Composer in Depth
Part 1

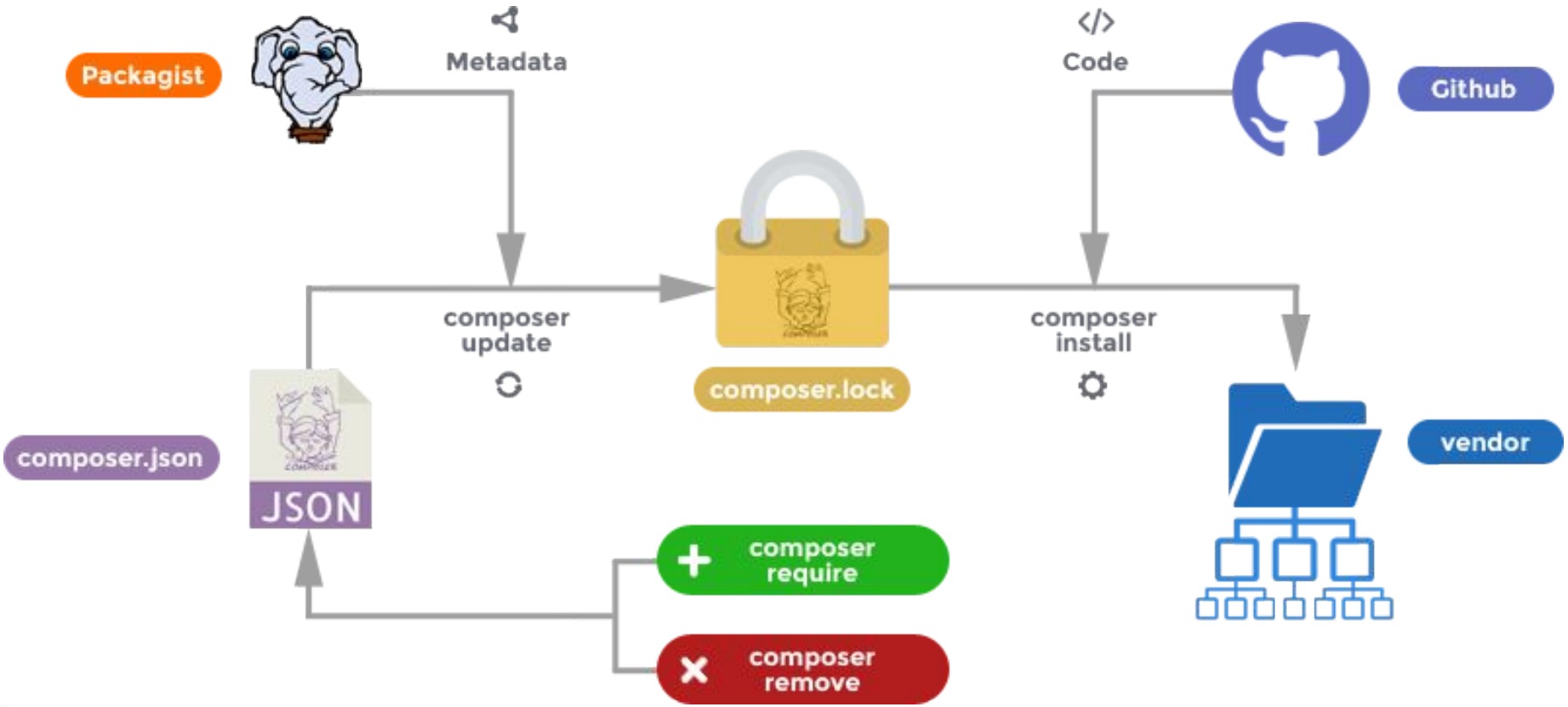
Nils Adermann
@naderman
Jordi Boggiano
@seldaek
Private Packagist
https://packagist.com

Dependency Management

- **Dependency Management** vs **Package Management**
- **System state** vs **installation/update instructions**

- Configuration Management
  - Tool to manage system state (puppet, salt, ansible, chef, …)
  - Description of state (master.pp, top.sls, …)

Nils Adermann @naderman
Jordi Boggiano @seldaek



Nils Adermann @naderman
Jordi Boggiano @seldaek

Working on “Libraries”

Publishing Packages

- README.md
  - What is it?
  - How do I use it?
  - How do I contribute? (Code of Conduct)
- Pick a License
  - SPDX
  - MIT, BSD, GPL
  - “proprietary”

Nils Adermann @naderman
Jordi Boggiano @seldaek

Publishing Packages

- CHANGELOG.md
  - BC breaks
    If necessary create UPGRADE.md
  - changes
  - bugfixes
  - new features

Nils Adermann @naderman
Jordi Boggiano @seldaek

Semantic Versioning

x.y.z

(BC-break).(new functionality).(bug fix)

http://semver.org/

Nils Adermann @naderman
Jordi Boggiano @seldaek

Semantic Versioning

Promise of Compatibility

X.Y.Z

- Must be used consistently
  Dare to increment **X**!
- Only valuable if BC/Compatibility promise formalized
  - See http://symfony.com/doc/current/contributing/code/bc.html
  - Document in Changelog

Nils Adermann @naderman
Jordi Boggiano @seldaek

Continuous Integration for Libraries

- Multiple runs
  - **`composer install`** from lock file
  - **`composer update`** for latest deps
  - **`composer update --prefer-lowest --prefer-stable`** for oldest (stable) deps

  - Potentially multiple composer.json files with different platform configurations
    - `COMPOSER=composer-customer1.json php composer.phar update`
    - `COMPOSER=composer-customer1.json php composer.phar install`
    - Don’t use this except for testing

Working on “Applications”

Simple Versioning

- There are no other packages depending on yours
  BC - for Composer consumption - doesn't matter
- Options:
  - Don't use versions at all, rely on your VCS
  - Increment a single integer
  - Use semver if you ship the application

Nils Adermann @naderman
Jordi Boggiano @seldaek

How to update?

- `“composer update”`
  - no isolation of problems unless run very frequently
- `“composer update <package...>”`
  - explicit conscious updates
- `“composer update --dry-run [<package...>]”`
  - Understanding and preparing effects of updates
  - Read CHANGELOGs
  - `composer outdated`

Nils Adermann @naderman
Jordi Boggiano @seldaek

Versions Constraints

-	**Exact Match:**	1.0.0	1.2.3-beta2	dev-master
-	**Wildcard Range:**	1.0.*	2.*	
-	**Hyphen Range:**	1.0-2.0 >=1.0.0 <2.1	1.0.0 - 2.1.0 >=1.0.0 <=2.1.0	
-	*Unbounded Range:* *Bad!*	*>= 1.0*		
-	**Next Significant Release**	~1.2 >=1.2.0 <2.0.0	~1.2.3 >=1.2.3 <1.3.0	
-	**Caret/Semver Operator**	^1.2 >=1.2.0 <2.0.0	^1.2.3 >=1.2.3 <2.0.0	**Best Choice for Libraries**

Operators: “ “ = AND, “||” = OR

Nils Adermann @naderman
Jordi Boggiano @seldaek

Stabilities

- **Order** dev -> alpha -> beta -> RC -> stable
- **Automatically from tags**
  1.2.3 -> stable
  1.3.0-beta3 -> beta
- **Automatically from branches**
  Branch -> Version (Stability)
  2.0 -> 2.0.x-dev (dev)
  master -> dev-master (dev)
  myfeature -> dev-myfeature (dev)
- **Choosing**

```
“foo/bar”: “1.3.*@beta”
“foo/bar”: “2.0.x-dev”

“minimum-stability”: “alpha”
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

In case of Errors

```
$ php composer.phar validate

./composer.json is valid for simple usage with composer but has
strict errors that make it unable to be published as a package:
See https://getcomposer.org/doc/04-schema.md for details on the schema
name : The property name is required
description : The property description is required
require.composer/composer : unbound version constraints (dev-master) should be avoided
```

Common: Version entry in composer.json conflicts with tag

```
$ php composer.phar self-update

$ php composer.phar update -vvv
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Resolution Conflicts: Overly Strict Requirements

```
// composer.json

    "require": {
        "cool/alice": "~1.3",
        "lazy/bob": "~1.2"
    }

// dependencies

    "name": "cool/alice",
    "require": {
        "monolog/monolog": "~1.6"
    }

    "name": "lazy/bob",
    "require": {
        "monolog/monolog": "1.3.*"
    }
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Resolution Conflicts: Overly Strict Requirements

```
Your requirements could not be resolved to an installable set of packages.

  Problem 1
    - Installation request for lazy/bob ~1.2 -> satisfiable by lazy/bob[1.4.0].
    - Installation request for cool/alice ~1.3 -> satisfiable by cool/alice[1.3.0].
    - lazy/bob 1.4.0 requires monolog/monolog 1.3.* -> satisfiable by monolog/monolog[1.3.0, 1.3.1]
    - cool/alice 1.3.0 requires monolog/monolog ~1.6 -> satisfiable by monolog/monolog[1.6.0, 1.7.0
    - Can only install one of: monolog/monolog[1.6.0, 1.3.0].
    - Can only install one of: monolog/monolog[1.6.0, 1.3.1].
    - Conclusion: don't install monolog/monolog 1.3.1
    - Conclusion: don't install monolog/monolog 1.7.0
    - Conclusion: don't install monolog/monolog 1.3.0
    - Conclusion: don't install monolog/monolog 1.6.0
```

Resolution Conflicts: Overly Strict Requirements

```
// composer.json

    "require": {
        "cool/alice": "~1.3",
        "lazy/bob": "~1.2"
    }

// dependencies

    "name": "cool/alice",
    "require": {
        "monolog/monolog": "~1.6"
    }

    "name": "lazy/bob",
    "require": {
        "monolog/monolog": "1.3.*"
    }
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Resolution Conflicts: Stabilities

```
// composer.json

    "minimum-stability": "beta",
    "require": {
        "monolog/monolog": "1.*",
        "symfony/symfony": "~2.4",
        "bad/package": "dev-master"
    }

// dependencies

    "name": "bad/package",
    "require": {
        "monolog/monolog": "dev-master",
    }
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Resolution Conflicts: Stabilities

```
Your requirements could not be resolved to an installable set of packages.

  Problem 1
    - Installation request for bad/package dev-master -> satisfiable by bad/package[dev-master].
    - bad/package dev-master requires monolog/monolog dev-master -> no matching package found.
```

Resolution Conflicts: Stabilities

```
// composer.json

    "minimum-stability": "beta",
    "require": {
        "monolog/monolog": "1.*",
        "symfony/symfony": "~2.4",
        "bad/package": "dev-master"
    }

// dependencies

    "name": "bad/package",
    "require": {
        "monolog/monolog": "dev-master",
    }
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Resolution Conflicts: Stabilities

```
// composer.json

    "minimum-stability": "beta",
    "require": {
        "monolog/monolog": "1.*@dev",
        "symfony/symfony": "~2.4",
        "bad/package": "dev-master"
    }

// dependencies

    "name": "bad/package",
    "require": {
        "monolog/monolog": "dev-master",
    }
```

Resolution Conflicts: Stabilities

```
// monolog

    "name": "monolog/monolog",
    "extra": {
        "branch-alias": {
            "dev-master": "1.12.x-dev"
        }
    }
```

```
- Installing monolog/monolog (dev-master 5ad421d)
  Cloning 5ad421d6a1d5d7066a45b617e5164d309c4e2852
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Resolution Conflicts: Stabilities

```
// monolog

    "name": "monolog/monolog",
    "extra": {
        "branch-alias": {
            "dev-master": "2.0.x-dev"
        }
    }
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Resolution Conflicts: Stabilities

```
Your requirements could not be resolved to an installable set of packages.

  Problem 1
    - Installation request for monolog/monolog 1.*@dev -> satisfiable by
monolog/monolog[1.12.0].
    - Installation request for bad/package dev-master -> satisfiable by bad/package[dev-master].
    - bad/package dev-master requires monolog/monolog dev-master -> satisfiable by
monolog/monolog[dev-master].
    - Can only install one of: monolog/monolog[1.12.0, dev-master].
```

We require “2.*@dev” instead

- Resolution works
- Project is probably broken:
  bad/package may not be compatible with 2.*

Nils Adermann @naderman
Jordi Boggiano @seldaek

No error but unexpected result?

- **`composer why [--tree] foo/bar`**
  `mydep/here 1.2.3 requires foo/bar (^1.0.3)`

- **`composer why-not [--tree] foo/bar ^1.2`**
  `foo/bar 1.2.3 requires php (>=7.1.0 but 5.6.3 is installed)`

Nils Adermann @naderman
Jordi Boggiano @seldaek

The Lock File

- Contents
  - all dependencies including transitive dependencies
  - Exact version for every package
  - download URLs (source, dist, mirrors)
  - Hashes of files

- Purpose
  - Reproducibility across teams, users and servers
  - Isolation of bug reports to code vs. potential dependency breaks
  - Transparency through explicit updating process

Nils Adermann @naderman
Jordi Boggiano @seldaek

Commit The Lock File

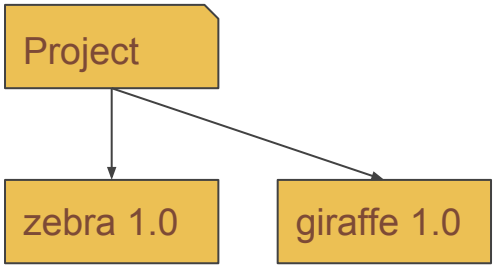
- If you don’t
  - composer install without a lock file is a composer update
  - Conflict can randomly occur on install
  - You may not get the same code
  - You no longer manage change
    Change is managing you!

- The lock file exists to be commited!

Nils Adermann @naderman
Jordi Boggiano @seldaek

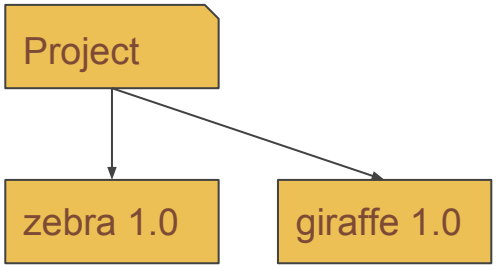
The Lock file will conflict

Day 0: “Initial Commit”



master

composer.lock
- zebra 1.0
- giraffe 1.0

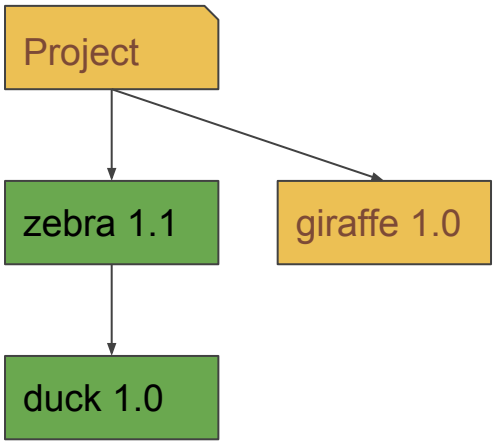


dna-upgrade

composer.lock
- zebra 1.0
- giraffe 1.0

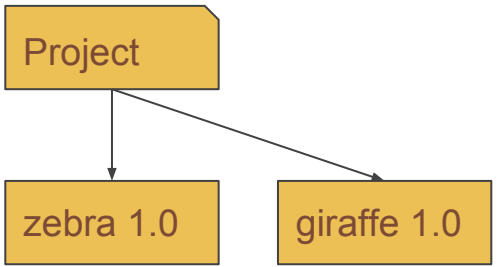
Nils Adermann @naderman
Jordi Boggiano @seldaek

Week 2: Strange new zebras require duck



master

composer.lock
- zebra 1.1
- giraffe 1.0
- duck 1.0



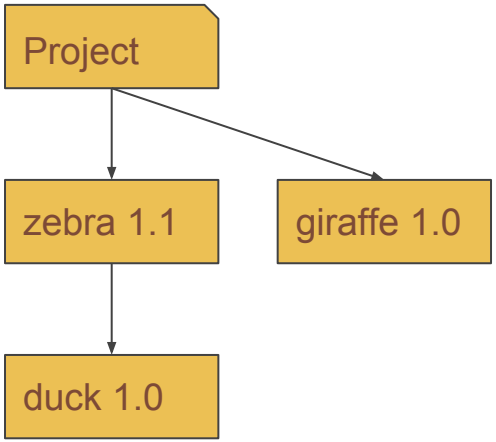
dna-upgrade

composer.lock
- zebra 1.0
- giraffe 1.0

Nils Adermann @naderman
Jordi Boggiano @seldaek

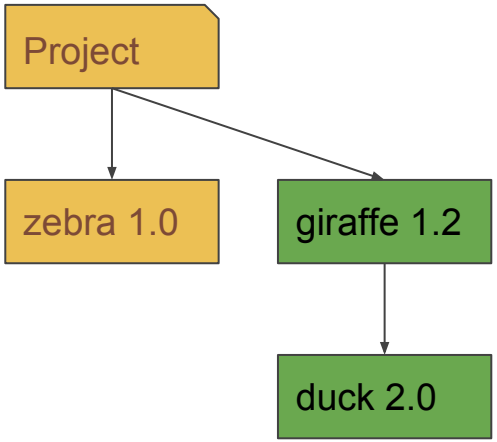

Week 3: Duck 2.0

Week 4: Giraffe evolves to require duck 2.0



master

composer.lock
- zebra 1.1
- giraffe 1.0
- duck 1.0

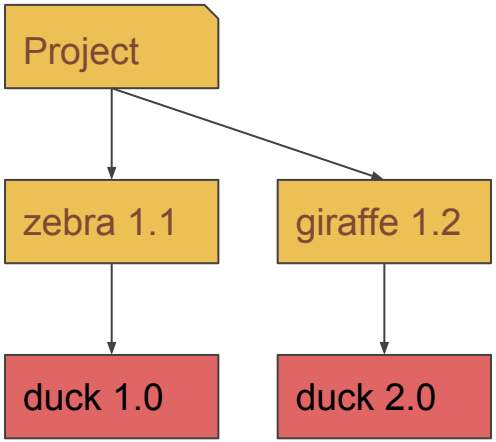


dna-upgrade

composer.lock
- zebra 1.0
- giraffe 1.2
- duck 2.0

Nils Adermann @naderman
Jordi Boggiano @seldaek

Text-based Merge

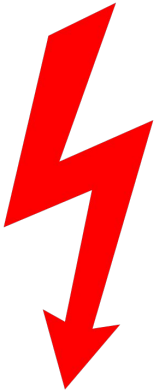


master

composer.lock

- zebra 1.1
- giraffe 1.2
- **duck 1.0**
- **duck 2.0**

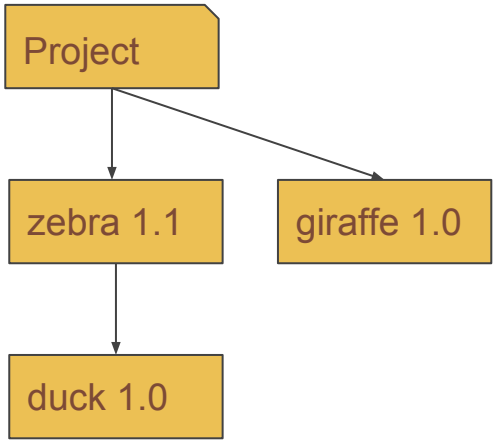
Merge results in invalid dependencies



Nils Adermann @naderman
Jordi Boggiano @seldaek

Reset composer.lock

```
git checkout <refspec> -- composer.lock
git checkout master -- composer.lock
```



dna-upgrade

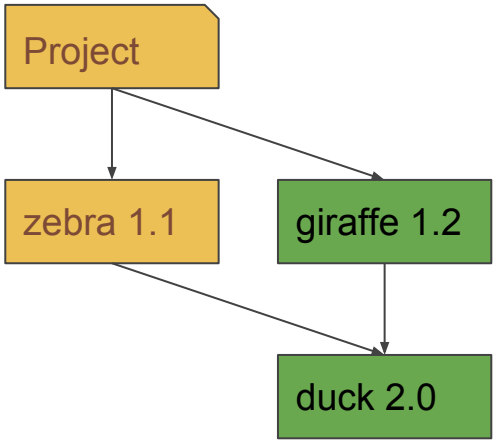
composer.lock

- zebra 1.1
- giraffe 1.0
- duck 1.0

Nils Adermann @naderman
Jordi Boggiano @seldaek

Apply the update again

```
composer update giraffe
  --with-dependencies
```



master

composer.lock

- zebra 1.1
- giraffe 1.2
- duck 2.0

How to resolve lock merge conflicts?

- composer.lock cannot be merged without conflicts
  - contains hash over relevant composer.json values

- `git checkout <refspec> -- composer.lock`
  - `git checkout master -- composer.lock`

- Reapply changes
  - `composer update <list of deps>`

Nils Adermann @naderman
Jordi Boggiano @seldaek

Deployment

Never Deploy without a Lock File

Do not run composer update during deployments

composer install performance

- Use `--prefer-dist` to avoid git clones
  - Will always download zip files if possible (default for stable versions)
- Store ~/.composer/cache between builds
  - How depends on CI product/setup you use

Nils Adermann @naderman
Jordi Boggiano @seldaek

Autoloader Optimization

- `composer install **--optimize-autoloader**`
  - `composer dump-autoload --optimize`
- `composer install --optimize-autoloader **--classmap-authoritative**`
  - `composer dump-autoload --optimize --classmap-authoritative`
- `composer install --optimize-autoloader **--apcu-autoloader**`
  - `composer dump-autoload --optimize --apcu`

https://getcomposer.org/doc/articles/autoloader-optimization.md

Nils Adermann @naderman
Jordi Boggiano @seldaek

Autoloader Optimization

- *Use this one*
  `composer dump-autoload --optimize --classmap-authoritative`

- Requires PHP7 to be optimal
  - opcache can keep static array definition in shared memory
  - no loading overhead on PHP request startup
- Will not search for classes not in lookup table
  - not useful for development
  - not useful for dynamically generated code (don't do that!)

Nils Adermann @naderman
Jordi Boggiano @seldaek

Platform Requirements

- Platform repository
  - implicitly defined additional package repository
  - contains packages for
    - PHP
    - extensions
    - system libraries (e.g. libxml)
  - packages cannot be updated/installed/removed

Nils Adermann @naderman
Jordi Boggiano @seldaek

Platform Requirements

```
$ ./composer.phar show --platform

composer-plugin-api 1.1.0    The Composer Plugin API
ext-apcu            5.1.8    The apcu PHP extension
ext-ctype           7.2.5    The ctype PHP extension
ext-curl            7.2.5    The curl PHP extension
ext-date            7.2.5    The date PHP extension
ext-dom             20031129 The dom PHP extension
ext-fileinfo        1.0.5    The fileinfo PHP extension
ext-filter          7.2.5    The filter PHP extension
ext-ftp             7.2.5    The ftp PHP extension
ext-hash            1.0      The hash PHP extension
ext-iconv           7.2.5    The iconv PHP extension
ext-intl            1.1.0    The intl PHP extension
ext-json            1.6.0    The json PHP extension
ext-libxml          7.2.5    The libxml PHP extension
...
lib-curl            7.59.0   The curl PHP library
lib-ICU             58.2     The intl PHP library
lib-libxml          2.9.5    The libxml PHP library
lib-openssl         2.5.5    LibreSSL 2.5.5
lib-pcre            8.41     The pcre PHP library
php                 7.2.5    The PHP interpreter
php-64bit           7.2.5    The PHP interpreter, 64bit
php-ipv6            7.2.5    The PHP interpreter, with IPv6 support
```

Platform Requirements

```
{
    “require”: {
        “php”: “^7.1.1”
    }
}
```

```
$ php -v
PHP 5.6.10

$ composer update
Your requirements could not be resolved to an installable set
of packages.

Problem 1
  - This package requires php ^7.1.1 but your PHP version
(5.6.10) does not satisfy that requirement.
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Platform Requirements

- What if you maintain multiple projects on your local system to be deployed to different platforms?
  - e.g. Server A running PHP 7.0, Server B running PHP 7.2
- What if you want to build Composer automation tools
  - Private Packagist at packagist.com runs on a single PHP version, managed projects have lots of different requirements

Nils Adermann @naderman
Jordi Boggiano @seldaek

Platform Requirements

```
{
    “require”: {
        “php”: “^7.1.1”
    }
}
```

```
$ php -v
PHP 5.6.10

$ composer update --ignore-platform-reqs
Success
```

No idea if dependencies even work on PHP 7.1.1

Nils Adermann @naderman
Jordi Boggiano @seldaek

Platform Requirements

```
“require”: {
    “php”:“^7.1.1”,
    “ext-intl”: “*”
}
“config”: {“platform”:{
    “php”: “7.1.2”,
    “ext-intl”: “1.1.0”

}}
```

```
$ php -v
PHP 5.6.10

$ composer update
Success
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Platform Requirements

- Watch out if you are using Plugins!
  - Composer plugins (Composer installers are plugins, too)
    - Packages with type “composer-plugin”
    - Will be installed before all other packages if dependencies allow it
    - Code will be executed in Composer process during update/install
  - Can be disabled with **--no-plugins**
  - no easy way to run them on prod later
- Watch out if you are using scripts
  - Use **--no-scripts**
  - Run them separately in production with **composer run-script <name>**

Nils Adermann @naderman
Jordi Boggiano @seldaek

Platform Requirements

```
“require”: {
    “php”:“^7.1.1”,
    “ext-intl”: “*”
}
“config”: {“platform”:{
    “php”: “7.1.2”,
    “ext-intl”: “1.1.0”

}}
```

```
$ composer update
```

Success

- Create ZIP
- deploy to prod

PHP Fatal Error

Prod was actually still on PHP 5.6

Platform Requirements

```
“require”: {
    “php”:“^7.1.1”,
    “ext-intl”: “*”
}
“config”: {“platform”:{
    “php”: “7.1.2”,
    “ext-intl”: “1.1.0”

}}
```

- dev$ composer update
- Create ZIP
- upload to prod
- **composer check-platform-reqs**
  - no error? switch to new code

PRIVATE PACKAGIST

Nils Adermann @naderman
Jordi Boggiano @seldaek

Summary

- Library CI: composer update --prefer-lowest --prefer-stable
- git checkout <branch> -- composer.lock
- composer dump-autoload --optimize --classmap-authoritative
- composer why/why-not
- composer show --platform
  {“config”:{“platform”:{“php”:”7.2.5”}}}
  composer check-platform-reqs
  Watch out for plugins & scripts!

- Formalize BC promises for users of your libraries
- SemVer: Don’t be afraid to increase the major version
- Document changes to dependencies

Commit the composer.lock file!

Nils Adermann @naderman
Jordi Boggiano @seldaek

Composer in Depth Part 2

Nils Adermann
@naderman
Jordi Boggiano
@seldaek
Private Packagist
https://packagist.com

A brief history of Composer

- Symfony & phpBB plugins
- Apr 2011 - First Commit
- Sep 2011 - Packagist.org
- Apr 2012 - First 1,000 Packages
- Apr 2013 - First 10,000 Packages
- Jun 2014 - Toran Proxy

Nils Adermann @naderman
Jordi Boggiano @seldaek

A brief history of Composer

- Symfony & phpBB plugins
- Apr 2011 - First Commit
- Sep 2011 - Packagist.org
- Apr 2012 - First 1,000 Packages
- Apr 2013 - First 10,000 Packages
- ~~Jun 2014 - Toran Proxy~~
- Dec 2016 - Private Packagist
- Jun 2018 - 185,000+ Packages with 1,200,000+ Versions

Nils Adermann @naderman
Jordi Boggiano @seldaek

What is Dependency Management?

- Assembly
- Dependency Change Management
- Risk Analysis & Reduction

May happen at build time or at runtime

Nils Adermann @naderman
Jordi Boggiano @seldaek

Dependency Assembly

- Installation of Libraries, Tools, etc.
  - composer install
  - apt-get install foo
  - Application of Configuration Management (Puppet, Chef, Ansible, Salt, …)
- Configuration for Connections to Services, external APIs
  - Authentication
  - Glue Code
- Connection to Services (usually at Runtime)

Nils Adermann @naderman
Jordi Boggiano @seldaek

Dependency Assembly

Past:

- Step-by-Step installation instructions
- Readmes, Delete and reinstall individual packages

Today:

- Description of a system state (e.g. composer.json, top.sls)
- Tools to move the system into the state (e.g. composer, salt)

Nils Adermann @naderman
Jordi Boggiano @seldaek

Dependency Change Management

- Dependency Change
  - Adding, Removing, Updating, Replacing of Libraries
  - Replacing APIs
  - composer update
- Dependency Change Management
  - Balance Risks, Consequences, Cost & Advantages
  - Architecture Decisions which enable “Change”
    - Example: Abstraction to replace concrete service

Nils Adermann @naderman
Jordi Boggiano @seldaek

Composer Architecture Decisions

- Separate independent tools and services
  - Avoid PEAR confusion and problems
- Build reusable code to allow for other tools and services to emerge
  - Check out https://github.com/composer

Nils Adermann @naderman
Jordi Boggiano @seldaek

composer update/install

- Load all package metadata
- Resolve dependencies to create transaction (install/remove/update)
- Create lock file
- Download or checkout files from locations in lock file

Nils Adermann @naderman
Jordi Boggiano @seldaek

Satis

- Static File Generator
- Big config file of all packages
- Archive creation for downloads possible
- No hooks to trigger updates
- Not suitable for building further tools or services on top of it

- Considerably cost to setup & maintain

Nils Adermann @naderman
Jordi Boggiano @seldaek

Private Packagist

- Your own Composer repository done right
  - SaaS or on-premises - https://packagist.com
- Easy setup
  - Integration with GitHub, Gitlab, Bitbucket
- Authentication
- Permission Management

- Foundation for future functionality to simplify dependency management

Nils Adermann @naderman
Jordi Boggiano @seldaek

Load package metadata?

- Package repositories
- Path repositories
- VCS repositories
- Composer Repositories
  - Packagist (packagist.org)
  - Satis
  - Private Packagist (packagist.com)

Nils Adermann @naderman
Jordi Boggiano @seldaek

Package Repository

```
"repositories": [
    {
        "type": "package",
        "package": {
            "name": "vendor/package",
            "version": "1.0.0",
            "dist": {
                "url": "http://example.org/package.zip",
                "type": "zip"
            },
            "source": {
                "url": "git://example.org/package.git",
                "type": "git",
                "reference": "tag name, branch name or commit hash"
            }
        }
    }
],
"require": {
    "vendor/package": "1.0.0"
}
```

Monorepo

- **repo/projectA/composer.json**

```
"repositories": [
    {"type": "path", "url": "../projectB"}
],
"require": {
    "vendor/projectB": "dev-master"
}
```

- **repo/projectB/composer.json**

```
"name": "vendor/projectB",
"version": "dev-master"
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

VCS Repository

```
"repositories": [
    {
        "type": "vcs",
        "url": "git://example.org/MyRepo.git"
    }
]
```

- Information is inferred from composer.json files in tags & branches
- dist download URLs only for known hosts, e.g. github, bitbucket, gitlab

Nils Adermann @naderman
Jordi Boggiano @seldaek

Using Forked Packages

Custom repositories have priority:

```
"repositories": [
    {
        "type": "vcs",
        "url": "https://github.com/naderman/symfony"
    }
],
"require": {
    "symfony/symfony": "dev-master"
}
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Using Forked Packages

Custom branches are available (composer show -v symfony/symfony)

```
"repositories": [
    {
        "type": "vcs",
        "url": "https://github.com/naderman/symfony"
    }
],
"require": {
    "symfony/symfony": "dev-my-patch"
}
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Using Forked Packages

Aliases allow other dependencies to resolve against custom branches:

```
"require": {
    "symfony/symfony": "dev-my-patch as 3.1.0"
    "other/package": "1.23"
}
```

```
"name": “other/package”
"require": {
    "symfony/symfony": "^3.1"
}
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Editing Packages You Own

Define the appropriate installation method

```
"config": {
    "preferred-install": {
        "acme/*": "source",
        "*": "dist"
    }
},
"require": {
    "acme/foo": "^1.2",
    "other/package": "^1.4"
}
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Composer Repository

```
"repositories": [
    {
        "type": "composer",
        "url": "https://satis.example.org/"
    },
    {
        "type": "composer",
        "url": "https://repo.packagist.com/my-org"
    },
    {
        "packagist.org": false
    }
]
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Composer Repository: Satis

```
packages.json:
{
    packages: {
        “seld/private-test”: {
            “dev-master”: {
                name: "seld/PRivate-test",
                version: "dev-master",
                version_normalized: "9999999-dev",
                source: {
                    ....
                },
                dist: {
                    ....
                },
                require: {
                    php: ">=5.3.0",
                ...
        }
    }
}
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Composer Repository: packagist.org

```
packages.json:
{
    packages: [ ],
    notify: "/downloads/%package%",
    notify-batch: "/downloads/",
    providers-url: "/p/%package%$%hash%.json",
    search: "/search.json?q=%query%&type=%type%",
    provider-includes: {
        p/provider-2013$%hash%.json: {
            sha256: "eb67fda529996db6fac4647ff46cf41bb31065536e1164d0e75f911d160f6b9f"
        },
        ...
        p/provider-archived$%hash%.json: {
            sha256: "444a8f22af4bc0e2ac0c09eda1f5edc63158a16e9d754100d7f774b930a38ae6"
        },
        p/provider-latest$%hash%.json: {
            sha256: "b0e0065f1e36f061b9fd2bbb096e7986321421f9eedc3d5e68dc4780d7295c33"
        }
    }
}
```

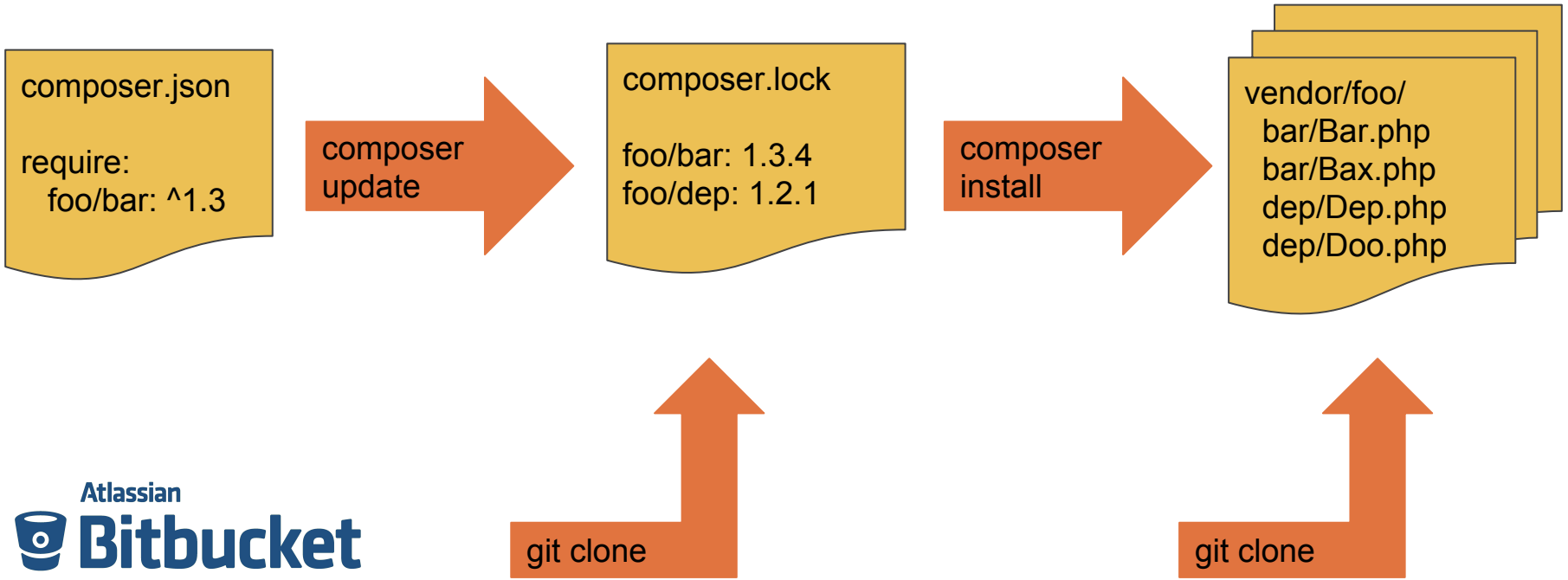

Nils Adermann @naderman
Jordi Boggiano @seldaek

Composer Repository: Private Packagist

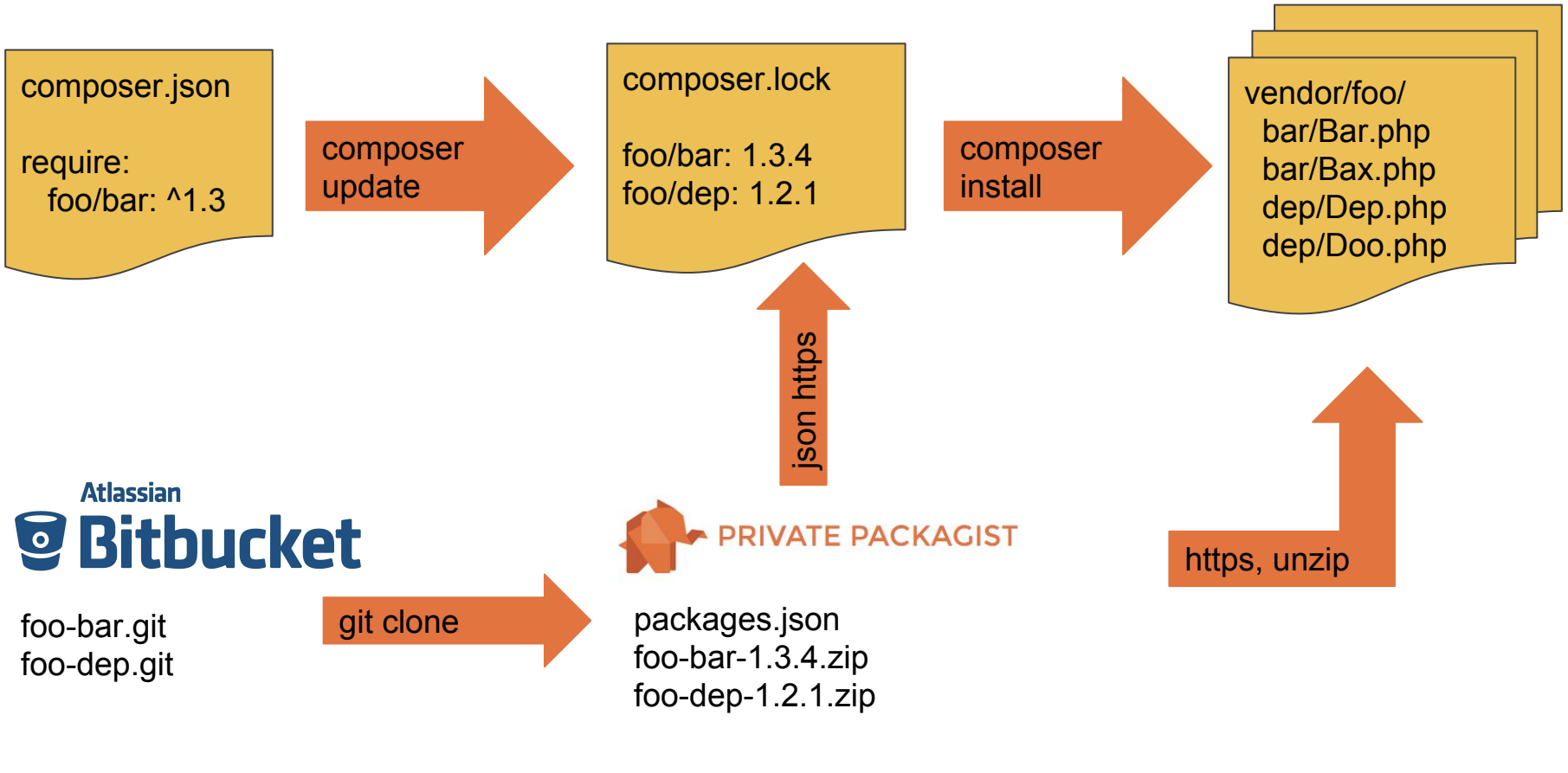
```
packages.json:
{
    packages: {
        “seld/private-test”: {
            “dev-master”: {
                name: "seld/PRivate-test",
        ...
    }
    providers-lazy-url: "/myorg/p/%package%.json",
    mirrors: [
        {
            dist-url:
"https://repo.packagist.com/packagist-nosync/dists/%package%/%version%/%reference%.%type%",
            preferred: true
        }
    ]
}
```


Nils Adermann @naderman
Jordi Boggiano @seldaek

Composer with Private Dependencies



Composer with Private Dependencies: Private Packagist



Risk Analysis: Availability

Affects Assembly

Examples:

- Open Source Library deleted
- Payment Service unavailable
- EU VATId Service out of order
- Jenkins not accessible

Nils Adermann @naderman
Jordi Boggiano @seldaek

Risk Reduction: Availability

- Software is available when you have a copy
  - composer cache
  - Forks
  - Private Packagist or Satis

Nils Adermann @naderman
Jordi Boggiano @seldaek

Composer with Open Source Dependencies

composer.json

require:
foo/bar: ^1.3

composer update

composer.lock

foo/bar: 1.3.4
foo/dep: 1.2.1

composer install

vendor/foo/
bar/Bar.php
bar/Bax.php
dep/Dep.php
dep/Doo.php

packages.json

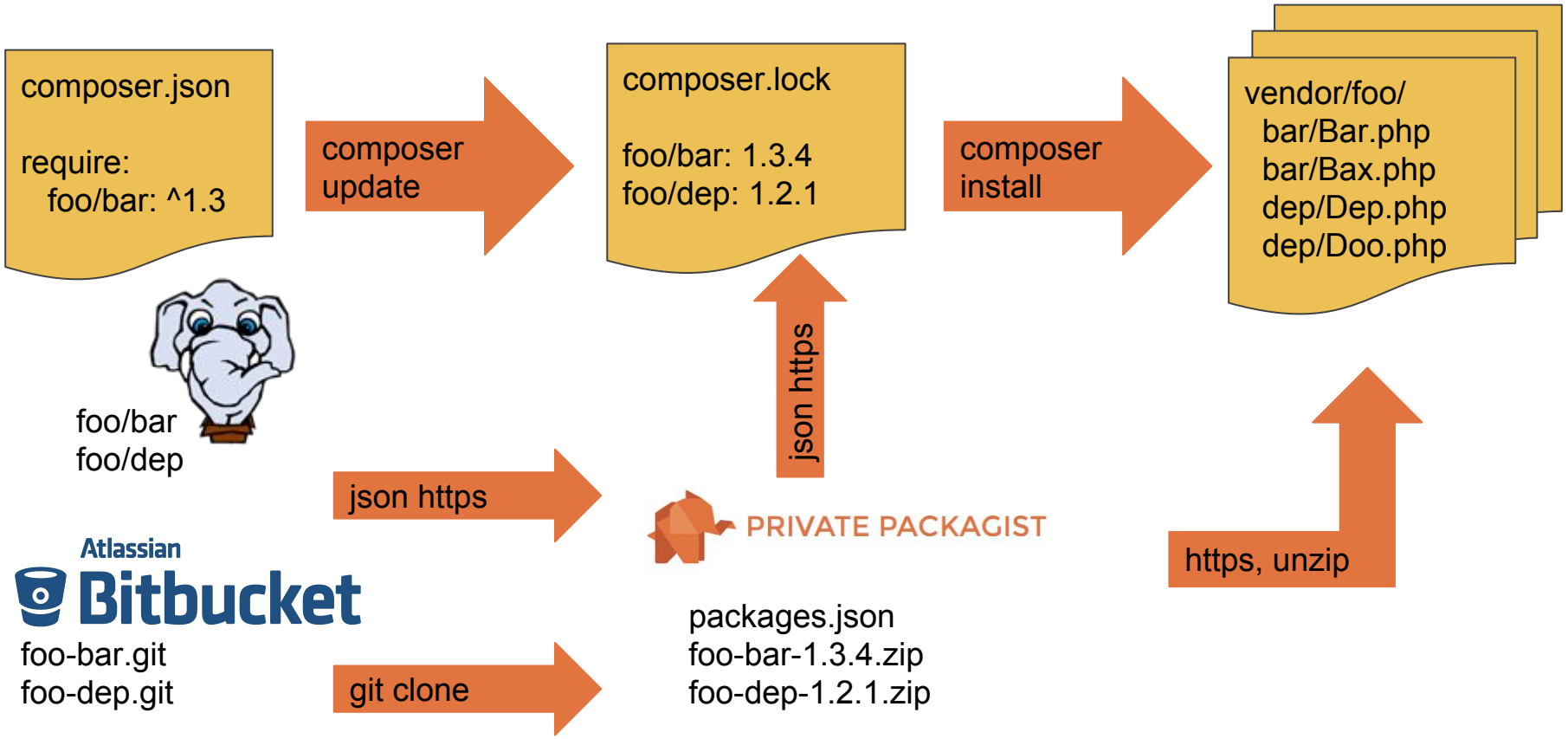
json https

Atlassian Bitbucket

foo-bar.git
foo-dep.git

git clone

Composer with Open Source Dependencies: Private Packagist



Downloading files from the lock file

```
{
    "content-hash": "bb557b05609c879265a30bc052ef77e4",
    "packages": [
        {
            "name": "aws/aws-sdk-php",
            "version": "3.25.6",
            "source": {
                "type": "git",
                "url": "https://github.com/aws/aws-sdk-php.git",
                "reference": "fe98140a4811abbe9104477b167dc3c7f9a8391b"
            },
            "dist": {
                "type": "zip",
                "url": "https://api.github.com/repos/aws/aws-sdk-php/zipball/fe...",
                "reference": "fe98140a4811abbe9104477b167dc3c7f9a8391b",
            },
            "require": {
                "guzzlehttp/guzzle": "^5.3.1|^6.2.1",
```

Downloading files from the lock file with Private Packagist

```
    "packages": [
        {
            "name": "aws/aws-sdk-php",
            "version": "3.25.6",
            "source": {
                "url": "https://github.com/aws/aws-sdk-php.git",
                ...
            },
            "dist": {
                "type": "zip",
                "url": "https://api.github.com/repos/aws/aws-sdk-php/zipball/...",
                "reference": "fe98140a4811abbe9104477b167dc3c7f9a8391b",
                "mirrors": [
                    {
                        "url":
"https://repo.packagist.com/phpbb/dists/%package%/%version%/%reference%.%type%",
                        "preferred": true
                    }
                ]
            }
```

Risk Reduction: (New) Dependencies

Quality Criteria for software libraries (and services)

- Number of Maintainers / Developers
- Actively Developed?
- How many users?
  - Packagist shows installation count
- Where is a library being installed from?
  - GitHub, self-hosted svn server? -> Availability
- Alternatives / how easy to replace? Complexity?
  - Could you take over maintenance?

Nils Adermann @naderman
Jordi Boggiano @seldaek

Risk Reduction: Compatibility

Semantic Versioning (Semver) promises Compatibility

x.y.z

- Must be used consistently
- Only valuable if BC/Compatibility promise formalized
  - See http://symfony.com/doc/current/contributing/code/bc.html
- Otherwise choose narrower Version Constraints, check more frequently
  - e.g. ~1.2.3 instead of ^1.2.3

Risk Reduction: Compatibility

- Automated
  - Tests
  - Static Analysis
- Manual
  - Read Changelogs (and write them!)
  - Experience which libraries break BC

Nils Adermann @naderman
Jordi Boggiano @seldaek

Risk Minimization: Compliance / Legal

- Affects Change Management
- Example
  - Viral Copy-Left License not compatible with proprietary product

- `composer licenses`
- Private Packagist License Review

Nils Adermann @naderman
Jordi Boggiano @seldaek

Assessing & Managing Risk

- Formulate a Plan B
- Identify problems which are probable and which have great effects

- **Dependencies are great!** They can save tons of money and time
- Only spend resources on reducing risk until the risk is acceptable

- Private Packagist can help you manage and reduce these risks by being the one central place for all your third party code

Nils Adermann @naderman
Jordi Boggiano @seldaek

How is Private Packagist helping?

- Faster and more reliable composer operations
- Work with private dependencies more efficiently
  - Automatic synchronization of packages, teams, users, permissions
  - Authentication Tokens
- One central place for all your dependencies
  Improved understanding of and control over open-source usage
  - Statistics and references between internal code and open-source code
  - License review
- Much more to come!

Nils Adermann @naderman
Jordi Boggiano @seldaek

Thank you!

https://packagist.com

Questions / Feedback?

E-Mail: contact@packagist.com
Twitter: @naderman & @seldaek