Ceph Software Defined Storage Appliance

Unified distributed data storage cluster with self-healing, auto-balancing and no single point of failure

Lowest power consumption in the industry: 70% power saving

Mars 400

Ambedded Technology Co., Ltd.

Best of Interop 2016 STORAGE WINNER

BC Best Choice AWARD

BEST CHOICE AWARD Golden 2017

Mars 400 Infinite Scale Out, Unified Virtual Storage

Mars 400 Features

- Effortless, Scalable and Auto-Configurable Ceph Appliance
- Easy to use web based Ceph user interface
- Performance and capacity scale out on demand
- Resilient survival of multiple rack/chassis/host/OSD failures
- Self-healing data protection
- Unified system supports object storage, SAN and NAS on a single device
- Amazon S3 and OpenStack back-end storage
- Configurable on all SSD, hybrid and full HDD
- ARM based Micro-Server architecture minimizes failures
- Consumes less than 100/105 Watts of power: 70% power less than competitors

Use Case & Applications

- Big Data Analysis, Machine Learning
- Hadoop compatible for Telecom and Energy Industries
- Cloud Storage Service, backend storage for OpenStack & Kubernetes
- Edge Data Center for IOT applications such as sensor data aggregation
- Massive Data Backup
- Database as a Service

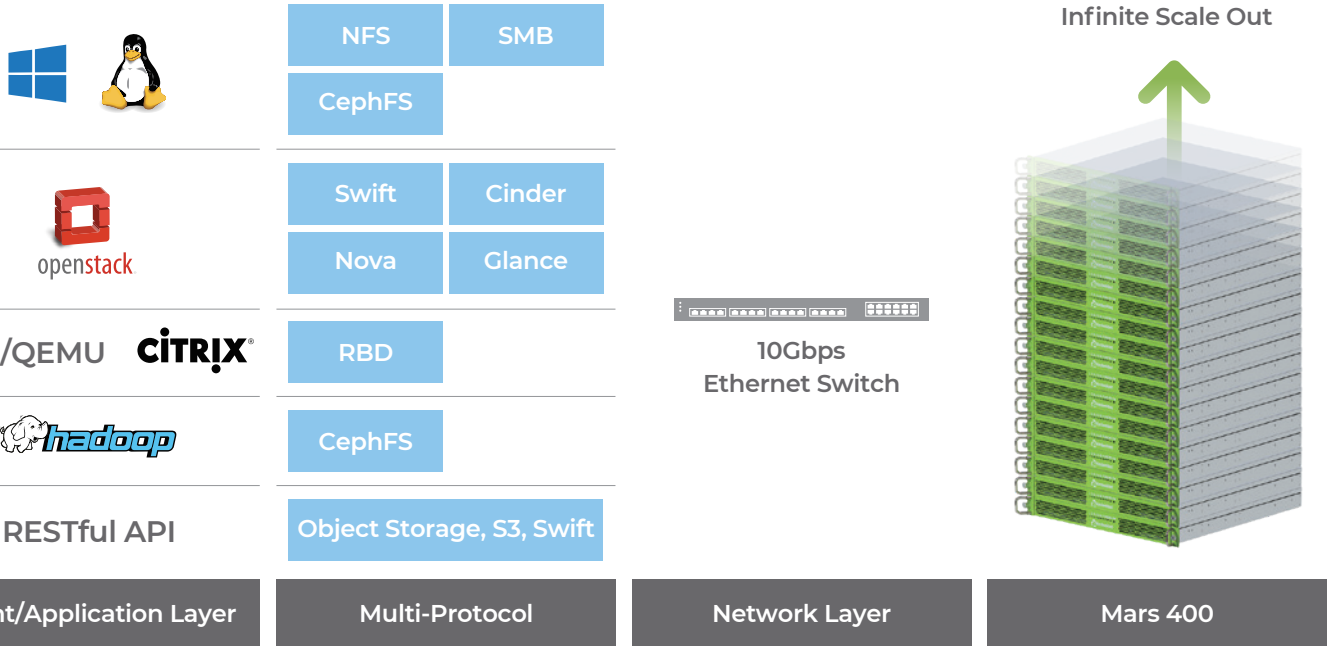
UVS
Unified Virtual Storage Manager
Ceph Management GUI

+

ceph
Optimized & Tuning Ceph

+

ARM Micro-Server



Simplified Design with High Availability

Intelligent Data Protection

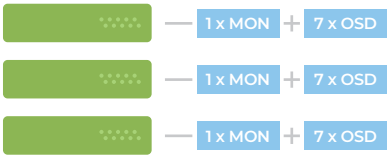
Data replication to diverse chassis and racks to minimize the impact of failure (via the CRUSH rule on UVS software). Self-healing Micro-Server architecture.

Minimizes the scale and impact of hardware failure

Each ARM Micro-Server connects to its dedicated drive reducing the impact of failure by 90% compared to an x86 based storage system.

Hot-Swappable Hardware

Micro-Server, switch, HDD, SSD and power supplies are all hot-swappable modules. Switches and power supplies are also redundant.



Basic Configuration

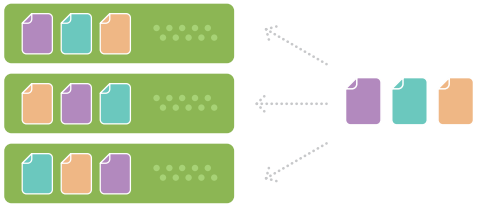
UVS – Unified Virtual Storage Management

Web-based Ceph Management GUI
Easy to Configure, Deploy, Manage, Monitor, Automate

Data replication and protection

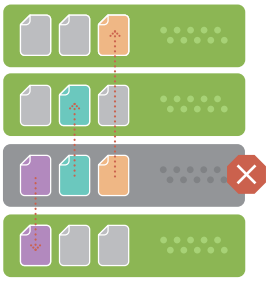
- Supports Replication and Erasure Code data protection methods. Support up to 10 x data replication.
- Erasure Code set in efficient, assigned storage space.
- Data is evenly distributed among storage nodes.

(1) Replica



(2) Erasure code

K+M < = OSD numbers (no limitation on M value)
Flexible to set up fault-tolerance ratio and overhead capacity



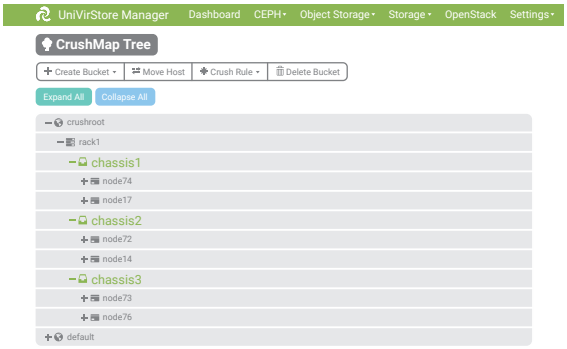
Auto-detection and self-healing ; back to data safe level

Real-Time Self-Healing and Fault-Tolerance

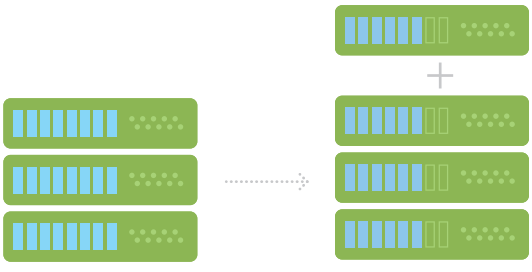
When any drive or Micro-Server fails, MARS 200/400 detects the failure and simultaneously regenerates the lost data per the CRUSH rule.

The CRUSH rule reduces and de-centralizes risk

The CRUSH algorithm distributes data replication/
Erasure code across dispersed racks, chassis and data centers.



Define the failure domain through CRUSH map on UVS manager



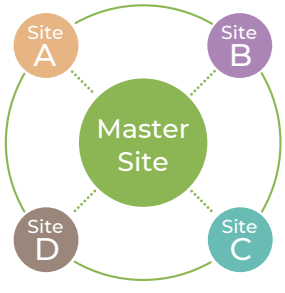
Capacity and performance scale out linearly

Scale out and Automatic Load Balancing

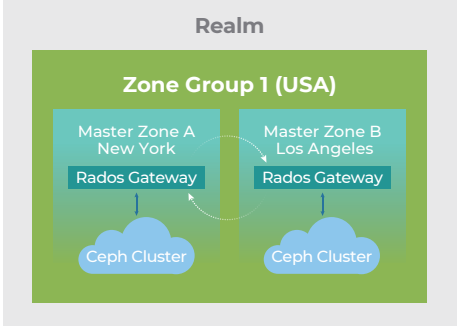
- Mars 200 & Mars 400 scale out capacity on demand without service interruption.
- Limitless linear performance and capacity scaling.
- All storage nodes automatically re-balance whenever there is a change in service.

Object Storage Multiple-Site, Active-Active Disaster Recovery

Shorten recovery point objectives (RPO) and Ceph Cluster recovery time objectives (RTO).



Multi-sites active-active support on RadosGW



Mars 400 CEPH Storage Appliances

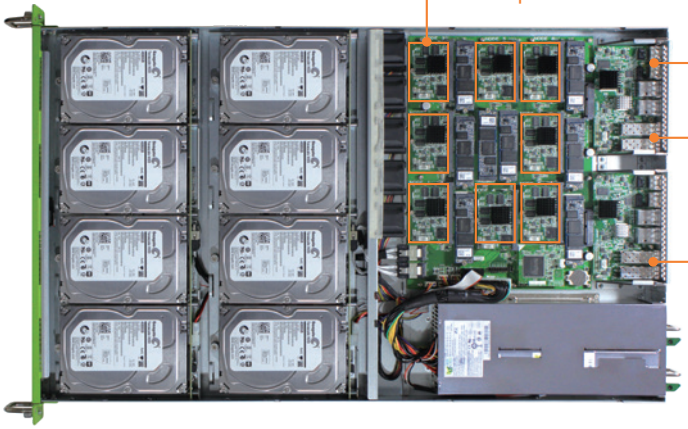
	Mars 400
Form Factor	1U Rack mount with 437.8 mm (W) x 43.5mm (H) x 741.2 mm (L) 1U Rack mount with 17.2" (W) x 1.7" (H) x 29.2" (L)
Micro-Server	SOC
	8 x ARM 64-bit Cortex-A72 Quad Core 1.2GHz
	Memory
	4G Bytes DDR4
	▪ Network Interface: 2 x 2.5Gbps Ethernet ▪ Storage Interface: 2 x SATA 3.0 (6 Gbps) ▪ Storage: 16GB flash memory for operating system, Ceph software and UVS manager
Network	▪ Redundant Dual Hot-Swappable switches (active/active) - 4 x 10Gps uplink, for client and scale-out - Support SFP+ or 10G baseT media with auto-media detection ▪ 1 x 100Mbps out of band management port (BMC)
Baseboard Management Controller (BMC)	1 x 100Mbps Ethernet out-of-band port Functions: - Micro-server Console over Ethernet - Reset specified Micro-Server - Control Micro-Server power ON/OFF - Control system power ON/OFF - Reset In-chassis switch - UID LED control
Storage Bay (HDD/SSD)	▪ 8 x top accessible hot-swappable SATA3 storage bay (3.5"HDD or 2.5" SSD/HDD) ▪ Each Micro-Server has a 120GB SATA 3 M.2 SSD slot for Ceph WAL & DB
Front Panel	- 8 green LED for Micro-Server status - UID LED - Power ON/OFF switch for power supply - HDD backplane with: 8x LEDs for locating HDD positions
Power Consumption	Max. 105 Watts (exclude 8 x SSD/HDD)
Accessories	▪ AC input power cord with IEC C14 inlet plug ▪ Slide rail kit ▪ Cable management arm (optional)
Power Supply	Dual 300 Watt 80 Plus Silver Redundant Power Supplies (active/active)
Safety	CE/FCC Class A, UKCA

1U 8 nodes ARM Micro-Server Cluster

Storage Device
- 8x SATA3 HDD/SSD OSD
- 8x SATA3 WAL/DB SSD

8x ARM Quad Core Micro-Server
- 4GB DDR4
- 16G Bytes Flash: System disk
- 5 Gbps LAN

- < 5 Watts power consumption
- Every node can be OSD, MON, MDS, Gateway



OOB BMC port

Dual uplink switches
Total 4x 10 Gbps

300 Watt Redundant power supply

ARM-based Micro-Server Architecture
Energy-Saving Distributed Storage Server

Unified Virtual Storage Manager (UVS) 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 node.

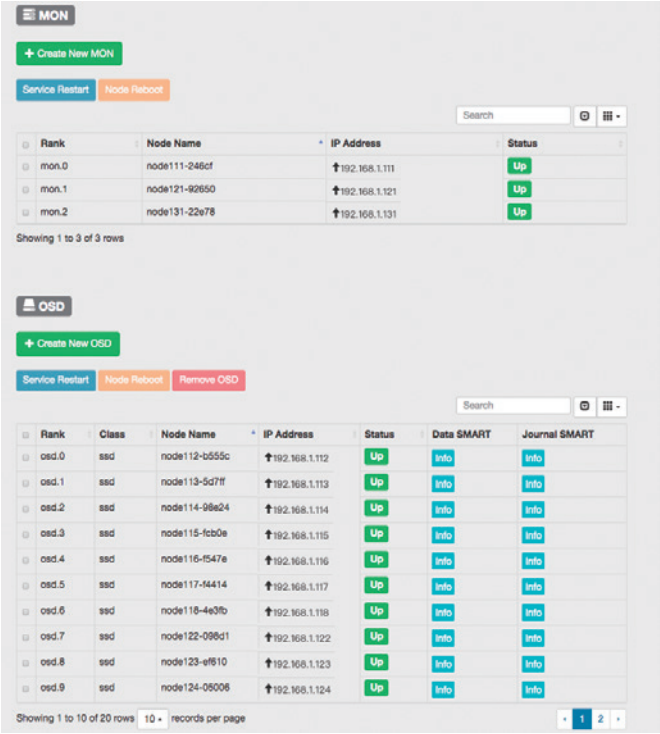
Dashboard

The dashboard provides graphical cluster information.

- Ceph cluster status
- Warning and error messages
- OSD and MON status
- Placement Group health status
- Cluster capacity usage
- Throughput metrics

MON/OSD Management

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



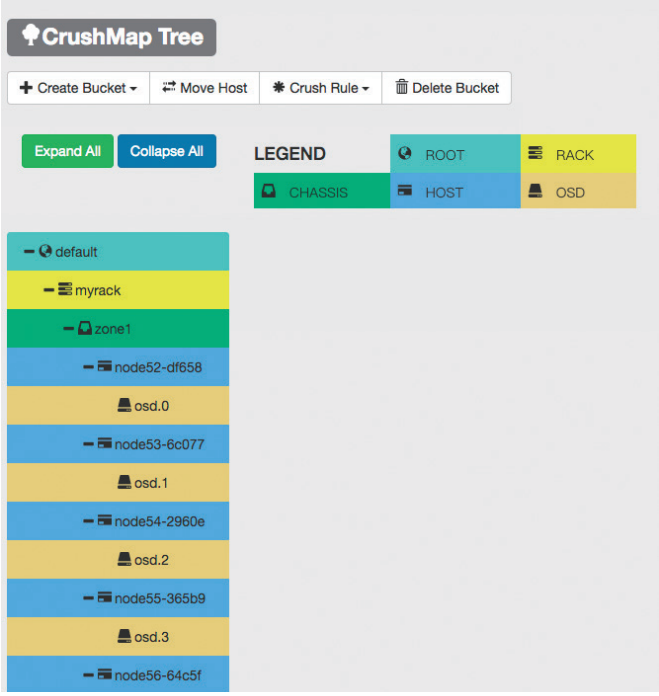
Pool Management & Cache Tiering

- 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.

CRUSH Map Configuration

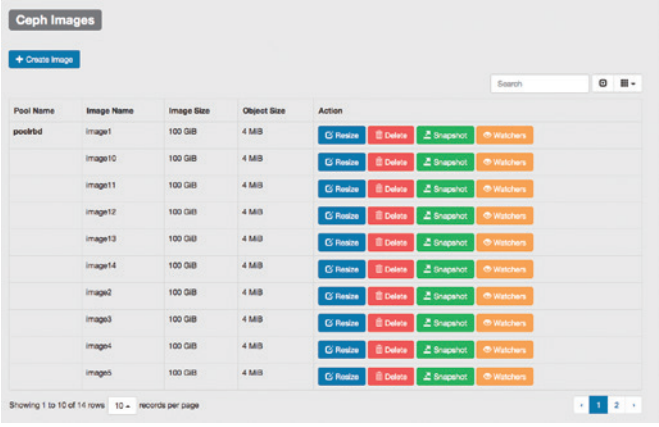
Ceph uses CRUSH algorism to distribute and store replicated data and erasure coding chunks to the configurable failure domain. CRUSH requires a map to avoid single point of failure, performance bottleneck and scalability limitations. UVS enables configuration of the CRUSH map and rule sets.

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



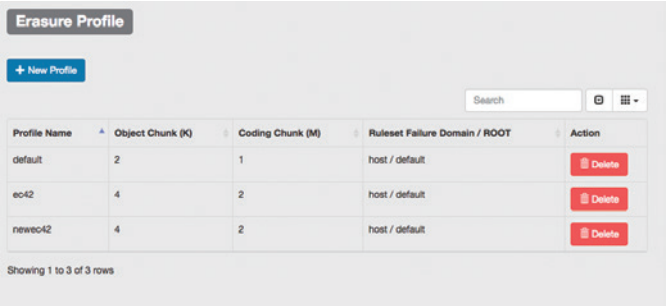
RBD Image Management & Snapshot

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



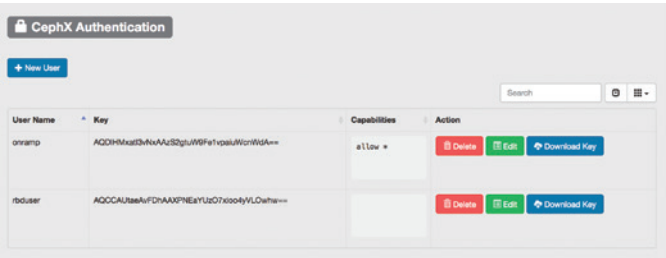
Erasure Code Profile Management

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



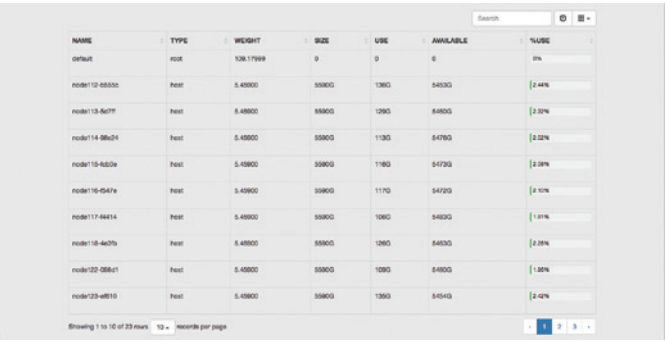
Client User Access Control

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



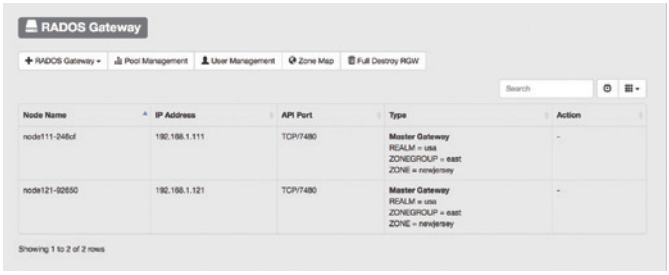
Usage Detail

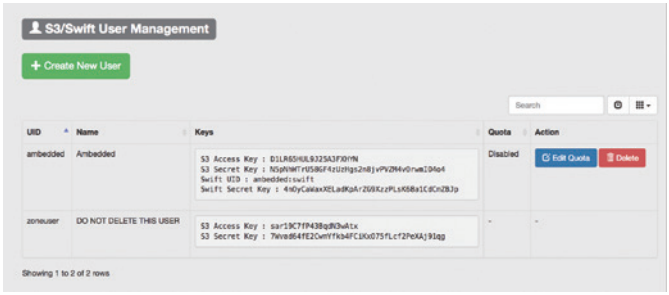
Usage detail lists the size, weight, use percentage and availability of each root, rack, chassis and host/disk.



Object Storage

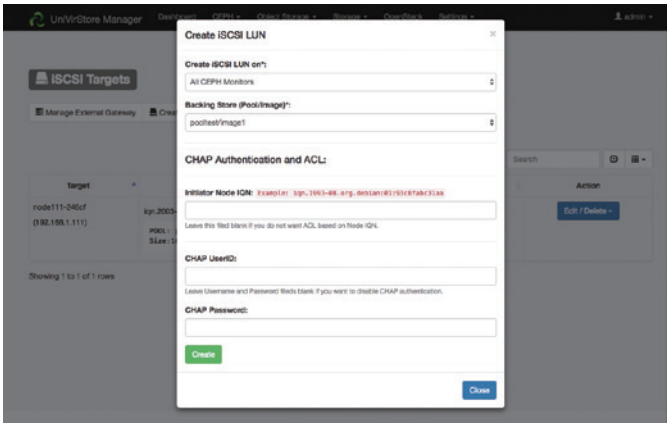
UVS manager supports the use of object storage. Applications can access the object storage through Amazon S3 and OpenStack Swift compatible API through the RADOS gateway.





iSCSI

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



And more with UVS Manager

UVS manager also supports keyring & ceph.conf file generation for OpenStack, Audit logs, Notification/email alert, UVS user management, On-fly firmware update....etc.

Ambedded Technology Co., Ltd.

Ambedded Technology Headquarter

Address: No.18, Siyuan St., Zhongzheng Dist., Taipei City 10087, Taiwan
TEL: +886-2-23650500
Contact: service@ambedded.com.tw
www.ambedded.com.tw

Ambedded USA

Contact : USSales@Ambedded.com