



# **Solving the Package Problem? Or Making it Infinitely Worse?**

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**Who's this guy?**



# **Solving the Package Problem (Or Making it Infinitely Worse?)**

- **The Packaging Problem We Face**
- **Solution: Software Collections**
- **Solution: rpm-ostree**
- **Solution: Linux Containers**
- **Potential Pitfalls**
- **Questions**



# **In the Beginning...**



# Distributions as the Center of the Universe



**Developers do not want to be limited to system versions of software**



**Developers want easier ways to  
deploy complex software from  
desktop to server**



**Automate ALL THE THINGS**





# **Software Collections, rpm-ostree, and Docker (oh my)**





# **Let's talk about Software Collections**

**Do not require changes to RPM**



**Software Collections are *not* just a different version packaged for your OS**



**Do not overwrite system files**



# Example: PHP 5.4

**On CentOS 6.x**

**PHP 5.4 package is** `php54`

**This pulls in:**

`php54-php-cli.x86_64`

`php54-php-common.x86_64`

`php54-php-pear.noarch`

`php54-php-process.x86_64`

`php54-php-xml.x86_64`

`php54-runtime.x86_64`

**Lives in:** `/opt/rh/php54/root`



# **Avoid conflicts with system files**



**Require *minor* changes to your  
existing spec files**





**Do not conflict with updates on your system**



**Nifty: *Can* depend on other SCLs**





# **Let's talk about using SCLs**

# Getting Started

- Assuming using a SLC with CentOS
  - `yum install centos-release-SCL`
  - `yum install php54` (or whatever...)
  - `scl enable php54 "application --option"`
  - Your application now uses PHP 5.4 ... the rest of the system ignores it.
  - Python & Django with SCL (by Langdon White):
    - <http://red.ht/scldjango>
  - Find packages for CentOS here:  
`http://mirror.metrocast.net/centos/6.5/SCL/x86_64/`



# Packaging SCLs

- **Grab the necessary packages (CentOS or Fedora or RHEL 6.5):**

```
yum install scl-utils scl-utils-build
```

- **Instructions on converting an existing package:** <http://bit.ly/scl-spec-file>

- **For Conversion:** `spec2scl`

- **General instructions on packaging SCLs:** <http://bit.ly/pkging-scls>





**SoftwareCollections.org**

# Software Collections Currently

- See: <https://www.softwarecollections.org/en/>
- CentOS SCL SIG:  
<http://wiki.centos.org/SpecialInterestGroup/SCLo>
- Git repo: <https://git.centos.org/project/?p=sig-sclo>
- Upstream mailing list:  
<https://www.redhat.com/mailman/listinfo/sclorg>
- 



# What is SoftwareCollections.org?

- Upstream community for development of SCLs.
- Build and hosting services for collections.
- Resources (documentation, forums, mailing lists) for developers/packagegers.
- An index of packaged software for users of CentOS, Fedora, RHEL, and other RPM-based distributions.





# The Lifecycle of Collections

- SCLs can be used to provide newer software support on older releases, or (going forward) to provide legacy support on newer releases:
  - Example: Application using Ruby on Rails N deployed on CentOS 6, via SCL. Same application deployed on CentOS 7 (when released) using SCL.
- OpenShift leverages SCLs for its cartridges using RHEL supported and non-supported components.
- SCLs can be used inside Docker containers to simplify container deployment.





**rpm-ostree**

# The Problem with Packages

- RPM (and dpkg) are designed to go one way: forward
- Upgrades are difficult to “roll back” in the event something goes wrong
- Switching between two distinct OSes / versions is more or less impossible



# What is rpm-ostree?

- Derived from ostree
  - Initially conceived of as a way to parallel install multiple UNIX-like OSes (e.g., Fedora Rawhide and Fedora 20)
  - “git for operating system binaries”
- Creates an installable tree from RPMs
- Not a package manager, but does take on some of the role from package managers



# What rpm-ostree Enables

- Install one or more operating system trees to a system
- Gives “atomic” updates
  - An update is, essentially, one unit – it succeeds or fails
  - An update can be rolled back
- Allows switching between “trees”
- Provides tools for creating tree composes



# Current Limitations

- Currently, an rpm-ostree “tree” is an immutable system
  - Doesn't allow for adding packages to a system w/out rebuilding the tree
- Build tools are still being developed, but moving quickly





**So, anybody heard of this Docker thing?**

# The Problem with Packages

- Deploying complex services / applications is difficult with packages
- Packages aren't as portable as we'd like
  - Application is developed on CentOS 6, but production is using CentOS 7?
- Packaging guidelines can be ... difficult
- Packages don't provide any solution for running containerized applications...





# Docker: It's Like Deluxe Super Awesome Packaging

- Docker is application-centric
- Docker containers are portable
- Supports versioning for an entire container
- Components can be re-used
- Allows for supplying ready-to-run services rather than half-configured packages
- Buzzword compliant



# Docker to the Rescue?

- Docker containers: relatively easy to work with
- Provide far more “services” than package systems
  - Application isolation
  - Image format, sharing, API
- Allows “layering” of applications
  - One group provides base image
  - Another group provides base image + framework/service (e.g., Apache)
  - Another group provides base image + framework + finished application ready to deploy





# Pitfalls

# Docker isn't Mature

- “Containers Don't Contain”
- Signing, etc. are still in their infancy
- Packaging apps in containers is still not well-understood
- Deploying apps in containers is still not well-understood



# Additional Problems

- Auditing software is difficult (or impossible) in containers
- Updates to containers – who tracks? How to automate?
- Host/Container mis-matches
- What else?



# Links and Pointers

- **Website:** [projectatomic.io](http://projectatomic.io)
- **Github:** [github.com/projectatomic](https://github.com/projectatomic)
- [Facebook.com/projectatomic](https://facebook.com/projectatomic)
- **Twitter:** [@projectatomic](https://twitter.com/projectatomic)
- **Mailing Lists:**  
<http://www.projectatomic.io/community/>



**Thanks!**

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