Plugging into the Red Hat kernel CI ecosystem

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Red Hat

Release every 8-10 weeks

~14,000 commits per release

Community tested

Delivers a high quality product

Not quite there. Linux-stable delivers missing pieces

50-200 commits per release

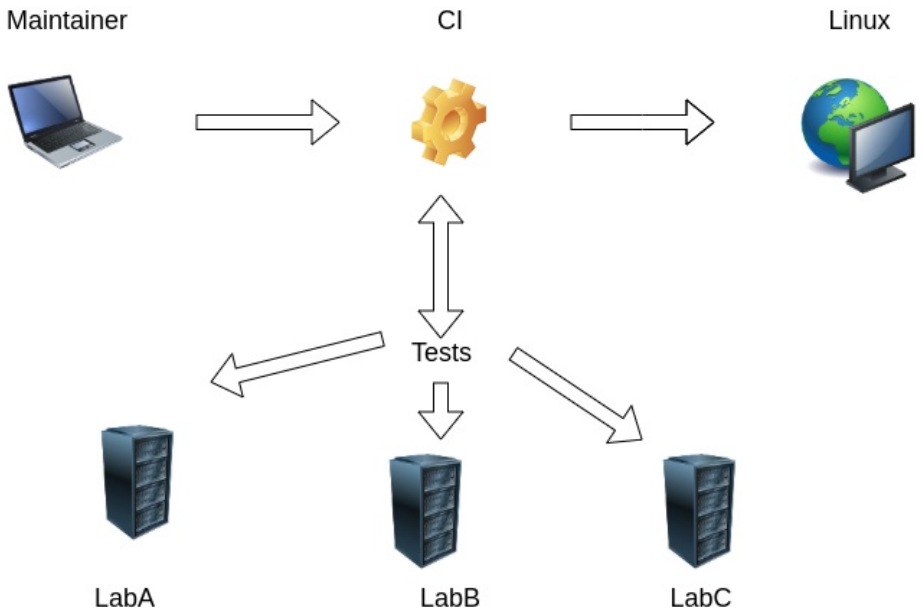
Every few days per release

Still too much post-release change

Exposes various problems

Fixing an issue after a change is committed is expensive
Detecting a change doesn’t regress without a test is hard
Running community tests on new hardware in a private lab is challenging.

Kernel CI ecosystem



Manages and automates labs of test computers.

Running Red Hat's lab for over 10 years

Diverse collection of state of the art hardware

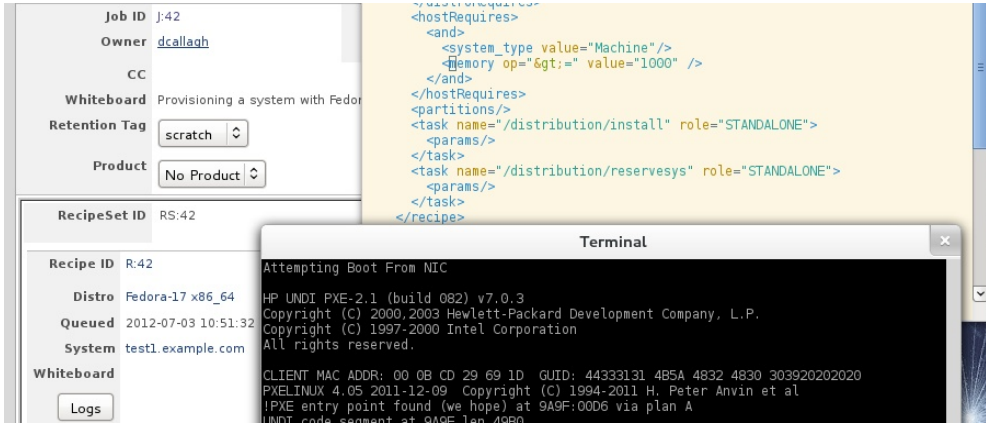
Remote console

Remote power

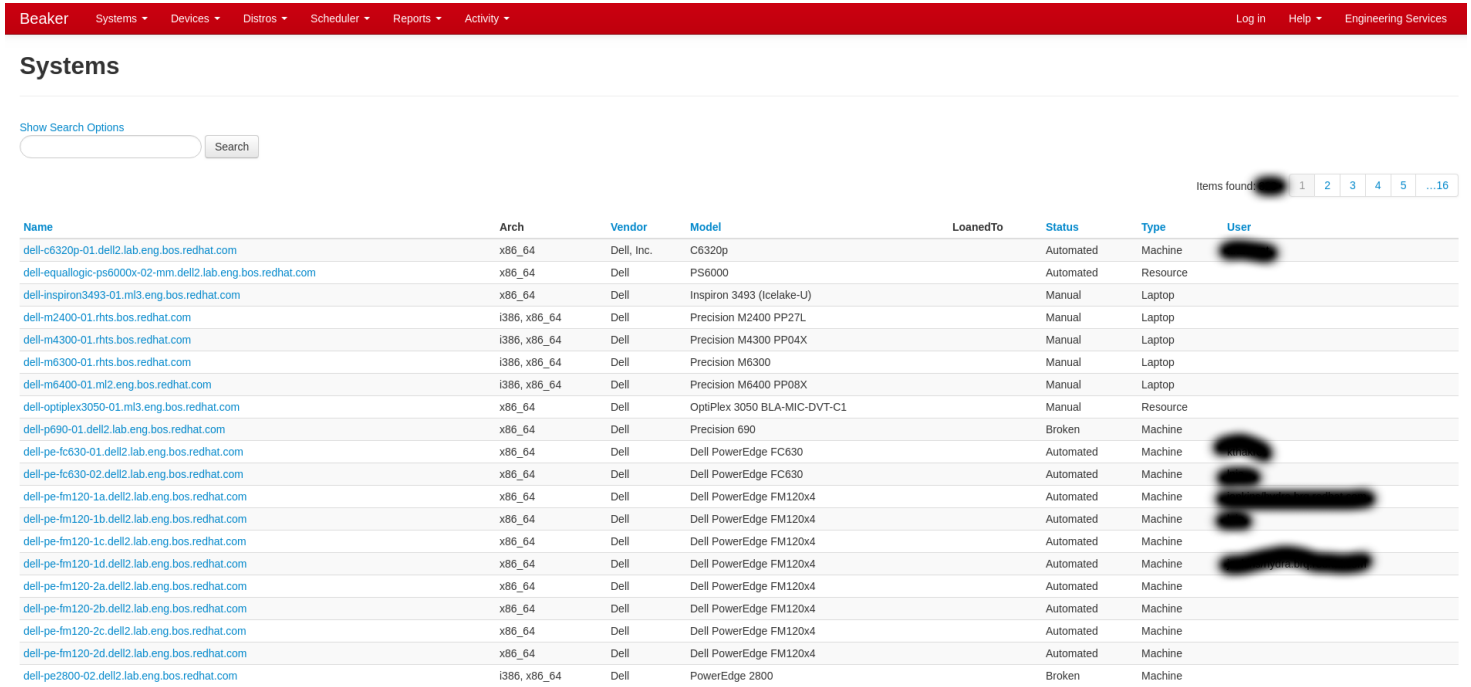
Inventory DB

Custom kickstarts

Reservation

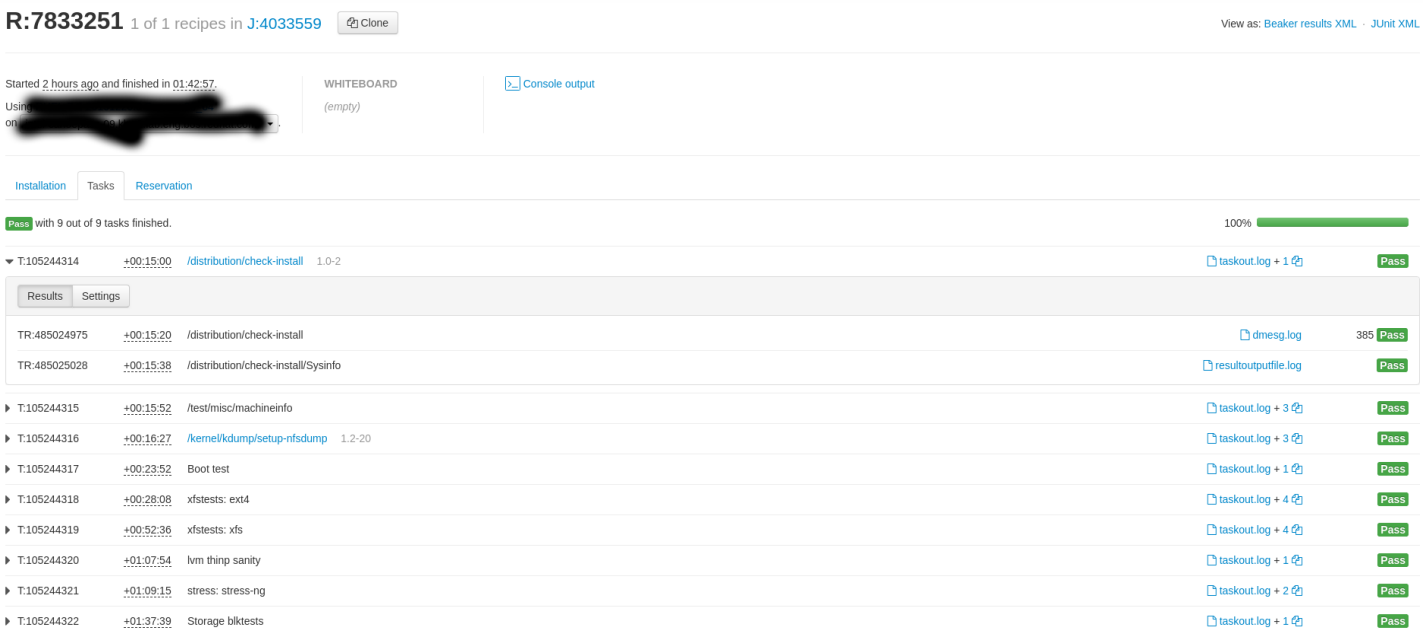


Beaker Homepage



Get involved https://beaker-project.org/

Beaker Tasks



Get involved https://beaker-project.org/

Beaker Details

Processors	40
Cores	20
Sockets	2
Hyper	True
Flags	lm fpu fpu_exception wp vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm epb intel_ppin ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase smep erms xsaveopt dtherm ida arat pln pts spec_ctrl intel_stibp flush_l1d cpufreq
Arch(s)	i386 x86_64

Disks

Model	Size	Logical sector size	Physical sector size
ST3750528AS	750.16 GB / 698.64 GiB	512 bytes	512 bytes
WDC WD1002FAEX-0	1000.20 GB / 931.51 GiB	512 bytes	512 bytes

Devices

Description	Type	Bus	Driver	Vendor ID	Device ID	Subsys Vendor ID	Subsys Device ID	Firmware Version
82801 PCI Bridge	bridge	pci	Unknown	8086	244E	0000	0000	
To Be Filled by O.E.M.	power	Unknown	Unknown	0000	0000	0000	0000	
Xeon E7 v2/Xeon E5 v2/Core i7 QPI Link Reut 0	generic	pci	Unknown	8086	0E83	8086	0000	
Xeon E7 v2/Xeon E5 v2/Core i7 QPI Link Reut 0	generic	pci	Unknown	8086	0E84	8086	0000	
Xeon E7 v2/Xeon E5 v2/Core i7 QPI Link 1	generic	pci	Unknown	8086	0E93	8086	0000	
Xeon E7 v2/Xeon E5 v2/Core i7 QPI Link Reut 1	generic	pci	Unknown	8086	0E94	8086	0000	
Intel Corporation	generic	pci	Unknown	8086	0EB8	8086	0000	
EHCI Host Controller	bus	usb	hub	1d6b	0002	0000	0000	

Get involved https://beaker-project.org/

Automated Tests

Over 90 Public Tests

Duration 2-4 hours

Reducing false positives

KPET: Dynamic patch detection

Trigger patterns based on code cove

Examples: LTP, xfstests, blktests

Workload testing separate

Automated Tests - Contributing

LTP https://linux-test-project.github.io/

Kselftests https://www.kernel.org/doc/html/v5.4/dev-tools/kselftest.html

Collection of Beaker wrapped public testsuites

CKI https://github.com/CKI-project/tests-beaker

Get involved http://cki-project.org / cki-project@redhat.com

Red Hat

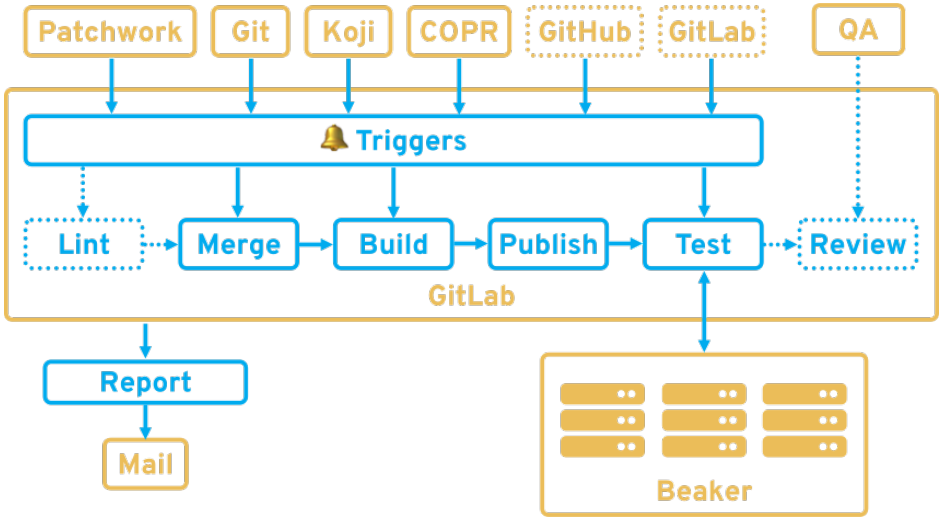
CKI (Continuous Kernel Integration)

Automated testing service

Built on gitlab pipelines

Uses git trees and patches

Emails results to mailing list



Red Hat

CKI - Stats

Finds 4-6 issues / week

Trees: linux-stable, arm, rdma,
scsi, net

Running up to 90 tests

4 arches

Get involved http://cki-project.org / cki-project@redhat.com /
https://gitlab.com/cki-project

Red Hat

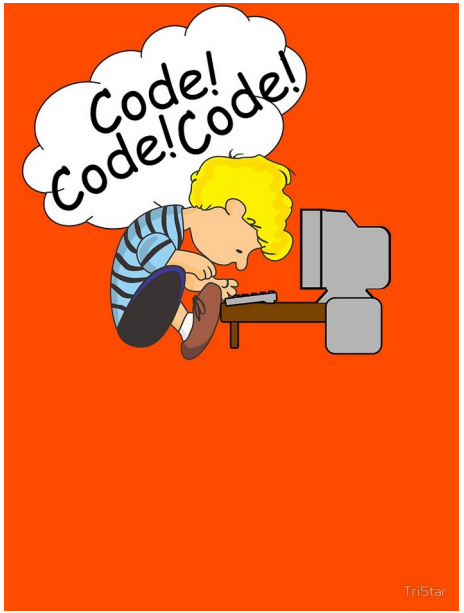
ARK / Fedora (Always Ready Kernel)

Source code git tree + distro magic

Defines configs and spec file

Natural development environment

How RHEL developers have worked for last 10+ years



ARK / Fedora Uses

Generate Fedora / RHEL-like configs

Build SRPMS / RPMS

Framework CKI uses to build upstream t

Contribute patches through gitlab

Get involved https://gitlab.com/cki-project/kernel-ark (Beta)

Red Hat

DCI (Distributed CI)

Red Hat Distributed CI

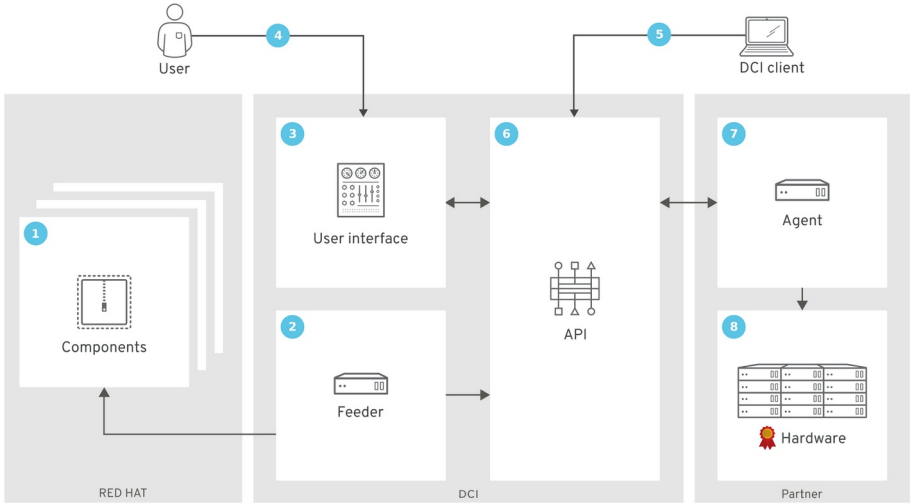
Incorporate remote partner labs into Red Hat labs

Utilizes Beaker

Runs remote jobs

Reports results to RH

HW certs



More info dci.org https://www.distributed-ci.io/

Red Hat

We did it! We built the ecosystem!

Intel 0-day

Linaro LKFT

Google syzbot

Kernelci.org

KernelCI

Ensuring the quality, stability and long-term maintenance of the Linux kernel.

Maintain an open source ecosystem around test and automation practices and principles for the Linux kernel.

Baylibre

CIVIL INFRASTRUCTURE PLATFORM

COLLABORA

FOUNDRIES.IO

Google

Microsoft

Red Hat

KernelCI.org Goals

Unify reporting methods

Encourage kernel maintainers to utilize CI services

Documenting how to plug in

Seeking memberships

Get involved https://foundation.kernelci.org/

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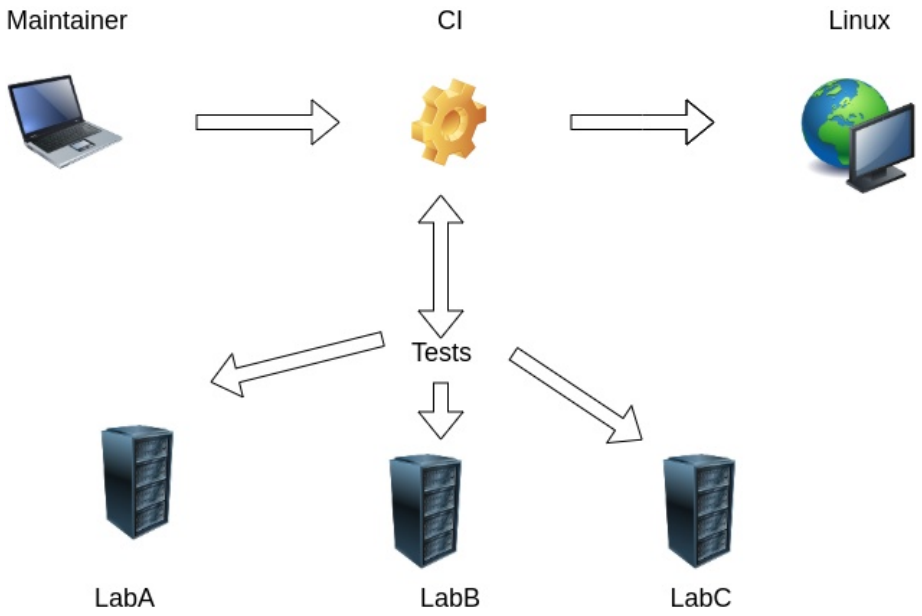
Kernel CI ecosystem Putting it together



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Thank you!

linkedin.com/company/red-hat

youtube.com/user/RedHatVideos

facebook.com/redhatinc

twitter.com/RedHat

Summary links

Don Zickus – dzickus@redhat.com

Beaker - https://beaker-project.org/

CKI - http://cki-project.org / cki-project@redhat.com

LTP - https://linux-test-project.github.io/

ARK - https://gitlab.com/cki-project/kernel-ark

DCI - https://www.distributed-ci.io/

KernelCI - https://foundation.kernelci.org/