Dealing with the “Elephant” in the Room

Leveraging Fedora for building PHP containers on RHEL UBI

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Agenda

- Who We Are
- PHP Base Containers
- Packaging PHP Native Extensions
- Future Directions
- Questions

Who Are We?

Neal Gompa

- Professional technologist
- Linux user for fifteen years
- Contributor and developer in Fedora, openSUSE, Mageia, and OpenMandriva Linux distributions
- Member of FESCo
- Member of many Fedora SIGs and WGs
- Senior DevOps Engineer at Datto, Inc.

Daniel Axelrod

- Builder of platforms
- Better technology through empathy
- Linux user for 17 years
- Package management nerd
- Once wrote a terrible yum clone
- Staff DevOps Engineer at Datto, Inc.

All About Datto

Founded in 2007

22 global locations

1,600 employees worldwide & growing

17,000 managed service provider partners

100% channel only

What We Offer

Datto products empower our community of Managed Service Provider partners with the right technology, business tools, and support to enable each and every one of their customers to succeed. It's an approach that has made us the world's leading innovator of MSP-delivered IT solutions.

Growth Products

Unified Continuity

Reliable data protection for full IT environment maximizing up time

- SIRIS
- ALTO
- NAS

Datto Cloud Continuity for PCs

Datto File Protection

Datto SaaS Protection

- Office 365
- Google Suite

Networking

Fully cloud managed networking solutions designed for MSPs

- Datto Networking WiFi
- Datto Networking Switches
- Datto Networking Edge Routers
- Datto Managed Power

File Sync & Share

Fully managed File Sync & Share solution

- Datto Workplace

Efficiency Products

Professional Services Automation (PSA)

Autotask PSA: SaaS platform for MSPs to manage their entire business

Commerce

Simplify quoting and drive revenue growth

Remote Monitoring & Management (RMM)

Datto RMM: Cloud-based Software for MSPs to manage SMB endpoints

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PHP Base Containers

And what makes them difficult

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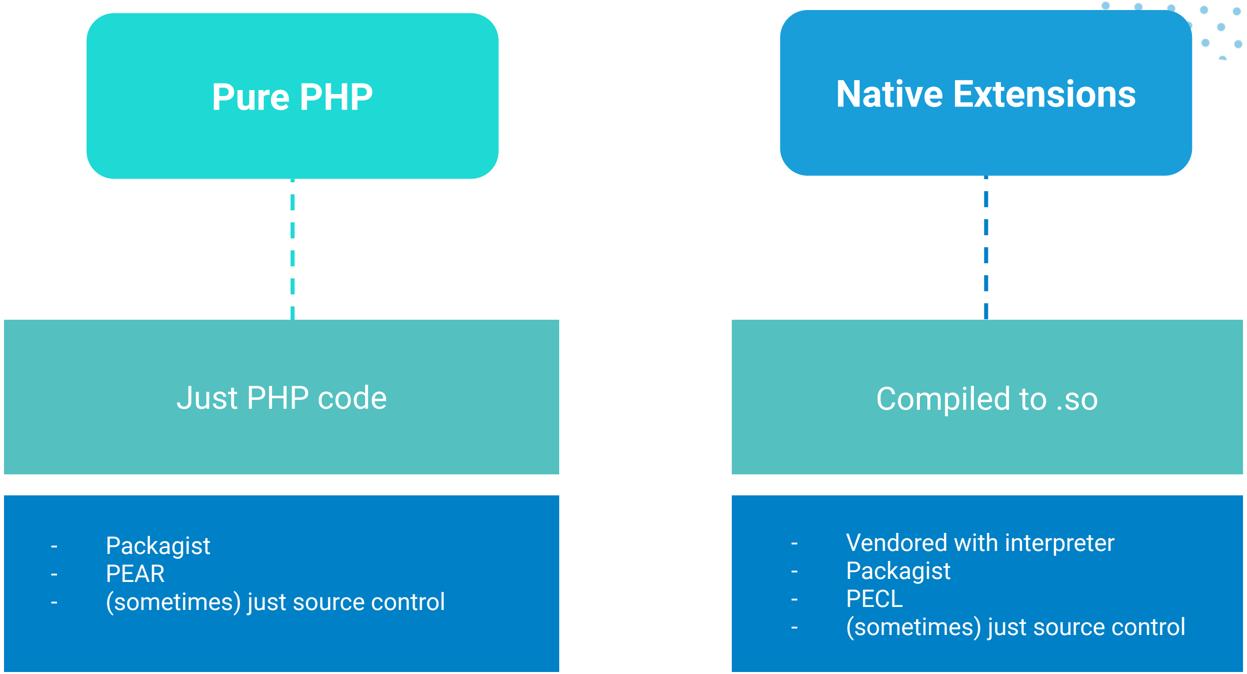
Datto’s PHP Base Container Stack

- The thing you start FROM in your app’s Dockerfile
- Based on Red Hat Universal Base Image
- Secure configuration defaults
- Support several versions of PHP
    - Accommodate gradual upgrades due to language breaking changes
- Ensure that dependencies come from maintained upstreams

PHP Language Packages



Pure PHP

Just PHP code

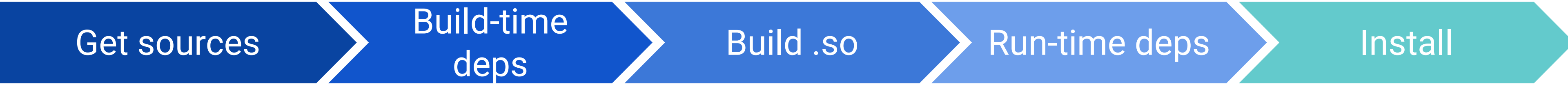
- Packagist
- PEAR
- (sometimes) just source control

Native Extensions

Compiled to .so

- Vendored with interpreter
- Packagist
- PECL
- (sometimes) just source control

Installing a Native Extension



Get sources

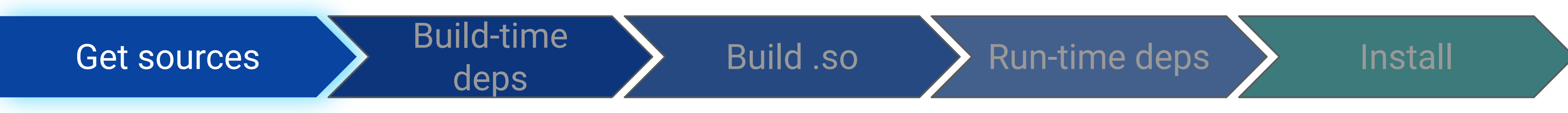
Build-time deps

Build .so

Run-time deps

Install

Installing a Native Extension



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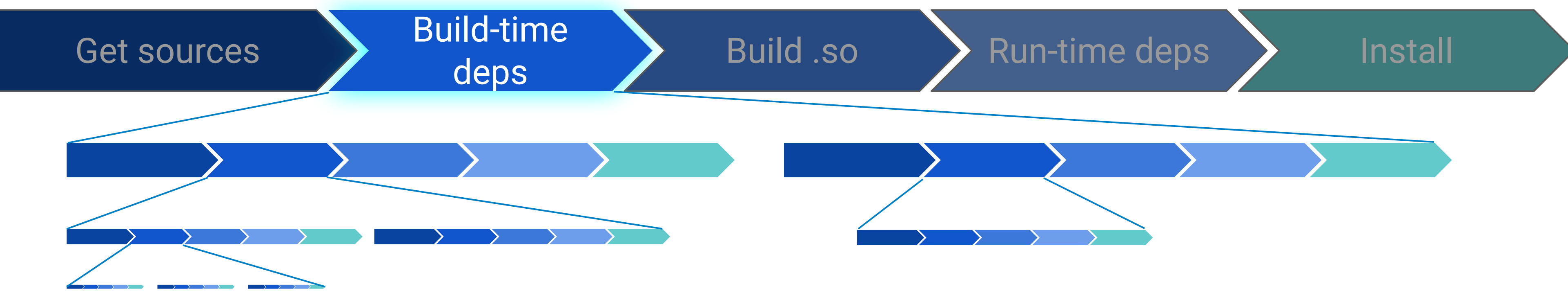
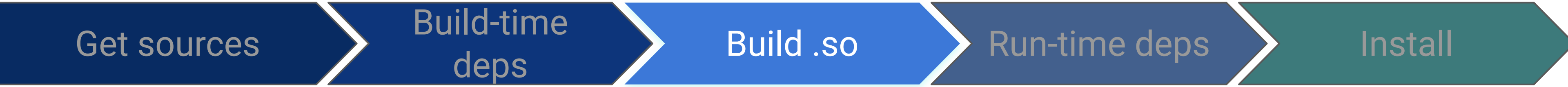


Installing a Native Extension



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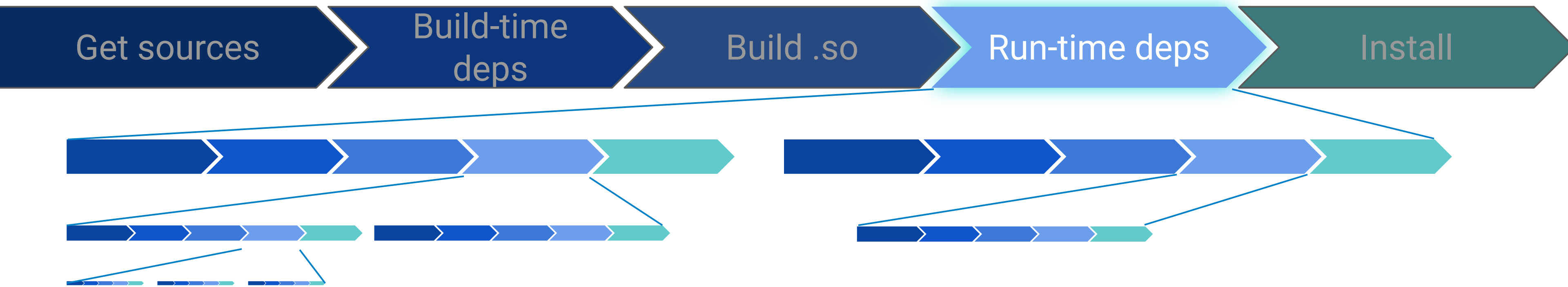
Installing a Native Extension



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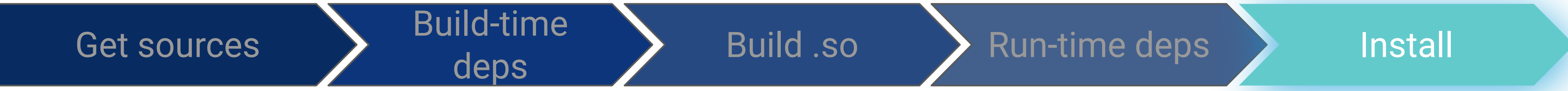
Installing a Native Extension



Get sources

Build-time deps

Build .so

Run-time deps

Install

- Put .so in correct place on disk
- Edit .ini files to load it in the right order

Sounds like a job for a package manager!

Sometimes language package manager can handle this

Sometimes not

- Sources bundled with PHP but not yet built and enabled
- OS-level build-time or run-time dependencies

OS Package manager to the rescue!

RHEL doesn’t include many native extensions

- Big matrix of PHP versions and extensions to support
- EPEL? No Modularity yet
- Many already packaged in Fedora!

Packaging PHP Native Extensions

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Open Build Service: SUSE’s “Koji”

The Open Build Service (OBS) is a software solution created by SUSE to build and manage the openSUSE and SUSE Linux Enterprise distributions. It’s similar to Koji, the RHEL/Fedora build system.

However, it was designed from the beginning to support a wide variety of Linux based platforms. Notably, it can build packages, repositories, and images for Red Hat/Fedora, SUSE, and Debian/Ubuntu systems.

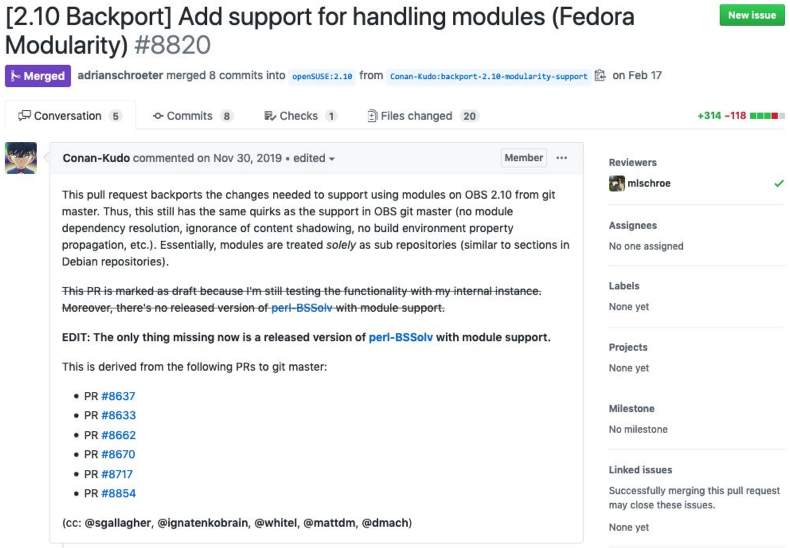
SUSE offers a hosted version as the openSUSE Build Service, and the appliance image is freely available for you to set up your own.

Why we use the Open Build Service?

- Source input flexibility through “source services” that allow scripted retrieval and processing of sources
- Easy scaling of resources through OBS workers that detect the orchestrator and auto-connect
- Automatic reverse dependency rebuilding on package updates to ensure dependencies are linked correctly
- Easy to deploy and get started with using the official appliance provided on the website
- Lets us build packages natively for RPM and Debian distributions using RPM spec files (using debbuild for Debian/Ubuntu)

OBS and Modularity

- Worked with the OBS team along with members of the DNF/YUM and Fedora Modularity teams to hash out a strategy to support modules in OBS
- The upstream OBS project implemented some of this two years ago, which led us to refocus on porting that to the stable OBS release
- Support for consuming modules was released with OBS version 2.10.1 with our assistance
- Enabled us to start taking advantage of modules at scale



[2.10 Backport] Add support for handling modules (Fedora Modularity) #8820

adrianschroeter merged 8 commits into `openSUSE:2.10` from `Conan-Kudo:backport-2.10-modularity-support` on Feb 17

Conan-Kudo commented on Nov 30, 2019 • edited

This pull request backports the changes needed to support using modules on OBS 2.10 from git master. Thus, this still has the same quirks as the support in OBS git master (no module dependency resolution, ignorance of content shadowing, no build environment property propagation, etc.). Essentially, modules are treated *solely* as sub repositories (similar to sections in Debian repositories).

~~This PR is marked as draft because I'm still testing the functionality with my internal instance. Moreover, there's no released version of perl-BSSolv with module support.~~

EDIT: The only thing missing now is a released version of perl-BSSolv with module support.

This is derived from the following PRs to git master:

- PR #8637
- PR #8633
- PR #8662
- PR #8670
- PR #8717
- PR #8854

(cc: @sgallagher, @ignatenkobrain, @whitel, @mattdm, @dmach)

Reviewers

mlschroe ✓

Assignees

No one assigned

Labels

None yet

Projects

None yet

Milestone

No milestone

Linked issues

Successfully merging this pull request may close these issues.

None yet

OBS Project Config

```
Release: <CI_CNT>.<B_CNT>%%{?dist}
# Ensure correct release package is picked
Prefer: centos-stream-release
Ignore: centos-linux-release
# Common modules all streams need
ExpandFlags: module:httpd-2.4
# Common flags
%define _without_tests 1
Macros:
%_without_tests 1
:Macros
```

```
# For building for PHP 7.2
%if "%_repository" == "CentOS_8_php-7.2"
ExpandFlags: module:php-7.2
Macros:
%dist .el8.php_7.2
:Macros
%endif

# For building for PHP 7.4
%if "%_repository" == "CentOS_8_php-7.4"
ExpandFlags: module:php-7.4
...
```

The script for building packages: distgit-obsimport

- Simple script that orchestrates checking out package sources from a Dist-Git server (Fedora by default) and pushing it to an OBS instance (the openSUSE Build Service by default) to build packages.
- Written in Python 3 and leverages osc (the OBS client tool), pygit2, and fedpkg.
- Available at https://pagure.io/obs-packaging-scripts

How it all comes together

Dockerfile (Base Container)

```
FROM registry.access.redhat.com/ubi8/ubi
USER root
ARG PHP_VERSION=7.2
COPY config/php-${PHP_VERSION}-modules-el8.repo \
     /etc/yum.repos.d/
RUN yum install -y \
        https://.../epel-release-latest-8.noarch.rpm \
    && yum module enable -y php:${PHP_VERSION} \
    && yum install -y php-cli php-fpm
USER app
```

Dockerfile (Application container)

```
FROM registry.../base-containers/php-fpm:7.4
USER root
RUN yum install -y \
        php-pecl-yaml
USER app
...
```

Sample .repo file

```
[Backports:php-modules-el8:CentOS_8_php-7.2]
name=PHP Modules for CentOS 8
baseurl=http://.../Backports:/php-modules-el8/CentOS_8_php-7.2
gpgkey=http://.../.../CentOS_8_php-7.2/repodata/repomd.xml.key
gpgcheck=1
enabled=1
```

Future Directions

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Ability to modify Specfile

- What if we need to modify dist-git from Fedora?
- Will become more important as Fedora diverges from EL8
- Mostly a question of workflow

Event-based container rebuilds

- Link between these:
  - OBS rebuilds dependant packages on package change
  - OKD rebuilds dependant containers on container change
- Rebuild containers when packages change
  - Instead of just on a schedule
- Will require ability to turn events on OBS’s event bus into webhooks

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Questions?