Tips and Tricks for Managing and Administering Ceph Clusters

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Quick background on me

Introduction:

- Working in data storage for over 15 years
- Specifically on Ceph for 5+ years
- Presented at Cephalocon and Red Hat Summit for multiple years.
- Have co-authored two books on deploying and managing Ceph clusters
- Current position is Support Product Lead for Ceph in the Product Experience Team at Red Hat
What are we going to be talking about

Prerequisites:

- A want to know more about Ceph!
- No deep Ceph knowledge required

Agenda:

- Will cover the Octopus release of Ceph
  - Current stable release is Octopus (15.2.7)
- An overview Cephadm, and usage basics
- A glance of our new embedded Ceph Dashboard

Note:

Will not be discussing Rook Ceph, or the Ceph Operator for Kubernetes

Upstream Code:
- https://github.com/ceph/ceph
What is Cephadm?

- Introduced in Ceph Octopus (v15.2.0).
- New orchestration API intended to become preferred installation and management tool for Ceph.
- Intended to replace Ansible, Puppet and other tools.
- Remove the dependency of understanding external tools in order to deploy Ceph.
- Centralizes configuration information enabling advanced management functionality.
- Intended to be future of installation and management for “bare-metal” Ceph deployments. We will use Rook Ceph for Kubernetes environments.
What’s the goal here?

- Focus on solving the core problem of making Ceph easier to install.
- Deployment of all components inside containers
- Inside containers limits OS dependencies
- Integrate with the orchestrator API
- No further dependency on external management tools
- Ability to isolate Ceph clusters on same hardware from each other
- Automate the upgrade process
- Allow migration from legacy deployment tools
It's really that simple!
All starts from a single host!

**Prerequisite:** Ensure the following dependencies are met: python3, lvm2, podman, systemd, ntp.

**Step 1** - Fetch the most recent version of the script
```bash
# curl --silent --remote-name --location https://github.com/ceph/ceph/raw/octopus/src/cephadm/cephadm
```

**Step 2 (optional)** - Install cephadm binary on the host
```bash
# ./cephadm install
```

**Step 3** - Bootstrap your first node
```bash
# cephadm bootstrap --mon-ip <monitor_ip> --allow-fqdn-hostname
```

**Step 4 (prerequisite)** - Copy the clusters public key over to additional nodes
```bash
# ssh-copy-id -f -i /etc/ceph/ceph.pub root@ceph7
```

**Step 5** - Add the new host(s) to ceph orchestrator
```bash
# ceph orch host add ceph6.cce.lab.eng.rdu2.redhat.com
```

**Step 6** - Allow the orchestrator to discover and deploy your devices
```bash
# ceph orch apply osd --all-available-devices
```
How Cephadm works?

Deploys and manages Ceph cluster using SSH connections to interact with hosts. Services are deployed using container images from Docker Hub.
Want More on Cephadm!

- https://docs.ceph.com/en/latest/cephadm/
- https://docs.ceph.com/en/latest/cephadm/install/
- https://ceph.io/ceph-management/introducing-cephadm/
What is the Ceph Dashboard?

- A built-in web based management and monitoring application that is part of the Open Source Ceph distribution.
- Originally shipped with Ceph Luminous and has vastly improved since.
- Goal was to make day to day management (and life!) easier for Ceph Administrators.
How Does it Work?

- Requires a running Ceph Octopus cluster.
- Supported and tested on Chrome and Firefox browsers
- Enabled via a ceph-mgr module (Dashboard) and is derived from the openATTIC Ceph Management and Monitoring Tool.
- Utilizes other ceph-mgr modules for collection and reporting.
- Provides a graphical representation of statistics and cluster information through a web server hosted by the ceph-mgr
- Manages and reports on Ceph clients in the cluster
- Configurable alerting system
- If deploying the cluster via Cephadm, by default the Dashboard is configured and enabled.

Check Out:
https://docs.ceph.com/en/latest/mgr/dashboard/
Ceph Dashboard

Hosts Overall Performance View

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Hosts</th>
<th>Overall Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSD</td>
<td>3</td>
<td>0.48%</td>
</tr>
<tr>
<td>AVG CPU Busy</td>
<td>5.59%</td>
<td>44</td>
</tr>
<tr>
<td>AVG RAM Utilization</td>
<td>0%</td>
<td>1 MiB</td>
</tr>
<tr>
<td>Physical IOPS</td>
<td>1.3 MBs</td>
<td>Network Load - Top 10 Hosts</td>
</tr>
<tr>
<td>AVG Disk Utilization</td>
<td>1.0 MBs</td>
<td>Network Load - Top 10 Hosts</td>
</tr>
</tbody>
</table>

CPU Busy - Top 10 Hosts

Network Load - Top 10 Hosts
Ceph Dashboard

Host Drilled Down
Pool Performance Stats

Top 15 Client IOPS by Pool

Top 15 Client Throughput by Pool

Top 15 Pools by Client IOPS

<table>
<thead>
<tr>
<th>Pool Name</th>
<th>Pool ID</th>
<th>IOPS (RW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>test_zone.rgw.buckets.non-ec</td>
<td>9.00</td>
<td>1</td>
</tr>
<tr>
<td>test_zone.rgw.buckets.data</td>
<td>8.00</td>
<td>1</td>
</tr>
<tr>
<td>test_zone.rgw.buckets.index</td>
<td>7.00</td>
<td>1</td>
</tr>
<tr>
<td>test</td>
<td>6.00</td>
<td>1</td>
</tr>
<tr>
<td>test_zone.rgw.meta</td>
<td>5.00</td>
<td>1</td>
</tr>
</tbody>
</table>

Top 15 Pools by Throughput

<table>
<thead>
<tr>
<th>Pool Name</th>
<th>Pool ID</th>
<th>Throughput</th>
</tr>
</thead>
<tbody>
<tr>
<td>test_zone.rgw.buckets.non-ec</td>
<td>9.00</td>
<td>1.00 B</td>
</tr>
<tr>
<td>test_zone.rgw.buckets.data</td>
<td>8.00</td>
<td>1.00 B</td>
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<td>1.00 B</td>
</tr>
<tr>
<td>test</td>
<td>6.00</td>
<td>1.00 B</td>
</tr>
<tr>
<td>test_zone.rgw.meta</td>
<td>5.00</td>
<td>1.00 B</td>
</tr>
</tbody>
</table>

Top 15 Pools By Capacity Used

<table>
<thead>
<tr>
<th>Pool Name</th>
<th>Pool ID</th>
<th>Capacity Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>test</td>
<td>6.00</td>
<td>0.66%</td>
</tr>
<tr>
<td>test_zone.rgw.buckets.data</td>
<td>8.00</td>
<td>0.03%</td>
</tr>
<tr>
<td>.rgw.root</td>
<td>2.00</td>
<td>0.00%</td>
</tr>
<tr>
<td>test_zone.rgw.log</td>
<td>3.00</td>
<td>0.00%</td>
</tr>
<tr>
<td>test_zone.rgw.meta</td>
<td>5.00</td>
<td>0.00%</td>
</tr>
</tbody>
</table>
Ceph Dashboard

RGW Performance Stats

RGW Overview - All Gateways

- Average GET/PUT Latencies
- Total Requests/sec by RGW Instance
- GET Latencies by RGW Instance
- Bandwidth Consumed by Type
- Bandwidth by RGW Instance
- PUT Latencies by RGW Instance
Thank you!