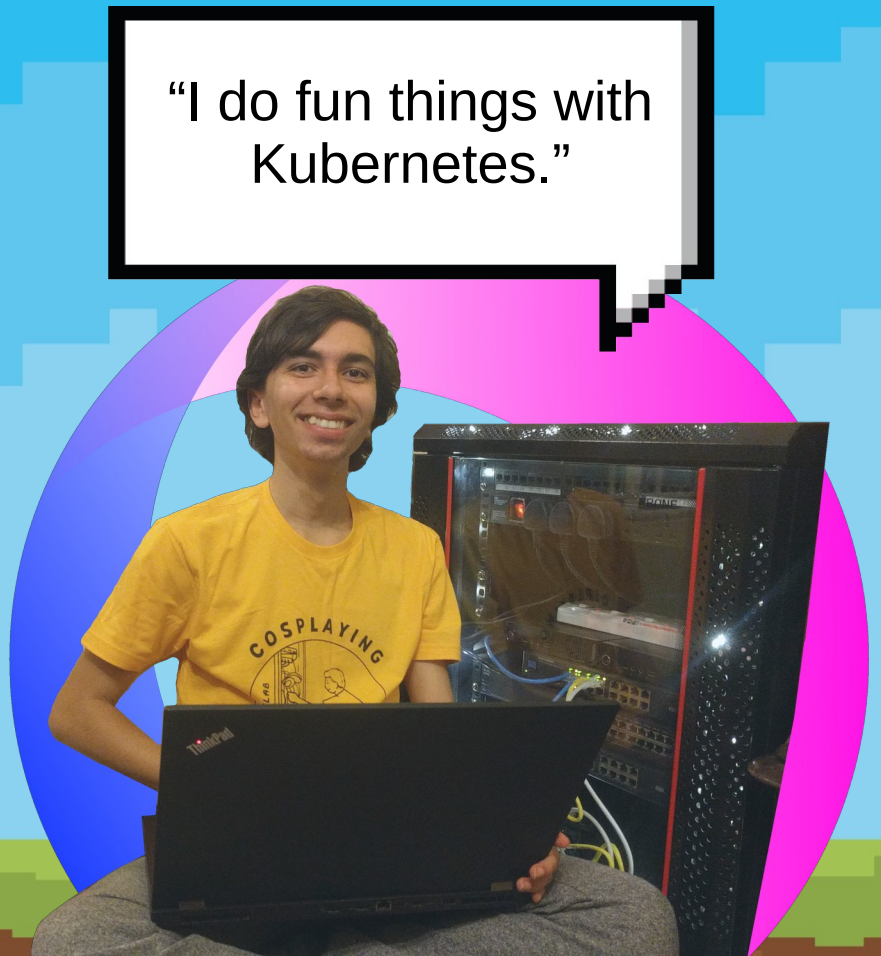
# Virtualisation with Harvester & Longhorn

By Alex Bissessur

alex.yaml

```yaml
---
apiVersion: v1
kind: Person
metadata:
 name: Alex Bissessur
spec:
  work:
    company: La Sentinelle
    role: Kubernetes Person
    location: Mauritius
  contact:
    website: alexbissessur.dev
    mastodon: moris.social/@AlexB
    github: github.com/xelab04
  interests:
    - Kubernetes
    - Linux
    - Free & Open Source Software
  hobbies:
    - Playing kubectl with Homelab
```



# Containerisation is the future

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But what about my legacy Vms?

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Run VMs the Cloud Native way

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But what about my legacy Vms?

Run VMs the Cloud Native way

How? Why? Are you insane?

# “I Like My Virtualisation Stack”

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- No, no you don’t.
  (you just don’t want to change)

# “I Like My Virtualisation Stack”

- No, no you don’t.
- Does Management like the cost?
  *someone* added an extra zero to the price, overnight
- How easy is your exit plan?
- Is it Open Source? (digital sovereignty)

# What is Harvester?

# What is Harvester?

- It is a platform for hyperconverged infrastructure.
- It is a collection of open source software.
- It is your “cloud on-prem solution”

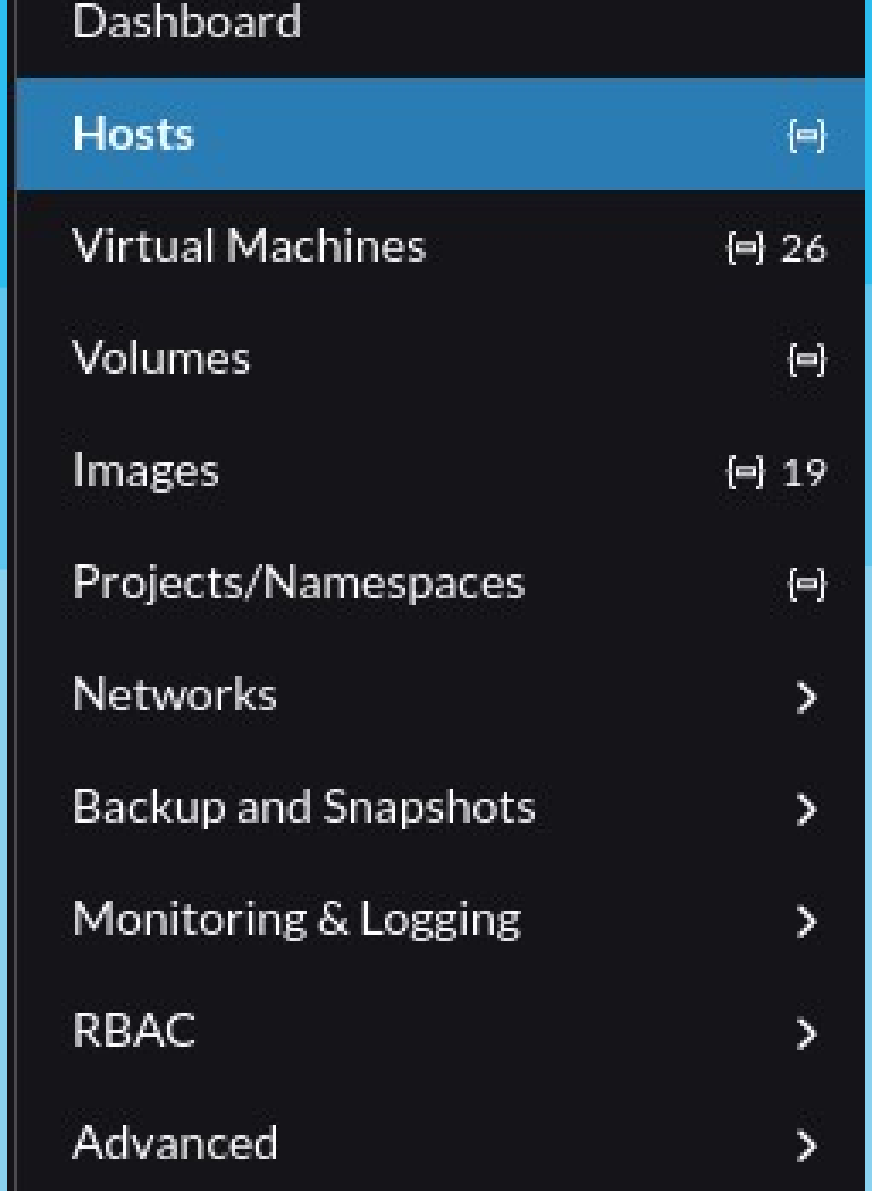
# Hyperconverged What?

- **H**yper**C**onverged **I**nfrastructure (HCI) means everything infra is under one roof.

- Infrastructure is:
  - compute
  - storage
  - network

# Why is That Good?

- From one interface, manage everything compute, networking, and storage.
- Specialise in one technology rather than 3 different tech stacks (from different vendors)
- Tighter integration of the 3 components


Dashboard
Hosts
Virtual Machines 26
Volumes
Images 19
Projects/Namespaces
Networks
Backup and Snapshots
Monitoring & Logging
RBAC
Advanced

# So What **is** Harvester?

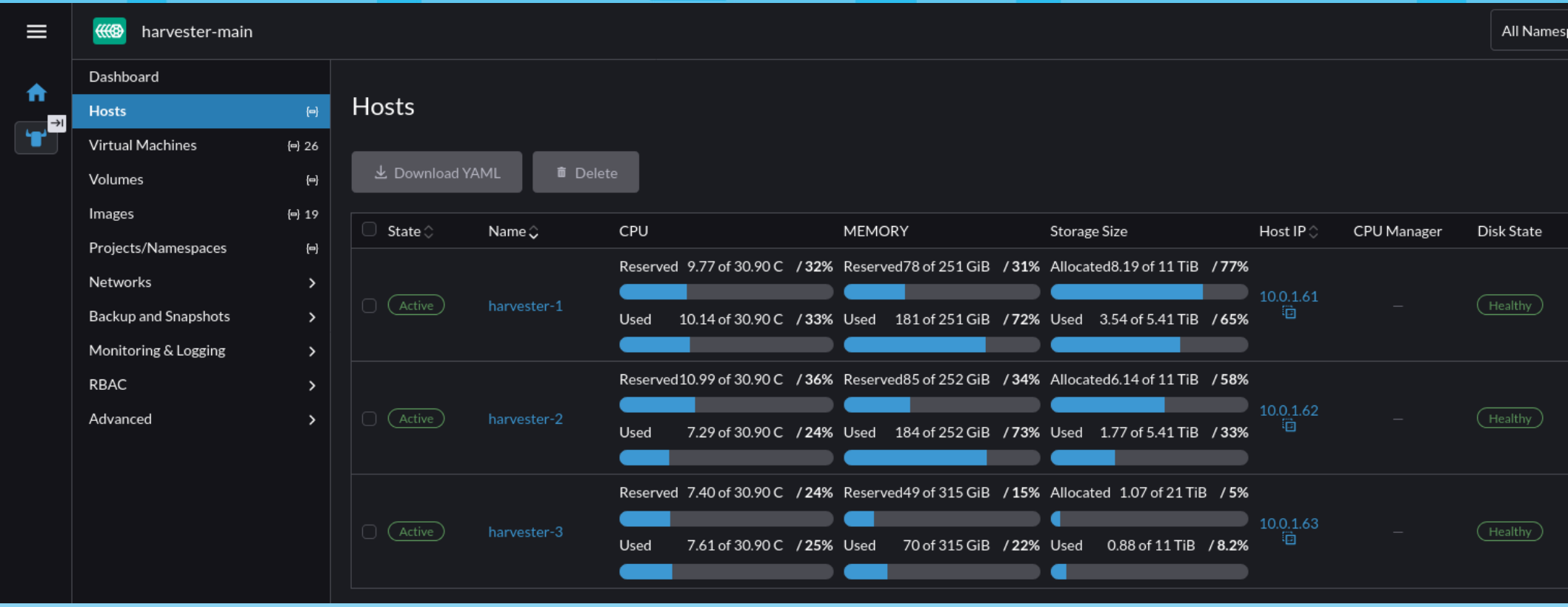
Under the hood, Harvester is made up of:

- rke2 – rancher kubernetes engine
- Longhorn – distributed block storage
- Kubevirt – VMs on top of Kubernetes
- Prometheus + Grafana – monitoring & alerts
- Rancher – the UI unifying management of all the parts

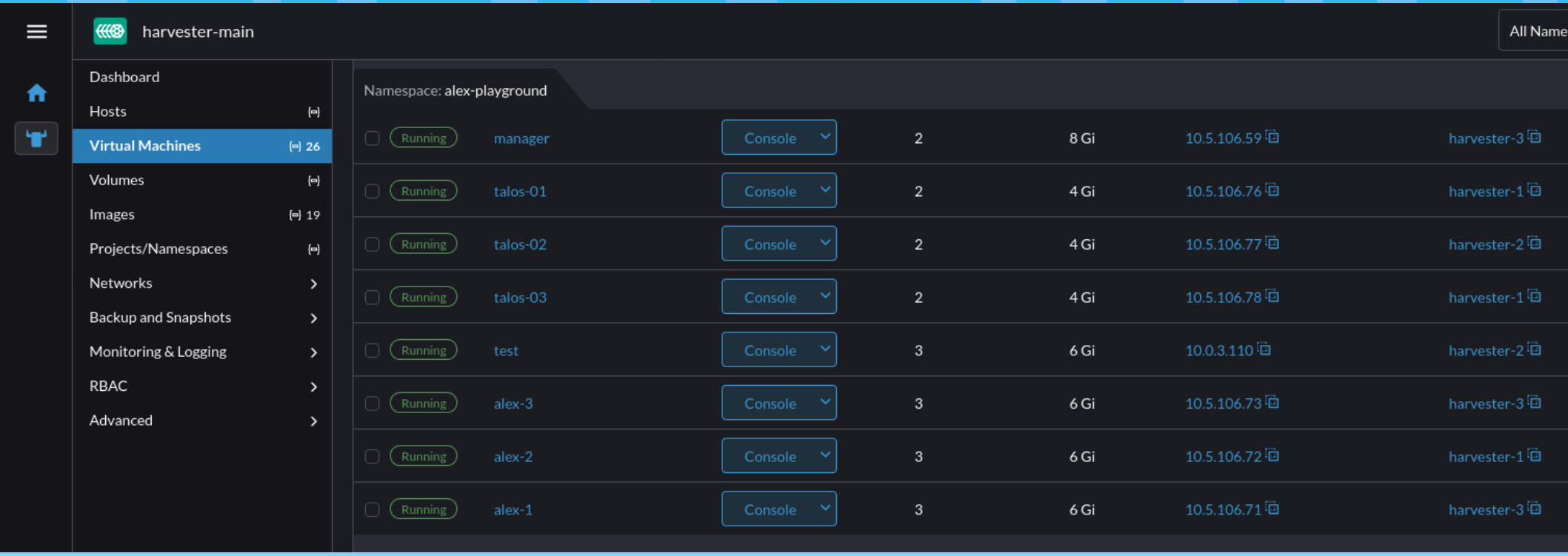
# Compute

- Harvester is built on top of Kubernetes (rke2)
- Harvester is meant to be clustered (eg 3 servers)
  - allows seamless failover in case of server failure
- VMs run through Kubevirt
- Possibility to run containers in parallel
  - past and future of infra in one platform

# Harvester Nodes



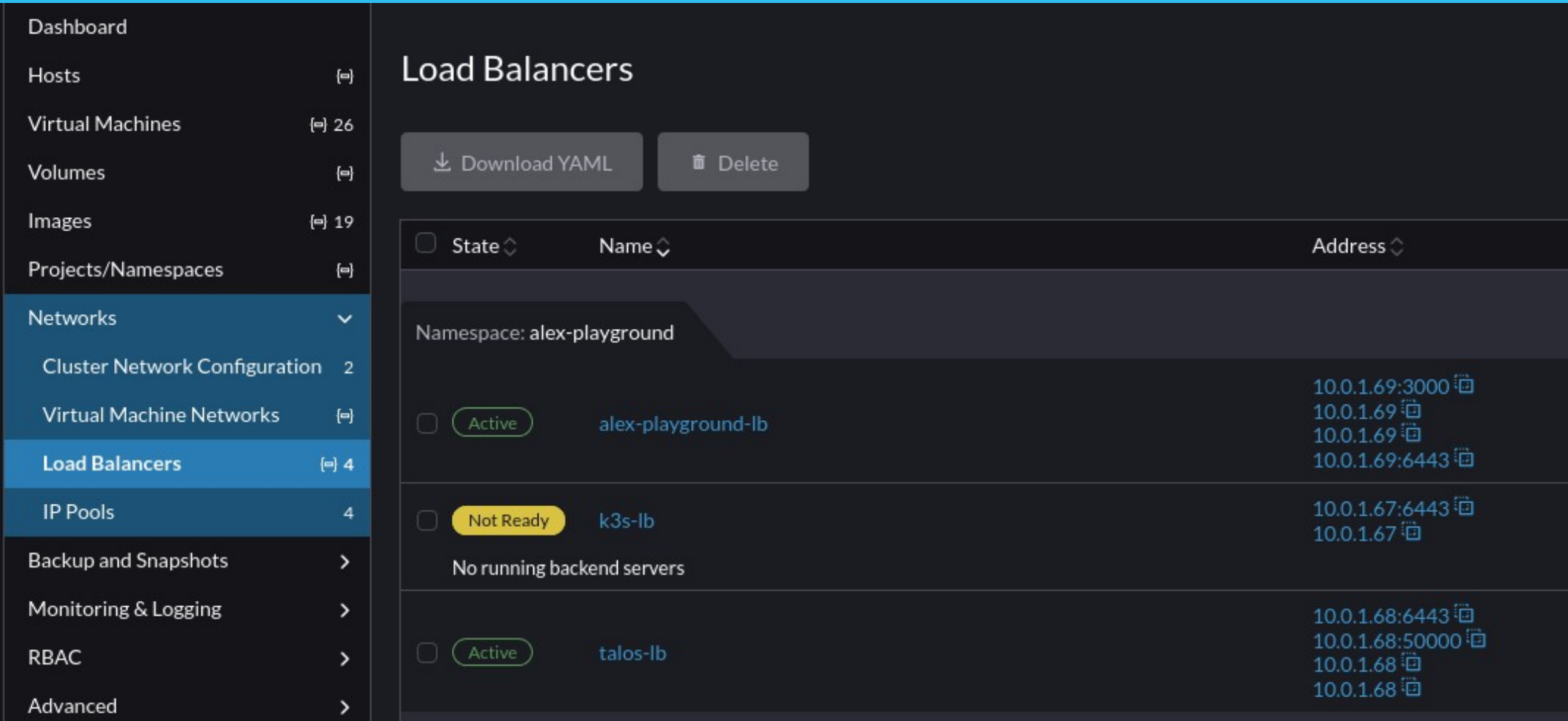
# VMs


harvester-main
All Name
Dashboard
Hosts
Virtual Machines 26
Volumes
Images 19
Projects/Namespaces
Networks
Backup and Snapshots
Monitoring & Logging
RBAC
Advanced
Namespace: alex-playground
Running manager Console 2 8 Gi 10.5.106.59 harvester-3
Running talos-01 Console 2 4 Gi 10.5.106.76 harvester-1
Running talos-02 Console 2 4 Gi 10.5.106.77 harvester-2
Running talos-03 Console 2 4 Gi 10.5.106.78 harvester-1
Running test Console 3 6 Gi 10.0.3.110 harvester-2
Running alex-3 Console 3 6 Gi 10.5.106.73 harvester-3
Running alex-2 Console 3 6 Gi 10.5.106.72 harvester-1
Running alex-1 Console 3 6 Gi 10.5.106.71 harvester-3

# Networking

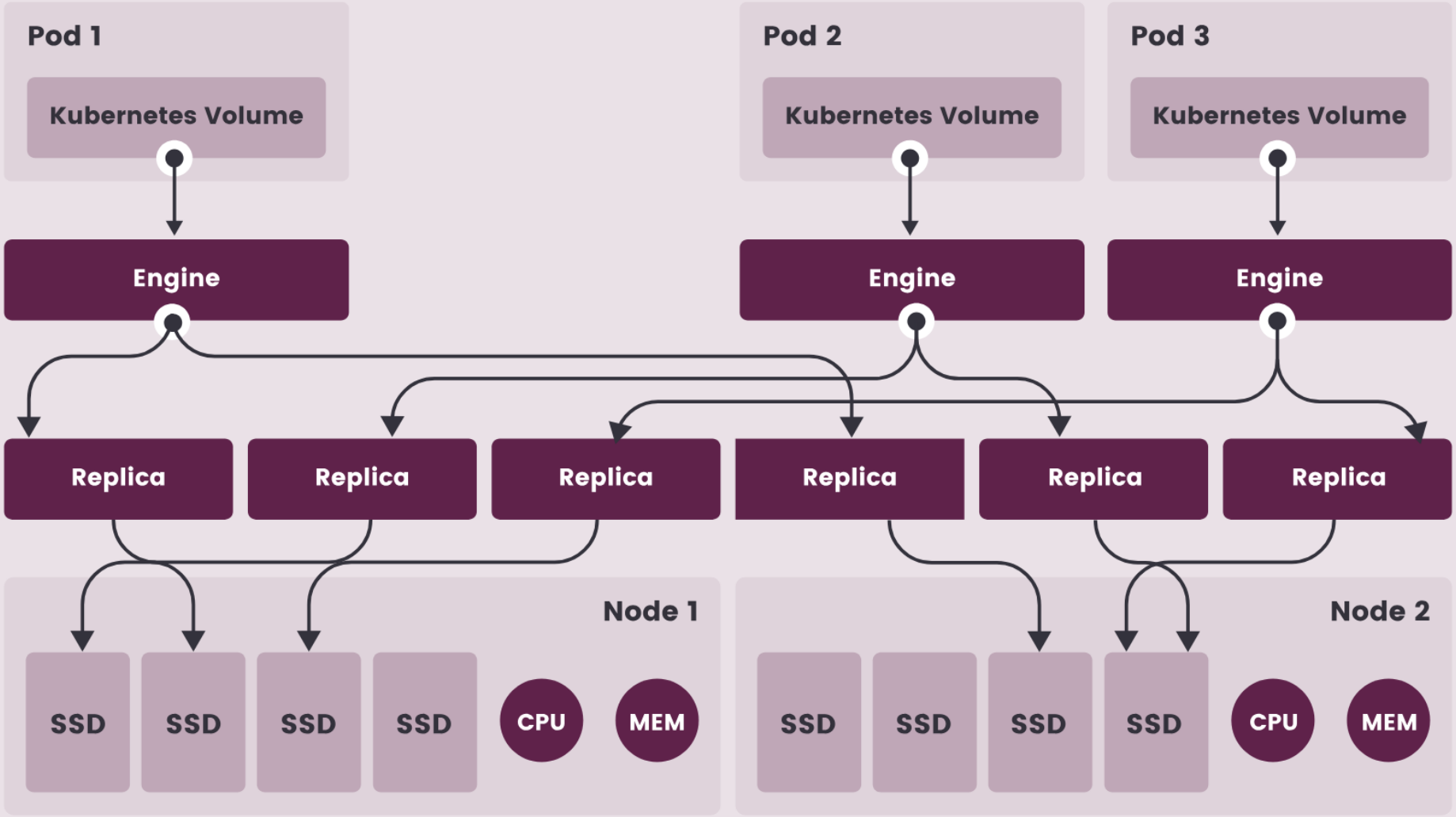
- Create networks within Harvester for different VMs to use
- Integrate VLANs with Harvester
- Use physical network for different VMs
  ex: reserve one ethernet port for a certain set of VMs
  also use different networks for storage traffic

# Networking

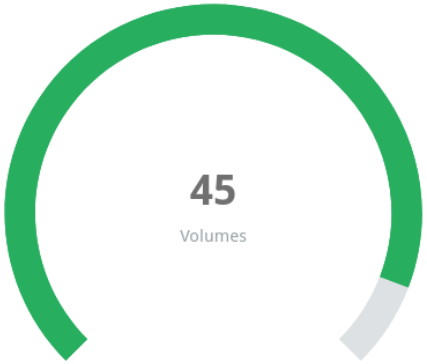

Dashboard
Hosts
Virtual Machines 26
Volumes
Images 19
Projects/Namespaces
Networks
Cluster Network Configuration 2
Virtual Machine Networks
Load Balancers 4
IP Pools 4
Backup and Snapshots
Monitoring & Logging
RBAC
Advanced
Load Balancers
Download YAML
Delete
State
Name
Address
Namespace: alex-playground
Active
alex-playground-lb
10.0.1.69:3000
10.0.1.69
10.0.1.69
10.0.1.69:6443
Not Ready
k3s-lb
10.0.1.67:6443
10.0.1.67
No running backend servers
Active
talos-lb
10.0.1.68:6443
10.0.1.68:50000
10.0.1.68
10.0.1.68

# Storage/Longhorn

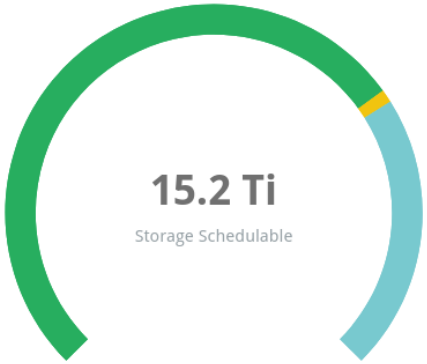
- Harvester uses Longhorn, a CNCF *incubating* project for storage
- Longhorn is an open source, cloud-native, persistent block storage solution
- Data is replicated across nodes' disks for redundancy and high availability


Pod 1
Kubernetes Volume
Pod 2
Kubernetes Volume
Pod 3
Kubernetes Volume
Engine
Engine
Engine
Replica
Replica
Replica
Replica
Replica
Replica
Node 1
SSD
SSD
SSD
SSD
CPU
MEM
Node 2
SSD
SSD
SSD
SSD
CPU
MEM

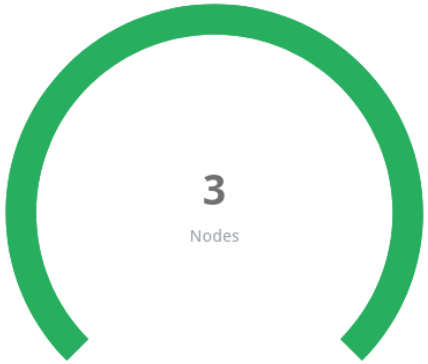
# Dashboard




| | |
|---|---|
| Healthy | 41 |
| Degraded | 0 |
| In Progress | 0 |
| Fault | 0 |
| Detached | 4 |
| Total | 45 |




| | |
|---|---|
| Schedulable | 15.2 Ti |
| Reserved | 300 Gi |
| Used | 6.2 Ti |
| Disabled | 0 Bi |
| Total | 21.7 Ti |




| | |
|---|---|
| Schedulable | 3 |
| Unschedulable | 0 |
| Down | 0 |
| Disabled | 0 |
| Total | 3 |

## Event Log

| Last Seen | First Seen | Count | Name | Kind | Type | Reason | Source | Message |
|---|---|---|---|---|---|---|---|---|
| | | | backing-image- | | | | longhorn-backing-image-manager- | Deleted backing image |

## Volume Details

State: Attached
Health: Healthy
Ready for workload: Ready
Conditions: Restore Scheduled TooManySnapshots
Frontend: Block Device
Data Engine: v1
Attached Node & Endpoint:
harvester-2
/dev/longhorn/pvc-19ccf922-d878-4efd-8831-2089a5464fde
Size: 25 Gi
Actual Size: 413 Mi

## Replicas

2089a5464fde-r-19d887a0
Healthy

harvester-2
Node
instance-manager-90a34bf76cd5cac3fd28a9d2f3aa3cd9
/var/lib/harvester/defaultdisk
Running

2089a5464fde-r-f6be10ae
Healthy

harvester-1
Node
instance-manager-b6cd77f73ef001339edbfea87ef1a3a8
/var/lib/harvester/defaultdisk
Running

## Snapshots and Backups

Take Snapshot | Create Backup

Show System Hidden:

snapshot 2 months ago
snapshot 2 months ago
f18905d0 2 months ago
snapshot 2 days ago
snapshot 20 hours ago
snapshot 20 hours ago
Volume Head

# Thank You!

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