
Koji 101

How to build your distro with koji

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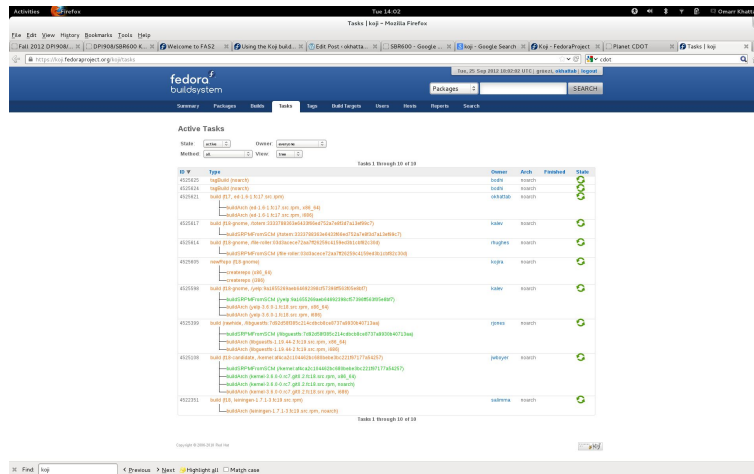
Agenda

- What is koji
- How does it work (from CI/CD)
- How does it work (internally)
- How to set up your koji (easy)

What is Koji?

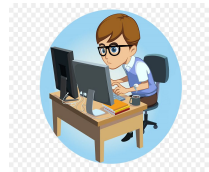
Koji is the software that builds RPM packages for the Fedora project. It uses Mock to create chroot environments to perform builds.

- **Security**
 - New buildroot for each build
- **Leverage other software**
 - Uses Yum and Mock open-source components
- **Flexibility**
 - active code base
- **Usability**
 - Web interface with SSL Authentication
 - Thin, portable client
- **Reproducibility**
 - Buildroot contents are tracked in a database
 - Versioned data

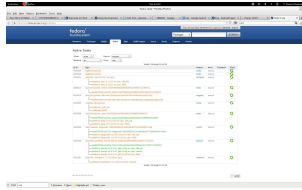


The screenshot displays the Fedora buildsystem web interface. At the top, there's a navigation bar with 'Summary', 'Packages', 'Builds', 'Tasks', 'Tags', 'Build Targets', 'Users', 'Tasks', 'Reports', and 'Search'. The 'Tasks' tab is active. Below the navigation bar, there's a section for 'Active Tasks' with a table listing various build tasks. The table has columns for ID, Type, Owner, Arch, Finished, and State. The tasks listed include 'fedora-rawhide', 'fedora-rawhide', 'fedora-rawhide', 'fedora-rawhide', 'fedora-rawhide', 'fedora-rawhide', 'fedora-rawhide', 'fedora-rawhide', 'fedora-rawhide', and 'fedora-rawhide'. Each task has a 'Finished' status and a 'State' column with a green checkmark icon.

ID	Type	Owner	Arch	Finished	State
422725	fedora-rawhide	ludlu	source		✓
422724	fedora-rawhide	ludlu	source		✓
422742	fedora-rawhide	ludlu	source		✓
422741	fedora-rawhide	ludlu	source		✓
422740	fedora-rawhide	ludlu	source		✓
422739	fedora-rawhide	ludlu	source		✓
422738	fedora-rawhide	ludlu	source		✓
422737	fedora-rawhide	ludlu	source		✓
422736	fedora-rawhide	ludlu	source		✓
422735	fedora-rawhide	ludlu	source		✓
422734	fedora-rawhide	ludlu	source		✓
422733	fedora-rawhide	ludlu	source		✓
422732	fedora-rawhide	ludlu	source		✓
422731	fedora-rawhide	ludlu	source		✓
422730	fedora-rawhide	ludlu	source		✓
422729	fedora-rawhide	ludlu	source		✓
422728	fedora-rawhide	ludlu	source		✓
422727	fedora-rawhide	ludlu	source		✓



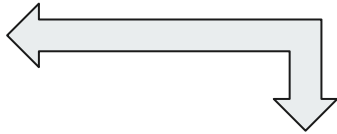
Koji Web interface



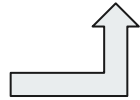
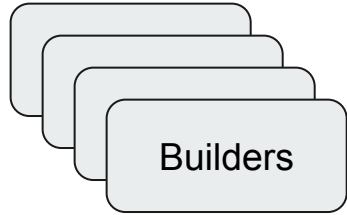
Koji CLI

```
$ koji build <build target> <git URL>
```

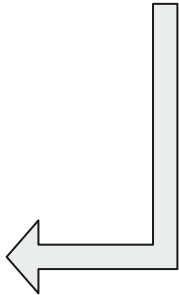
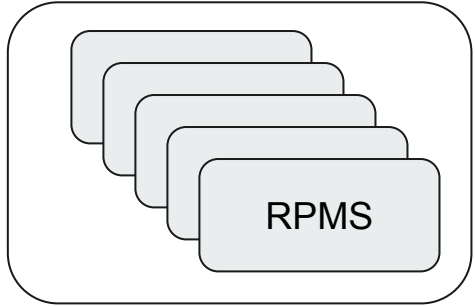
.spec files



Kojibuilder
Postgresql
KojiWeb
Koji Hub



RPM



Library of RPMS



Packages



Search

Summary

Packages

Builds

Tasks

Tags

Build Targets

Users

Hosts

Reports

Search

Thu, 25 Oct 2018 09:04:50 UTC | [login](#)

Welcome to Koji Web

Recent Builds

ID ▼	NVR	Built by	Finished	State
No builds				

Recent Tasks

ID ▼	Type	Owner	Arch	Finished	State
No tasks					



Hosts

State:

Hosts 1 through 1 of 1

ID	Name ▲	Archives	Enabled?	Ready?	Last Update
1	kojibuilder	x86_64	✓	✓	2018-10-25 09:18:22

Hosts 1 through 1 of 1



Welcome to Koji Web

Recent Builds

ID ▾	NVR	Built by	Finished	State
No builds				

Recent Tasks

ID ▾	Type	Owner	Arch	Finished	State
3	build (dist-demo, /chuyd/ssh-pass.git:koji-example)	kojiadmin	noarch		
1	newRepo (dist-centos-build)	kojiadmin	noarch	2018-10-25 09:21:28	



Welcome to Koji Web

Recent Builds

ID ▼	NVR	Built by	Finished	State
No builds				

Recent Tasks

ID ▼	Type	Owner	Arch	Finished	State
3	build (dist-demo, /chuyd/ssh-pass.git.koji-example)	kojadmin	noarch		
1	newRepo (dist-centos-build)	kojadmin	noarch	2018-10-25 09:21:28	

Information for task build (dist-demo, /chuyd/sshpass.git:koji-example)

ID	10
Method	build
Parameters	Source: git://github.com/chuyd/sshpass.git#koji-example Build Target: dist-demo Options: scratch = True
State	closed
Created	Thu, 25 Oct 2018 09:34:12 UTC
Started	Thu, 25 Oct 2018 09:34:13 UTC
Completed	Thu, 25 Oct 2018 09:38:15 UTC
Owner	kojiadmin
Channel	default
Host	kojibuilder
Arch	noarch
Parent	
Descendants	build <ul style="list-style-type: none">buildSRPMFromSCM (/chuyd/sshpass.git:koji-example)buildArch (sshpass-1.06-2.el7.centos.src.rpm, x86_64)
Waiting?	no
Awaited?	no
Priority	20
Weight	0.20
Result	
Output	

Information for task buildSRPMFromSCM (/chuyd/sshpass.git:koji-example)

ID	11
Method	buildSRPMFromSCM
Parameters	SCM URL: git://github.com/chuyd/sshpass.git#koji-example Build Tag: dist-centos-build Options: scratch = True repo_id = 3
State	closed
Created	Thu, 25 Oct 2018 09:34:13 UTC
Started	Thu, 25 Oct 2018 09:34:13 UTC
Completed	Thu, 25 Oct 2018 09:36:58 UTC
Owner	kojiadmin
Channel	default
Host	kojibuilder
Arch	noarch
Buildroot	/var/lib/mock/dist-centos-build-2-3
Parent	build (dist-demo, /chuyd/sshpass.git:koji-example)
Descendants	
Waiting?	no
Awaited?	no
Priority	19
Weight	1.00
Result	source = url= git://github.com/chuyd/sshpass.git#koji-example , source= git#57fd320a5a24c4e139dfe20524bd0c1144bd85b5 brootid = 2 srpm = tasks/11/11/sshpass-1.06-2.el7.centos.src.rpm logs = tasks/11/11/hw_info.log , tasks/11/11/state.log , tasks/11/11/build.log , tasks/11/11/root.log
Output	build.log (tail) checkout.log (tail) hw_info.log (tail) mock_output.log (tail) root.log (tail) state.log (tail) sshpass-1.06-2.el7.centos.src.rpm

Information for task buildArch (sshpass-1.06-2.el7.centos.src.rpm, x86_64)

ID	12
Method	buildArch
Parameters	SRPM: tasks/11/11/sshpass-1.06-2.el7.centos.src.rpm Build Tag: dist-centos-build Arch: x86_64 Keep SRPM? yes Options: repo_id = 3
State	closed
Created	Thu, 25 Oct 2018 09:37:00 UTC
Started	Thu, 25 Oct 2018 09:37:00 UTC
Completed	Thu, 25 Oct 2018 09:38:08 UTC
Owner	kojadmin
Channel	default
Host	kojibuilder
Arch	x86_64
Buildroot	/var/lib/mock/dist-centos-build-3-3
Parent	build (dist-demo, /chuyd/sshpass.git:koji-example)
Descendants	
Waiting?	no
Awaited?	no
Priority	19
Weight	1.50
Result	brootid = 3 srpms = tasks/12/12/sshpass-1.06-2.el7.centos.src.rpm rpms = tasks/12/12/sshpass-1.06-2.el7.centos.x86_64.rpm, tasks/12/12/sshpass-debuginfo-1.06-2.el7.centos.x86_64.rpm logs = tasks/12/12/hw_info.log, tasks/12/12/state.log, tasks/12/12/build.log, tasks/12/12/root.log, tasks/12/12/installed_pkgs.log, tasks/12/12/mock_output.log
Output	build.log (tail) hw_info.log (tail) installed_pkgs.log (tail) mock_output.log (tail) root.log (tail) state.log (tail) sshpass-1.06-2.el7.centos.src.rpm sshpass-1.06-2.el7.centos.x86_64.rpm sshpass-debuginfo-1.06-2.el7.centos.x86_64.rpm

Information for tag dist-centos-build

Name	dist-centos-build
ID	2
Arches	x86_64
Locked	no
Permission	none
Maven Support?	no
Include All Maven Builds?	no
Inheritance	dist-centos-build └─ dist-centos-7.5.1804
External repos	centos-7-5-1804-repo (inherited from dist-centos-7.5.1804) centos-7-5-1804-update-repo (inherited from dist-centos-7.5.1804) centos-7-5-1804-extras-repo (inherited from dist-centos-7.5.1804)
Repo created	Thu, 25 Oct 2018 09:28:08 UTC
Packages	1
Builds	0
Targets building from this tag	dist-demo
Targets building to this tag	No build targets

```

DEBUG util.py:490: BUILDSTDERR: Failed to set locale, defaulting to C
DEBUG util.py:490: BUILDSTDERR: There is no installed groups file.
DEBUG util.py:490: BUILDSTDERR: Maybe run: yum groups mark convert (see man yum)
DEBUG util.py:492:
=====
DEBUG util.py:492: Package           Arch      Version           Repository
DEBUG util.py:492:                               Size
=====
DEBUG util.py:492: Installing for group install "build":
DEBUG util.py:492: bash              x86_64    4.2.46-30.el7    build    1.0 M
DEBUG util.py:492: bzip2             x86_64    1.0.6-13.el7    build    52 k
DEBUG util.py:492: coreutils         x86_64    8.22-21.el7     build    3.3 M
DEBUG util.py:492: cpio              x86_64    2.11-27.el7     build    211 k
DEBUG util.py:492: diffutils         x86_64    3.3-4.el7       build    322 k
DEBUG util.py:492: findutils         x86_64    1:4.5.11-5.el7  build    559 k
DEBUG util.py:492: gawk              x86_64    4.0.2-4.el7_3.1 build    874 k
DEBUG util.py:492: gcc               x86_64    4.8.5-28.el7    build    16 M
DEBUG util.py:492: gcc-c++           x86_64    4.8.5-28.el7    build    7.2 M
DEBUG util.py:492: grep              x86_64    2.20-3.el7      build    344 k
DEBUG util.py:492: gzip              x86_64    1.5-10.el7      build    130 k
DEBUG util.py:492: info              x86_64    5.1-5.el7       build    233 k
DEBUG util.py:492: make              x86_64    1:3.82-23.el7   build    420 k
DEBUG util.py:492: patch             x86_64    2.7.1-8.el7     build    110 k
DEBUG util.py:492: redhat-rpm-config noarch    9.1.0-80.el7.centos build    79 k
DEBUG util.py:492: rpm-build         x86_64    4.11.3-32.el7   build    147 k
DEBUG util.py:492: sed               x86_64    4.2.2-5.el7     build    231 k
DEBUG util.py:492: shadow-utils     x86_64    2:4.1.5.1-24.el7 build    1.1 M
DEBUG util.py:492: tar               x86_64    2:1.26-34.el7   build    845 k
DEBUG util.py:492: unzip             x86_64    6.0-19.el7      build    170 k
DEBUG util.py:492: which             x86_64    2.20-7.el7      build    41 k
DEBUG util.py:492: Installing for dependencies:
DEBUG util.py:492: acl               x86_64    2.2.51-14.el7   build    81 k
DEBUG util.py:492: audit-libs       x86_64    2.8.1-3.el7     build    99 k
DEBUG util.py:492: basesystem       noarch    10.0-7.el7.centos build    5.0 k
DEBUG util.py:492: binutils          x86_64    2.27-27.base.el7 build    5.9 M
DEBUG util.py:492: bzip2-libs       x86_64    1.0.6-13.el7   build    40 k
DEBUG util.py:492: ca-certificates  noarch    2017.2.20-71.el7 build    401 k
DEBUG util.py:492: centos-release   x86_64    7-5.1804.el7.centos build    24 k
DEBUG util.py:492: chkconfig        x86_64    1.7.4-1.el7     build    181 k
DEBUG util.py:492: cpp               x86_64    4.8.5-28.el7    build    5.9 M
DEBUG util.py:492: cracklib         x86_64    2.9.0-11.el7   build    80 k
DEBUG util.py:492: cracklib-dicts   x86_64    2.9.0-11.el7   build    3.6 M
DEBUG util.py:492: cryptsetup-libs  x86_64    1.7.4-4.el7     build    223 k
DEBUG util.py:492: curl             x86_64    7.29.0-46.el7   build    268 k
DEBUG util.py:492: cyrus-sasl-lib   x86_64    2.1.26-23.el7   build    155 k
DEBUG util.py:492: dbus             x86_64    1:1.10.24-7.el7 build    245 k
DEBUG util.py:492: dbus-libs        x86_64    1:1.10.24-7.el7 build    169 k
DEBUG util.py:492: device-mapper    x86_64    7:1.02.146-4.el7 build    289 k
DEBUG util.py:492: device-mapper-libs x86_64    7:1.02.146-4.el7 build    316 k
DEBUG util.py:492: dracut           x86_64    033-535.el7     build    325 k
DEBUG util.py:492: dwz              x86_64    0.11-3.el7      build    99 k
DEBUG util.py:492: elfutils         x86_64    0.170-4.el7     build    282 k
DEBUG util.py:492: elfutils-default-yama-scope noarch    0.170-4.el7     build    31 k
DEBUG util.py:492: elfutils-libelf  x86_64    0.170-4.el7     build    195 k
DEBUG util.py:492: elfutils-libs    x86_64    0.170-4.el7     build    267 k
DEBUG util.py:492: expat            x86_64    2.1.0-10.el7_3  build    81 k

```

Welcome to Koji Web

Recent Builds

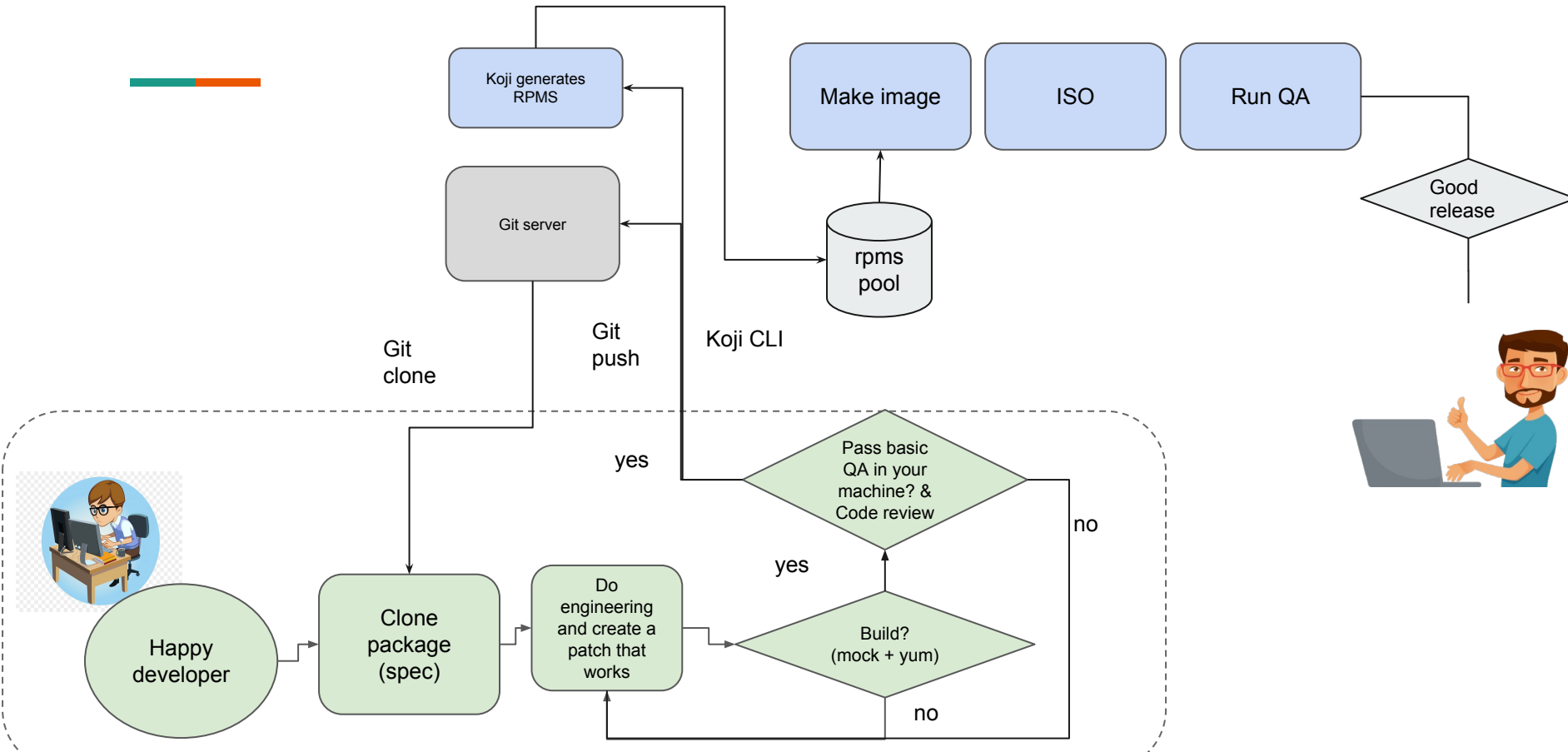
ID ▾	NVR	Built by	Finished	State
1	sshpas-1.06-2.el7.centos	kojiadmin	2018-10-25 09:45:37	

Recent Tasks

ID ▾	Type	Owner	Arch	Finished	State
18	buildNotification (sshpas-1.06-2.el7.centos)	kojibuilder	noarch		

How do I Create CI/CD system for happy developers







Koji Internally

Koji is based on:

- Mock
- Yum
- Rpmbuild
- Createrepo



Mock

- Creates a new chroot for every build
- Executes commands in a chroot
- Commands can be run
 - Privileged
 - Unprivileged
- Output is copied to a results location
- Ensures that the output is controlled
- Builds on yum

Rpmbuild

- Converts bare components into a binary package.
 - Spec file
 - Upstream tarball
 - Patch files
- SRPMS and binary rpms

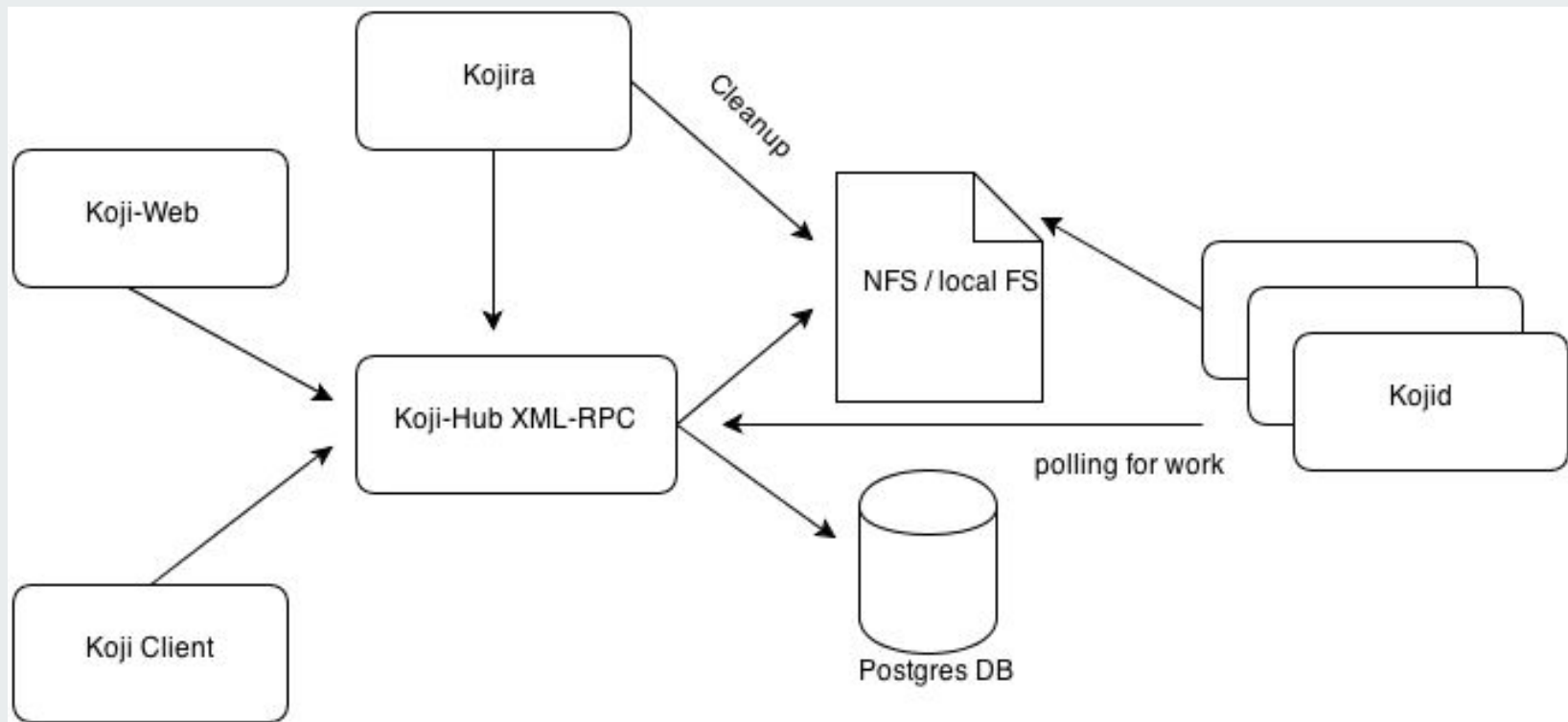
Yum

- Reads repository metadata
- Installs rpm packages

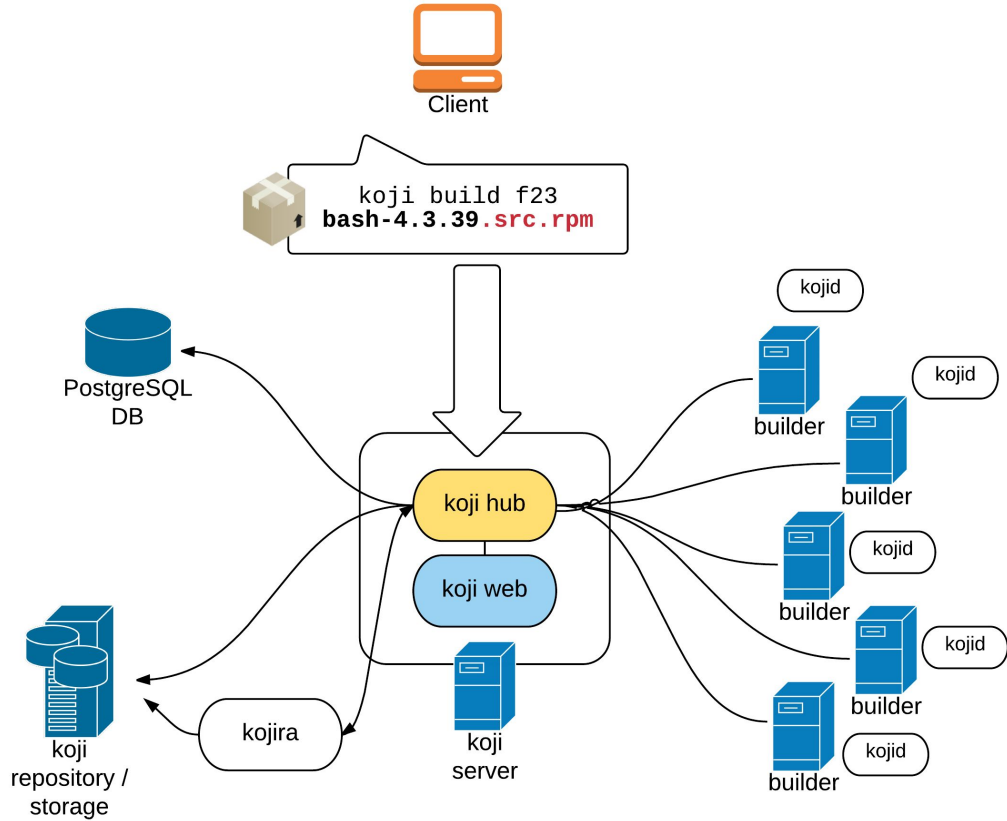


Koji Components

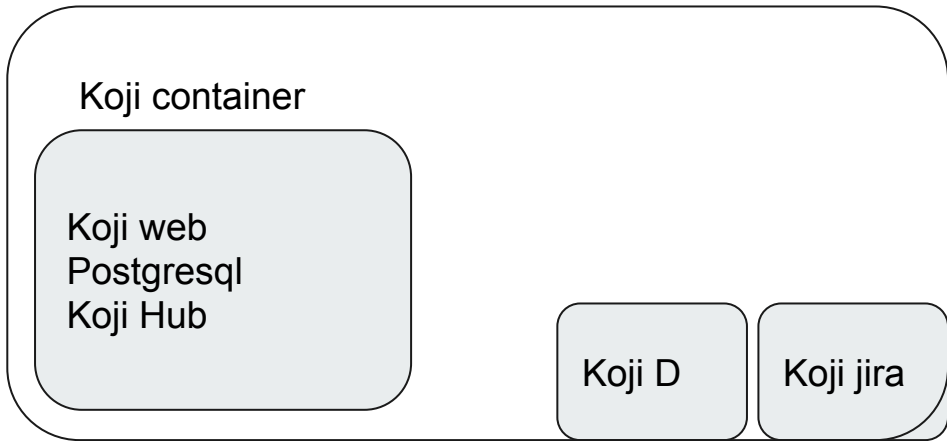
- Kojihub
- Kojira
- Kojid
- Kojiweb
- Koji



Koji build system



How to set up your koji (easy)



Bare Metal System



Demo time