

Plugging into the Red Hat kernel CI ecosystem

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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

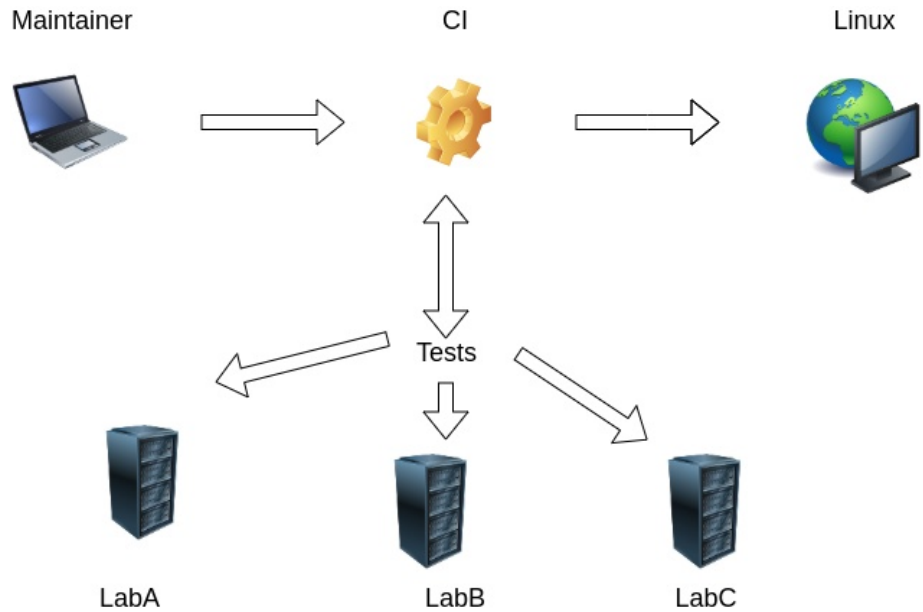
Exposes various problems

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

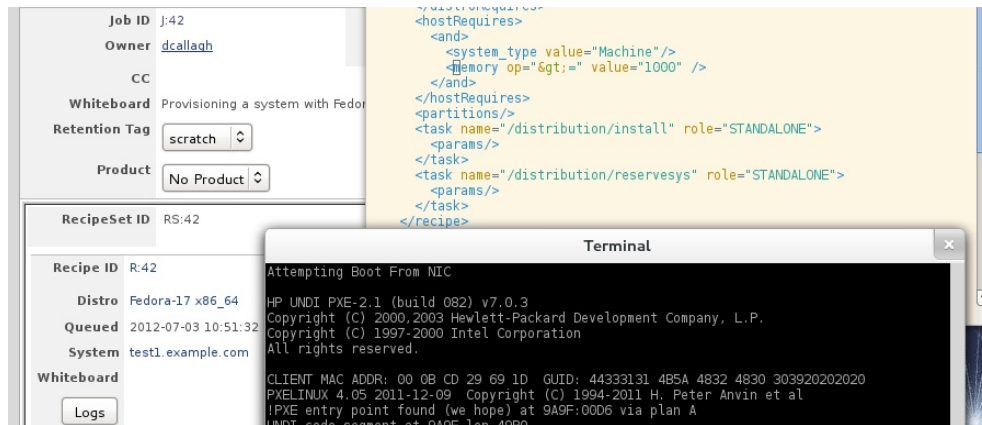
Remote console

Remote power

Inventory DB

Custom kickstarts

Reservation



The screenshot displays the Beaker web interface. On the left, a job configuration form shows details for Job ID J:42, Owner dcallagh, CC, Whiteboard (Provisioning a system with Fedora), Retention Tag (scratch), and Product (No Product). Below this, the RecipeSet ID is RS:42, and a list of recipes is shown, including Recipe ID R:42 with details for Distro (Fedora-17 x86_64), Queued time (2012-07-03 10:51:32), System (test1.example.com), and Whiteboard. A 'Logs' button is visible at the bottom of the recipe list.

On the right, an XML configuration snippet is shown, defining host requirements and tasks for a distribution installation and reservation.

```
<!-- hostRequires -->
<hostRequires>
  <and>
    <system_type value="Machine"/>
    <memory op=">" value="1000" />
  </and>
</hostRequires>
<partitions/>
<task name="/distribution/install" role="STANDALONE">
  <params/>
</task>
<task name="/distribution/reservesys" role="STANDALONE">
  <params/>
</task>
</recipe>
```

At the bottom right, a terminal window titled 'Terminal' shows the boot process of a test machine. The output includes:

```
Attempting Boot From NIC
HP UNDI PXE-2.1 (build 082) v7.0.3
Copyright (C) 2000,2003 Hewlett-Packard Development Company, L.P.
Copyright (C) 1997-2000 Intel Corporation
All rights reserved.

CLIENT MAC ADDR: 00 0B CD 29 69 1D  GUID: 44333131 485A 4832 4830 303920202020
PXELINUX 4.05 2011-12-09 Copyright (C) 1994-2011 H. Peter Anvin et al
IPXE entry point found (we hope) at 9A9F:00D6 via plan A
UNDI code segment at 9A9F:1a00
```

Systems

Show Search Options

Items found: 1 2 3 4 5 ...16

Name	Arch	Vendor	Model	LoanedTo	Status	Type	User
dell-c6320p-01.dell2.lab.eng.bos.redhat.com	x86_64	Dell, Inc.	C6320p		Automated	Machine	
dell-equallogic-ps6000v-02-mm.dell2.lab.eng.bos.redhat.com	x86_64	Dell	PS6000		Automated	Resource	
dell-inspiron3493-01.mi3.eng.bos.redhat.com	x86_64	Dell	Inspiron 3493 (Icelake-U)		Manual	Laptop	
dell-m2400-01.rhts.bos.redhat.com	i386, x86_64	Dell	Precision M2400 PP27L		Manual	Laptop	
dell-m4300-01.rhts.bos.redhat.com	i386, x86_64	Dell	Precision M4300 PP04X		Manual	Laptop	
dell-m6300-01.rhts.bos.redhat.com	i386, x86_64	Dell	Precision M6300		Manual	Laptop	
dell-m6400-01.ml2.eng.bos.redhat.com	i386, x86_64	Dell	Precision M6400 PP08X		Manual	Laptop	
dell-optiplex3050-01.mi3.eng.bos.redhat.com	x86_64	Dell	OptiPlex 3050 BLA-MIC-DVT-C1		Manual	Resource	
dell-p690-01.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Precision 690		Broken	Machine	
dell-pe-fc630-01.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FC630		Automated	Machine	
dell-pe-fc630-02.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FC630		Automated	Machine	
dell-pe-fm120-1a.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FM120x4		Automated	Machine	
dell-pe-fm120-1b.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FM120x4		Automated	Machine	
dell-pe-fm120-1c.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FM120x4		Automated	Machine	
dell-pe-fm120-1d.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FM120x4		Automated	Machine	
dell-pe-fm120-2a.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FM120x4		Automated	Machine	
dell-pe-fm120-2b.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FM120x4		Automated	Machine	
dell-pe-fm120-2c.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FM120x4		Automated	Machine	
dell-pe-fm120-2d.dell2.lab.eng.bos.redhat.com	x86_64	Dell	Dell PowerEdge FM120x4		Automated	Machine	
dell-pe2800-02.dell2.lab.eng.bos.redhat.com	i386, x86_64	Dell	PowerEdge 2800		Broken	Machine	

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

Beaker Tasks



R:7833251 1 of 1 recipes in J:4033559 [Clone](#)

View as: [Beaker results XML](#) · [JUnit XML](#)

Started 2 hours ago and finished in 01:42:57.

Using 

WHITEBOARD

(empty)

[Console output](#)

[Installation](#) [Tasks](#) [Reservation](#)

Pass with 9 out of 9 tasks finished.

100% 

▼ T:105244314		+00:15:00	/distribution/check-install	1.0-2	taskout.log + 1	Pass
Results	Settings					
TR:485024975		+00:15:20	/distribution/check-install		dmesg.log	385 Pass
TR:485025028		+00:15:38	/distribution/check-install/Sysinfo		resultoutprofile.log	Pass
▶ T:105244315		+00:15:52	/test/misc/machineinfo		taskout.log + 3	Pass
▶ T:105244316		+00:16:27	/kernel/kdump/setup-nfsdump	1.2-20	taskout.log + 3	Pass
▶ T:105244317		+00:23:52	Boot test		taskout.log + 1	Pass
▶ T:105244318		+00:28:08	xfstests: ext4		taskout.log + 4	Pass
▶ T:105244319		+00:52:36	xfstests: xfs		taskout.log + 4	Pass
▶ T:105244320		+01:07:54	lvm thing sanity		taskout.log + 1	Pass
▶ T:105244321		+01:09:15	stress: stress-ng		taskout.log + 2	Pass
▶ T:105244322		+01:37:39	Storage blktests		taskout.log + 1	Pass

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



Beaker Details



Processors	4U
Cores	20
Sockets	2
Hyper	True
Flags	lm fpu_exception wp vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr 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 sse3 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 lbrs ibpb stibp tpr_shadow vmxmi flexpriority ept vpid fsgsbase smep erms xsaveopt dtherm ida arat pln pts spec_ctrl intel_stibp flush_11d 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/>





Over 90 Public Tests

Duration 2-4 hours

Reducing false positives

KPET: Dynamic patch detection

Trigger patterns based on code coverage

Examples: LTP, xfstests, blktests

Workload testing separate





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>

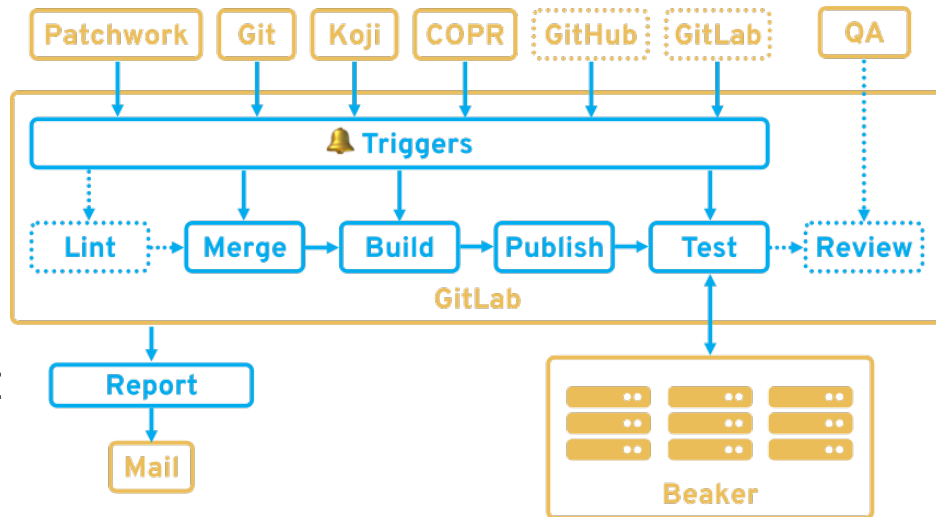
Get involved <http://cki-project.org> / cki-project@redhat.com

CKI (Continuous Kernel Integration)



Automated testing service
Built on gitlab pipelines
Uses git trees and patches

Emails results to mailing list





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>

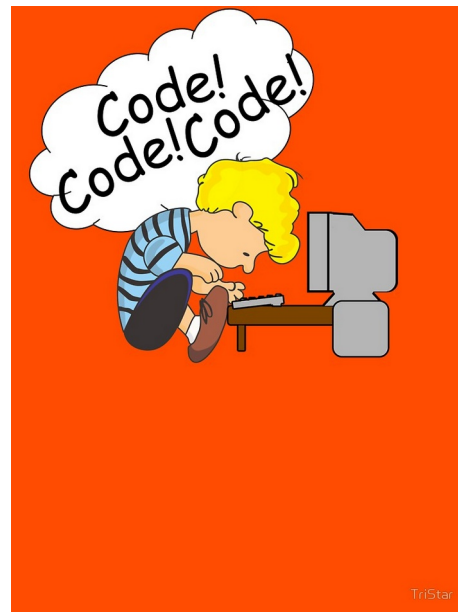
Source code git tree + distro magic

Defines configs and spec file

Natural development environment

How RHEL developers have worked

for last 10+ years





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)



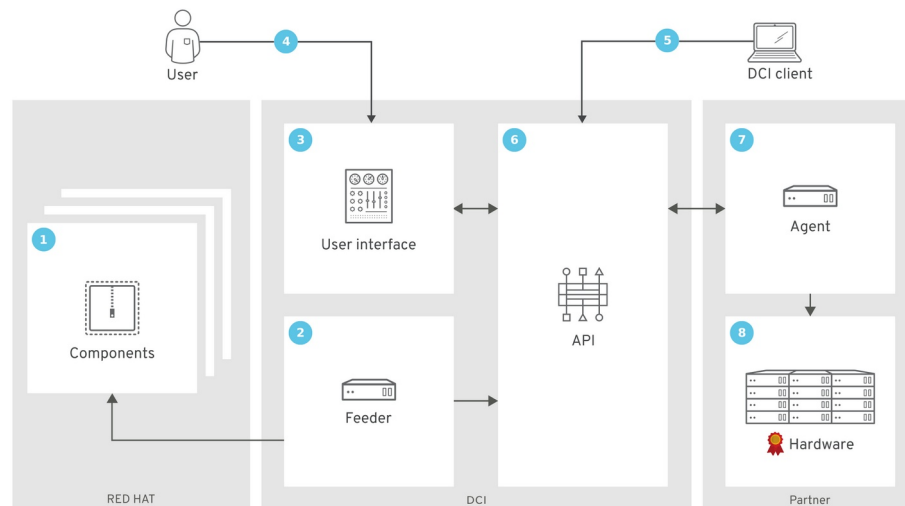
Incorporate remote partner labs into Red Hat labs

Utilizes Beaker

Runs remote jobs

Reports results to RH

HW certs



More info [dci.org](https://www.distributed-ci.io/) <https://www.distributed-ci.io/>

We did it! We built the ecosystem!

Intel 0-day

Linaro LKFT

Google syzbot

Kernelci.org

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.





Unify reporting methods

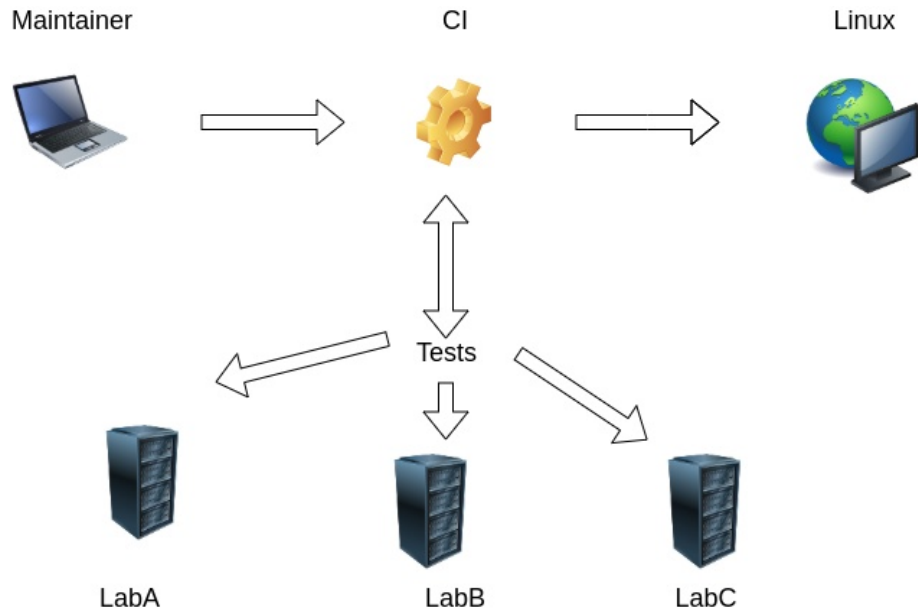
Encourage kernel maintainers to utilize CI services

Documenting how to plug in

Seeking memberships

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

Kernel CI ecosystem Putting it together



Thank you!



[linkedin.com/company/red-hat](https://www.linkedin.com/company/red-hat)



[youtube.com/user/RedHatVideos](https://www.youtube.com/user/RedHatVideos)



[facebook.com/redhatinc](https://www.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/>