



Ceph CI and Developer Tooling: Past, Present, and Future

David Galloway

Who Am I?



David Galloway

Ceph Labs - Infrastructure Architect - IBM
@djgalloway

- Red Hat since 2010
- Joined Ceph project in 2016
- Brief sabbatical at a startup 2022-2024
- Returned to Ceph in November 2024

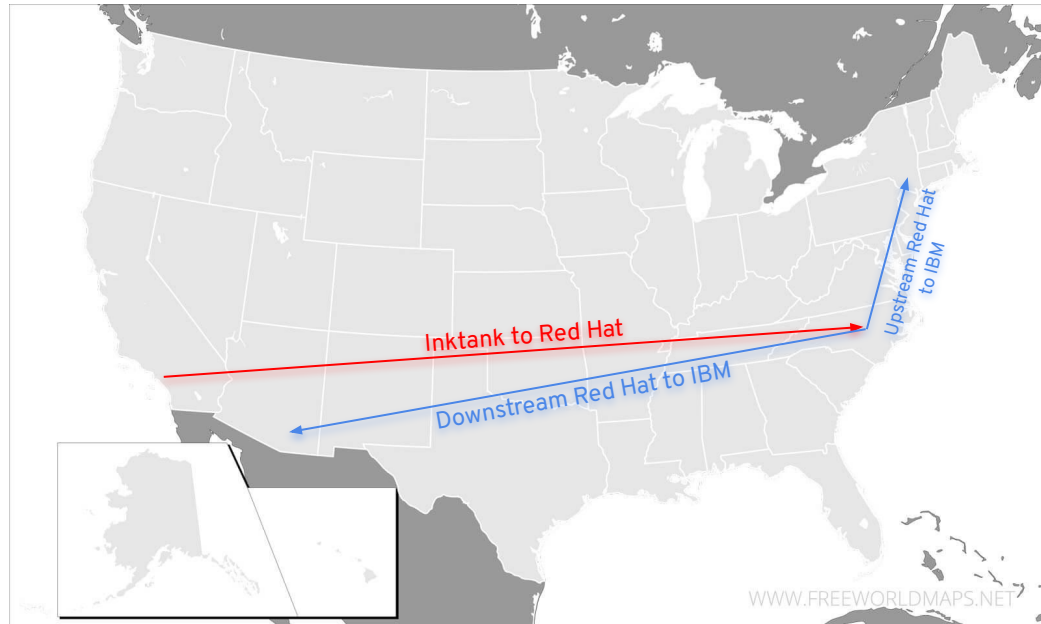


Who is the Ceph Labs Team?



- Dan Mick - Developer, US
- David Galloway - Infra Architect / Team Lead, US
- Adam Kraitman - System Administrator, Israel
- Evelyn Perez - Project Manager, Mexico
- Fernando Alcocer - System Administrator, Mexico
- Jitendra Sahu - DevOps Developer, India

Where are the Ceph Labs?



2015 - Migration from Irvine, CA to Morrisville, NC

2025 - Downstream lab (“Octo”) migrated from Morrisville, NC to Tucson, AZ

2025 - Upstream lab (“Sepia”) migrated from Morrisville, NC to Poughkeepsie, NY

Ceph CI: The Past



- gitbuilders
- VPSHOSTS
 - cloud-init
 - downburst
- Openstack (OVH)
- Static teuthology testnodes
 - Chef
- Randomly distributed services
 - LXC/KVM
- No DCIM
- Minimal hardware/process docs
- No monitoring, then Nagios
- No Jenkins pipelines

Autobuilder results

Branch	Status	Commit	Who	Result
ain_sparse_read	ok	5da0662	yehuda	ok librados: fix end_block calculation for ain_read
master	ok	aad529e	yehuda	ok rgs: merge chunks for clone range, truncate to 0 before
oldrgw	ok	c35770c	yehuda	ok Merge branch 'ygo-multipar'
rados-load-gen	FAIL	4b16d6f	yehuda	Warnings(4)/Errors(4) radosgw: load gen. wip (Force Rebuild)
	Warn	fb81442	yehuda	Warnings(1) teuthology: fix compilation
rgw	FAIL	244aab6	yehuda	Errors rgs: fix some issues with call to clone_range (Force Rebuild)
	(Pending)	4298b59	yehuda	rgs: fix clone_range
...
...	FAIL	5c65661	sage.weil	Errors(1) mon: order degraded before unbound (Force Rebuild)
...
...	FAIL	5175851	samuel.just	Errors(1) ReplicatedPG: make sure that rollback sages is not degraded (Force Rebuild)
...
...	FAIL	5af5b9f	cmccabe	Errors libceph: de-globalize (Force Rebuild)
...	ok	bfe6c8	yehuda	ok flistmon: remove warning
stable	ok	64b1b2c	sage	ok v0.30
v0.28.1	ok	d66c6ca	sage	ok v0.28.1
v0.28.2	ok	2324204	sage	ok v0.28.2
v0.29	ok	8e69c39	sage	ok v0.29
v0.29.1	ok	77d38e4	sage	ok v0.29.1
v0.30	ok	64b1b2c	sage	ok v0.30
wip-client	ok	cde5dc2	sage.weil	ok client: improve debug output a bit
wip-client-entries	BUILDING	d8733ee	sage	client: do not leak MetaRequests on get_or_create() failure
	(Pending)	8b83932	sage	client: do not assume MetaRequest's entries are linked
...
...	ok	902f699	sage	ok qc: add clone_range tool
wip-mds	ok	9761e95	sage	ok fix mds scatter_writebehind starvation
wip-objecter-error-handling	ok	9ca5d99	cmccabe	ok Add 'How to use C_GatherBuilder' comment
wip-snaprealm	ok	f197601	sage.weil	ok mds: fix snaprealm split for dir inode
wip_bugfix	Warn	d0869d7	samuel.just	Warnings(1) ReplicatedPG: Fix some otc leaks
wip_sambugfix	ok	d2b1255	samuel.just	ok debugging - do not merge



Sepia -- Notes on the test lab for the Ceph project »

Table Of Contents

- Servers
- BIOS settings
- Dell's DRAC out-of-band management system
- Network
- Requesting Lab Access
- Adding users (lab admins)
- Notes creating gitbuilder-ceph-rpm-fedora22-amd64-basic
- Using IPMI on physical machines
- New user basics
- Using serial consoles
- VMs and containers
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Quick search

Sepia – Notes on the test lab for the Ceph project

Ceph is a unified, distributed storage system that operates on a large number of hosts connected by a TCP/IP network.

Sepia is the name we gave to our pool of test machines. It happens to be both a color and a **genus of cuttlefish**. When you see a cuttlefish, for example *sepia plana*.

This repository contains notes on managing and using the “Sepia” lab of test machines, used by the Ceph project. It is not perfect, but it is a work in progress, with a focus on searchability and developer friendliness.

The target audience for this documentation is administrators; people **managing** the sepia machines. If all you need is to use the machines, you are not the target audience.

While the Sepia machines are not publicly accessible, we hope to share tools & knowledge with the greater community. If you are interested in using OpenStack – do contact us and we might be able to give you access to the hardware resources of the *sepia* lab. Or an OpenStack cloud.



- Per distro
- Per distro version
- Per architecture
- With / without thread caching

```
env.roledefs['pre_cxx11'] = [  
    'ubuntu@gitbuilder-ceph-deb-precise-amd64-basic.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-deb-precise-amd64-notcmalloc.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-deb-wheezy-amd64-basic.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-rpm-centos6-5-amd64-basic.front.sepia.ceph.com',  
]  
  
env.roledefs['gitbuilder_auto'] = [  
    'ubuntu@gitbuilder-ceph-deb-jessie-amd64-basic.ovh.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-deb-precise-amd64-basic.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-deb-precise-amd64-notcmalloc.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-deb-trusty-amd64-basic.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-deb-trusty-amd64-notcmalloc.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-deb-trusty-i386-basic.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-deb-wheezy-amd64-basic.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-tarball-trusty-amd64-basic.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-tarball-trusty-amd64-cmake.ovh.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-tarball-trusty-i386-basic.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-deb-xenial-amd64-basic.front.sepia.ceph.com',  
]  
  
env.roledefs['gitbuilder_ceph_rpm'] = [  
    'ubuntu@gitbuilder-ceph-rpm-centos6-5-amd64-basic.front.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-rpm-centos7-amd64-basic.ovh.sepia.ceph.com',  
    'ubuntu@gitbuilder-ceph-rpm-centos7-amd64-notcmalloc.ovh.sepia.ceph.com',  
]
```

Ceph CI: status.sepia.ceph.com



Some systems are experiencing issues

This page is intended to provide a quick overview of the operational status of the Sepia lab. It doesn't try to provide many testing-related metrics.

For more detailed testing information, see the [Grafana dashboard](#)

teuthology

queue status ⓘ	Operational
pulpito	Operational
paddles	Operational
teuthology System Load	Operational

CI

jenkins.ceph.com	Operational
2.jenkins.ceph.com	Operational
shaman	Operational
chacra	Operational

Infrastructure

Running Jobs ⓘ

Last 12 Hours ▾

Loading data

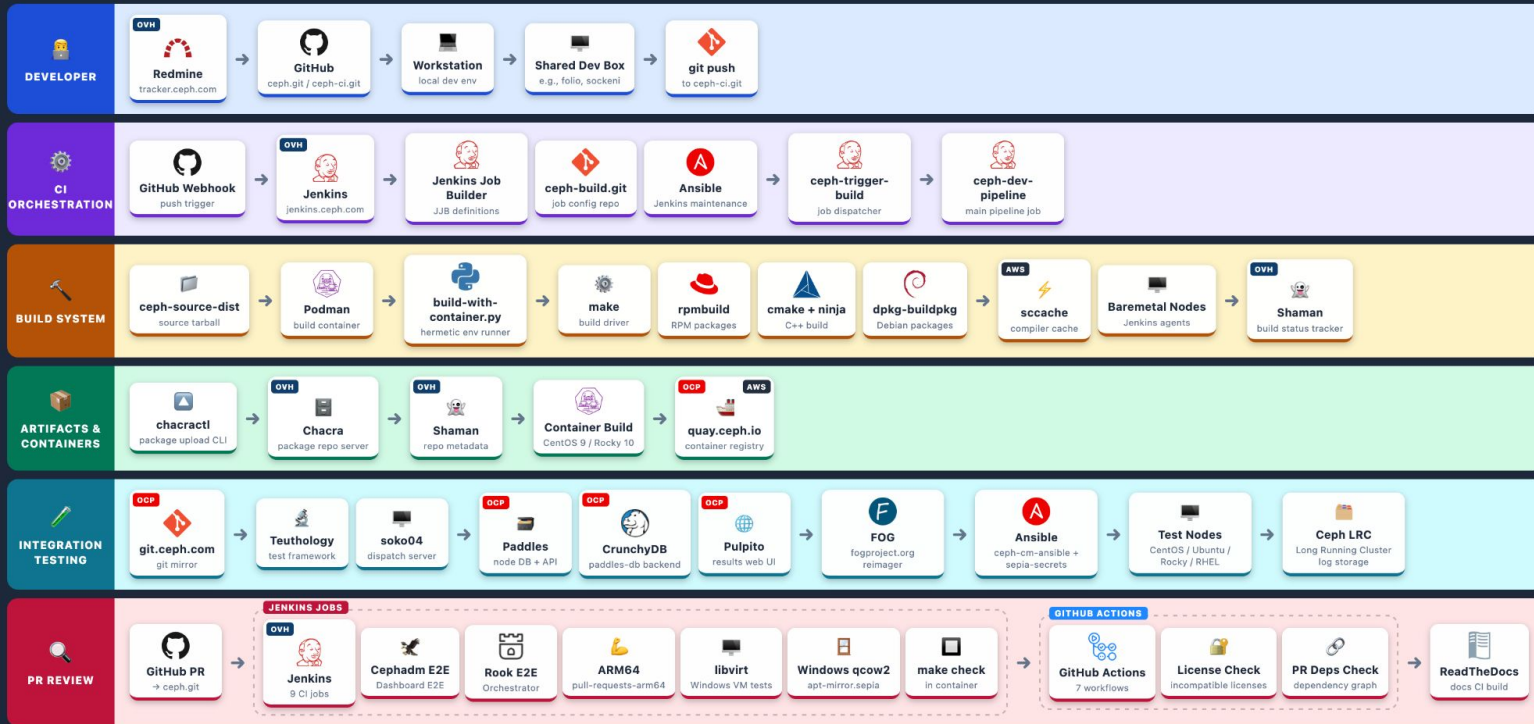
Queued Jobs

Last 12 Hours ▾

Ceph CI: The Present



Ceph CI Pipeline — Present State



Ceph CI: ceph-dev-pipeline



Jenkins / ceph-dev-pipeline / #3818 / Pipeline Overview

BRANCH=wip-wip-crimson-ec-with-recovery
SHA1=cc958d8223998a823f2955efa1624b6fcfcf567
VERSION=20.3.0-6275-gcc958d82
DISTROS=centos9 jammy noble windows
ARCHS=x86_64
FLAVORS=default debug
SETUP_BUILD_ID=3146
shaman builds for this branch+commit

Graph

Start Checkout SCM source distribution parallel build

node checkout ceph-build copy artifacts check for built packages builder container build upload packages

Matrix - DIST = 'centos10', ARCH...

Matrix - DIST = 'rocky9', ARCH ...

Matrix - DIST = 'rocky10', ARCH ...

Matrix - DIST = 'focal', ARCH =...

node checkout ceph-build copy artifacts check for built packages builder container build upload packages

node checkout ceph-build copy artifacts check for built packages builder container build upload packages

Matrix - DIST = 'bookworm', AR...

Matrix - DIST = 'centos9', ARCH...

container 6m 20s Started 1h 51m ago 172.21.2.7+L

Ceph CI: Shaman Web UI



Shaman

Builds ceph > main

🔔 Latest Builds Available

	id	project	ref	distro	release	flavor	arch	modified
✓	465643	ceph	main	centos	9	default	arm64	22 hours, 20 minutes, 37 seconds ago
✓	465642	ceph	main	windows	1809	default	x86_64	22 hours, 56 minutes, 18 seconds ago
✓	465641	ceph	main	rocky	10	default	x86_64	22 hours, 26 minutes, 11 seconds ago
✓	465640	ceph	main	ubuntu	jammy	default	x86_64	22 hours, 12 minutes, 51 seconds ago
✓	465639	ceph	main	ubuntu	noble	default	x86_64	22 hours, 19 minutes, 34 seconds ago
✓	465638	ceph	main	centos	9	debug	x86_64	22 hours, 37 minutes, 40 seconds ago
✓	465637	ceph	main	centos	9	default	x86_64	22 hours, 35 minutes, 41 seconds ago
✓	465636	ceph	main	rocky	10	default	arm64	21 hours, 53 minutes, 54 seconds ago

Ceph CI: Quay.ceph.io



RED HAT QUAY

EXPLORE

REPOSITORIES

TUTORIAL

search



release_...

← Repositories ↑ Organization



ceph-ci / ceph



Repository Tags

Compact

Expanded

Show Signatures



1 - 25 of 80



main

TAG

LAST MODIFIED ↓

SIZE

EXPIRES

MANIFEST

main-arm64

a day ago

512.2 MiB

Never

SHA256 e7559947f9de



main-centos-stream9-arm64-devel

a day ago

512.2 MiB

Never

SHA256 e7559947f9de



main-rockylinux-10

a day ago

621.6 MiB

Never

SHA256 8dc772cc6980



main-rockylinux-10-x86_64-devel

a day ago

621.6 MiB

Never

SHA256 8dc772cc6980



main

a day ago

546.5 MiB

Never

SHA256 26fac8c5fe49



main-centos-stream9-x86_64-devel

a day ago

546.5 MiB

Never

SHA256 26fac8c5fe49



main-debug

a day ago

666.0 MiB

Never

SHA256 6f1ff757074b



main-centos-stream9-x86_64-devel-debug

a day ago

666.0 MiB

Never

SHA256 6f1ff757074b



Ceph CI: FOG



FOG Project

Task Management

Main Menu

- Active Tasks
- List All Hosts
- List All Groups
- Active Multicast Tasks
- Active Snapin Tasks
- Scheduled Tasks

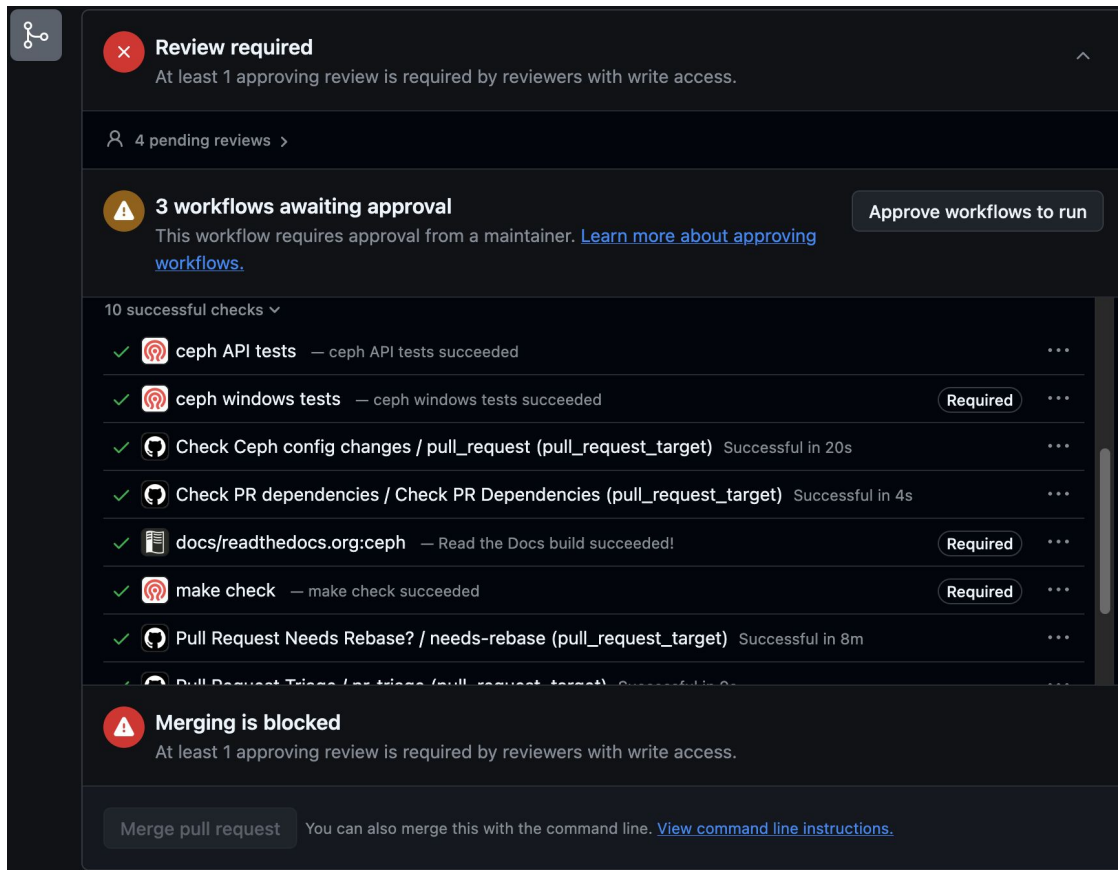
Active Tasks

||

<input type="checkbox"/>	Started By: <input type="text" value="Search..."/>	Hostname MAC <input type="text" value="Search..."/>	Image Name <input type="text" value="Search..."/>	Start Time <input type="text" value="Search..."/>	Working with node <input type="text" value="Search..."/>	Status <input type="text" value="Search..."/>
<input type="checkbox"/>	fog	trial037	trial_ubuntu_24.04	2026-02-10 00:53:31	DefaultMember	⚡ 📄 🟢
<input type="checkbox"/>	fog	trial089	trial_centos_9.stream	2026-03-20 07:11:03	DefaultMember	⚡ 📄 🟢
<input type="checkbox"/>	fog	trial098	trial_centos_9.stream	2026-03-20 07:11:09	DefaultMember	⚡ 📄 🟢

Cancel selected tasks?

Ceph CI: Pull Request Checks



The screenshot shows a GitHub pull request interface with the following elements:

- Review required:** A red 'x' icon and text: "Review required. At least 1 approving review is required by reviewers with write access."
- 4 pending reviews:** A person icon and text: "4 pending reviews >"
- 3 workflows awaiting approval:** A yellow warning icon and text: "3 workflows awaiting approval. This workflow requires approval from a maintainer. [Learn more about approving workflows.](#)" A button "Approve workflows to run" is visible.
- 10 successful checks:** A dropdown arrow and a list of checks:
 - ✓ **ceph API tests** — ceph API tests succeeded
 - ✓ **ceph windows tests** — ceph windows tests succeeded **Required**
 - ✓ **Check Ceph config changes / pull_request (pull_request_target)** Successful in 20s
 - ✓ **Check PR dependencies / Check PR Dependencies (pull_request_target)** Successful in 4s
 - ✓ **docs/readthedocs.org:ceph** — Read the Docs build succeeded! **Required**
 - ✓ **make check** — make check succeeded **Required**
 - ✓ **Pull Request Needs Rebase? / needs-rebase (pull_request_target)** Successful in 8m
 - ✓ **Pull Request Trigger (on trigger) (pull_request_target)** Successful in 0s
- Merging is blocked:** A yellow warning icon and text: "Merging is blocked. At least 1 approving review is required by reviewers with write access."
- Merge pull request:** A button with text: "Merge pull request. You can also merge this with the command line. [View command line instructions.](#)"

Ceph CI: Releasing Ceph



- QE
- Build (ceph-release-pipeline)
- Pull
- Sign
- Push
- Container build
- Promote
- Announce

Pulpito Queue By Status By Branch By Suite By Machine Type Nodes Node Lock Stats Node Job Stats

branch: tentacle-release x / 25 runs

Job stats for this page: 222 failed, 16 dead, 987 passed, (1225 total)

User	Scheduled*	Started	Updated	Runtime	Suite	Branch	Machine Type	Revision	Pass	Fail	Dead
yuriw	2026-03-22 14:47:11	2026-03-22 14:47:22	2026-03-22 17:22:06	2:34:44	krbd	tentacle-release	trial	5bb3278	64	2	0
yuriw	2026-03-22 14:44:23	2026-03-22 14:44:27	2026-03-22 15:39:52	0:55:25	smoke	tentacle-release	trial	5bb3278	23	0	0
yuriw	2026-03-21 15:09:45	2026-03-21 16:26:41	2026-03-21 16:56:30	0:29:49	upgrade:tentacle-p2p	tentacle-release	trial	5bb3278	2	0	0
yuriw	2026-03-21 15:09:42	2026-03-21 16:26:30	2026-03-21 16:40:14	0:13:44	upgrade:telemetry-upgrade	tentacle-release	trial	5bb3278	0	1	0
yuriw	2026-03-21 15:09:36	2026-03-21 16:25:39	2026-03-21 22:38:08	6:12:29	upgrade:reef-x	tentacle-release	trial	5bb3278	1	0	1
yuriw	2026-03-21 15:09:27	2026-03-21 16:22:54	2026-03-21 18:47:54	2:25:00	upgradesquid-x	tentacle-release	trial	5bb3278	2	5	0
yuriw	2026-03-21 15:09:19	2026-03-21 16:19:09	2026-03-21 17:26:04	1:06:55	nvmeof	tentacle-release	trial	5bb3278	1	2	1
yuriw	2026-03-21 15:08:50	2026-03-21 16:17:36	2026-03-21 17:17:00	0:59:24	rbd	tentacle-release	trial	5bb3278	3	3	0
yuriw	2026-03-21 15:07:49	2026-03-21 16:06:56	2026-03-21 22:21:40	6:14:44	orch	tentacle-release	trial	5bb3278	4	23	3
yuriw	2026-03-21 15:06:46	2026-03-21 15:42:35	2026-03-21 19:10:48	3:28:13	fs	tentacle-release	trial	5bb3278	3	32	3
yuriw	2026-03-21 15:06:28	2026-03-21 15:33:24	2026-03-21 16:23:18	0:49:54	rgw	tentacle-release	trial	5bb3278	0	11	1
yuriw	2026-03-21 15:05:28	2026-03-21 15:31:22	2026-03-21 21:39:05	6:07:43	rados	tentacle-release	trial	5bb3278	4	20	2
yuriw	2026-03-20 14:50:35	2026-03-21 05:51:56	2026-03-21 07:23:38	1:31:42	powercycle	tentacle-release	trial	5bb3278	16	0	0
yuriw	2026-03-20 14:50:30	2026-03-21 05:51:54	2026-03-21 06:05:32	0:13:38	perf-basic	tentacle-release	trial	5bb3278	3	0	0
yuriw	2026-03-20 14:50:23	2026-03-21 05:47:29	2026-03-21 07:21:13	1:33:44	upgrade:tentacle-p2p	tentacle-release	trial	5bb3278	3	2	0
yuriw	2026-03-20 14:50:18	2026-03-21 05:41:25	2026-03-21 05:59:00	0:17:35	upgrade:telemetry-upgrade	tentacle-release	trial	5bb3278	1	1	0
yuriw	2026-03-20 14:50:07	2026-03-21 05:39:21	2026-03-21 08:35:12	2:55:51	upgrade:reef-x	tentacle-release	trial	5bb3278	7	2	0
yuriw	2026-03-20 14:49:56	2026-03-21 05:31:10	2026-03-21 08:25:14	2:54:04	upgradesquid-x	tentacle-release	trial	5bb3278	2	7	0
yuriw	2026-03-20 14:49:45	2026-03-21 05:08:52	2026-03-21 06:32:20	1:23:28	nvmeof	tentacle-release	trial	5bb3278	5	4	0
yuriw	2026-03-20 14:46:54	2026-03-21 02:43:48	2026-03-21 10:44:18	8:00:30	rbd	tentacle-release	trial	5bb3278	185	5	1
yuriw	2026-03-20 14:43:31	2026-03-20 22:07:37	2026-03-21 05:20:43	7:13:06	orch	tentacle-release	trial	5bb3278	187	28	2
yuriw	2026-03-20 14:40:12	2026-03-20 21:30:18	2026-03-21 03:11:30	5:41:12	fs	tentacle-release	trial	5bb3278	169	38	0
yuriw	2026-03-20 14:39:27	2026-03-20 16:38:14	2026-03-20 18:09:40	1:31:26	rgw	tentacle-release	trial	5bb3278	33	12	0
yuriw	2026-03-20 14:35:22	2026-03-20 14:55:09	2026-03-20 21:54:49	6:59:40	rados	tentacle-release	trial	5bb3278	246	24	2
yuriw	2026-03-20 14:34:13	2026-03-20 14:37:58	2026-03-20 15:43:15	1:05:17	smoke	tentacle-release	trial	5bb3278	23	0	0

Ceph CI: Present Challenges



- Duplicate binary builds
- Flaky unit tests
- Poor job/build visibility
- CI discovering infrastructure problems
- Custom-built python microservices
- Desire for GitHub Actions but lack of experience

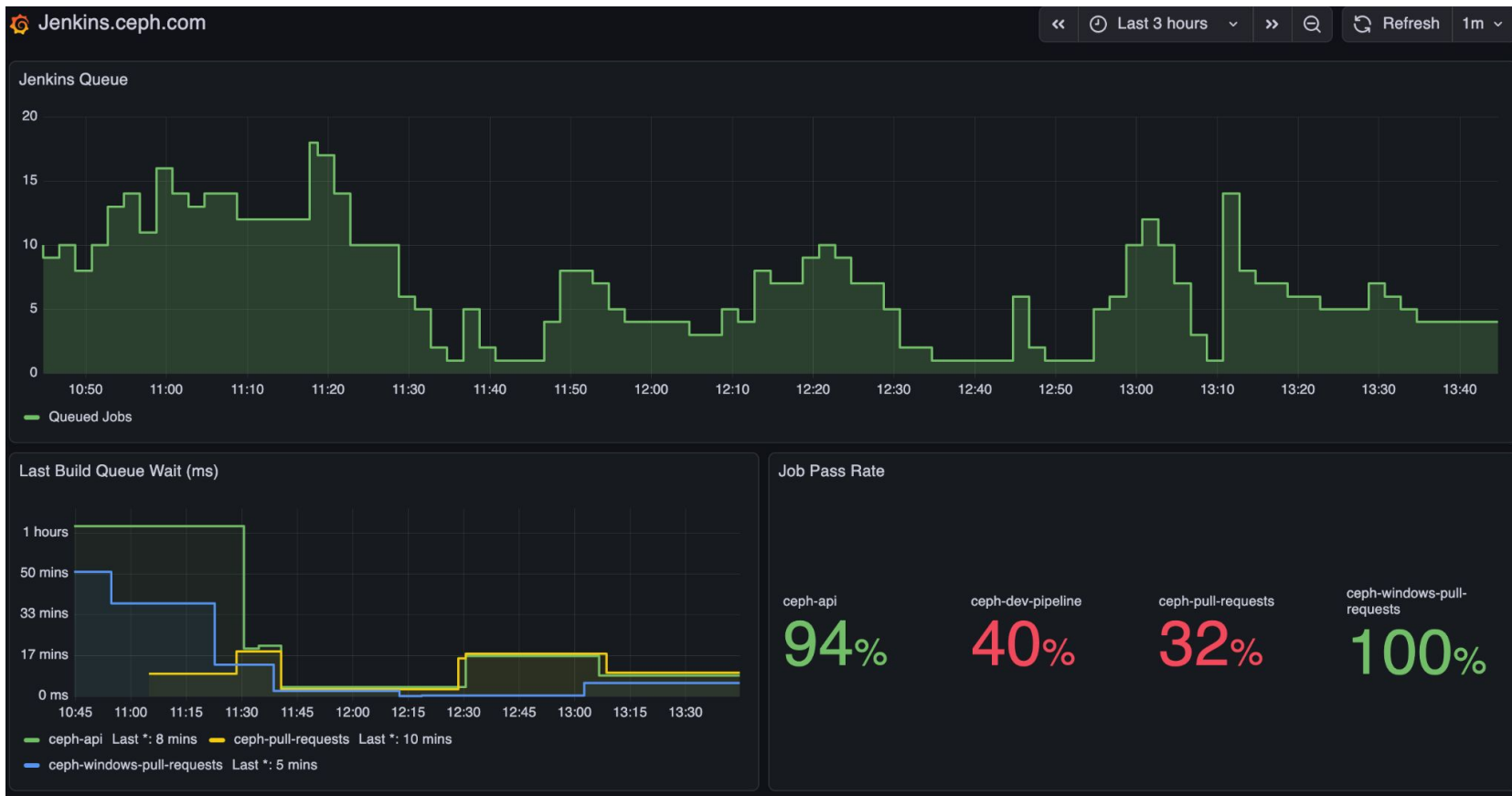
The screenshot shows the Ceph Cluster Status interface. At the top, it says "Cluster Status". Below that, a red box displays "HEALTH_ERR" with a warning triangle icon. Underneath, there is a link to "See Logs for more details." followed by two bullet points: "MDS_ALL_DOWN: 1 filesystem is offline" and "MDS_UP_LESS_THAN_MAX: 1 filesystem is online with fewer MDS than max_mds". At the bottom, it indicates "0 standby".

Ceph CI: The Future



- Metrics
- Monitoring
- Stability
- Centralized logging
- Build bursting

Ceph CI: jenkins.ceph.com dashboard





Thanks!

Sources / Thanks



- <https://eagain.net/talks/ceph-devops/ceph-devops-2012-09-19.pdf>
- Releasing Ceph by Ken Dreyer and Alfredo Deza
 - https://youtu.be/seHyiQT8YJM?si=tDX4kbe4HhPE_S-2
 - <https://cephalocon2019.sched.com/event/M7jf/releasing-ceph-deep-dive-into-build-infrastructure-alfredo-deza-ken-dreyer-redhat>
- Ceph Dev Metrics Survey: <https://forms.gle/Ut9ehoyuSut1a1Fs5>