are block devices striped over objects and stored in its backend Ceph pool. UVS creates images with specific backend pools. Other UVS management tasks include.

- Create and deleting image
- Assign image object size
- Size and resize image
- Snapshot, clone and flatten images
- List images with their name, image size, objects size and watchers (users).

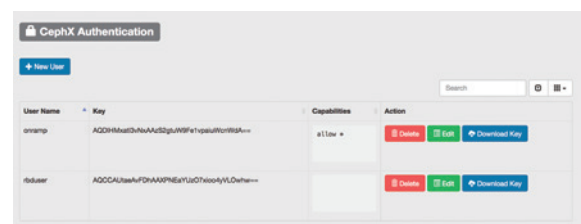


Erasure Code Profile Management

Before creating an erasure code pool, Administrators creates an Erasure Code profile with specified object Data Chunk (K) and Coding Chunk (M) values, and a failure domain. UVS makes this quite straightforward.

Client User Access Control

Ceph requires authentication and authorization via username / keyring. UVS manages user access and creates the associated keyring, which administrators can download after creation.



Usage Detail

Usage detail lists the size, weight, use percentage and availability of each root, rack, chassis and host/disk. Pool usage data such as used, use percentage, maximum capacity and number of object are listed.

NAME	TYPE	WEIGHT	SIZE	USE	AVAILABLE	%USE
default	root	105.17999	0	0	0	0%
nodes112-8856c	host	5.43900	59903	1360	54593	2.44%
nodes113-5d77f	host	5.43900	59903	1250	54653	2.22%
nodes114-89a24	host	5.43900	59903	1190	54713	2.02%
nodes115-5d20e	host	5.43900	59903	1180	54723	2.04%
nodes116-9d47a	host	5.43900	59903	1170	54733	2.14%
nodes117-9d414	host	5.43900	59903	1060	54843	1.91%
nodes118-4d3f5	host	5.43900	59903	1260	54643	2.28%
nodes122-098d1	host	5.43900	59903	1060	54843	1.98%
nodes123-af91c	host	5.43900	59903	1350	54553	2.42%

Object Storage

UVS manager supports the use of object storage. Applications can access the object storage through Amazon S3 and OpenStack Swift compatible API through the RADOS gateway.

Administrators use UVS to create a multi-site RADOS gateway for Active-Active disaster recovery.

UVS provides the following object storage features

- Creating RADOS gateway either standalone or Multisite Master/Secondary.
- Creating RADOS gateways on X86 servers.
- Configuring RADOS gateway pools
- Number of replication
- Number of placement group
- Changing CRUSH rule set
- Changing replica to erasure code or vice versa
- Creating/Deleting S3/Swift users and access keys

Node Name	IP Address	API Port	Type	Action
nodes111-246cf	192.168.1.111	TCP/7480	Master Gateway REALM = usa ZONEGROUP = mast ZONE = newjersey	-
nodes121-4265d	192.168.1.121	TCP/7480	Master Gateway REALM = usa ZONEGROUP = mast ZONE = newjersey	-

UID	Name	Keys	Quota	Action
embedded	Embedded	S3 Access Key : D1LR05HL932543F70R6 S3 Secret Key : 80y8W7v028FA20ngz2e3jFQ2M46m4m2044 Swift UID : embedded:swift Swift Secret Key : 4dyCakexELas9k4r238kzrPLx88ax1CgKz3p	Disabled	Edit Quota Create
zomaster	DO NOT DELETE THIS USER	S3 Access Key : sar13C77F939p70u6t+ S3 Secret Key : 7wv8d4E2cwH7184FLCjGd75FLc2F0xJ95ag	-	-

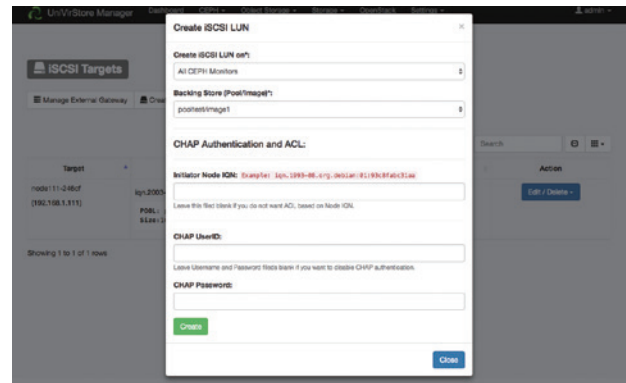
OpenStack Component	Pool Name	CephX User Name	Key	Action
CINDER	cinder	cinder	AZB8U+4e77yMFAAK1Dq5dcmG7URhcW8ZG2w	Download Key
GLANCE	glance	glance	AZB8U+4e77yMFAAK1Dq5dcmG7URhcW8ZG2w	Download Key
NOVA	nova	nova	AZB8U+4e77yMFAAK1Dq5dcmG7URhcW8ZG2w	Download Key

OpenStack

Cloud platforms like OpenStack require storage that is reliable, scalable, unified and distributed. Ceph integrates easily with OpenStack components like Cinder (block), Manila (file), Swift (object), Glance (images), Nova (VM virtual disks) and Keystone (identity). UVS OpenStack options allow administrators to create Pools and keys to use with OpenStack with a single click. UVS generates the Ceph client keyring for client.glance, client.cinder, client.nova and ceph.conf, supporting download and copy client access.

iSCSI

This feature helps to create iSCSI gateways on external servers or internal MON nodes and manage iSCSI LUNs with CHAP and ACL authentication.



#	Date/Time	User	Client IP	Log Message
627	Tue, 10 Apr 2018 15:13:45 +0800	admin	192.168.1.2	User logged in successfully
626	Tue, 10 Apr 2018 10:10:41 +0800	admin	192.168.1.120	Downloaded keyring for CephX user onramp
625	Tue, 10 Apr 2018 10:10:11 +0800	admin	192.168.1.120	Downloaded keyring for CephX user onramp
624	Tue, 10 Apr 2018 10:10:02 +0800	admin	192.168.1.120	Updated CephX user onramp with caps allow *
623	Tue, 10 Apr 2018 10:09:42 +0800	admin	192.168.1.120	Created CephX user onramp
622	Tue, 10 Apr 2018 10:08:59 +0800	admin	192.168.1.120	User logged in successfully
621	Mon, 09 Apr 2018 16:32:30 +0800	admin	192.168.1.120	LUN lpg1 on 192.168.1.161 for localpool/localnode created successfully.
620	Mon, 09 Apr 2018 16:31:53 +0800	admin	192.168.1.120	LUN lpg1 on 192.168.1.161 for localpool/localnode created successfully.
619	Mon, 09 Apr 2018 16:31:13 +0800	admin	192.168.1.120	Image localpool/localnode with size 2000 and object size 22 created
618	Mon, 09 Apr 2018 16:30:38 +0800	admin	192.168.1.120	Image localpool/localnode with size 2000 and object size 22 created

Audit Log

An Audit Log automatically tracks every user action on the Ceph cluster. It records user Log on time, action performed, and resulting status. The logs can be forwarded to external Syslog servers.

Notification – Alerts on e-mail

Administrators can configure UVS to send Ceph warning and error messages to multiple email addresses, removing the need for constant Dashboard monitoring. When problems arise, users receive email alerts.



UVS User Management

Administrator can create many UVS manager users with configurable name, password, and access level. Users can be either full function administrators or viewers only. Users can change their password afterward.

User Name	Group	Action
admin	Admin	
embedded	View	Edit

Node Name	IP Address	Version
node111-249cf	192.168.1.111	2.0-5
node112-b555c	192.168.1.112	2.0-5
node113-6d7ff	192.168.1.113	2.0-5
node114-98a24	192.168.1.114	2.0-5
node115-1cb0e	192.168.1.115	2.0-5
node115-5477e	192.168.1.116	2.0-5
node117-14414	192.168.1.117	2.0-5
node118-4a37b	192.168.1.118	2.0-5
node121-62630	192.168.1.121	2.0-5
node122-09821	192.168.1.122	2.0-5

Firmware Update

Use Firmware Update function to upload the Ambedded update file released to one of MON nodes, pushing it to all nodes in the cluster with a single click. Firmware updates do not disrupt storage operations.

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