Cockpit Infrastructure

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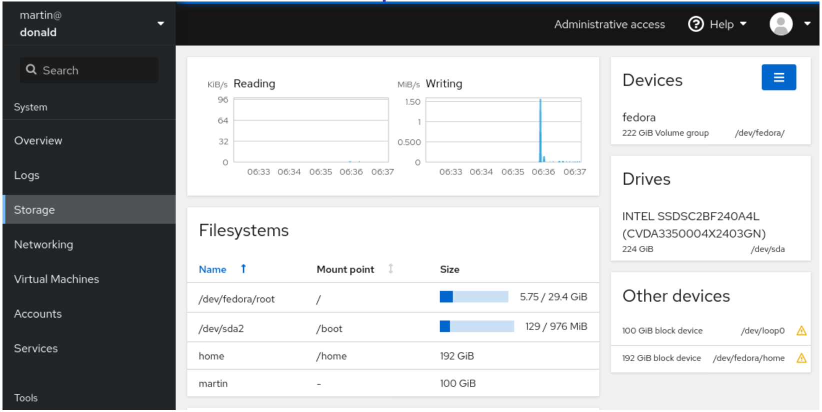
Cockpit Team



Devices

fedora
222 GiB Volume group /dev/fedora/

Drives

INTEL SSDSC2BF240A4L (CVDA3350004X2403GN)
224 GiB /dev/sda

Filesystems

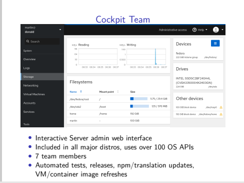
Name	Mount point	Size
/dev/fedora/root	/	5.75 / 29.4 GiB
/dev/sda2	/boot	129 / 976 MiB
home	/home	192 GiB
martin	-	100 GiB

Other devices

100 GiB block device /dev/loop0 ⚠

192 GiB block device /dev/fedora/home ⚠

- Interactive Server admin web interface
- Included in all major distros, uses over 100 OS APIs
- 7 team members
- Automated tests, releases, npm/translation updates, VM/container image refreshes



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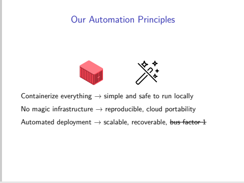
- Conceptually: Linux session running in a web browser; moral server equivalent of what GNOME is on a desktop
- talks to $>$ 100 system APIs, times $>$ 10 supported OSes $\rightarrow$ moving target, combinatorial explosion, things break all the time
- small team, heavily dependent on infrastructure
- automated testing, releasing, code hygiene, updating VM and container images

Our Automation Principles

Containerize everything → simple and safe to run locally

No magic infrastructure → reproducible, cloud portability

Automated deployment → scalable, recoverable, ~~bus factor 1~~



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Containerize everything → simple and safe to run locally
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- Humans first: Make it simple and enjoyable to locally hack on tests, automation, CI
- happens that these very qualities make it easy to deploy to infra
- Containers are easy to reproduce, easy to run locally and on different cloud platforms/CI providers
- infra uses the exact same containers and commands as humans, just more powerful
- Deployed using publicly available ansible scripts

Which infrastructure exactly?

- GitHub workflows for all non-KVM tasks
- CentOS CI: Kubernetes ReplicationController
- bos.e2e: systemd-controlled docker
- AWS: on-demand c5.metal instance, $$$, systemd podman

2021-01-13

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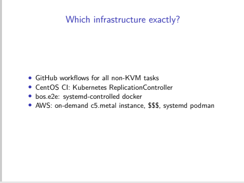
└─Which infrastructure exactly?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- GitHub's infra is unlimited, free, zero admin cost
- . . . . use for releases, container refreshes, and more
- tests need /dev/kvm access and internal network access depending on the tested OS
- CentOS CI ocp: powerful, free, many nodes; no internal tests; RCs
- e2e: 10 real-iron powerful machines; internal tests; systemd autorestart controlled docker instances
- AWS: on-demand test fallback in case e2e goes down, but pricey ($100/day)
- . . . permanent image server backup and log store; cheap virtualized instances

Event flow for releases

```
$ git tag -s -m '123

- cool new feature A
- fix heisenberg compensator on Fedora (rhbz#1234)
'
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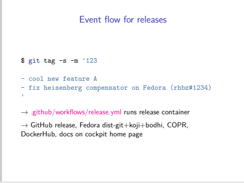
→ .github/workflows/release.yml runs release container

→ GitHub release, Fedora dist-git+koji+bodhi, COPR, DockerHub, docs on cockpit home page



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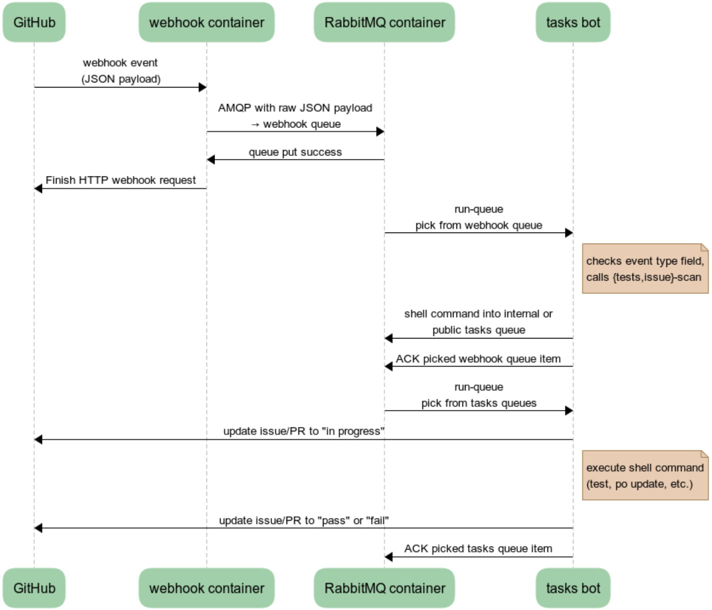
- Explain a bit *what* we run on the infra; first example is releases
- minimized human work: summarize news, push signed tag, everything else is fully automated
- pushing tag triggers release workflow
- runs release container; looks at “cockpituous” script of the particular project, which controls what/where exactly to release

Event flow for tests


GitHub
webhook container
RabbitMQ container
tasks bot
webhook event (JSON payload)
AMQP with raw JSON payload → webhook queue
queue put success
Finish HTTP webhook request
run-queue pick from webhook queue
checks event type field, calls {tests,issue}-scan
shell command into internal or public tasks queue
ACK picked webhook queue item
run-queue pick from tasks queues
update issue/PR to "in progress"
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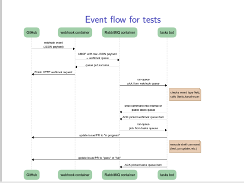
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- tests infra is more complicated, no GH workflows yet
- starting point: GitHub event: something happens, like open PR; calls URL in your infra with JSON payload
- ephemeral → translate to distributed, transactional work queue: AMQP; very simple to use, robust, small; eats Jenkins for breakfast
- webhook pod is simple Python script + off-the-shelf rabbit container
- just single instance on CentOS CI; auto-recovers through PR/issue scanning (github is single source of truth)
- thus we can deal with few hours downtime, but not with days
- dozens of worker bots on various clouds connect to AMQP and run tasks

Strong aspects of our CI

- reproducible, portable
- platform agnostic work queue
- deployment only through Ansible
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- separate changes in our code from changes in OSes

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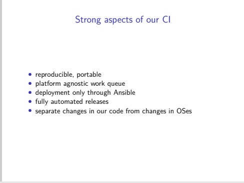
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- make use of hybrid cloud; harness lots of powerful resources whereever we can get them
- for example, we can run our tests on Travis unmodified; just run it in our tasks container
- robust and simple work queue
- push-button releases
- Intro mentioned combinatorial explosion of OSes times APIs; we are everybody's OS regression test
- became good at isolating our changes from ever-changing/regressing OSes around us
- semi-auto-refreshed OS images, tests run completely offline
- find and investigate OS regressions at VM image update time, not in project PRs
- fully automatic tracking of OS regressions

Weak aspects/challenges of our CI

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- precarious e2e machines
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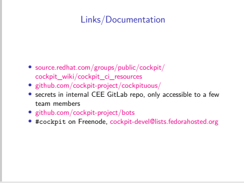
- our test logging/artifact infra is very arcane, too much custom logic; needs SSH, SPOF; want to move to standard infra (http post, s3, loki, etc.)
- e2e machines are ever more difficult to keep running; old RHEL 7 and no automation around Satellite; need well-maintained internal infra
- use host journal and k8s container logs for investigating failures; no automated monitoring (except for email on bot crash), notification, or prevention
- has not been a big enough pain point: no precious state in our CI, can re-scan github
- hard to find public infra with /dev/kvm: Travis for a while, but they stopped having free plans

Links/Documentation

- source.redhat.com/groups/public/cockpit/cockpit_wiki/cockpit_ci_resources
- github.com/cockpit-project/cockpituous/
- secrets in internal CEE GitLab repo, only accessible to a few team members
- github.com/cockpit-project/bots
- `#cockpit` on Freenode, cockpit-devel@lists.fedorahosted.org



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- finally, where can you look at our stuff and steal or contribute
- top-level document on the source, describes available internal and external infra, lots of pointers
- public cockpituous repo has all our infra containers and Ansible scripts
- secrets like Fedora password, GitHub or COPR token are in a very restricted internal CEE GitLab repo
- bots is the code that runs inside containers; grab AMQP work queue item, invoke test, update translations, build VM image
- you can always say hi on IRC or ask on our mailing list