



# rpminspect tag runner

Testing both rpminspect and CentOS Stream at scale

Jim Bair

Senior Software Engineer at Red Hat

Fedora, RHEL and CentOS Stream CI

jbair on IRC

---

# What is rpminspect?

<https://github.com/rpminspect/rpminspect>

**rpminspect** is an RPM build deviation analysis tool. It looks at the output of an RPM build (e.g., the output of a Koji build) and examines the contents of the build artifacts to report:

- Policy compliance
- Changes from a previous build to the current build
- General correctness and best practices

rpminspect is run today against CentOS Stream in Zuul against MRs in gitlab. Here's an example:

- [https://gitlab.com/redhat/centos-stream/rpms/mariadb/-/merge\\_requests/22](https://gitlab.com/redhat/centos-stream/rpms/mariadb/-/merge_requests/22)

rpminspect is responsible for running 189 tests across 44 inspections, and growing as needed.

So, what kind of tests are we talking about?

# What is rpminspect testing?

Here are a few examples of inspections rpminspect is performing on builds:

## license

- Verify the string specified in the License tag of the RPM metadata describes permissible software licenses as defined by the license database. Also checks to see if the License tag contains any unprofessional words as defined in the configuration file

## runpath

- Check for forbidden paths in both the DT\_RPATH and DT\_RUNPATH settings in ELF shared objects.

## symlinks

- Symbolic links must be resolvable on the installed system. This inspection ensures absolute and relative symlinks are valid. It also checks for any symlink usage that will cause problems for RPM.

To see a complete list of all inspections and what they do, you can run: `rpminspect -lv`

# What is a tag?

In CentOS, the Koji build system is used for building and tracking RPMs. Koji organizes packages using tags as documented here:

- <https://docs.pagure.org/koji/HOWTO/#koji-architecture>

To see the tags in CentOS Stream 9, you can install **koji** and **centpkg** in Fedora and run:

- `koji -p stream list-tags`

To see the packages currently ready to ship to composes in Stream, you can run:

- [koji -p stream list-tagged --latest c9s-pending](#)
  - The `--latest` flag avoids duplicate packages if multiple updates are available for a given package on the `c9s-pending` tag

# Example of koji list-tagged:

```
jim@lenovo:~  
xorg-x11-drv-vmware-13.2.1-18.el9      c9s-pending      ajackson  
xorg-x11-drv-wacom-1.0.0-1.el9        c9s-pending      phuttere  
xorg-x11-font-utils-7.5-53.el9       c9s-pending      mboddu  
xorg-x11-fonts-7.5-33.el9            c9s-pending      mboddu  
xorg-x11-proto-devel-2021.4-2.el9    c9s-pending      mboddu  
xorg-x11-server-1.20.11-10.el9       c9s-pending      ofourdan  
xorg-x11-server-Xwayland-21.1.3-2.el9 c9s-pending      ofourdan  
xorg-x11-server-utils-7.7-44.el9     c9s-pending      mboddu  
xorg-x11-util-macros-1.19.3-4.el9    c9s-pending      mboddu  
xorg-x11-utils-7.5-40.el9           c9s-pending      mboddu  
xorg-x11-xauth-1.1-10.el9           c9s-pending      mboddu  
xorg-x11-xbitmaps-1.1.1-23.el9      c9s-pending      mboddu  
xorg-x11-xinit-1.4.0-11.el9         c9s-pending      mboddu  
xorg-x11-xtrans-devel-1.4.0-8.el9   c9s-pending      mboddu  
xrestop-0.4-29.el9                  c9s-pending      mboddu  
xsane-0.999-42.el9                  c9s-pending      mboddu  
xterm-366-8.el9                      c9s-pending      tkorbar  
xz-5.2.5-8.el9                      c9s-pending      mmuzila  
xz-java-1.8-14.el9                  c9s-pending      mboddu  
yajl-2.1.0-20.el9                   c9s-pending      jnovy  
yara-4.2.1-4.el9                    c9s-pending      mhuth  
yasm-1.3.0-15.el9                   c9s-pending      mboddu  
yelp-40.3-2.el9                     c9s-pending      mboddu  
yelp-tools-40.0-3.el9               c9s-pending      mboddu  
yelp-xsl-40.2-1.el9                 c9s-pending      klember  
zaf-0-0.25.20080714svn.el9          c9s-pending      mboddu  
zenity-3.32.0-8.el9                 c9s-pending      dking  
zip-3.0-33.el9                      c9s-pending      jamartis  
zlib-1.2.11-33.el9                  c9s-pending      mmuzila  
zsh-5.8-9.el9                       c9s-pending      kdudka  
zstd-1.5.1-2.el9                    c9s-pending      jamartis  
zziplib-0.13.71-9.el9               c9s-pending      mboddu  
[jim@lenovo ~]$
```

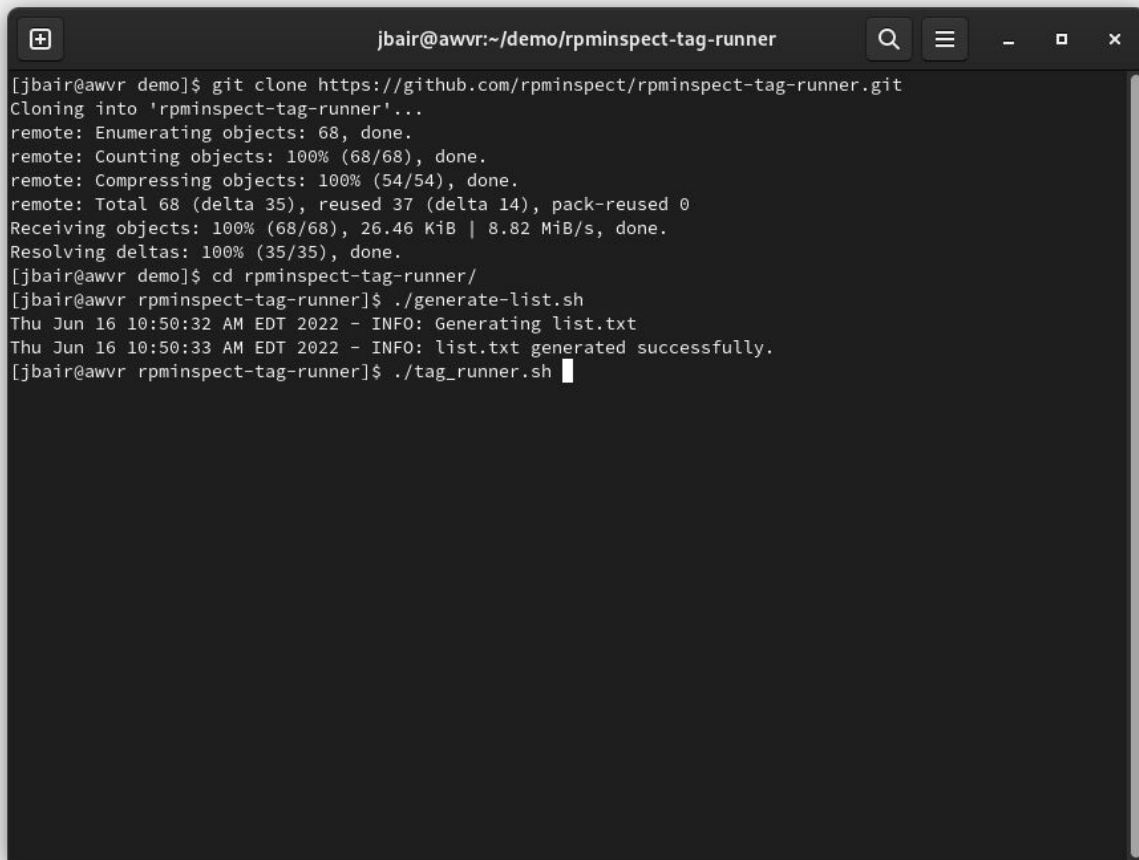
# What is rpminspect-tag-runner?

<https://github.com/rpminspect/rpminspect-tag-runner>

**rpminspect tag runner** allows for rapid, concurrent testing across thousands of packages in a given tag.

- We generate a list of all builds ready to ship in CentOS Stream 9
- We run rpminspect against the builds we find in a threaded manner
  - Assuming no hiccups, this takes ~3.5 hours on a 10C20T Fedora desktop
- We use adjustable command-line arguments that help with debugging
- We capture as much data as we can!
  - test results, stdout, stderr, runtime, exit code, and the command we ran
- For every successful inspection, we then find the previous build of the package and run an rpminspect **comparison** between the old and new builds

# Example of tag-runner:

A terminal window with a dark background and light text. The window title is 'jbair@awvr:~/demo/rpminspect-tag-runner'. The terminal shows the following commands and output:

```
[jbair@awvr demo]$ git clone https://github.com/rpminspect/rpminspect-tag-runner.git
Cloning into 'rpminspect-tag-runner'...
remote: Enumerating objects: 68, done.
remote: Counting objects: 100% (68/68), done.
remote: Compressing objects: 100% (54/54), done.
remote: Total 68 (delta 35), reused 37 (delta 14), pack-reused 0
Receiving objects: 100% (68/68), 26.46 KiB | 8.82 MiB/s, done.
Resolving deltas: 100% (35/35), done.
[jbair@awvr demo]$ cd rpminspect-tag-runner/
[jbair@awvr rpminspect-tag-runner]$ ./generate-list.sh
Thu Jun 16 10:50:32 AM EDT 2022 - INFO: Generating list.txt
Thu Jun 16 10:50:33 AM EDT 2022 - INFO: list.txt generated successfully.
[jbair@awvr rpminspect-tag-runner]$ ./tag_runner.sh
```

# Example of tag-runner:

```
jbair@awvr:~/demo/rpminspect-tag-runner
Thu Jun 16 10:52:18 AM EDT 2022 - Testing NetworkManager-1.39.6-1.el9
Thu Jun 16 10:52:19 AM EDT 2022 - Testing NetworkManager-libreswan-1.2.14-1.el9.3
Thu Jun 16 10:52:19 AM EDT 2022 - Testing OpenIPMI-2.0.32-3.el9
Thu Jun 16 10:52:20 AM EDT 2022 - Testing PEGTL-2.8.3-4.el9
Thu Jun 16 10:52:20 AM EDT 2022 - Testing PackageKit-1.2.4-2.el9
Thu Jun 16 10:52:21 AM EDT 2022 - Testing PyYAML-5.4.1-6.el9
Thu Jun 16 10:52:21 AM EDT 2022 - Testing SDL2-2.0.20-2.el9
Thu Jun 16 10:52:22 AM EDT 2022 - Testing WALinuxAgent-2.7.0.6-1.el9
Thu Jun 16 10:52:22 AM EDT 2022 - Testing Xaw3d-1.6.3-7.el9
Thu Jun 16 10:52:23 AM EDT 2022 - Testing a52dec-0.7.4-42.el9
Thu Jun 16 10:52:23 AM EDT 2022 - Testing aajohan-comfortaa-fonts-3.001-10.el9
Thu Jun 16 10:52:24 AM EDT 2022 - 20 rpminspect jobs currently running:
2895871 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh 389-ds-base-2.0.14-1.el9
2895888 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh Box2D-2.4.1-7.el9
2895906 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh CUnit-2.1.3-25.el9
2895930 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh Cython-0.29.22-7.el9
2895960 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh HdrHistogram-2.1.12-3.el9
2895988 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh HdrHistogram_c-0.11.0-6.el9
2896020 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh Judy-1.0.5-28.el9
2896064 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh LibRaw-0.20.2-5.el9
2896113 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh ModemManager-1.18.2-3.el9
2896164 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh NetworkManager-1.39.6-1.el9
2896217 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh NetworkManager-libreswan-1.2.14-1.el9.3
2896272 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh OpenIPMI-2.0.32-3.el9
2896337 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh PEGTL-2.8.3-4.el9
2896394 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh PackageKit-1.2.4-2.el9
2896452 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh PyYAML-5.4.1-6.el9
2896527 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh SDL2-2.0.20-2.el9
2896582 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh WALinuxAgent-2.7.0.6-1.el9
2896637 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh Xaw3d-1.6.3-7.el9
2896695 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh a52dec-0.7.4-42.el9
2896762 pts/10 S+ 0:00 /bin/bash ./run_rpminspect.sh aajohan-comfortaa-fonts-3.001-10.el9
```



# A bit of history

Red Hat originally developed an internal QE tool called **rpmdiff** (not the one from rpmlint)

This tool was built a long time ago....before things like the cloud, virtualization, or containers.

This tool runs as a service and performs tests on built packages similar to the tests in rpminspect:

- Package policy compliance
- Legal checks
- Kernel ABI verification
- Security policies
- Comparisons from one build to the next

**rpminspect** was built as it's replacement with the goals of being open source, run on the command line and being much more portable along with some much needed refactoring along the way.

# Where does tag-runner fit in?

rpminspect is at v1.9, with 1.10 in active development:

<https://github.com/rpminspect/rpminspect/releases/tag/v1.9>

- With 130 commits since this release (and counting!), the speed of development to fully replace rpmdiff means a lot of bug-fixes and improvements
- Inspection failures fall into two categories:
  - A bug to be fixed in rpminspect itself
  - An valid failure that requires an updated build or the creation of an rpminspect.yaml configuration within the build
- Updated copr builds improve accuracy of our inspections and tag-runner helps us discover newly-passing builds quickly
- tag-runner has helped to improve the stability of the upcoming 1.10 release:
  - <https://github.com/rpminspect/rpminspect/pull/791>
  - <https://github.com/rpminspect/rpminspect/pull/792>

# Current rpminspect stats on c9s

c9s-pending on 16-June-2022

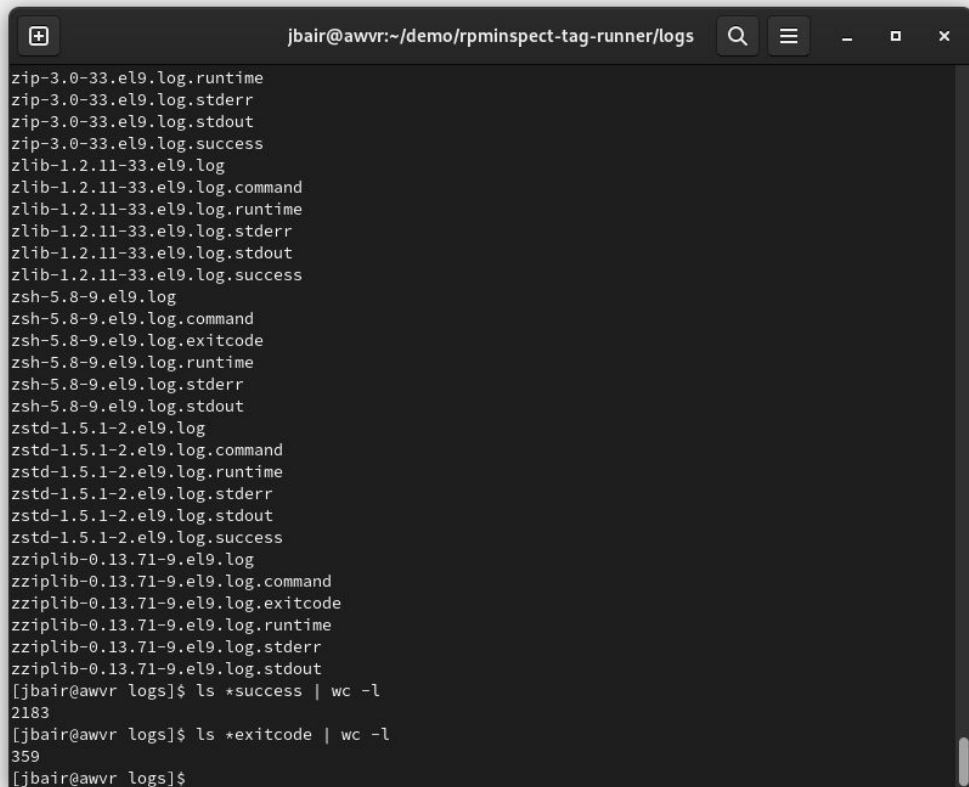
Total runtime: ~8 hours

Total packages: 2542

Inspection pass rate: 86%

Comparison pass rate: 97%

Your feedback helps us to provide  
better test results!



```
jbair@awvr:~/demo/rpminspect-tag-runner/logs
zip-3.0-33.el9.log.runtime
zip-3.0-33.el9.log.stderr
zip-3.0-33.el9.log.stdout
zip-3.0-33.el9.log.success
zlib-1.2.11-33.el9.log
zlib-1.2.11-33.el9.log.command
zlib-1.2.11-33.el9.log.runtime
zlib-1.2.11-33.el9.log.stderr
zlib-1.2.11-33.el9.log.stdout
zlib-1.2.11-33.el9.log.success
zsh-5.8-9.el9.log
zsh-5.8-9.el9.log.command
zsh-5.8-9.el9.log.exitcode
zsh-5.8-9.el9.log.runtime
zsh-5.8-9.el9.log.stderr
zsh-5.8-9.el9.log.stdout
zstd-1.5.1-2.el9.log
zstd-1.5.1-2.el9.log.command
zstd-1.5.1-2.el9.log.runtime
zstd-1.5.1-2.el9.log.stderr
zstd-1.5.1-2.el9.log.stdout
zstd-1.5.1-2.el9.log.success
zziplib-0.13.71-9.el9.log
zziplib-0.13.71-9.el9.log.command
zziplib-0.13.71-9.el9.log.exitcode
zziplib-0.13.71-9.el9.log.runtime
zziplib-0.13.71-9.el9.log.stderr
zziplib-0.13.71-9.el9.log.stdout
[jbair@awvr logs]$ ls *success | wc -l
2183
[jbair@awvr logs]$ ls *exitcode | wc -l
359
[jbair@awvr logs]$
```

# What's next for tag-runner?

- Requests for features can be found in github:  
<https://github.com/rpminspect/rpminspect-tag-runner/issues>
- Team discussions around creating a pipeline to monitor compose and rpminspect health with tag-runner daily or weekly
- Single command runs providing an easy to digest summary/report
- Better resiliency for public networks with unexpected timeouts
- Allow profiles to define tags and koji end-points for various distributions
- Size based sorting; PoC works but it does take some time to run (30+ minutes)
  - I need to bring the PoC into the repo and add cache support (a lot of re-runs against the same builds so a cache helps)
- If you try it and find bugs or would like additional features, send us a PR or file an issue



**Questions?**



# Thank you!

Jim Bair

[jbair@redhat.com](mailto:jbair@redhat.com)

**jbair** on IRC

[jimbair](#) on github

**@jamesdbair** on Twitter

---