

Table of Contents

| | |
|---|----|
| Micro Cloud (Hybrid) Architecture DRAFT | 1 |
| Basic Topology Important parts | 1 |
| Network remarks | 1 |
| AWS Basic knowledge (Introduction by Chetan) | 1 |
| This is My Architecture playlist from AWS | 1 |
| Schematics | 1 |
| Basic Topology | 1 |
| Integration Schema | 2 |
| Service Flow | 2 |
| CEPH SD Storage Schema | 2 |
| AZ recommendation | 3 |
| HA granularity | 3 |
| Software Stack | 3 |
| Cloud Core Infrastructure (IaaS) | 3 |
| Deployment | 4 |
| Security as a Service (SECaaS) | 4 |
| Software as a Service (SaaS) | 4 |
| Platform as a Service (PaaS) | 5 |
| Cloud-Init | 5 |
| API + CLI | 5 |
| Multiuser setups | 5 |
| Kubernetes (MicroK8s) | 5 |
| Hardware Draft | 6 |
| Security | 6 |
| Power Backup | 6 |
| Man-Trap | 6 |
| Zero-Trust-Security | 6 |
| Main-Distribution-Frame (MDF) | 6 |
| Intermediate Distribution Frame (IDF) | 6 |
| Meet-Me-Room (MMR) | 6 |
| Carrier Hotel | 6 |
| East-West Traffic | 6 |
| North-South Traffic | 7 |
| CDN | 7 |
| Hardware suppliers & Datacenter vendors | 7 |
| Remarks | 7 |
| Add Storage type | 7 |
| Backup | 8 |
| Storage CEPH | 8 |
| Create VM | 9 |
| Running VM | 9 |
| Firewall Template (SECaaS) | 10 |
| MultiCluster Proxmox Dashboard | 10 |
| MultiCluster Kubernetes Dashboard | 11 |
| Proxmox on RaspberryPI 5 / with Win11 ARM inside | 11 |
| Proxmox direct import from VMWare ESXi | 11 |
| AWS Load Balancer | 11 |
| Software stack overview | 13 |
| Openstack | 14 |
| MINIO S3 service for small networks | 17 |
| CEPH 3node 10gbit performance (KVM-VirtIO) | 17 |
| CEPH Performance Proxmox | 18 |

Micro Cloud (Hybrid) Architecture DRAFT

Disposable HW and SW architecture required! Vendor-lock-in may be kept at minimum levels. SDDC (Software-Defined Data Center): A data storage facility where networking, storage, CPU and security are virtualized and delivered as a service. Stable, cheap, good enough.

| Tier | Description |
|------|--|
| I | A Tier 1 data center is a basic server room implementing the general guidelines for computer system installations. This first level runs within a 99.671 percent availability through one non-redundant distribution path with non-redundant capacity components. |
| II | A Tier 2 data center Includes all requirements of Tier 1, plus a guarantee of 99.741 percent availability with redundant site infrastructure capacity components. |
| III | In addition to fulfilling requirements of Tiers 1 and 2, Tier 3 data centers provide dual-powered IT equipment to receive data from multiple independent distribution paths with an increased availability of 99.982 percent guaranteed. |
| IV | Tier 4 data centers include the components of the first three Tiers with the addition of independently dual-powered cooling equipment. The site infrastructure is fault-tolerant with distribution capability and the capacity to store electrical power. An availability of 99.995 percent is guaranteed. |

Basic Topology Important parts

| | |
|---------------------|---|
| Command and conquer | Openstack Horizon, Proxmox Datacenter Manager, Nutanix Prism etc. |
| Compute Nodes | KVM |
| Storage Nodes | File, Block, Objects |

Network remarks

Disable Spanning Tree Protocol for servers

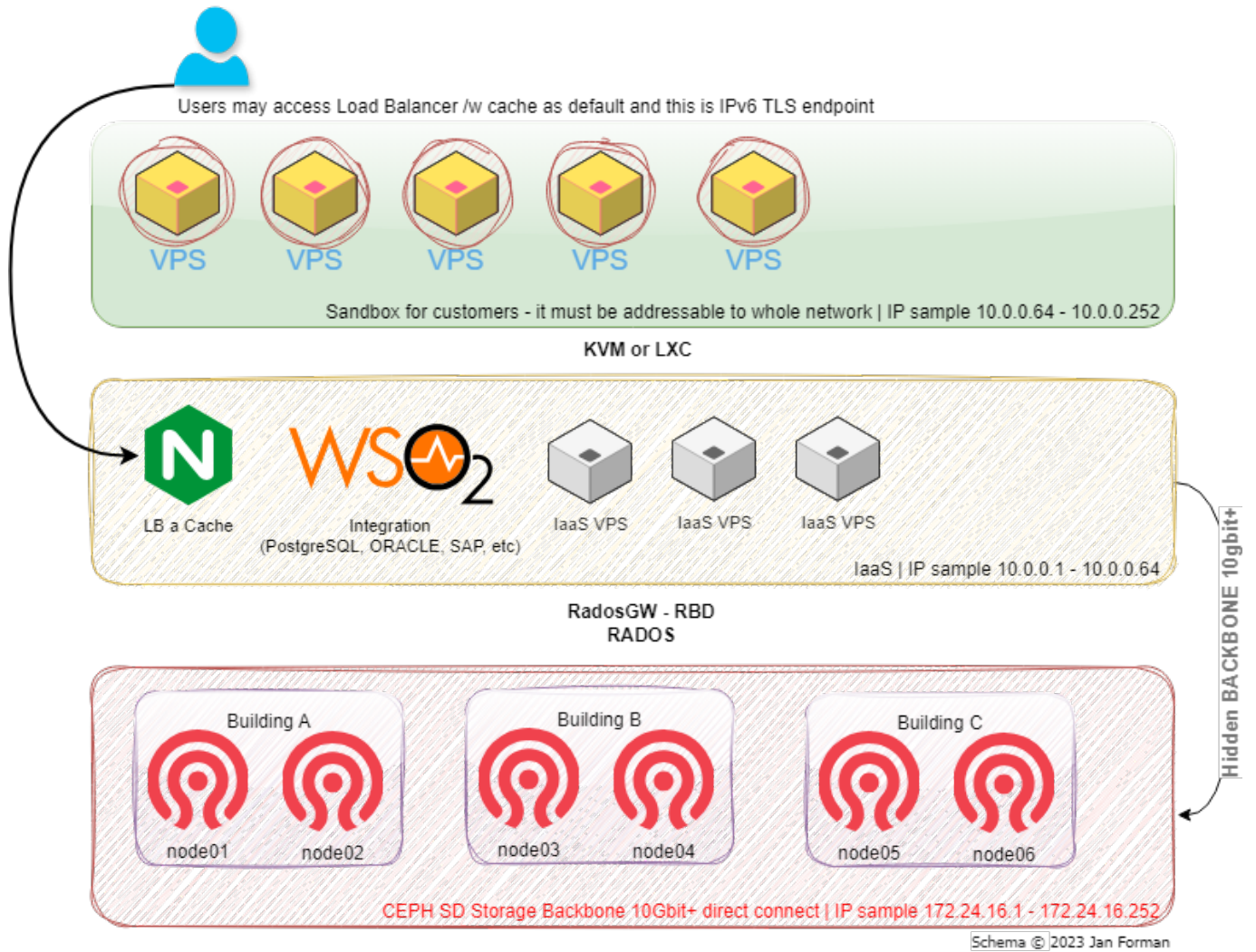
AWS Basic knowledge (Introduction by Chetan)

This is My Architecture playlist from AWS

[This is my architecture](#)

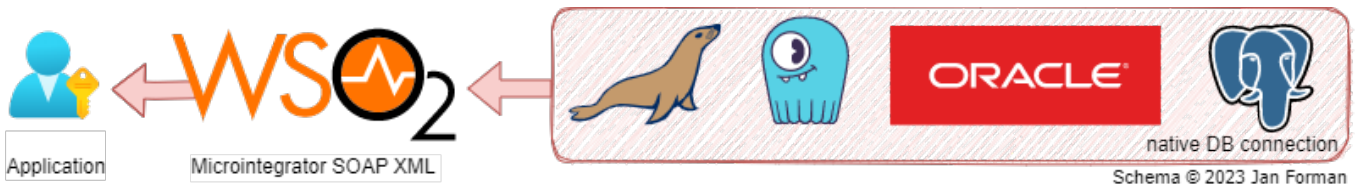
Schematics

Basic Topology



Firewalls are templates linked to VPS instance

Integration Schema



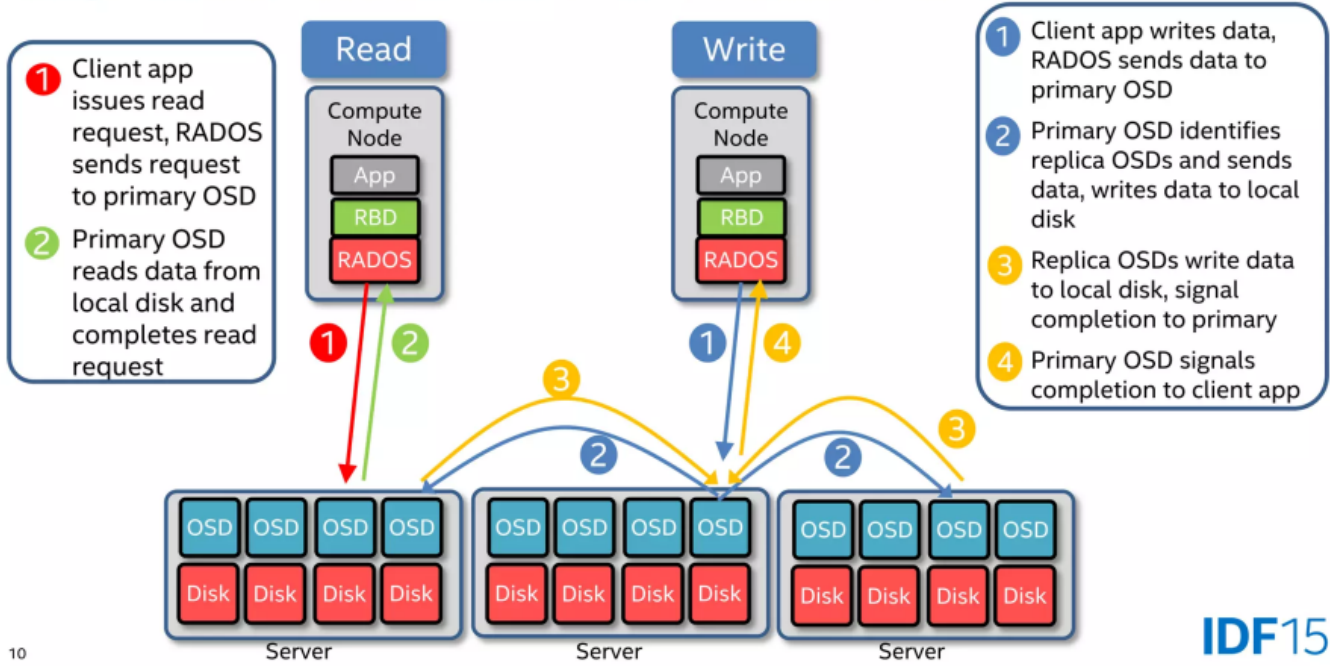
Service Flow

CEPH SD Storage Schema

Ceph Storage at CERN (IT Department)

Exabyte storage scaleout with Geocluster and autoscaling

Object Store Daemon (OSD) Read and Write Flow



IDF15

10 © 2015 Jian Zhang Intel CEPH software optimizations for cloud workloads

Replication HA schema

- root
- \ datacenter
- \ \ row
- \ \ \ rack
- \ \ \ \ host
- \ \ \ \ \ osd

AZ recommendation

| | |
|------------|-----------------------------|
| EBS | 1x AZ |
| EFS | ~3x AZ (Full region) |
| S3 | ~3x AZ (Full region) |

HA granularity

| By service | No HA | Single AZ | MultiAZ |
|-----------------------|-------|-----------|---------|
| VPS | Yes | No | No |
| CephFS | No | Yes | may |
| Blockstorage - CEPH | No | Yes | may |
| Blockstorage - Minio | Yes | may | No |
| Blockstorage - Garage | Yes | may | No |
| GalleraCluster | No | Yes | may |
| ScyllaDB | No | Yes | may |
| Mariadb | Yes | Yes | may |
| Postgresql | Yes | Yes | may |
| Citus | No | Yes | may |

Software Stack

Cloud Core Infrastructure (IaaS)

| Type | Cloud Service Description | CPU support |
|--|---|-------------------------------|
| Compute Nodes and Management | AWS EC2 replacement with cloudinit support | ARM support |
| Openstack | Full, but as LEGO style | YES |
| Proxmox | Light, but EASY to implement | YES |
| - LXC may deploy container templates - both have native CEPH support | | |
| SD Storage (Object, Block, File) Scaleout | AWS S3 compatible and EBS replacement | |
| AWS EBS - CEPH SD Block Storage | Hyperconverged or PetaSAN | YES |
| AWS EFS - CEPH SD File Storage | Hyperconverged or PetaSAN | YES |
| SD Load Balancer, Cache | AWS ELB / Citrix Netscaler replacement | |
| NGINX | or AlibabaCloud clone | YES |
| Integration + Enterprise Service Bus | IBM WebSphere replacement | |
| WSO2 Integrator | | YES |
| Mass webhosting | | |
| ISP Config | | YES |
| MQTT Platform | AWS IoT core replacement | |
| Mosquitto | | YES |
| Cloud Data Synchronization / Backup | | |
| Rclone | | YES |
| Restic | | YES |
| Infrastructure Monitoring System | AWS CloudWatch replacement | |
| NetXMS | | agent only |
| Grafana | | YES |
| Kubernetes Orchestrator | AWS EKS replacement | |
| Mikro K8s | | |
| Microsoft Windows | Windows Infrastructure | \$\$\$ not recommended |
| 1x Datacenter - dedicated HW | Xx Server Standard on KVM | no/LIMITED |
| XXX users | CAL (client access licence) per user | |
| Cloudinit for Windows | | |

Deployment

| |
|------------------|
| Ansible |
| Terraform |
| Juju |

Security as a Service (SECaaS)

| Type | Cloud Service Description | CPU support |
|------------------------------------|---|-------------|
| WAF (Application Firewall) | | |
| OWASP® ModSecurity | +nginx connector | YES |
| SD Firewall | AWS VPC, Security groups replacement | |
| Integrated firewall with templates | inside hypervisor | YES |
| pfSense | +platform integrated (VPS sandboxing) | LIMITED |

Software as a Service (SaaS)

| Type | Info | Service Description | Location |
|--------------------------------|--------------------------|--|---------------|
| Services and Management | API catalog | WSO2 API Manager | KVM or LXC |
| DB | PostgreSQL | CitusData (Sharding Cluster) | KVM or LXC |
| DB | PostgreSQL | Postgresql | KVM or LXC |
| DB | PostgreSQL | Neon | KVM or LXC |
| DB | MariaDB | MariaDB with GalleraCluster | KVM or LXC |
| DB | AWS DynamoDB replacement | ScyllaDB Alternator | KVM or LXC |
| Storage | AWS S3 | Ceph version | CEPH Cluster |
| Storage | AWS S3 | Garage | Garage |
| Storage | AWS S3 | Minio version | Minio Cluster |

Platform as a Service (PaaS)

| Type | Name | Service Description | Location |
|-------------------|------------------|--|----------------------------------|
| Web Publishing | Info | Wordpress | ISPConfig |
| Web Storage | Network Drive | NextCloud * can use AWS S3 | ISPConfig, LXC or KVM |
| Videoconferencing | Talk | Talk * WebRTC | Inside Nextcloud + coTurn Server |
| Bug Tracking | Bug Tracking | Mantis Bug Tracker | ISPConfig |
| Forum | Discussion Forum | VanillaForums | ISPConfig |
| Knowledge Base | Wikipedia | DokuWiki | ISPConfig |

* WebRTC is decentralized protocol it may needs some help from CDN

Cloud-Init

KVM - Virtual drive with configuration

LXC - scripts for distribution executed directly in container

API + CLI

[PROXMOX API documentation](#)

Multiuser setups

You may use pools inside Proxmox to separate users and namespaces inside Kubernetes

Kubernetes (MicroK8s)

The screenshot displays the Kubernetes dashboard interface. At the top, there's a navigation bar with 'Workloads > Pods' selected. On the left, a sidebar lists various Kubernetes resources like Cron Jobs, Daemon Sets, Deployments, etc. The main area features two graphs: 'CPU Usage' (a green area chart) and 'Memory Usage' (a blue area chart). Below these is a 'Pods' table with columns for Name, Namespace, Images, Labels, Node, Status, Restarts, CPU Usage (cores), Memory Usage (bytes), and Created. The table lists several pods including 'registry-766d4b9987-tbg69', 'nginx-pod', 'nginx-ingress-controller-djcmc', 'metrics-server-df8dbf7f-bcp7c', and 'mariadb-pod'.

| Name | Namespace | Images | Labels | Node | Status | Restarts | CPU Usage (cores) | Memory Usage (bytes) | Created |
|--------------------------------|--------------------|--|---|----------|---------|----------|-------------------|----------------------|----------------|
| registry-766d4b9987-tbg69 | container-registry | registry:2.8.1 | app: registry pod-template-hash: 766d4b9987 | microk8s | Running | 0 | 1.00m | 5.72Mi | 22 minutes ago |
| nginx-pod | default | nginx | run: nginx-pod | microk8s | Running | 0 | 0.00m | 7.13Mi | 25 minutes ago |
| nginx-ingress-controller-djcmc | ingress | registry.k8s.io/nginx-ingress-controller:v1.11.2 | controller-revision-hash: 6d4f68995 name: nginx-ingress-microk8s | microk8s | Running | 0 | 4.00m | 102.25Mi | 19 minutes ago |
| metrics-server-df8dbf7f-bcp7c | kube-system | registry.k8s.io/metrics-server:v0.6.3 | pod-template-generation: 1 k8s-app: metrics-server | microk8s | Running | 0 | 8.00m | 16.79Mi | 34 minutes ago |
| mariadb-pod | default | mariadb | run: mariadb-pod | microk8s | Running | 0 | 1.00m | 91.50Mi | 26 minutes ago |

Hardware Draft

| |
|-------------------------|
| Compute nodes |
| AMD Epyc |
| EBS - SD Storage |
| Ampere / ARM 4x core+ |

Security

Biometric Readers + card

Power Backup

Inside everyrack plus diesel generators outside building

Man-Trap

Cage or room with Biometric Readers + card

Zero-Trust-Security

Every microservice must not trust to anyone else

Main-Distribution-Frame (MDF)

Incoming and outgoing communication and power lines within a building

A panel or set of panels where all communication cables from different parts of the building are both terminated and connected.

Cage or room with Biometric Readers + card

Intermediate Distribution Frame (IDF)

A wall-mounted or free-standing rack used to manage and interconnect a telecommunications cable between end-user devices and the main distribution frame (MDF).

Meet-Me-Room (MMR)

Network interchange place

Cage or room with Biometric Readers + card

Carrier Hotel

Internet exchange points for an area.

East-West Traffic

From server to server within a network's data center

North-South Traffic

Data flowing from or to a system physically residing outside the data center

CDN

Content Delivery Network with NGINX or TENGINE

Hardware suppliers & Datacenter vendors

Reuse what's possible and make sense

Custom boards from 1000+ pcs

| Hardware | Datacenter builders |
|---|--------------------------------|
| ASRock Rack | Equinix |
| Gigabyte Enterprise | Digital Realty |
| Ingrasys | Cologix |
| Wiwynn | Aligned |
| Quanta Cloud Technology | DataBank |
| Tyan | NTT Data |
| Inventec | Digital Edge |
| ZT systems | EdgeConneX |
| Supermicro | |
| Aivres | |

Remarks

Add Storage type

Datacenter

The screenshot shows a storage management interface. On the left is a sidebar menu with options: Search, Summary, Notes, Cluster, Ceph, Options, Storage (highlighted), Backup, Replication, Permissions, Users, API Tokens, and Two Factor. A dropdown menu is open over the 'Storage' option, listing various storage types: Directory, LVM, LVM-Thin, BTRFS, NFS, SMB/CIFS, GlusterFS, iSCSI, CephFS (highlighted), RBD, ZFS over iSCSI, ZFS, Proxmox Backup Server, and ESXi. In the background, a table lists existing storage configurations:

| Type | Content |
|-----------|---|
| RBD (PVE) | Disk image, Container |
| Directory | VZDump backup file |
| LVM-Thin | Disk image, Container |
| NFS | VZDump backup file |
| NFS | Disk image, ISO image, Container template |

Backup

Virtual Machine 111 (ora-jispcv.hzscr.internal) on node 'cloud-gis02' legacy sql Start Shutdown Migrate Console More Help

Backup now Restore Show Configuration Edit Notes Change Protection Remove Storage: synology-backup

| Name | Notes | Date ↓ | Format | Size |
|---|-------|---------------------|---------|-----------|
| vzdump-qemu-111-2024_08_24-03_00_04.vma.zst | | 2024-08-24 03:00:04 | vma.zst | 140.98 GB |
| vzdump-qemu-111-2024_08_17-03_00_00.vma.zst | | 2024-08-17 03:00:00 | vma.zst | 141.38 GB |
| vzdump-qemu-111-2024_08_10-03_00_01.vma.zst | | 2024-08-10 03:00:01 | vma.zst | 142.88 GB |
| vzdump-qemu-111-2024_08_03-03_00_10.vma.zst | | 2024-08-03 03:00:10 | vma.zst | 143.00 GB |
| vzdump-qemu-111-2024_07_27-03_00_00.vma.zst | | 2024-07-27 03:00:00 | vma.zst | 143.10 GB |
| vzdump-qemu-111-2024_07_20-03_00_10.vma.zst | | 2024-07-20 03:00:10 | vma.zst | 143.09 GB |
| vzdump-qemu-111-2024_07_13-03_00_05.vma.zst | | 2024-07-13 03:00:05 | vma.zst | 143.64 GB |

Storage CEPH

Replication schema

Reload Create OSD Manage Global Flags No OSD selected Details Start Stop

| Name ↑ | Class | OSD Type | Status | Version | weight | reweight | Used (%) | Total | Apply/Commit Latency (ms) | PGs |
|-------------|-------|-----------|---------|---------|---------|----------|----------|----------|---------------------------|-----|
| default | | | | 18.2.2 | | | | | | |
| cloud-gis00 | | | | 18.2.2 | | | | | | |
| osd.0 | ssd | bluestore | up / in | 18.2.2 | 1.74599 | 1.00 | 7.87 | 1.75 TiB | 1 / 1 | 86 |
| osd.7 | ssd | bluestore | up / in | 18.2.2 | 1.74599 | 1.00 | 10.99 | 1.75 TiB | 1 / 1 | 76 |
| osd.8 | ssd | bluestore | up / in | 18.2.2 | 1.81879 | 1.00 | 10.16 | 1.82 TiB | 1 / 1 | 79 |
| cloud-gis01 | | | | 18.2.2 | | | | | | |
| osd.1 | ssd | bluestore | up / in | 18.2.2 | 1.7466 | 1.00 | 10.11 | 1.75 TiB | 0 / 0 | 87 |
| osd.2 | ssd | bluestore | up / in | 18.2.2 | 1.7466 | 0.95001 | 10.54 | 1.75 TiB | 0 / 0 | 72 |
| osd.3 | ssd | bluestore | up / in | 18.2.2 | 1.7466 | 0.95001 | 8.79 | 1.75 TiB | 0 / 0 | 82 |
| cloud-gis02 | | | | 18.2.2 | | | | | | |
| osd.4 | ssd | bluestore | up / in | 18.2.2 | 1.7466 | 0.90002 | 9.20 | 1.75 TiB | 0 / 0 | 78 |
| osd.5 | ssd | bluestore | up / in | 18.2.2 | 1.7466 | 1.00 | 8.77 | 1.75 TiB | 0 / 0 | 75 |
| osd.6 | ssd | bluestore | up / in | 18.2.2 | 1.7466 | 0.95001 | 11.45 | 1.75 TiB | 0 / 0 | 88 |

CEPH One SSD backbone network connectivity

Details: OSD 8 ⊗

Reload

General **Network** Devices

| | |
|----------------------------------|--|
| Front Address (Client & Monitor) | v2: 172.24.16.1:6808 v1: 172.24.16.1:6809 |
| Heartbeat Front Address | v2: 172.24.16.1:6813 v1: 172.24.16.1:6814 |
| Back Address (OSD) | v2: 172.24.16.1:6810 v1: 172.24.16.1:6811 |
| Heartbeat Back Address | v2: 172.24.16.1:6816 v1: 172.24.16.1:6818 |

CEPH Pools (replication config)

| Pool # | Name | Size/min | # of Placement Groups | Optimal # of PGs | Autoscale Mode | CRUSH Rule (ID) | Used (%) |
|--------|----------------------------|----------|-----------------------|------------------|----------------|---------------------|--------------------|
| 3 | ceph-pool | 3/2 | 64 | 32 | off | replicated_rule (0) | 1.61 TiB (12.81%) |
| 12 | .mgr | 3/2 | 1 | 1 | on | replicated_rule (0) | 209.26 MiB (0.00%) |
| 13 | .rgw.root | 3/2 | 32 | 32 | warn | replicated_rule (0) | 48.00 KiB (0.00%) |
| 14 | default.rgw.log | 3/2 | 32 | 32 | warn | replicated_rule (0) | 408.00 KiB (0.00%) |
| 15 | default.rgw.control | 3/2 | 32 | 32 | warn | replicated_rule (0) | 0 B (0.00%) |
| 16 | default.rgw.meta | 3/2 | 8 | 8 | warn | replicated_rule (0) | 119.21 KiB (0.00%) |
| 17 | default.rgw.buckets.index | 3/2 | 8 | 8 | warn | replicated_rule (0) | 157.69 KiB (0.00%) |
| 18 | default.rgw.buckets.data | 3/2 | 32 | 32 | warn | replicated_rule (0) | 93.65 GiB (0.83%) |
| 19 | default.rgw.buckets.non-ec | 3/2 | 32 | 32 | warn | replicated_rule (0) | 15.59 KiB (0.00%) |
| | | | | | | | 1.70 TiB |

Create VM

Create: LXC Container

General **Template** Disks CPU Memory Network DNS Confirm

Storage:

Template:

| Name | For... | Size |
|---|--------|-----------|
| amzn-2-standard-amd64.tar.gz | tgz | 91.42 MB |
| centos-6-arctic_10-1_x86_64.tar.gz | tgz | 1.37 GB |
| centos-6-oracle12c-1_x86_64.tar.gz | tgz | 5.56 GB |
| debian-12-standard_12.2-1_amd64.tar.zst | tzst | 126.13 MB |
| oracle-8-cloud_amd64.tar.gz | tgz | 214.10 MB |
| rockylinux-9-default_20221109_amd64.tar.xz | txz | 102.70 MB |
| ubuntu-22.04-standard_22.04-1_amd64.tar.zst | tzst | 129.82 MB |
| ubuntu-24.04-standard_24.04-2_amd64.tar.zst | tzst | 141.59 MB |

Running VM

Virtual Machine 125 (wso2mi.hzspk.internal) on node 'cloud-gis02'

Start Shutdown Migrate Console More Help

Summary

- Console
- Hardware
- Cloud-Init
- Options
- Task History
- Monitor
- Backup
- Replication
- Snapshots
- Firewall
- Permissions

wso2mi.hzspk.internal (Uptime: 361 days 20:35:0)

Status: running

HA State: started, Group: XeonE5-2680

Node: cloud-gis02

CPU usage: 1.11% of 4 CPU(s)

Memory usage: 70.62% (2.82 GiB of 4.00 GiB)

Bootdisk size: 16.00 GiB

IPs: 10.160.149.9, fe80::be24:11ff:fe0e:2628

Notes: WSO2 µIntegrator 4.1 == ! ==
IP: 10.160.149.9 @ UBUNTU 22.04 LTS 64bit
ORACLE, Postgres, MariaDB, MSSQL connectors
+Mosquito 3.1 +NGINX

CPU usage graph: Shows CPU usage percentage over time, fluctuating around 1.1%.

Memory usage graph: Shows total and RAM usage in bytes over time, with RAM usage around 2.82 GiB.

Network traffic graph: Shows network traffic (netin, netout) in kilobytes over time, with a significant spike in netin around 2024-08-21.

Container 106 (sz-hzscr.internal) on node 'cloud-gis01' No Tags

Start Shutdown Migrate Console More Help

Week (average)

sz-hzscr.internal (Uptime: 12 days 21:06:43) CentOS

Status running

HA State none

Node cloud-gis01

Unprivileged No

CPU usage 0.01% of 6 CPU(s)

Memory usage 13.07% (133.79 MiB of 1.00 GiB)

SWAP usage N/A

Bootdisk size 18.43% (2.87 GiB of 15.58 GiB)

Notes

Polohy SŽ, IZS == 1 ==

IP: 10.160.149.24 @ ROCKY Linux 8.10 + NGINX + PHP + SQLite3 + SpatialLite

Parsuje data SŽ a na základě propojení dat odhaduje polohu vlaků Poskytuje GeoJSON rozhraní nad polohami vozidel

<http://10.160.149.24>

CPU usage

Memory usage

Network traffic

Firewall Template (SEcaaS)

Group: Create Remove Edit Rules: Add Copy Remove Edit

| Group ↑ | Comment | On | Type | Action | Macro | Protocol | Source | S.Port | Destination | D.Port |
|----------|---------------------|-------------------------------------|------|--------|-------|----------|--------|--------|-------------|--------|
| ags | ArcGIS Enterprise | <input checked="" type="checkbox"/> | out | ACCEPT | Ping | | | | | |
| lb | Load Balancer | <input checked="" type="checkbox"/> | out | DROP | | | | | | |
| scylladb | Big Data | <input checked="" type="checkbox"/> | in | ACCEPT | Ping | | | | | |
| web | Accept HTTP traffic | <input checked="" type="checkbox"/> | in | ACCEPT | | tcp | | | +cloud | 8080 |
| wso2 | Micro Integrator | <input checked="" type="checkbox"/> | in | ACCEPT | HTTP | | +cloud | | +cloud | |
| | | <input checked="" type="checkbox"/> | in | ACCEPT | HTTPS | | +cloud | | +cloud | |
| | | <input checked="" type="checkbox"/> | in | DROP | | | | | | |

MultiCluster Proxmox Dashboard

The screenshot displays the Proxmox VE dashboard with the following sections:

- System Resources:** CPU (2.5%), RAM (45.6%), and DISK (23.0%) usage for the cloud-gis cluster.
- Status:** 3 online node(s), 0 offline node(s).
- Virtual machines:** 6 virtual machine(s) started, 1 virtual machine(s) stopped, 0 template(s).
- LXC Containers:** 18 LXC container(s) started, 1 LXC container(s) stopped.
- Resources Summary:** CPU at 3% (144 CPU(s)), RAM at 46% (169.69 GB / 371.36 GB), and DISK at 25% (24.74 TB / 98.93 TB).
- Nodes Table:**

| Node | ID | IP | CPU | RAM | DISK | UPTIME |
|-------------|----|---------------|------|-------|-------|----------------------|
| cloud-gis00 | 1 | 10.160.149.10 | 4.4% | 14.8% | 7.1% | 40 jour(s) 00:45:58 |
| cloud-gis01 | 2 | 10.160.149.11 | 1.9% | 72.4% | 15.3% | 411 jour(s) 03:05:45 |
| cloud-gis02 | 3 | 10.160.149.12 | 1.4% | 70.4% | 19.3% | 413 jour(s) 02:14:02 |
- Server load:** A line graph showing AVG server load for cloud-gis00, cloud-gis01, and cloud-gis02 over time.
- Activity Log:**

| Start time | End time | Duration | Node | User | Description | Status |
|-------------------|-------------------|----------|-------------|----------|-------------|--------|
| 28/08/24 11:48:08 | 28/08/24 11:48:55 | 00:00:47 | cloud-gis00 | root@pam | Shell | OK |
| 28/08/24 11:45:54 | 28/08/24 11:48:06 | 00:02:12 | cloud-gis00 | root@pam | Shell | OK |
| 28/08/24 11:45:04 | 28/08/24 11:45:49 | 00:00:45 | cloud-gis00 | root@pam | Shell | OK |
| 28/08/24 11:08:12 | 28/08/24 11:52:25 | 00:44:13 | cloud-gis00 | root@pam | Shell | OK |
| 28/08/24 11:07:47 | 28/08/24 11:08:09 | 00:00:22 | cloud-gis00 | root@pam | Shell | OK |

MultiCluster Kubernetes Dashboard

[Kubernetes KubeWall](#)

Proxmox on RaspberryPI 5 / with Win11 ARM inside

Proxmox direct import from VMWare ESXi

<https://www.youtube.com/watch?v=8Z9Zvt2RxIA>

AWS Load Balancer

VPC dashboard × **Subnets (1/2) Info** Last updated 12 minutes ago Actions Create subnet

| Name | Subnet ID | State | VPC | IPv4 CIDR | IPv6 CIDR | Available IPv4 addresses |
|-------------------------------------|--------------------------|-----------|-----------------------|----------------|-------------------------|--------------------------|
| <input checked="" type="checkbox"/> | subnet-0ff8394458cb94e1c | Available | vpc-05adaa844b29dde10 | 172.31.0.0/20 | 2a05:d016:8cd:c9c9::/64 | 4090 |
| <input type="checkbox"/> | my-test-subnet-delete | Available | vpc-05adaa844b29dde10 | 172.31.16.0/24 | - | 250 |

subnet-0ff8394458cb94e1c Details Flow logs Route table Network ACL CIDR reservations Sharing Tags

Details

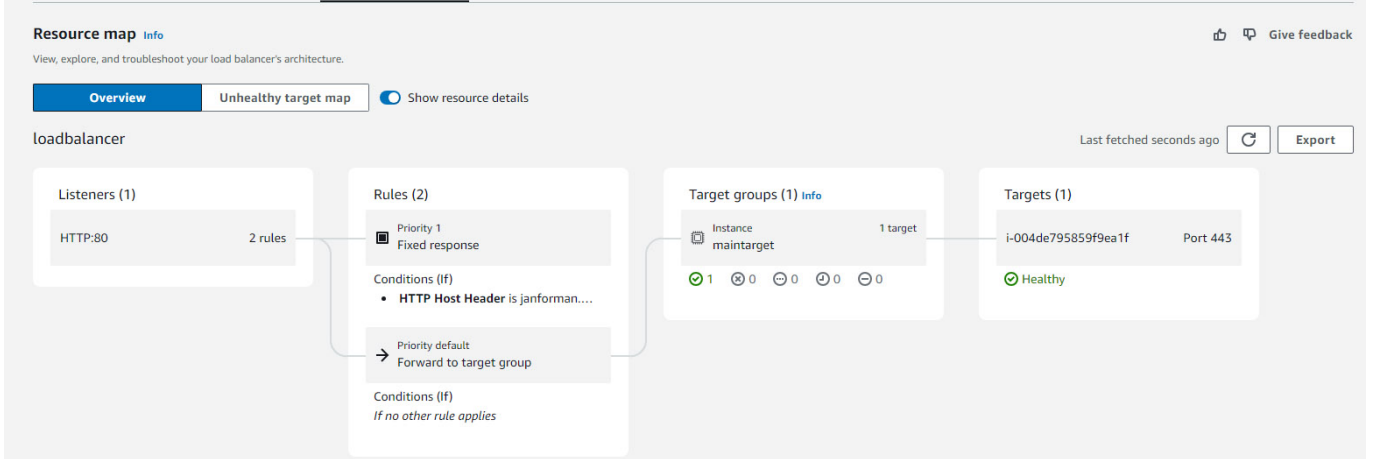
| | | | |
|---------------------------------------|---|--------------------------------------|---|
| Subnet ID subnet-0ff8394458cb94e1c | Subnet ARN arn:aws:ec2:eu-north-1:964348697580:subnet/subnet-0ff8394458cb94e1c | State Available | IPv4 CIDR 172.31.0.0/20 |
| Available IPv4 addresses 4090 | IPv6 CIDR 2a05:d016:8cd:c9c9::/64 | Availability Zone eu-north-1c | Availability Zone ID eun1-az3 |
| Network border group eu-north-1 | VPC vpc-05adaa844b29dde10 | Route table rtb-0d4956eb400df7ae5 | Network ACL acl-0fb585019407f5f5b |
| Default subnet Yes | Auto-assign public IPv4 address Yes | Auto-assign IPv6 address No | Auto-assign customer-owned IPv4 address No |
| Customer-owned IPv4 pool | | IPv4 CIDR reservations | IPv6 CIDR reservations |

loadbalancer Actions

Details

| | | | |
|--|--|---|--|
| Load balancer type Application | Status Active | VPC vpc-05adaa844b29dde10 | IP address type IPv4 |
| Scheme Internet-facing | Hosted zone Z23TAZGLKFMNIO | Availability Zones subnet-0ff8394458cb94e1c eu-north-1c (eun1-az3) subnet-0072d5382bbbf4fa eu-north-1a (eun1-az1) | Date created June 17, 2024, 10:45 (UTC+02:00) |
| Load balancer ARN arn:aws:elasticloadbalancing:eu-north-1:964348697580:loadbalancer/app/loadbalancer/c523f95aa5f7762d | DNS name loadbalancer-873478218.eu-north-1.elb.amazonaws.com (A Record) | | |

[Listeners and rules](#) [Network mapping](#) [Resource map - new](#) [Security](#) [Monitoring](#) [Integrations](#) [Attributes](#) [Tags](#)



EC2 > Target groups > maintarget

maintarget Actions ▾

Details

arn:aws:elasticloadbalancing:eu-north-1:964348697580:targetgroup/maintarget/a1235ec01f739182

| | | | |
|-------------------------|---|---------------------------|--|
| Target type Instance | Protocol : Port HTTPS: 443 | Protocol version HTTP1 | VPC vpc-05adaa844b29dde10 |
| IP address type IPv4 | Load balancer loadbalancer | | |

| | | | | | |
|--------------------|---|---|---|--|---|
| 1 Total targets | ✔ 1 Healthy <hr style="width: 100%;"/> 0 Anomalous | ✘ 0 Unhealthy | ⊖ 0 Unused | ⊖ 0 Initial | ⊖ 0 Draining |
|--------------------|---|---|---|--|---|

► Distribution of targets by Availability Zone (AZ)
Select values in this table to see corresponding filters applied to the Registered targets table below.

Registered targets (1)
Anomaly mitigation: Not applicable
Deregister
Register targets

Target groups route requests to individual registered targets using the protocol and port number specified. Health checks are performed on all registered targets according to the target group's health check settings. Anomaly detection is automatically applied to HTTP/HTTPS target groups with at least 3 healthy targets.

| Instance ID | Name | Port | Zone | Health status | Health status details | Launch... | Anomaly detection result |
|-------------------------------------|------------|------|-------------|---------------|-----------------------|-------------|--------------------------|
| i-004de795859f9ea1f | eu-north-1 | 443 | eu-north-1c | ✔ Healthy | - | November... | ✔ Normal |

AWS S3 (replicated across AZs within location), S3 Express One Zone (faster, cheaper only one zone)

Software stack overview

Sorted by my recommendation

| Openstack | Pros | Cons |
|--|--|---|
| | OpenSource, cost-effective | Hard to setup |
| | Modular design | Modular design |
| | Ultimate solution for very large clouds | Higher maintenance costs |
| NASA Hybrid Cloud Amazon AWS and OpenStack, SEZNAM.cz | | |
| AT&T runs its mobile core network on an OpenStack cloud, serving millions of subscribers. | | |
| China Mobile, one of the world's largest telecom providers, is building the biggest NFV network based on OpenStack with over 50,000 servers. | | |
| OpenStack is more alive than ever with 40 million cores in production and over 300 public cloud data centers worldwide. | | |
| Proxmox | Pros | Cons |
| | OpenSource, cost-effective | Scalability issues for very large environments |
| | Easy to setup | approx. 32 servers in group more needs MultiCluster manager |
| | Multiple HV KVM, LXC | Limited enterprise support |
| | LXC is very lightweight | Upgrade on OS level |
| | Integrated SD storage, SD firewall (like AWS sg) | |
| | CEPH and ZFS implemented, IPAM support | |
| | Can consume CEPH from a dedicated cluster | |
| | Open vSwitch alternative to vSphere Distributed Switch | |
| | SDN Network alternative to NSX-T Data Center | |
| OpenNebula | Pros | Cons |
| | Multiple HV KVM, LXC, vCenter | |
| | Kubernetes included | |
| Nutanix AHV | Pros | Cons |
| | Kubernetes Support | Vendor-lock-in (Closed opensource products) |
| | Integrated storage and networking solutions | Messy Architecture |
| | Rocky Linux, Cassandra | No external storage support |
| Microsoft Hyper-V | Pros | Cons |

| Openstack | Pros | Cons |
|-----------|---------------|-----------------------------|
| | Easy to setup | Cost, limited functionality |
| | | Additional licensing costs! |
| | | Vendor-lock-in |
| VMWare | Pros | Cons |
| | Easy to setup | Higher cost |
| | | Additional licensing costs! |
| | | Vendor-lock-in |

| CEPH | Pros | Cons |
|--|--|-----------------------------|
| | No single point of failure | Complex |
| | Data durability via replication or erasure coding | minimum 8nodes+ recommended |
| | No interruption of service from rolling upgrades, online expansion, etc. | QoS on pool |
| | A single cluster can serve object, block, and file | |
| | Compatibility with Openstack, S3, K8s, Proxmox | |
| Notable known references | | |
| Approx 3500 clusters worldwide with more than 1.5EB capacity | | |
| CERN storage services and its support of experiments, 37000 users 5100 projects in data centers. | | |
| SAMSUNG | CHINA MOBILE | DigitalOcean |
| My experience from 7.3.2018 in production 18TB MLC AllFlash | | |

Competitors [Dell Isilon](#) [Dell Powerflex](#)

You may connect storage nodes with one network card and compute nodes with two (in LACP mode)

Openstack

The screenshot shows the OpenStack dashboard interface. At the top, there is a navigation bar with the OpenStack logo, the user's email 'janforman.com', and the role 'admin'. Below the navigation bar, a sidebar on the left lists various project components: Project, API Access (highlighted), Compute, Volumes, Container Infra, Network, Admin, and Identity. The main content area is titled 'API Access' and shows a list of service endpoints. At the top right of this area, there are buttons for 'View Credentials' and 'Download OpenStack RC File'. The list of endpoints is as follows:

| Service | Service Endpoint |
|-----------|--|
| Compute | http://10.20.21.12:80/openstack-nova/v2.1 |
| Identity | http://10.20.21.12/openstack-keystone/v3 |
| Image | http://10.20.21.12:80/openstack-glance |
| Network | http://10.20.21.12:80/openstack-neutron |
| Placement | http://10.20.21.12:80/openstack-placement |
| Volumev2 | http://10.20.21.12:80/openstack-cinder/v2/9cca5b7c2ba3428e95d3e71da229a71b |
| Volumev3 | http://10.20.21.12:80/openstack-cinder/v3/9cca5b7c2ba3428e95d3e71da229a71b |

Below the list, it indicates 'Zobrazeno 7 položek' (Showing 7 items).

Spustit instanci



Podrobnosti

Typy určují velikost výpočetních, pamětních a úložných možností instance.

Zdroj

Přiděleno

Zobrazena 1 položka

Typ

| Název | VCPUS | RAM | Celková kapacita disku | Systémový disk | Efemérní disk | Veřejné |
|-------------|-------|------|------------------------|----------------|---------------|---------|
| > t4g.small | 2 | 8 MB | 8 GB | 0 GB | 8 GB | Ano |

Zobrazena 1 položka

Sítě

Síťové porty

Bezpečnostní skupiny

Key Pair

▼ Dostupné 4

Vyberte jeden

Konfigurace

Skupiny serverů

Zobrazeny 4 položky

Plánovač pokynů

| Název | VCPUS | RAM | Celková kapacita disku | Systémový disk | Efemérní disk | Veřejné |
|-------------|-------|--------|------------------------|----------------|---------------|---------|
| > m1.tiny | 1 | 512 MB | 4 GB | 4 GB | 0 GB | Ano |
| > m1.small | 1 | 2 GB | 30 GB | 30 GB | 0 GB | Ano |
| > m1.medium | 2 | 4 GB | 60 GB | 60 GB | 0 GB | Ano |
| > m1.large | 4 | 8 GB | 90 GB | 90 GB | 0 GB | Ano |

Zobrazeny 4 položky

Metadata

✕ Zrušit

< Zpět

Další >

Spustit instanci

Vytvořit obraz



Detaily obrazu *

Detaily obrazu

Zadejte obraz pro nahrání do Služby obrazů.

Název obrazu

windows xp

Popis obrazu

Zdroj obrazu

Soubor *

Vybrat soubor WinXPSP3-VE-052011.iso

Formátovat *

- ISO - obraz optického disku
- PLOOP - Virtuozzo/Parallels Loopback Disk
- QCOW2 - emulátor QEMU
- Raw
- VDI - obraz virtuálního disku
- VHD - virtuální pevný disk
- VMDK - disk virtuálního stroje
- AKI - obraz kernelu Amazon**
- AMI - obraz stroje Amazon
- ARI - obraz Ramdisku Amazon

Viditelnost

Privátní Sdíleno Community Veřejné

Ramdisk

Zvolit obraz

Minimální kapacita disku (GB)

0

Minimum RAM (MB)

0

Chráněno

Ano Ne

Zrušit < Zpět Další > Vytvořit obraz

- Project
- API Access
- Compute
- Overview
- Instances
- Images
- Key Pairs**
- Server Groups
- Volumes
- Container Infra
- Network
- Admin
- Identity

Project / Compute / Key Pairs

Key Pairs

Click here for filters or full text search. + Vytvořit klíč Import Public Key Delete Key Pairs

Zobrazena 1 položka

| <input type="checkbox"/> | Název ^ | Typ | |
|--------------------------|--------------|-----|-----------------|
| <input type="checkbox"/> | eu-plz-cloud | ssh | Delete Key Pair |

Zobrazena 1 položka

openstack. janforman.com • admin admin

Project / Volumes / Volumes

Volumes

Filter + Create Volume ⇌ Accept Transfer 🗑 Delete Volumes

Zobrazena 1 položka

| <input type="checkbox"/> | Name | Description | Size | Status | Group | Type | Attached To | Availability Zone | Bootable | Encrypted | Actions |
|--------------------------|----------------|-------------|------|--------|-------|----------|-------------|-------------------|----------|-----------|----------------------------|
| <input type="checkbox"/> | elastic volume | - | 8GiB | - | - | ebs-1000 | nova | nova | No | No | Delete Volume |

Project: Project
API Access: API Access
Compute: Compute
Volumes: Volumes
Snapshots: Zobrazena 1 položka
Groups: Groups
Group Snapshots: Group Snapshots
Container Infra: Zobrazena 1 položka
Network: Network
Admin: Admin
Identity: Identity

MINIO S3 service for small networks

MINIO
OBJECT STORE
ADFL LICENSE

User

- Object Browser
- Access Keys
- Documentation

Administrator

- Buckets
- Policies
- Identity
- Monitoring
- Metrics**
- Logs
- Audit
- Events
- Configuration
- License

Metrics

Info Usage Traffic Resources

Server Information

Buckets

2

Browse →

Objects

39

Reported Usage

4 GiB

- Time since last Heal Activity: n/a
- Time since last Scan Activity: n/a
- Uptime: n/a

Servers

3

● Online ● Offline

Drives

3

● Online ● Offline

Backend type: Erasure ✓

Standard storage class parity: 1 ✓

Reduced redundancy storage class parity: 1 ✓

Servers (3)

| | | | | |
|-----------------------------|-------|-------|------------|---------------------------------|
| minio1.janforman.com:9000 ● | 1/1 ● | 3/3 ● | 30 minutes | Version: 2025-04-22T22:12:26Z ▼ |
| minio2.janforman.com:9000 ● | 1/1 ● | 3/3 ● | 4 minutes | Version: 2025-04-22T22:12:26Z ▼ |
| minio3.janforman.com:9000 ● | 1/1 ● | 3/3 ● | 1 hour | Version: 2025-04-22T22:12:26Z ▼ |

CEPH 3node 10gbit performance (KVM-VirtIO)

3 servers with 3xSSD (9 OSD)

| Block Size | 4k | (IOPS) | 64k | (IOPS) |
|------------|-------------|---------|-------------|--------|
| ----- | --- | ---- | ---- | ---- |
| Read | 49.45 MB/s | (12.3k) | 220.80 MB/s | (3.4k) |
| Write | 49.54 MB/s | (12.3k) | 221.96 MB/s | (3.4k) |
| Total | 98.99 MB/s | (24.7k) | 442.76 MB/s | (6.9k) |
| Block Size | 512k | (IOPS) | 1m | (IOPS) |
| ----- | --- | ---- | ---- | ---- |
| Read | 597.15 MB/s | (1.1k) | 663.25 MB/s | (647) |
| Write | 628.88 MB/s | (1.2k) | 707.43 MB/s | (690) |
| Total | 1.22 GB/s | (2.3k) | 1.37 GB/s | (1.3k) |

CEPH Performance Proxmox

<https://www.proxmox.com/images/download/pve/docs/Proxmox-VE-Ceph-Benchmark-202312-rev0.pdf>

<https://cilium.io>

From:
<https://wiki.janforman.com/> - **wiki.janforman.com**

Permanent link:
<https://wiki.janforman.com/microcloud>

Last update: **2026/01/21 10:12**

