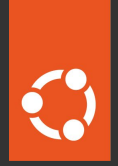

MicroCeph: Get Ceph Up and Running in Minutes

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Why MicroCeph

1. Deploying and operating a Ceph cluster is complex
    a. Multiple nodes, distributed components and configurations
    b. Complex bootstrapping procedure
    c. Complex operation
2. Hardware requirements non-trivial,
    a. I can't just install a package on my laptop and be done
3. Operational complexity impacts Ceph adoption among users
    a. Impacts use of Ceph for focused (but smaller) use-cases

What Is MicroCeph

- Single package Ceph cluster
  - All in one package
  - 4 commands to get a functional cluster
  - Only one node and one disk required

```
# A functional ceph install for testing and labs

sudo snap install microceph            # install package
sudo microceph cluster bootstrap       # bootstrap initial node
sudo microceph disk add loop,4G,3      # add simulated drives
sudo ceph -s                           # verify status
```

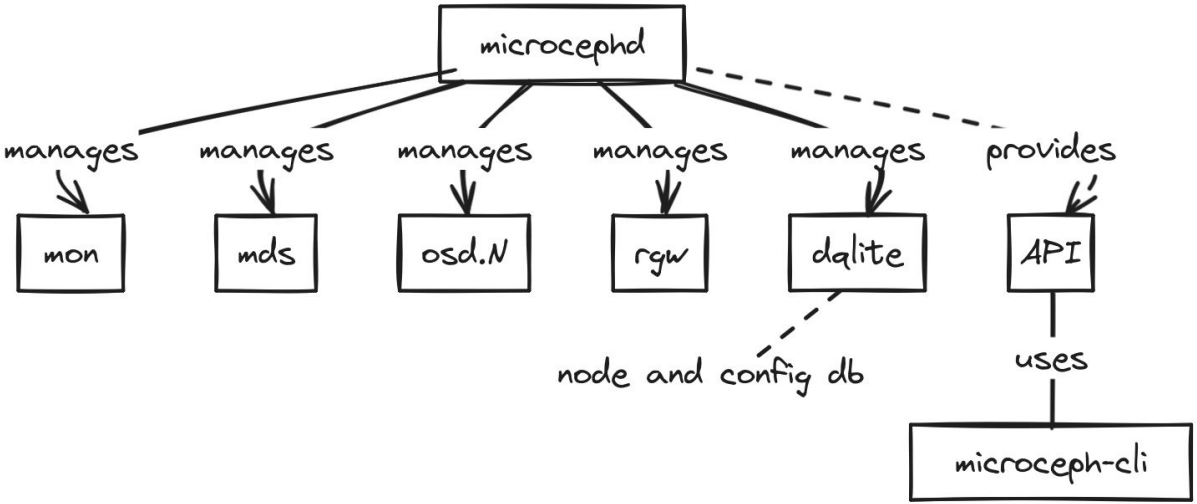
MicroCeph: Snap Package

Snap package format

- Isolation: puts all userland in a single package
  - just need kernel and network / block devices
  - consistent environment across operating systems
- Access to host system is confined for safety / security / robustness
- Standardized risk levels: edge, candidate, stable
- Easy to build, easy to distribute

MicroCeph Arch

- Service management daemon
  - Cluster database (dqlite)
  - Ceph daemons
- CLI talks to service management via API
- Built from standard Ubuntu Ceph .deb LTS packages



MicroCeph Internals: Service API

- Service management daemon exposes API
- All interaction via API
  - Enable/disable/migrate services
  - Query block dev info
  - Add/remove disks
  - Add/remove nodes
  - Change config
  - etc...
- Useful for integration
- CLI is just another API client

MicroCeph Internals

- MicroCeph is built on top of the MicroCluster library
- MicroCluster provides
  - Dqlite: distributed database (RAFT)
  - Cluster membership
  - API framework
- Written in Go

MicroCeph: Scalability, Performance

- MicroCeph scales down: single node, single disk
- Automatic failure domain rules
  - Manages CRUSH rules to adapt from single-node (OSD-level) to multi-node (host-level) failure domains as clusters grow (or shrink back)
  - -> single node clusters work ootb, and as you scale up you get added safety automatically
- Larger failure domains available via custom CRUSH rules
  - MicroCeph doesn't have a concept of racks or rooms
  - but won't interfere with CRUSH rules that implement wider failure domains
- MicroCeph scale up: primarily bound by RAFT (dqlite)
- Performance: same as Cephs, we're not sitting in the data path for any Ceph operations

MicroCeph: Integrations

- Cloud projects that integrate MicroCeph
  - Sunbeam (OpenStack on K8s)
  - MicroK8s
  - MicroCloud / LXD
- Juju integration: charm-microceph available to integrate into Juju clouds (beta)
- CI integration: microceph-action provides S3 for CI

MicroCeph: Demos

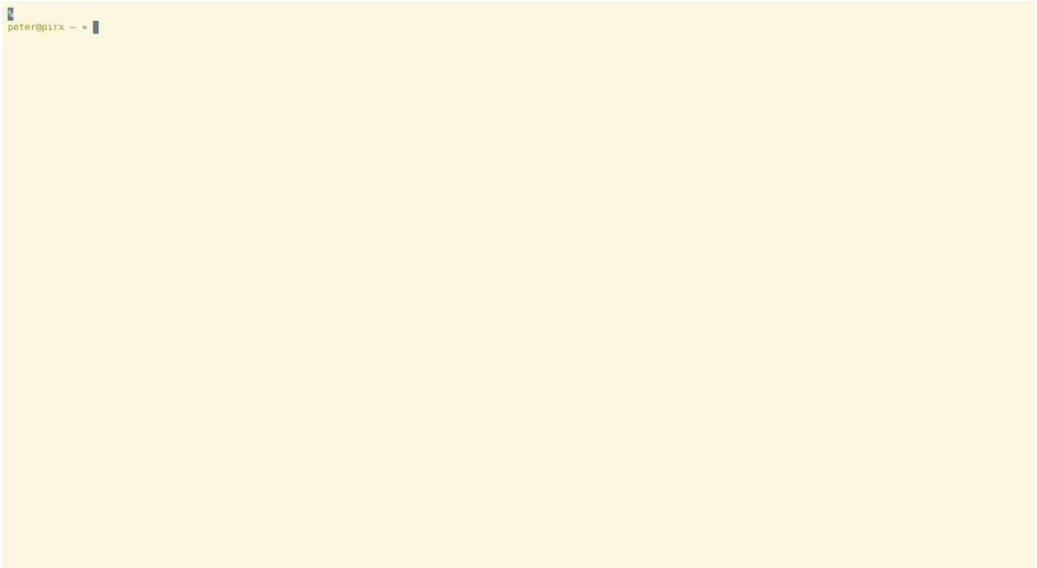
Single Node with RGW
https://asciinema.org/a/634408

(Demos are at 1.5x speed, 1s max idle to save time)

MicroCeph: Demos

Scaling up
https://asciinema.org/a/635478

- Choose risk level
- Add nodes
- Auto-add block devices
- Enable 2nd RGW
- Use encrypted OSD
- Remove OSDs
- Block refreshes



MicroCeph: Whats Next

- Auto-Clustering via mDNS
- Built-in RGW loadbalancing and HA
- RBD mirroring support

Thank you! Questions?

MicroCeph: Resources

- Source: https://github.com/canonical/microceph
- Docs: https://canonical-microceph.readthedocs-hosted.com/en/reef-stable/
- Talk to us: https://matrix.to/#/#ubuntu-ceph:matrix.org
- Juju charm: https://github.com/canonical/charm-microceph
- MicroStack: https://microstack.run
- MicroCeph GH action: https://github.com/phvalguima/microceph-action