

Современные подходы в разработке инфраструктурного кода на Puppet

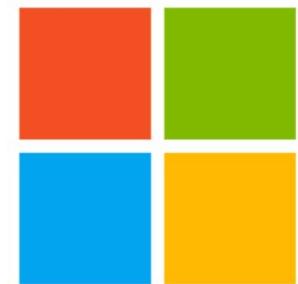
Игорь Курочкин
Экспресс 42

О себе

qik



- Scaxy, Qik, Skype, MS, Express 42
- Инфраструктура как код:
 - Chef, Puppet, Ansible, Salt



план

- Теория:
 - Инфраструктура как код
 - Puppet
 - Workflow
- Практика и ДЗ

Практика, дз и слайды

- <https://github.com/express42/mc-puppet>

Теория

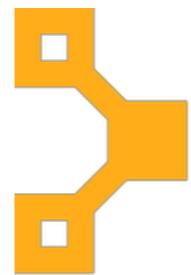
Инфраструктура как код

- Ускорение процесса поставки
- Снижение количества ошибок
- Взаимодействие команд

Инструменты



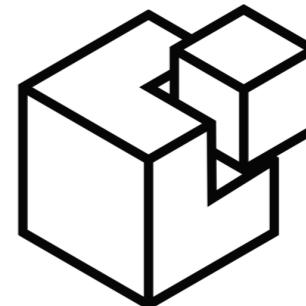
CHEF



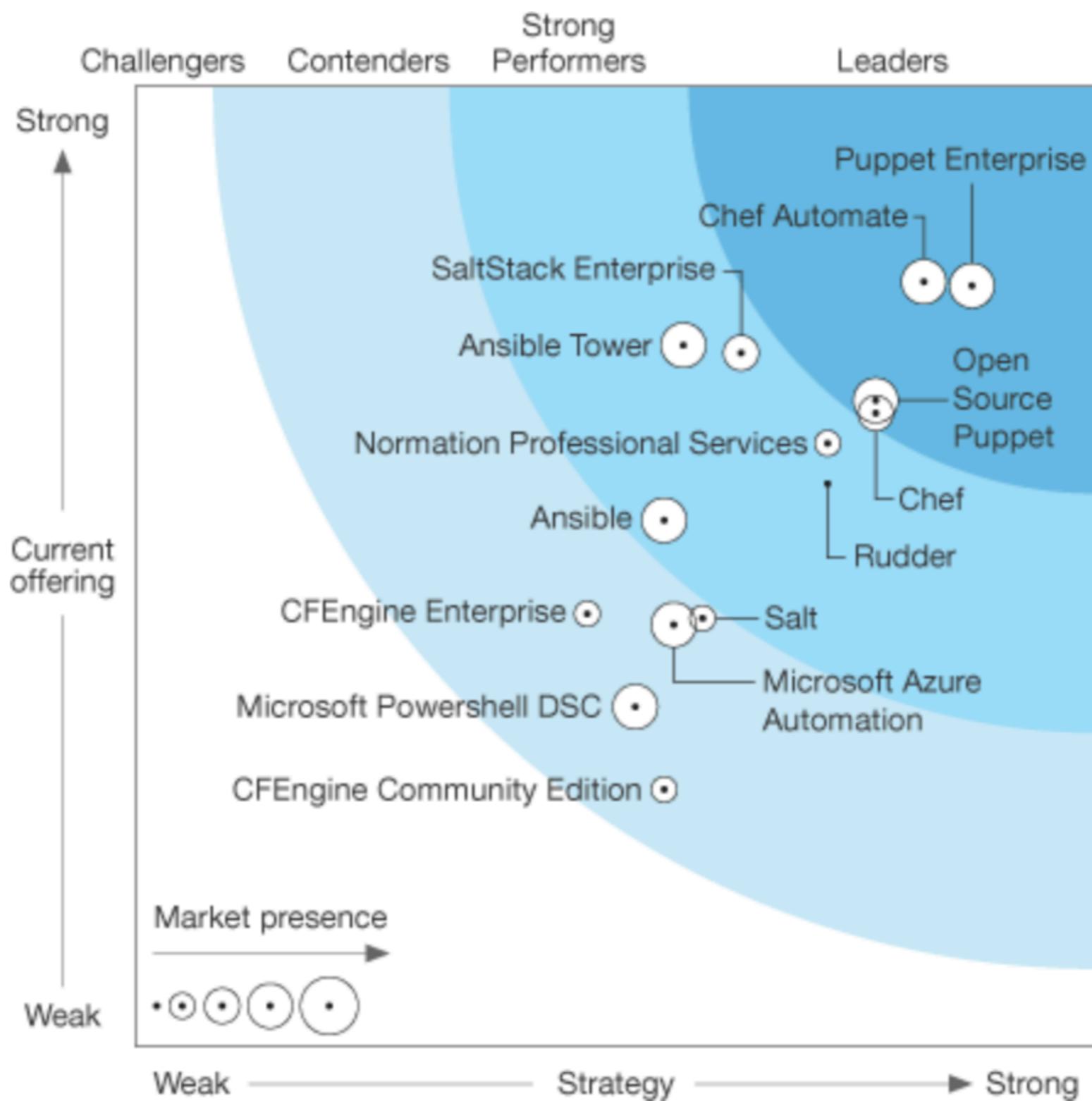
puppet



ANSIBLE



SALTSTACK



Puppet

- С 2005 года, текущая версия 6
- Puppet Platform:
 - Server, Agent, PuppetDB
- Puppet Open Source:
 - PDK, Bolt, Beaker, Razor, Container Registry, Puppet DB, Facter
- Puppet Enterprise:
 - Delivery, Pipelines, CodeManager

Опрос

- Какую версию Puppet используете?
- Кто планирует обновляться?
- Кто использует community модули?
- У кого есть тесты?
- У кого больше 2-х репозиториев?
- И больше 2-х человек коммитят?

Puppet 6

- Вышел 18 сентября 2018
- Добавили:
 - Pupperware
 - New resource API, new type Deffered
- Убрали:
 - MCollective, puppet module generate/build

Практики из разработки

- Среда разработки и структура репозиториев
- Политики версионирования и разбиение на модули
- Управление артефактами и внешние зависимости
- Тестирование и ревью изменений
- CI/CD для инфраструктурного кода

Проблемы с разработкой

- Старые и разные версии инструментов
- Один репозиторий
- Монолитные модули и одна версия
- Только свои модули или старый форки
- Нет тестирования и ручная выкатка

Варианты решений

- Документация, best practices, инструкции и регламенты
- Bootstrap скрипты и свои инструменты
- Git Hooks
- Packages (gem, deb, rpm, ...)
- Docker
- Development Kit

Варианты решений

- Документация, best practices, инструкции и регламенты
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- Docker
- **Development Kit**

Development Kit

- Локальная разработка и тестирование
- Одно окружение для Linux, OS X, Windows
- Набор CLI инструментов и библиотек
- Workflows и best practices
- Интеграция в CI

Chef DK



Puppet DK



Цели

- Обучение Community и повышение качества публичных модулей
- Общие подходы по созданию и тестированию Puppet кода
- Единый CLI и официальное окружение разработки

Puppet Development Kit

- Первый коммит - январь 2017
- Сейчас:
 - 1000+ коммитов
 - 24 релиза
 - Текущая версия 1.7.0

Что внутри PDK

- Ruby (несколько версий)
- Git
- Puppet (facter, hiera, puppet, ...)
 - 4 (4.7.x-4.10.x)
 - 5 (5.0.x-5.5.x)
 - 6*

PDK и Puppet 6

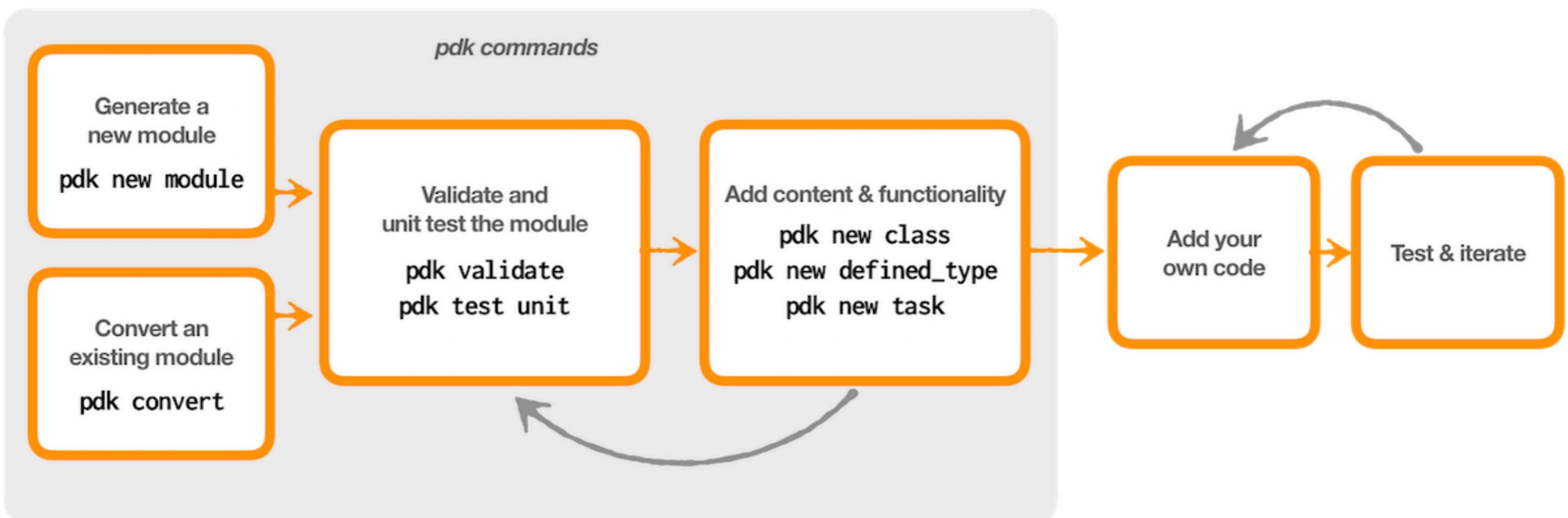
- Будет в релизе 1.7.1
- Релиз должен был быть 19 сентября
- Workaround:
 - --puppet-dev
 - --puppet-version

Что еще в PDK

- Утилита `pdk`
- Шаблоны для модулей, классов, провайдеров, задач, ...
- Ссылки на инструменты:
 - Линтеры
 - Фреймворки для тестирования
 - Дополнительные утилиты
- Rake обертки вокруг инструментов

Workflow

Workflow



Установка PDK

- Пакет для Linux, OS X, Windows
- RPM, DEB, MSI
- Есть в Homebrew
- Модуль для Powershell и VScode плагин

Создание модуля

- pdk new module
 - pdk new class
 - pdk new defined_type
 - pdk new task
 - pdk new provider

pdk new module

- Имя модуля
- Опции:
 - --full-interview
 - --skip-interview
 - --template-url=<value>

Имя модуля

- <АВТОР>-<ИМЯ_МОДУЛЯ>
- express42_puppet_module
- express42-puppet-module
- express42-puppet_module

Имя модуля

- <АВТОР>-<ИМЯ_МОДУЛЯ>
- ~~express42_puppet_module~~
- express42-puppet-module
- express42-puppet_module

Имя модуля

- <АВТОР>-<ИМЯ_МОДУЛЯ>
- express42_puppet_module
- express42-puppet-module
- express42-puppet_module

Версия

- Semantic Versioning 2.0.0 <https://semver.org>
- Tom Preston-Werner (GitHub)
- X.X.X:
 - MAJOR - несовместимые изменения
 - MINOR - новый функционал
 - PATCH - исправления

Интервью

- Варианты:
 - 9 вопросов (--full-interview)
 - 4 вопроса (default)
 - 0 вопросов (--skip-interview)
 - `~/.pdk/cache/answers.json`

Шаблоны

- `--template-url=https://github.com/puppetlabs/pdk-templates`
- `config_defaults.yml` (общий конфиг)
- `moduleroot`, `moduleroot_init` (erb шаблоны конфигов)
- `object_templates` (шаблоны для `pdk new ...`)

.sync.yml

- Делаем fork от pdk-templates или
- Вносим изменения в .sync.yml в репозитории модуля
- Пример:
 - appveyor.yml:
 - delete: true

Структура модуля

- /examples
- /files
- /manifests
- /spec
- /task
- /templates

Структура модуля

- metadata.json
- README.md
- CHANGELOG.md
- Gemfile
- Rakefile

Структура модуля

- .fixtures.yml
- .gitattributes
- .gitignore
- .gitlab-ci.yml
- .pdkignore
- .rspec
- .rubocop.yml
- .travis.yml
- .yardopts
- appveyor.yml

Gemfile

- group :development
- gem puppet-module-posix-dev-rX.X
 - metadata-json-lint
 - puppet-lint, puppet-syntax
 - rubocop
 - puppet-blacksmith
 - puppet-strings, ...

pdk bundle exec

- pdk bundle exec puppet
- pdk bundle exec ruby
- pdk bundle exec rubocop
- pdk bundle exec rake

pdk bundle exec rake

```
rake beaker                                     # Run beaker acceptance tests
rake beaker:sets                                # List available beaker nodesets
rake beaker:ssh[set,node]                         # Try to use vagrant to login to the Beaker node
rake build                                       # Build puppet module package
rake changelog                                    # Generate a Changelog from GitHub
rake check:dot_underscore                         # Fails if any .._ files are present in directory
rake check:git_ignore                            # Fails if directories contain the files specified in .gitignore
rake check:symlinks                             # Fails if symlinks are present in directory
rake check:test_file                            # Fails if .pp files present in tests folder
rake clean                                       # Clean a built module package
rake compute_dev_version                        # Print development version of module
rake help                                        # Display the list of available rake tasks
rake lint                                         # Run puppet-lint
rake lint_fix                                     # Run puppet-lint
rake metadata_lint                               # Run metadata-json-lint
rake module:bump                                 # Bump module version to the next patch
rake module:bump:full                            # Bump module version to the next FULL version
rake module:bump:major                           # Bump module version to the next MAJOR version
rake module:bump:minor                           # Bump module version to the next MINOR version
rake module:bump:patch                           # Bump module version to the next PATCH version
rake module:bump_commit                         # Bump version and git commit
rake module:bump_commit:full                     # Bump module version to the next FULL version and git commit
rake module:bump_commit:major                   # Bump module version to the next MAJOR version and git commit
rake module:bump_commit:minor                   # Bump module version to the next MINOR version and git commit
rake module:bump_commit:patch                  # Bump module version to the next PATCH version and git commit
rake module:bump_to_version[new_version]       # Bump module to specific version number
rake module:clean                                # Runs clean again
rake module:dependency[module_name,version]      # Set specific module dependency version
rake module:push                                 # Push module to the Puppet Forge
rake module:release                             # Release the Puppet module, doing a clean, build, tag, push, bump_commit and git push
rake module:tag                                 # Git tag with the current module version
rake module:version                            # Get current module version
rake module:version:next                         # Get next module version
rake module:version:next:major                  # Get the next MAJOR version
rake module:version:next:minor                  # Get the next MINOR version
rake module:version:next:patch                 # Get the next PATCH version
rake parallel_spec                            # Run spec tests in parallel and clean the fixtures directory if successful
rake parallel_spec_standalone                 # Parallel spec tests
rake release_checks                           # Runs all necessary checks on a module in preparation for a release
rake rubocop                                  # Run RuboCop
```

pdk update

- Когда вышла новая версия PDK
- Когда обновились шаблоны
- Когда обновилась конфигурация в .sync.yml
- Есть --noop и --force опции
- Отчет в update_report.txt

metadata.json

"pdk-version": "1.7.0"

"template-url": "file:///opt/puppetlabs/pdk/share/cache/
pdk-templates.git",

“template-ref”: “1.7.0-0-g57412ed”

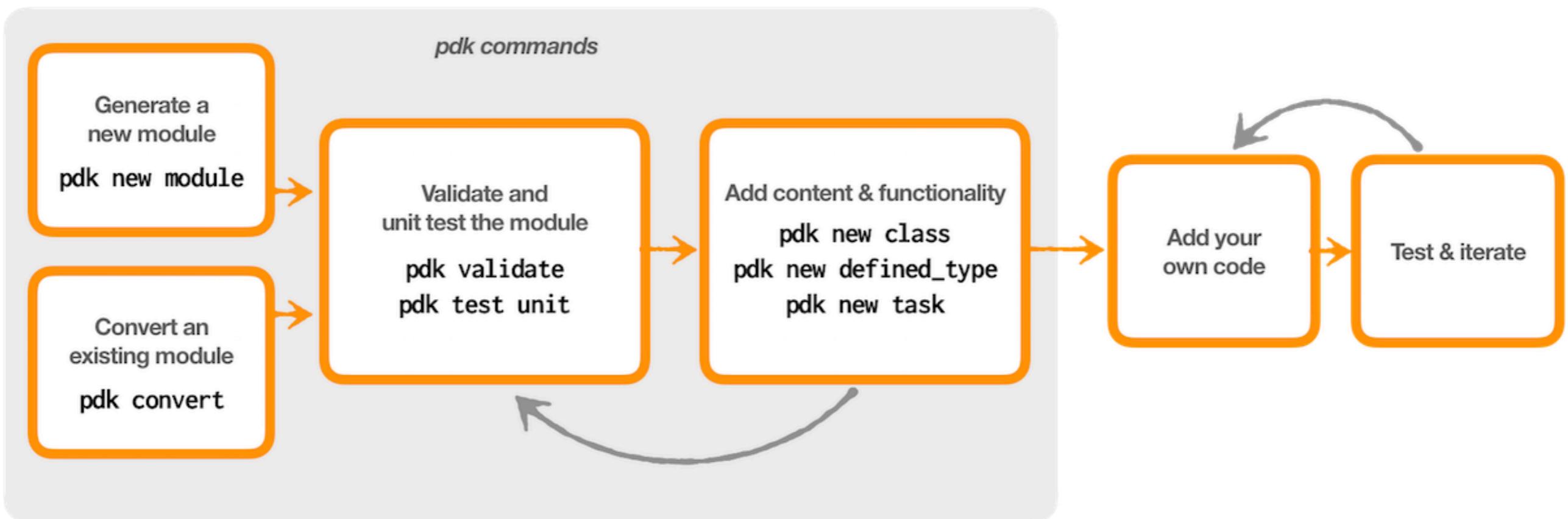
pdk convert

- Конвертация старых модулей
- Есть --noop и --force опции
- Diff в convert_report.txt

pdk new task

- Bolt + Puppet tasks
- Ad-Hoc:
 - Запустить puppet run
 - Обновить пакеты
 - Перезапустить сервис

Workflow



pdk validate

- pdk validate --list
 - pdk (INFO): Available validators: metadata, puppet, ruby
- pdk validate -a
- pdk validate --puppet-dev
- pdk validate --puppet-version

pdk validate

```
[MacBook-Pro-Igor:pdk_module ikurochkin$ pdk validate
pdk (INFO): Running all available validators...
pdk (INFO): Using Ruby 2.4.4
pdk (INFO): Using Puppet 5.5.6
[✓] Checking metadata syntax (metadata.json tasks/*.json).
[✓] Checking module metadata style (metadata.json).
[✓] Checking task metadata style (tasks/*.json).
[✓] Checking Puppet manifest syntax (**/**.pp).
[✓] Checking Puppet manifest style (**/*.*.pp).
[✓] Checking Ruby code style (**/**.rb).
```

pdk validate

- Metadata:
 - Metadata-json-lint
- Puppet:
 - Puppet Style Guide, puppet-lint, puppet-syntax
- Ruby:
 - Rubocop, .rubocop.yml

pdk test unit

- Rspec-puppet
 - <https://github.com/rodjek/rspec-puppet>
- Rspec-puppet-facts
- Puppetlabs-spec-helper

pdk test unit

```
module/
  └── manifests/
  └── lib/
  └── spec/
    ├── spec_helper.rb
    ├── classes/
    │   └── <class_name>.spec.rb
    ├── defines/
    │   └── <define_name>.spec.rb
    ├── applications/
    │   └── <application_name>.spec.rb
    ├── functions/
    │   └── <function_name>.spec.rb
    ├── types/
    │   └── <type_name>.spec.rb
    ├── type_aliases/
    │   └── <type_alias_name>.spec.rb
    └── hosts/
        └── <host_name>.spec.rb
```

pdk test unit

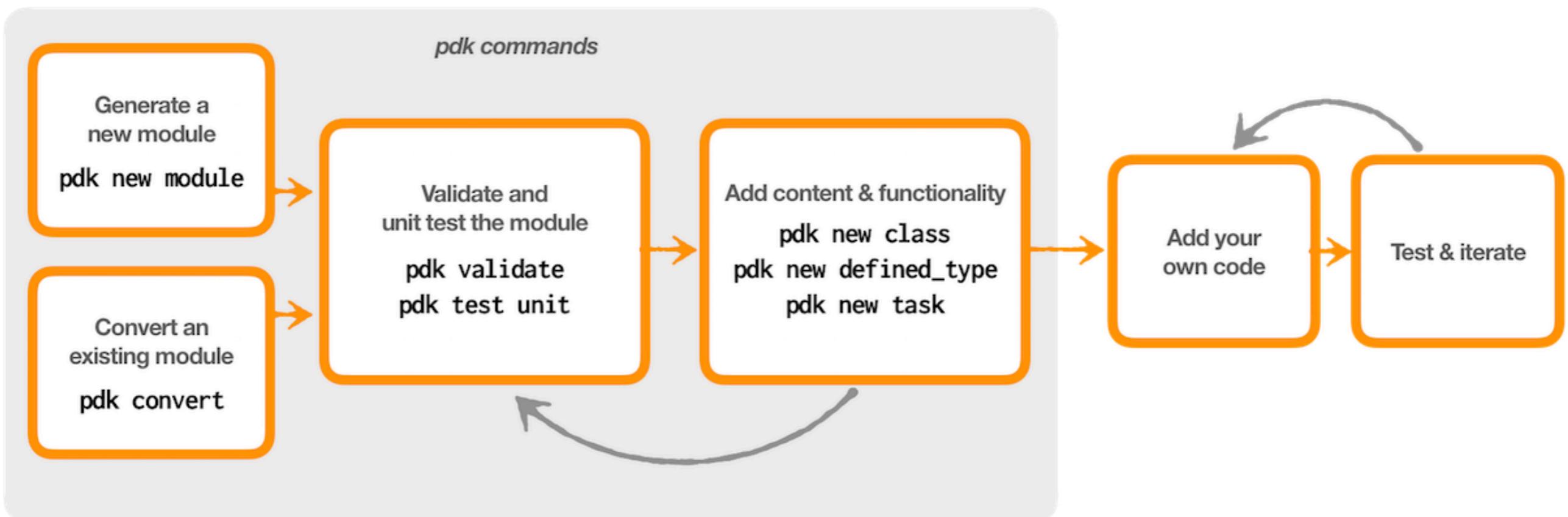
```
[MacBook-Pro-Igor:pdk_module ikurochkin$ pdk test unit
pdk (INFO): Using Ruby 2.4.4
pdk (INFO): Using Puppet 5.5.6
[✓] Preparing to run the unit tests.
[✓] Running unit tests.
    Evaluated 18 tests in 1.209295 seconds: 0 failures, 0 pending.
```

pdk test unit

```
foo_spec.rb

1 require 'spec_helper'
2
3 ▼ describe 'foo' do
4   ▼ on_supported_os.each do |os, os_facts|
5     ▼ context "on #{os}" do
6       let(:facts) { os_facts }
7
8         it { is_expected.to compile }
9       end
10      end
11    end
12  
```

Workflow



Roadmap

- Публикация модулей в Forge
- Конфигурация для PDK и утилит
- Валидация EPP, ERB и YAML
- Валидация и тестирования Control репозиториев (r10k)
- Интеграция Puppet-strings
- Diff изменений

Roadmap

- pdk new function
- pdk new fact
- pdk new control
- pdk new dependency
- pdk update metadata

Roadmap

- <https://github.com/puppetlabs/pdk-planning>
- [https://github.com/puppetlabs/pdk-planning/blob/
master/ROADMAP.md](https://github.com/puppetlabs/pdk-planning/blob/master/ROADMAP.md)
- <https://tickets.puppetlabs.com/projects/PDK/summary>

pdk bundle exec rake -T

```
rake beaker                                     # Run beaker acceptance tests
rake beaker:sets                                # List available beaker nodesets
rake beaker:ssh[set,node]                         # Try to use vagrant to login to the Beaker node
rake build                                       # Build puppet module package
rake changelog                                    # Generate a Changelog from GitHub
rake check:dot_underscore                         # Fails if any .._ files are present in directory
rake check:git_ignore                            # Fails if directories contain the files specified in .gitignore
rake check:symlinks                             # Fails if symlinks are present in directory
rake check:test_file                            # Fails if .pp files present in tests folder
rake clean                                       # Clean a built module package
rake compute_dev_version                        # Print development version of module
rake help                                         # Display the list of available rake tasks
rake lint                                         # Run puppet-lint
rake lint_fix                                     # Run puppet-lint
rake metadata_lint                               # Run metadata-json-lint
rake module:bump                                 # Bump module version to the next patch
rake module:bump:full                            # Bump module version to the next FULL version
rake module:bump:major                           # Bump module version to the next MAJOR version
rake module:bump:minor                           # Bump module version to the next MINOR version
rake module:bump:patch                           # Bump module version to the next PATCH version
rake module:bump_commit                         # Bump version and git commit
rake module:bump_commit:full                     # Bump module version to the next FULL version and git commit
rake module:bump_commit:major                   # Bump module version to the next MAJOR version and git commit
rake module:bump_commit:minor                   # Bump module version to the next MINOR version and git commit
rake module:bump_commit:patch                   # Bump module version to the next PATCH version and git commit
rake module:bump_to_version[new_version]        # Bump module to specific version number
rake module:clean                                # Runs clean again
rake module:dependency[module_name,version]       # Set specific module dependency version
rake module:push                                  # Push module to the Puppet Forge
rake module:release                             # Release the Puppet module, doing a clean, build, tag, push, bump_commit and git push
rake module:tag                                  # Git tag with the current module version
rake module:version                            # Get current module version
rake module:version:next                         # Get next module version
rake module:version:next:major                  # Get the next MAJOR version
rake module:version:next:minor                  # Get the next MINOR version
rake module:version:next:patch                  # Get the next PATCH version
rake parallel_spec                            # Run spec tests in parallel and clean the fixtures directory if successful
rake parallel_spec_standalone                 # Parallel spec tests
rake release_checks                           # Runs all necessary checks on a module in preparation for a release
rake rubocop                                  # Run RuboCop
```

Workflow

Next commands

create and
the module
validate
test unit

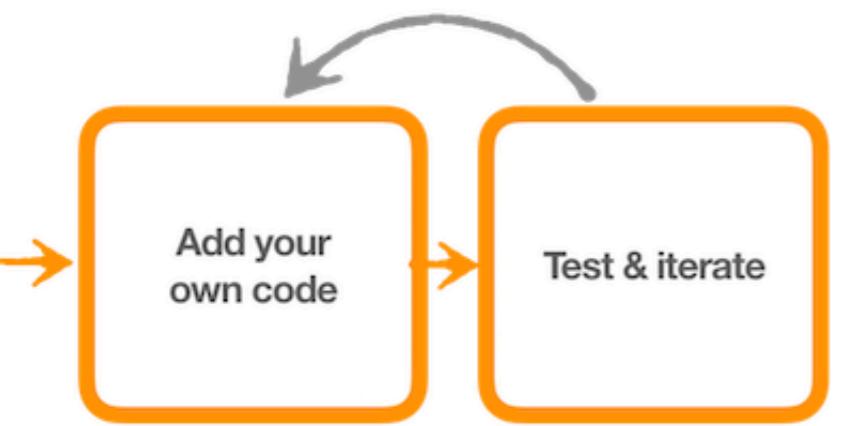
Add content & functionality
`pdk new class`
`pdk new defined_type`
`pdk new task`

Add your
own code

Test & iterate



Workflow



Workflow



pdk test acceptance

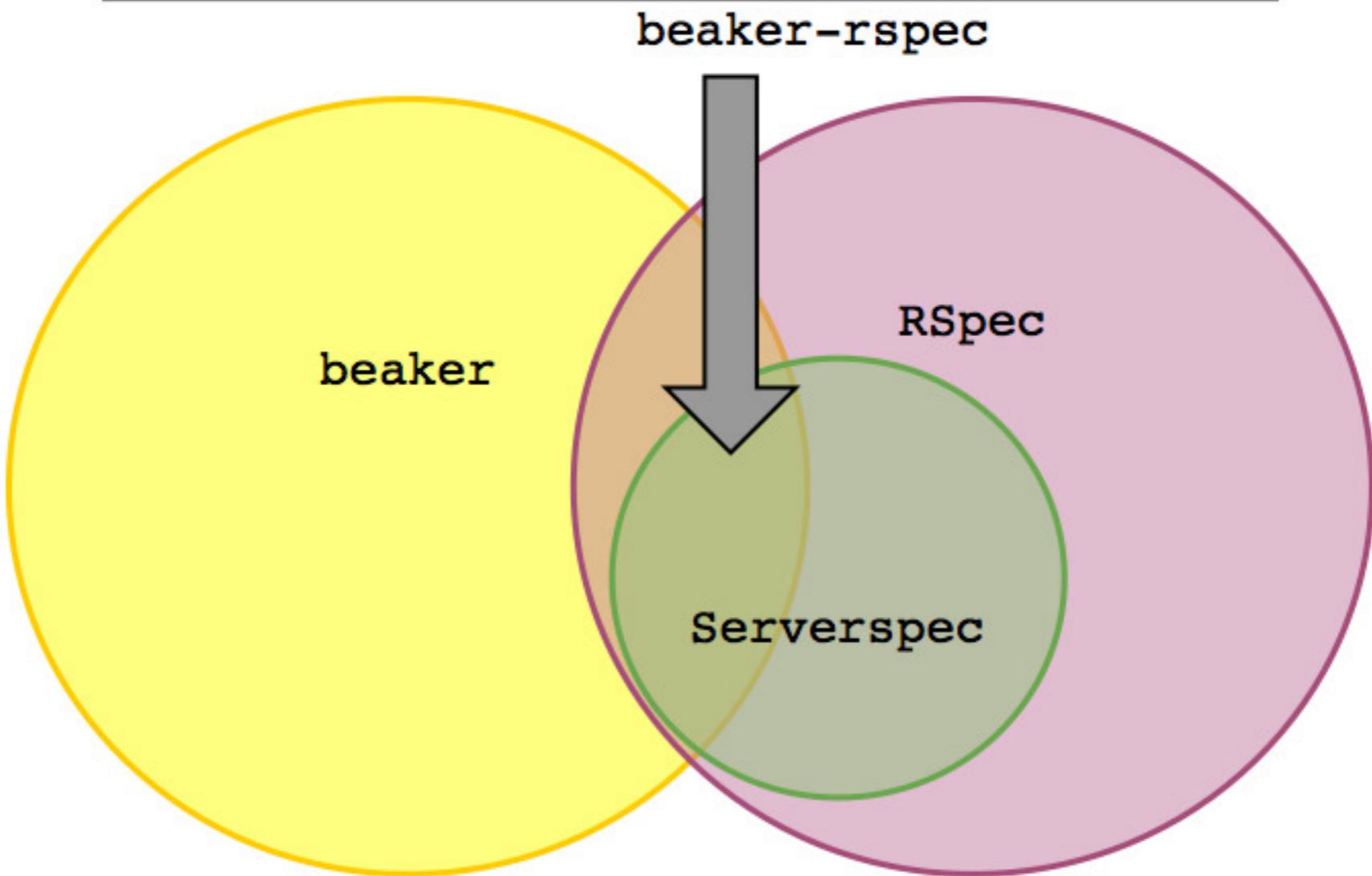
- Beaker
 - rake beaker, rake beaker:sets
- Test Kitchen

Beaker

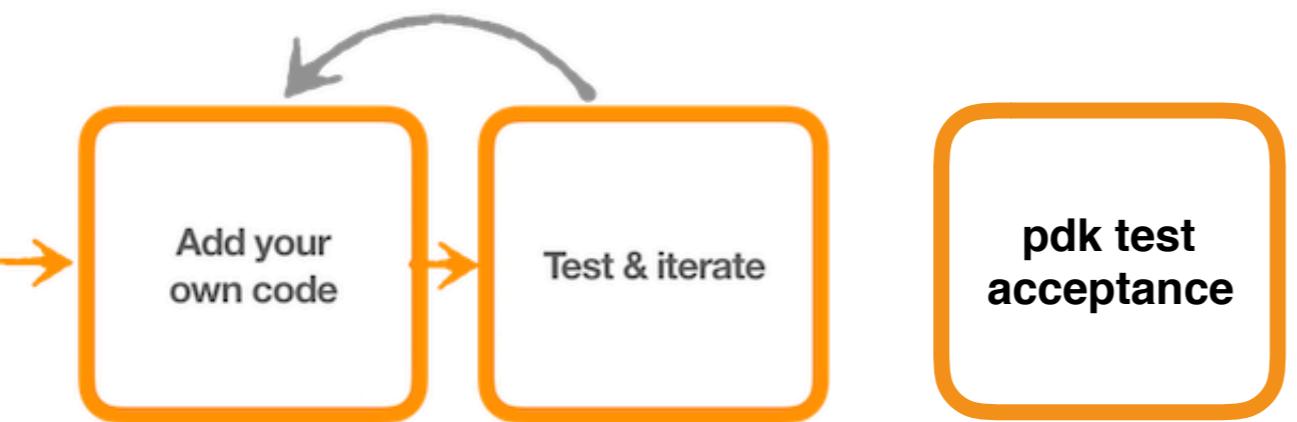
- Официальные инструмент для acceptance/integration тестов
- Поддерживает тестирование в:
 - Vagrant, LXC, AWS, GCE, DO, VmWare, Docker, OpenStack
- Beaker DSL vs Rspec/Serverspec
 - <https://github.com/puppetlabs/beaker>
 - <https://github.com/puppetlabs/beaker-rspec>

Beaker-rspec

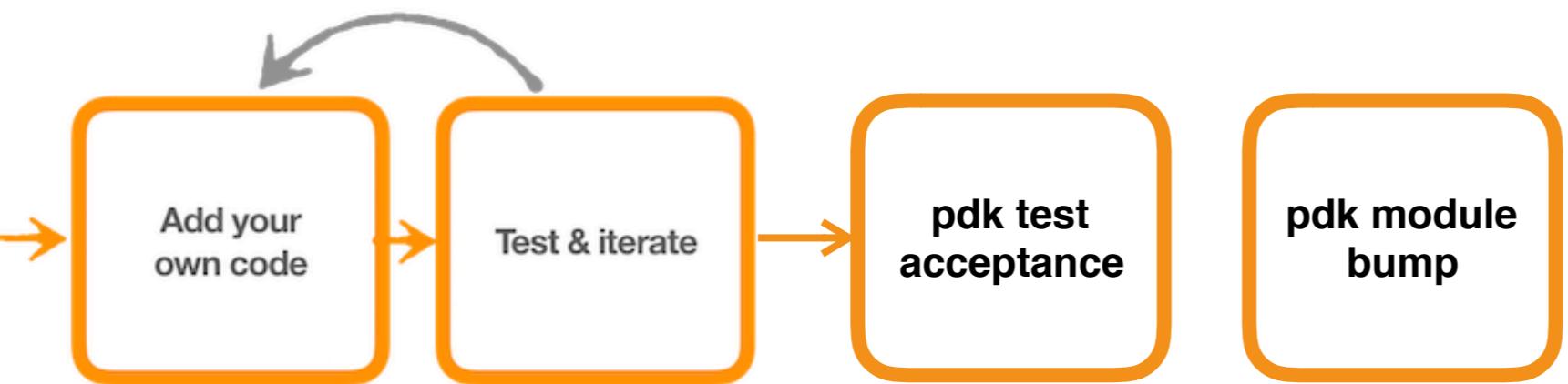
beaker vs. beaker-rspec



Workflow



Workflow



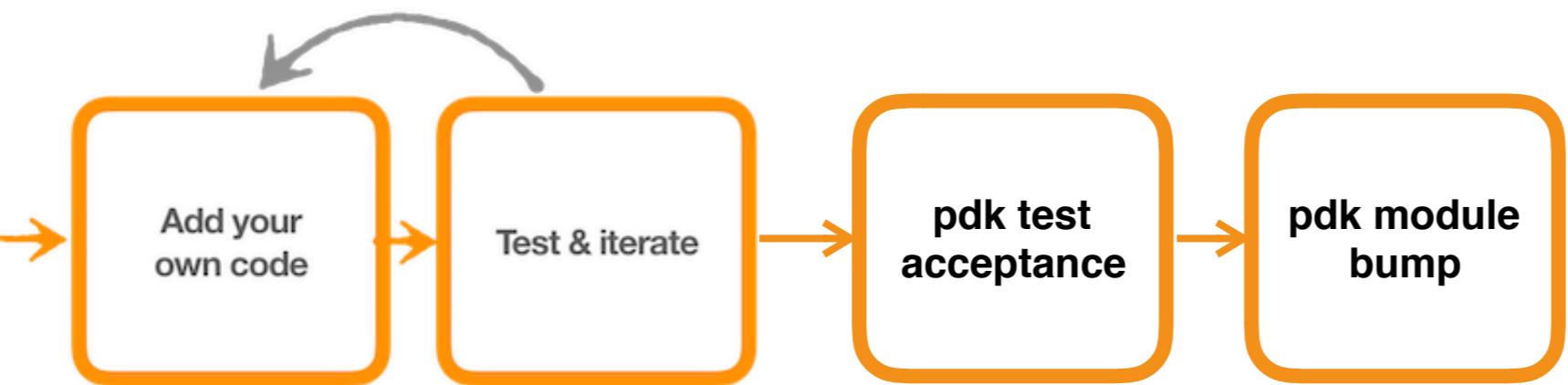
pdk module bump

- Puppet-blacksmith:
 - <https://github.com/voxpupuli/puppet-blacksmith>
 - rake module:bump
 - rake module:bump_commit

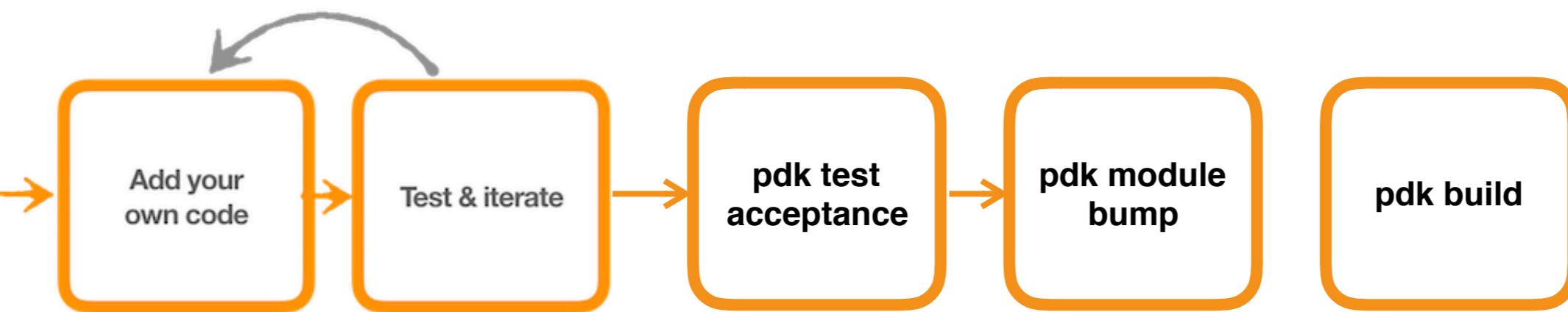
pdk module bump

```
rake module:bump                                # Bump module version to the next patch
rake module:bump:full                            # Bump module version to the next FULL version
rake module:bump:major                           # Bump module version to the next MAJOR version
rake module:bump:minor                           # Bump module version to the next MINOR version
rake module:bump:patch                           # Bump module version to the next PATCH version
rake module:bump_commit                         # Bump version and git commit
rake module:bump_commit:full                     # Bump module version to the next FULL version and git commit
rake module:bump_commit:major                   # Bump module version to the next MAJOR version and git commit
rake module:bump_commit:minor                   # Bump module version to the next MINOR version and git commit
rake module:bump_commit:patch                   # Bump module version to the next PATCH version and git commit
rake module:bump_to_version[new_version]        # Bump module to specific version number
```

Workflow



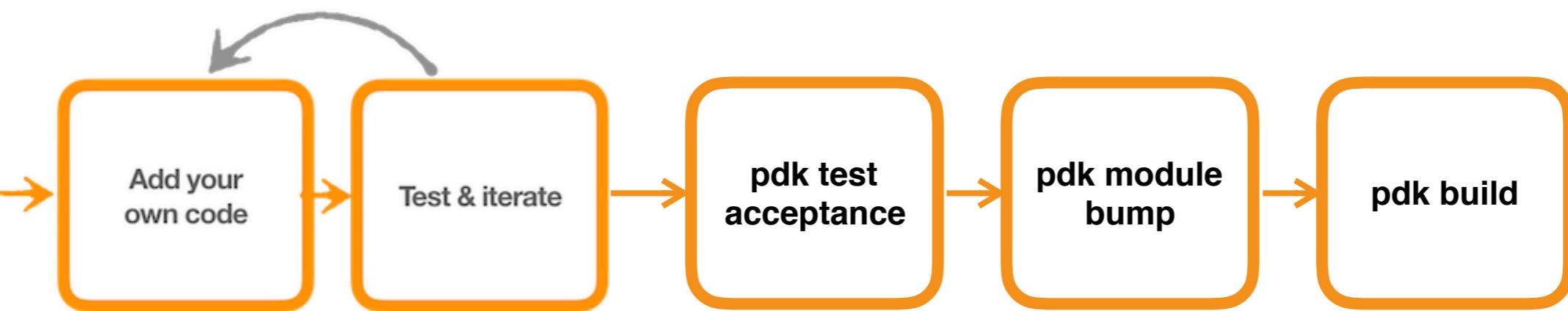
Workflow



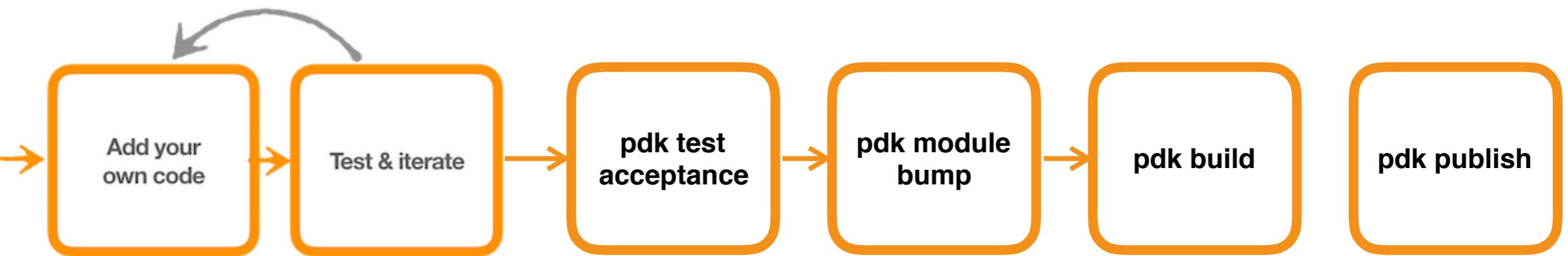
pdk build

- ./pkg
- forgeusername-module_name-version.tar.gz
- interview
- cleaning

Workflow



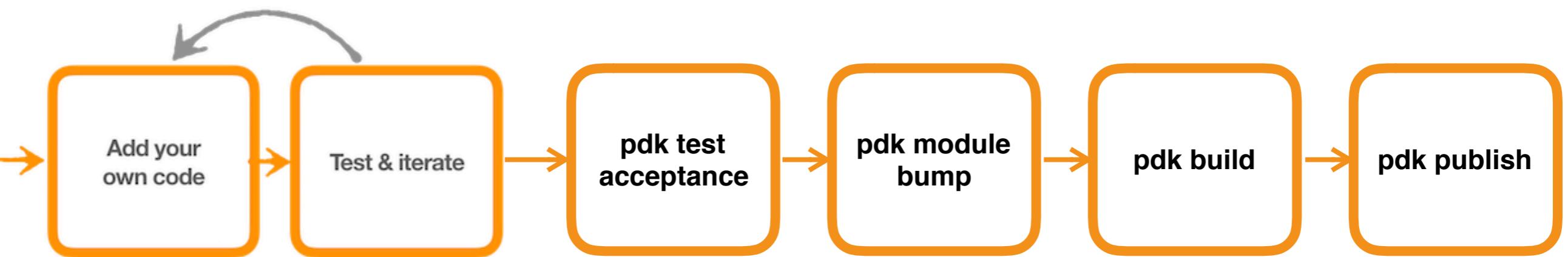
Workflow



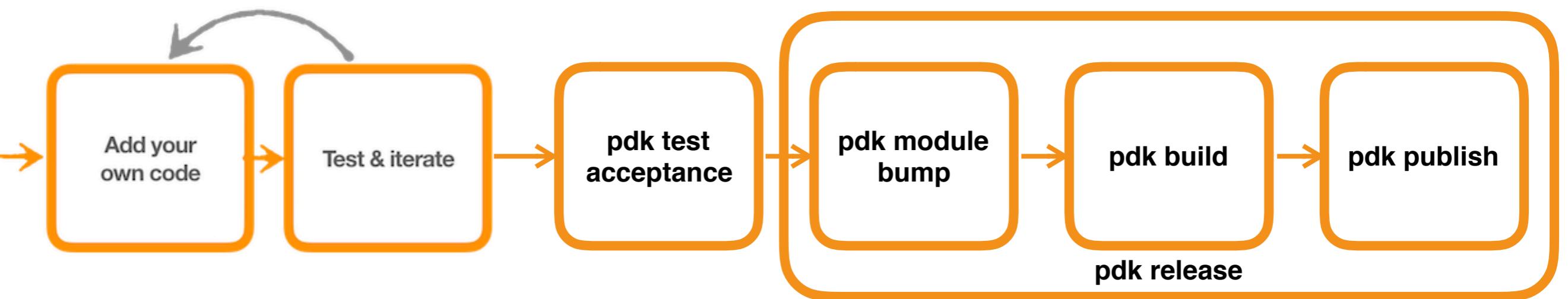
pdk publish

- Puppet-blacksmith:
 - rake module:push
 - .puppetforge.yml
- metadata.json, README, CHANGELOG, LICENSE
- <10Mb

Workflow



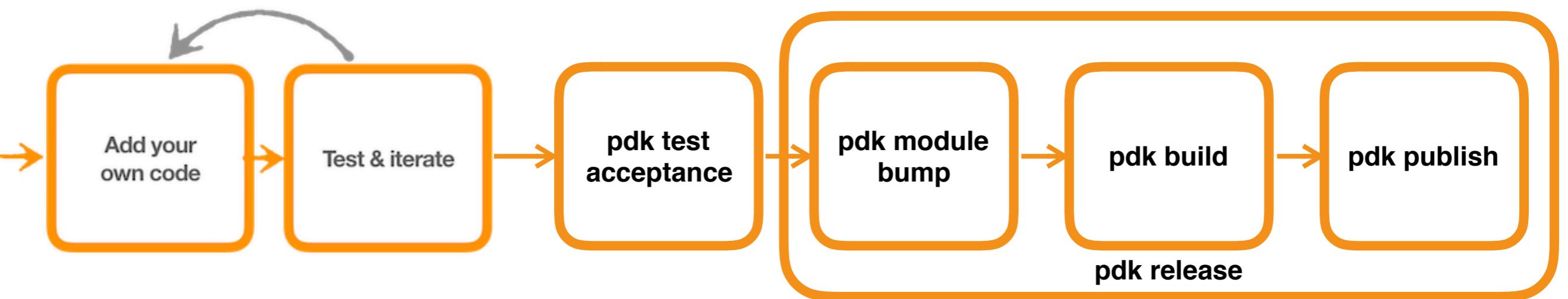
Workflow



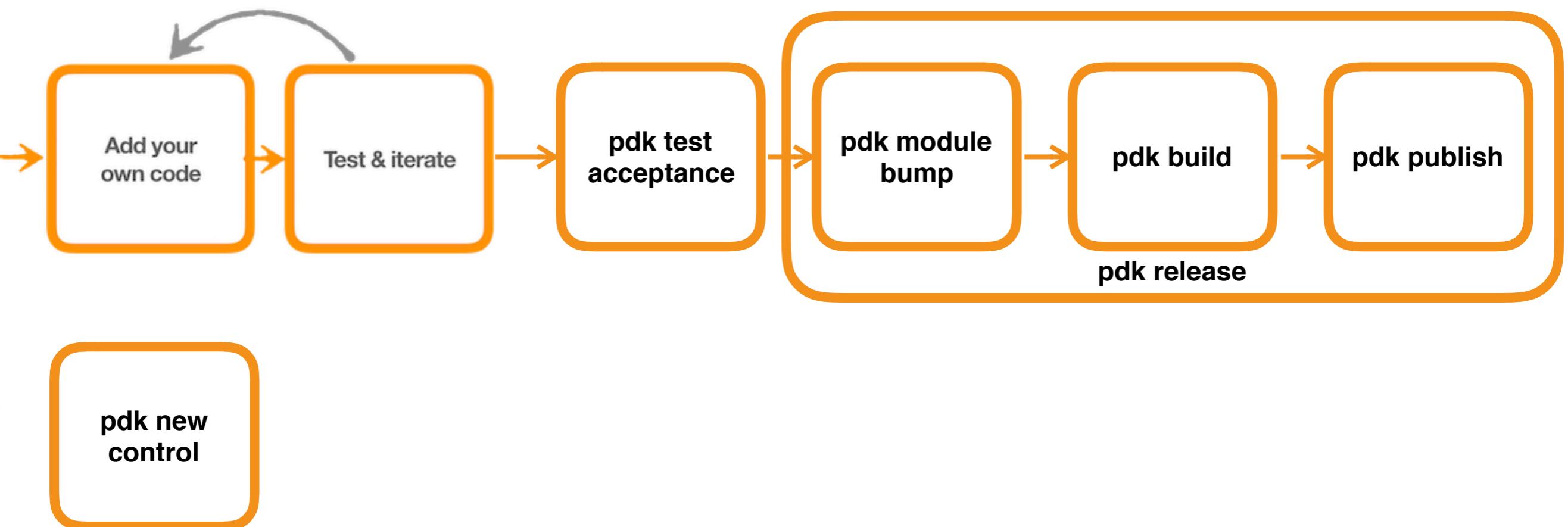
pdk release

- clean
- tag
- push
- bump_commit
- build
- publish

Workflow



Workflow



pdk new control

- Шаблоны:
 - Control repo от Puppet
 - <https://github.com/puppetlabs/control-repo>
 - PSICK от Example42
 - <https://github.com/example42/psick>

Control repo

```
control-repo/
├── data/
│   └── nodes/
│       └── common.yaml
# Hiera data directory.
# Node-specific data goes here.
# Common data goes here.

└── manifests/
    └── site.pp
# The "main" manifest that contains a default node definition.

└── scripts/
    ├── code_manager_config_version.rb
    ├── config_version.rb
    └── config_version.sh
# A config_version script for Code Manager.
# A config_version script for r10k.
# A wrapper that chooses the appropriate config_version script.

└── site/
    ├── profile/
    └── role/
# This directory contains site-specific modules and is added to
# The profile module.
# The role module.

└── LICENSE
└── Puppetfile
# A list of external Puppet modules to deploy with an environment

└── README.md
└── environment.conf
└── hiera.yaml
# Environment-specific settings. Configures the moduelpath and
# Hiera's configuration file. The Hiera hierarchy is defined here
```

Puppetfile

```
1  forge 'https://forge.puppet.com'

2

3  # Modules from the Puppet Forge
4  # Versions should be updated to be the latest at the time you start
5  mod 'puppetlabs/inifile',      '2.2.1'
6  mod 'puppetlabs/stdlib',       '4.25.1'
7  mod 'puppetlabs(concat',       '4.2.1'

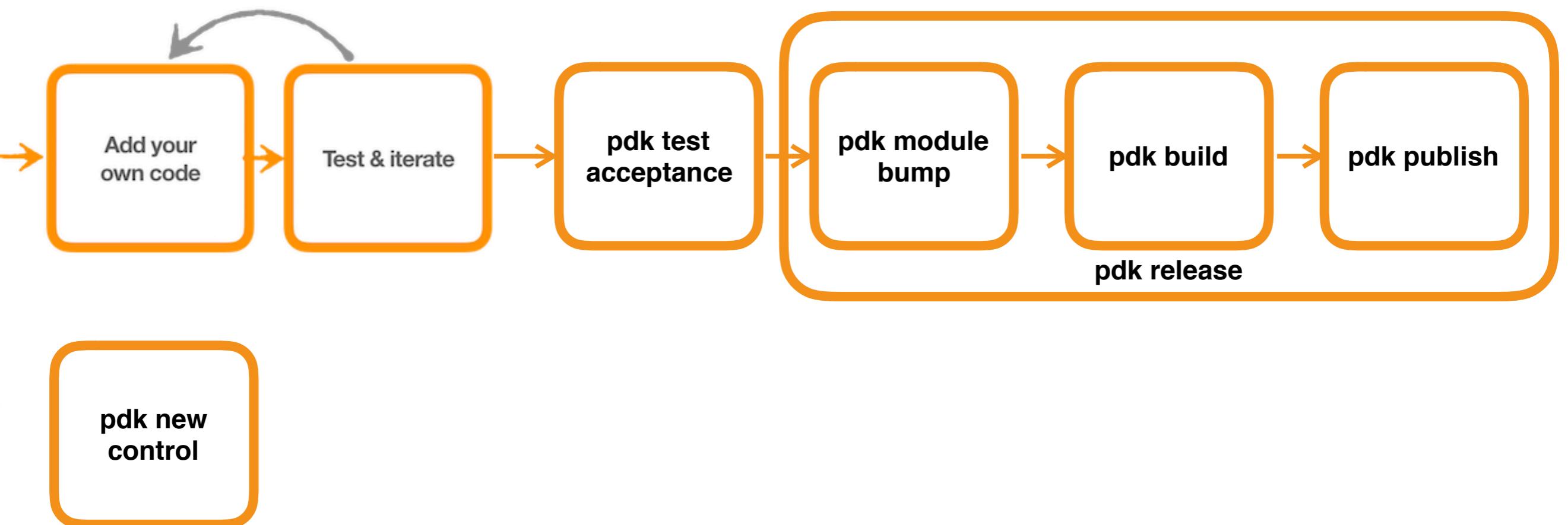
8

9  # Modules from Git
10 # Examples: https://github.com/puppetlabs/r10k/blob/master/doc/puppetfile.mkd#examples
11 mod 'apache',
12   :git    => 'https://github.com/puppetlabs/puppetlabs-apache',
13   :commit => 'de290646f97e04b4b8e42c70f6e01e860c394ce7'

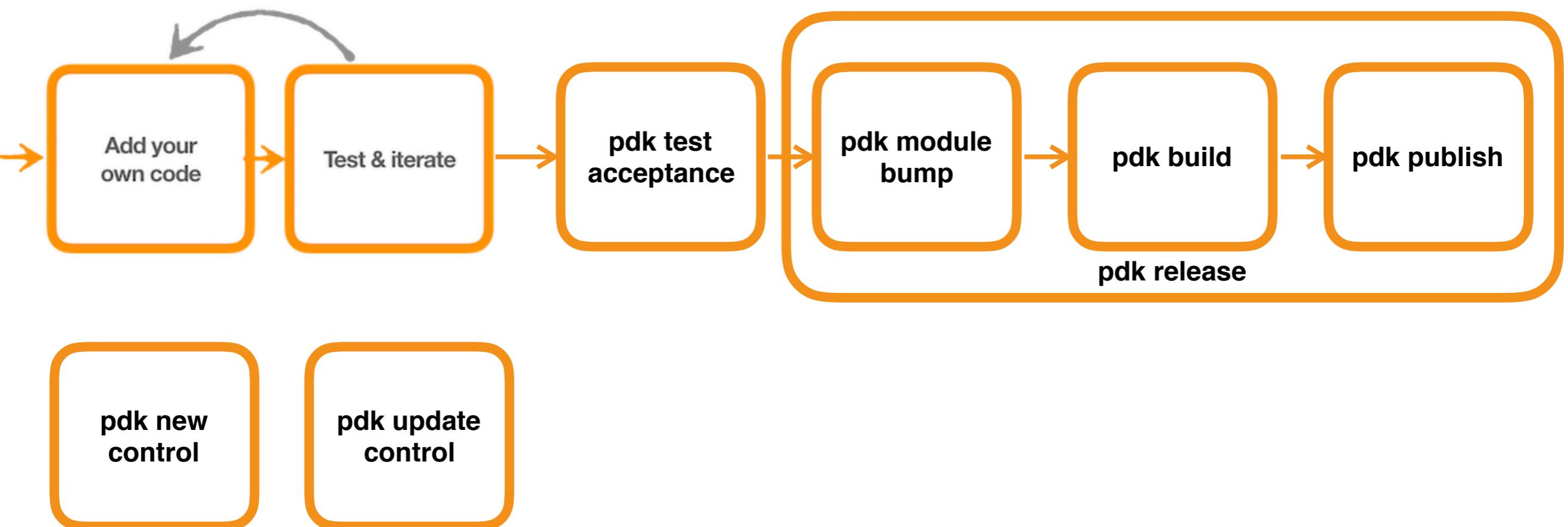
14

15 mod 'apache',
16   :git    => 'https://github.com/puppetlabs/puppetlabs-apache',
17   :branch => 'docs_experiment'
18 |
```

Workflow



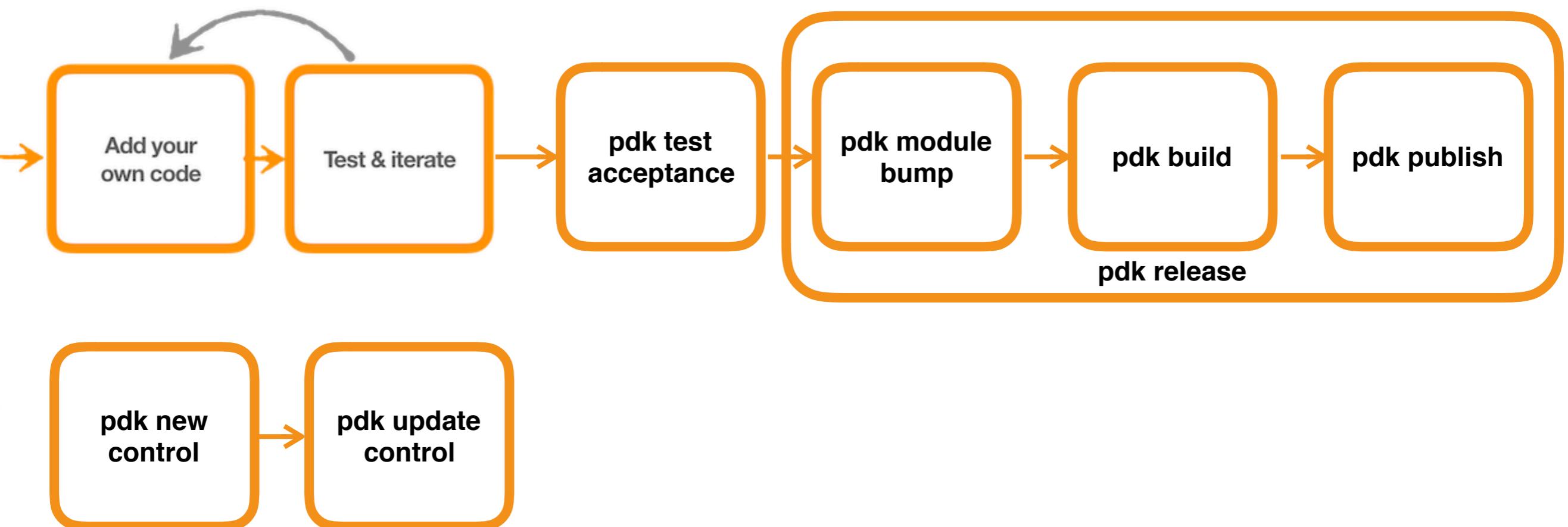
Workflow



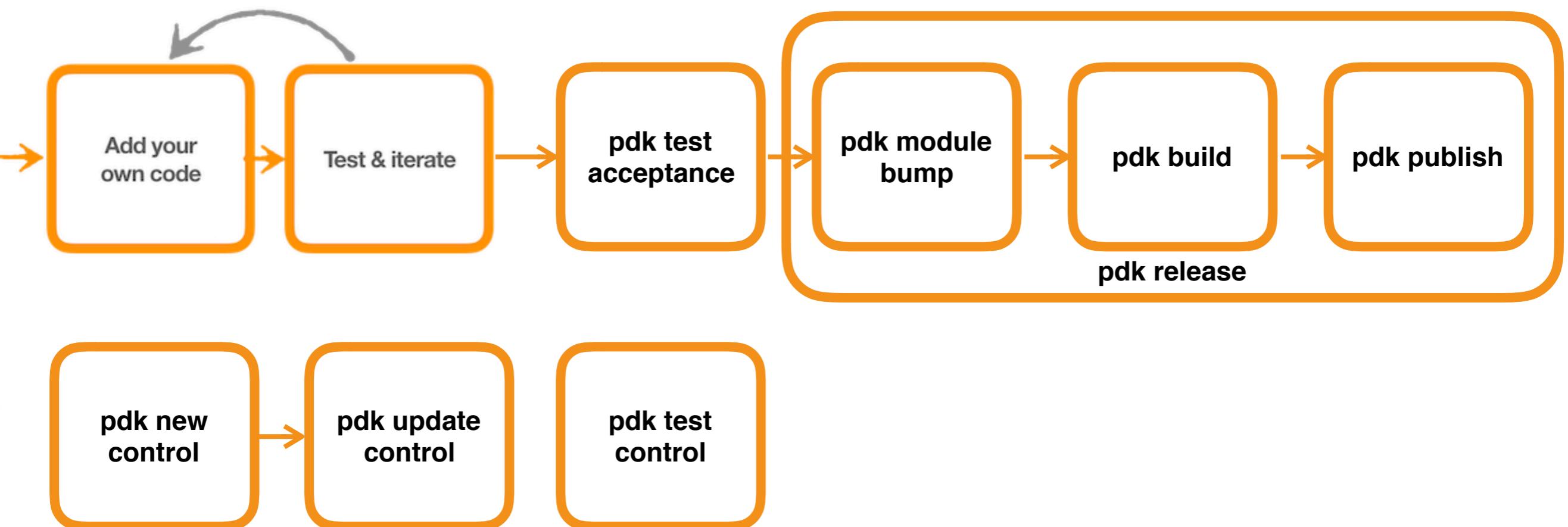
pdk update control

- Librarian-puppet <http://librarian-puppet.com>
 - librarian-puppet init/install/update/outdated
 - Puppetfile.lock
- R10k <https://github.com/puppetlabs/r10k>
 - r10k puppetfile check/install/purge

Workflow



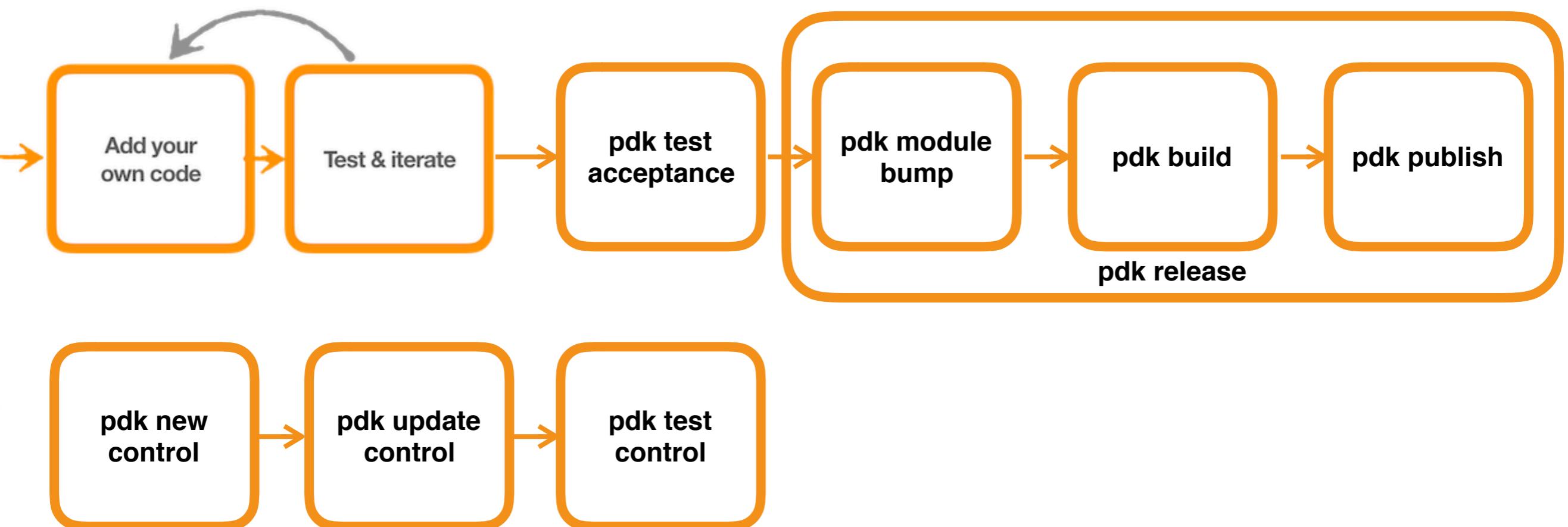
Workflow



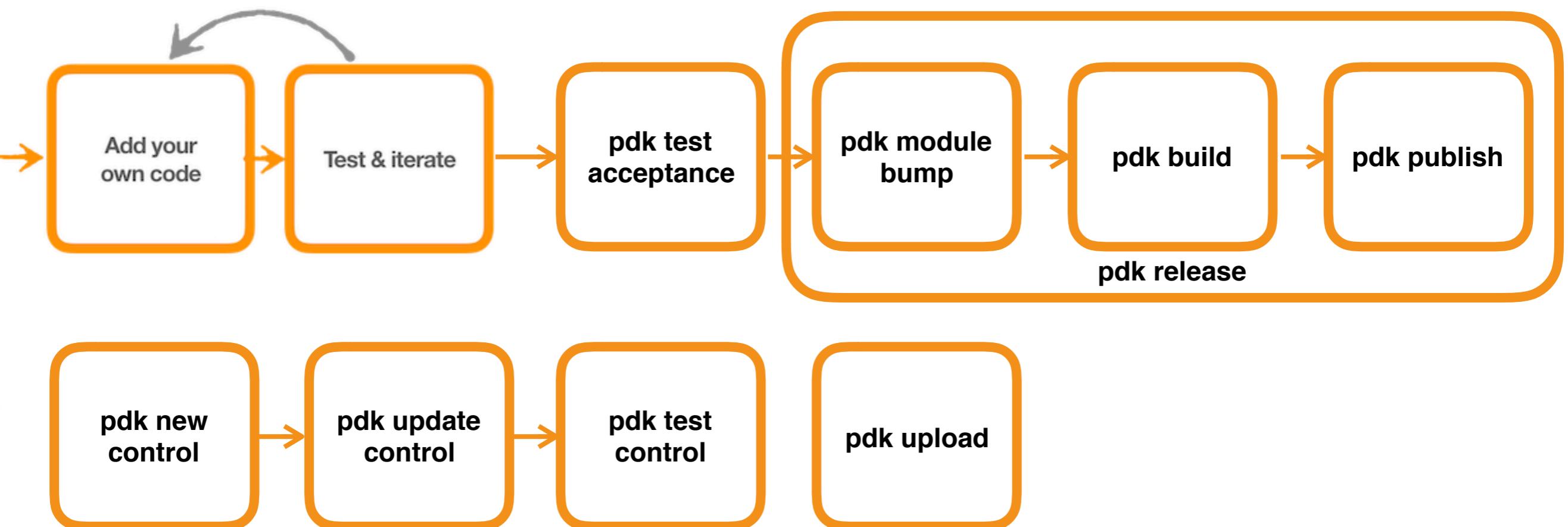
pdk test control

- Onceover
 - <https://github.com/dylanratcliffe/onceover>
 - Тестирование Roles и Profiles
 - Внутри Beaker и Rake задачи
 - Есть плагины

Workflow



Workflow

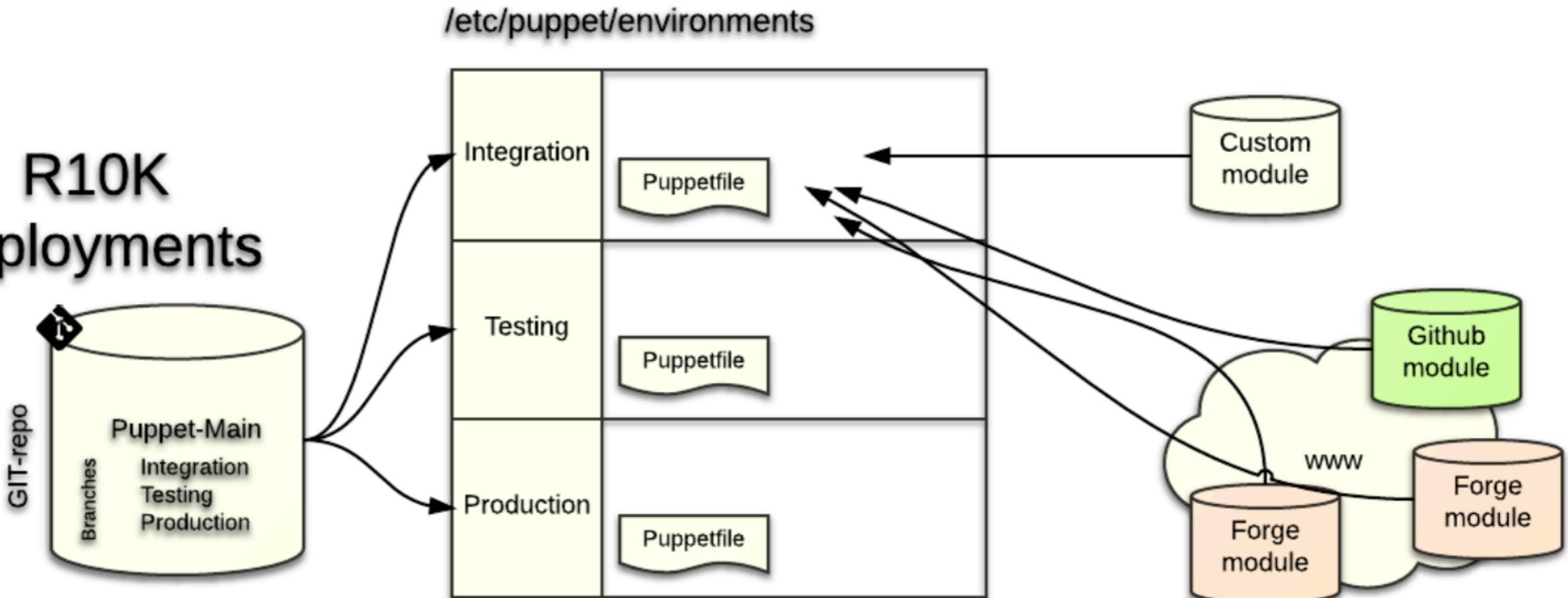


pdk upload

- R10k
 - r10k deploy environment
 - r10k deploy module
- Code Manager (PE)

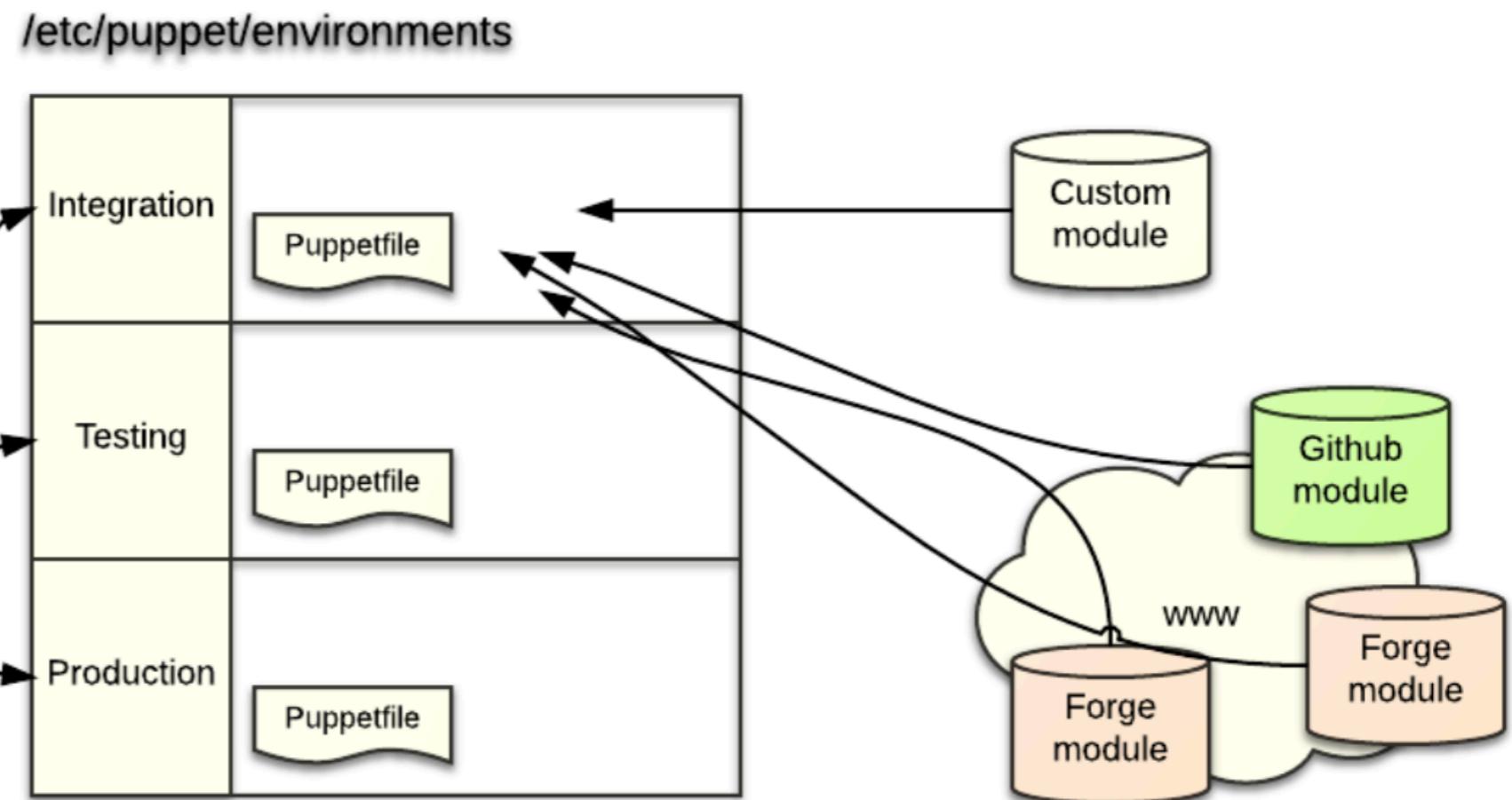
R10k

R10K deployments



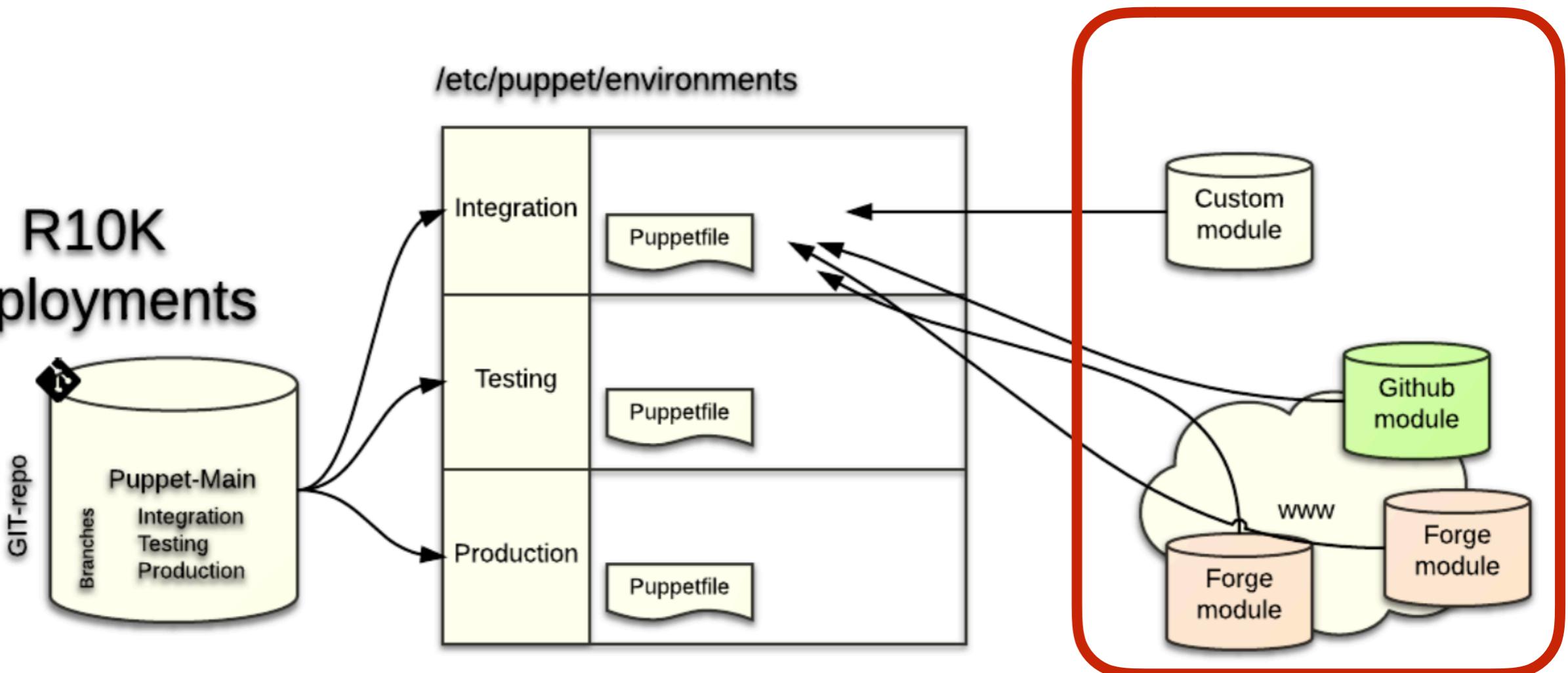
R10k

R10K deployments



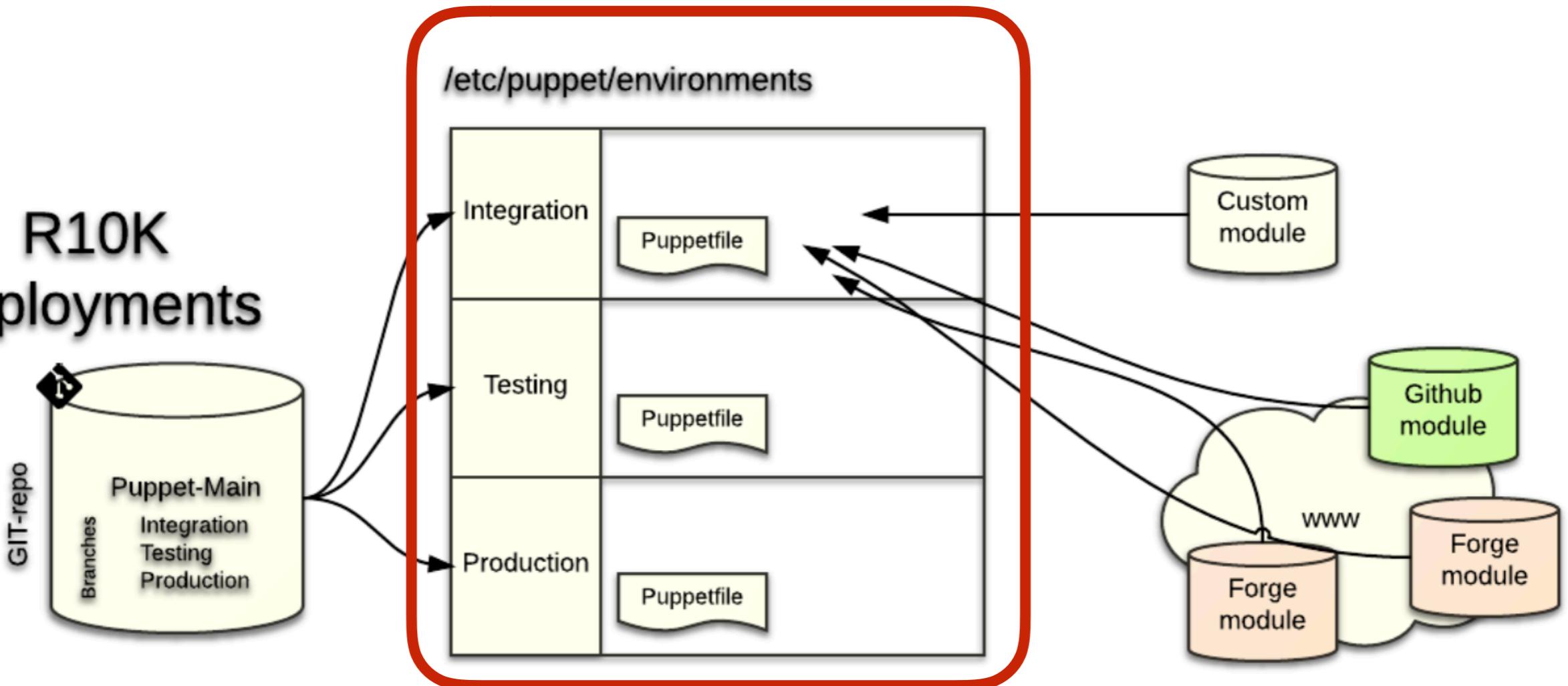
R10k

R10K deployments

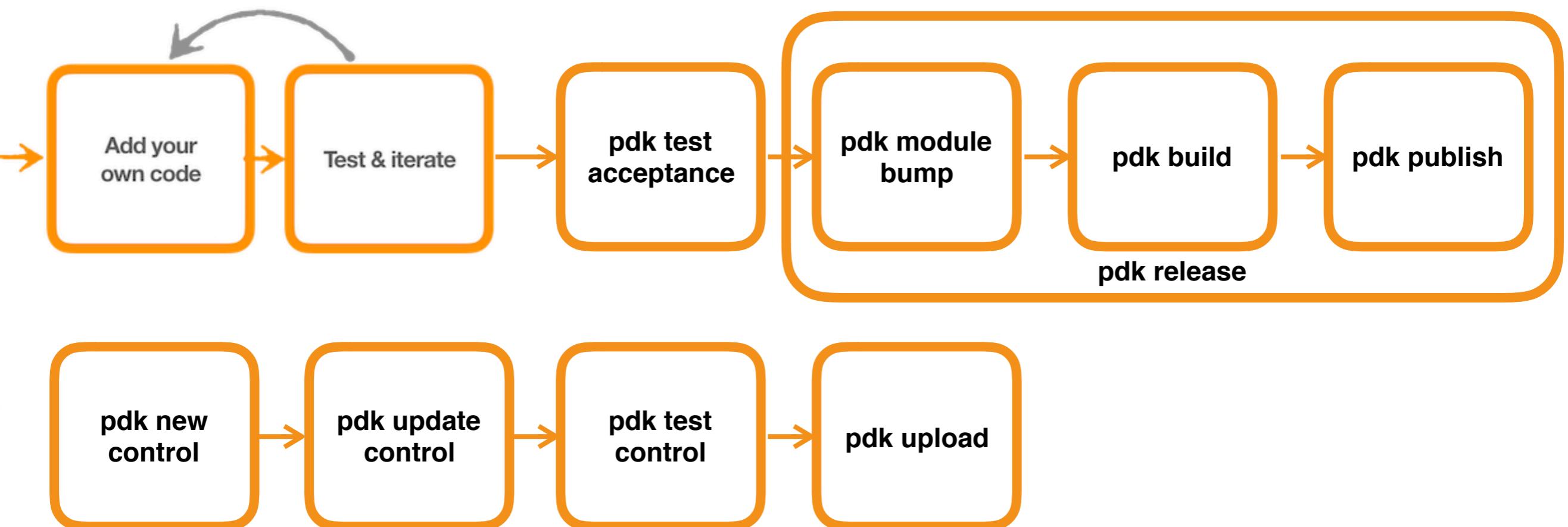


R10k

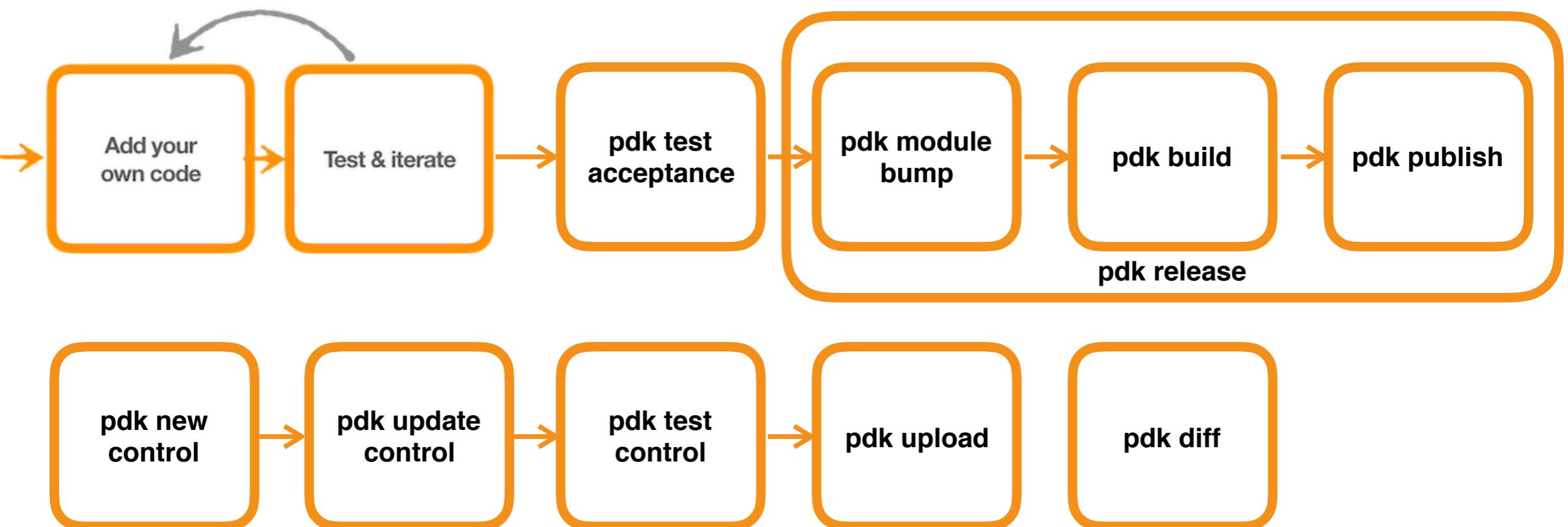
R10K deployments



Workflow



Workflow



pdk diff

- Octocatalog-diff
 - Diff между бранчами
 - Не требует Puppet master

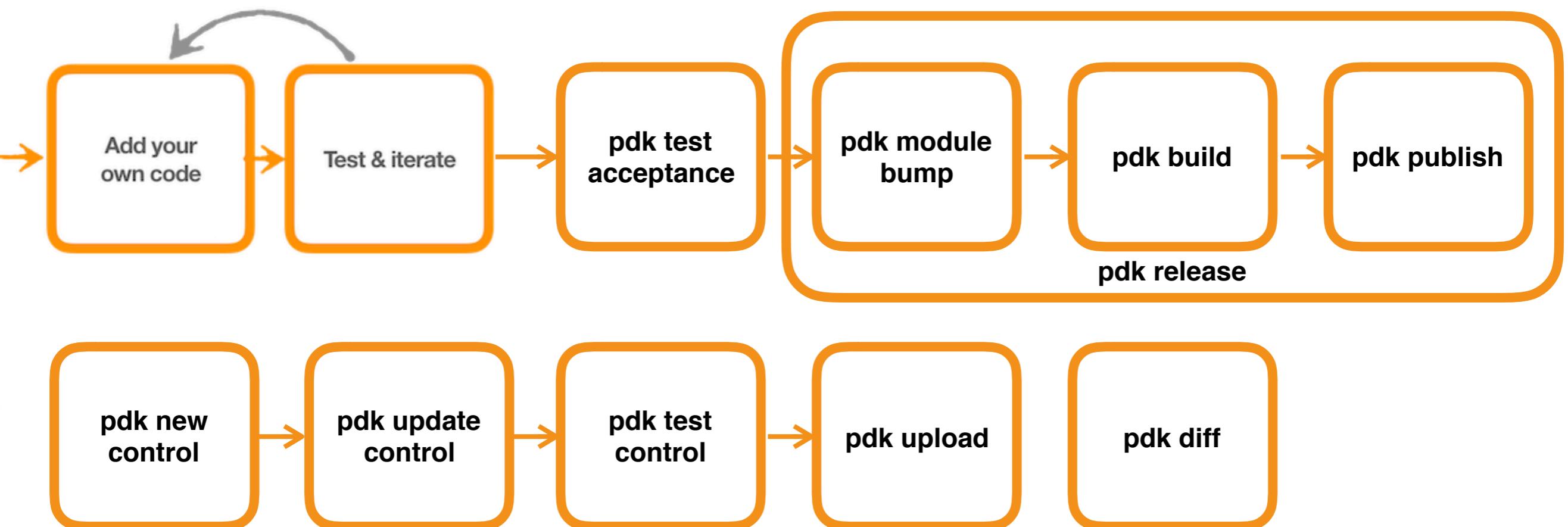


↗ with ❤ by GitHub

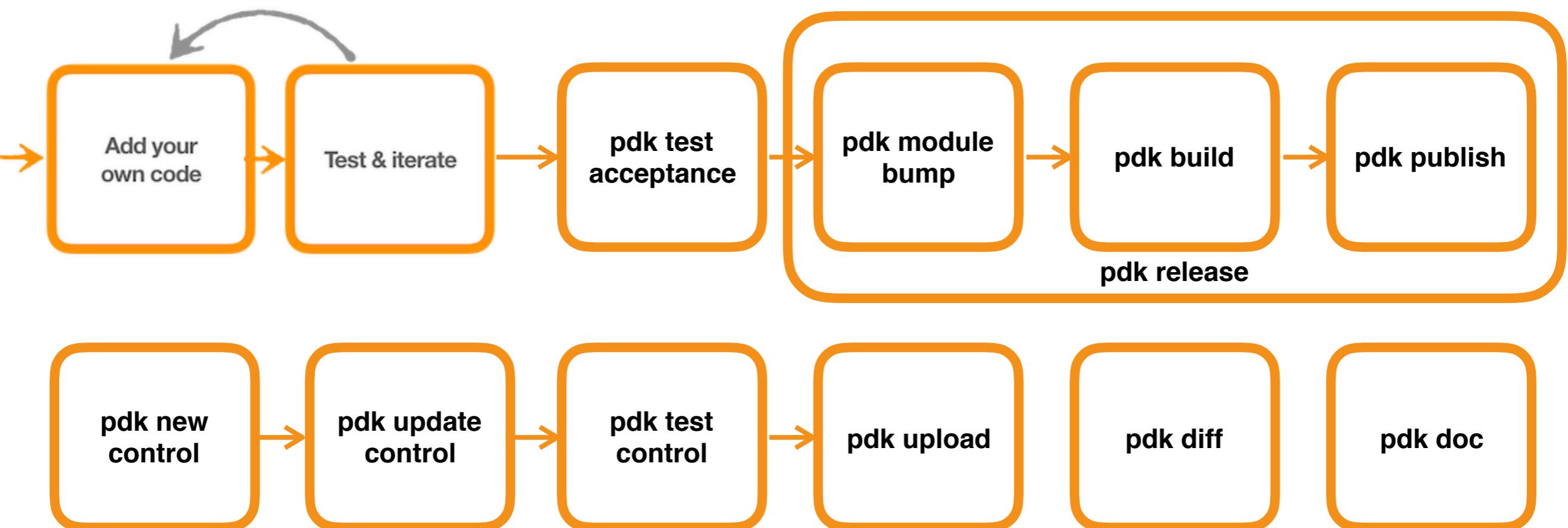
pdk diff

```
Kevins-MacBook-Pro:puppet kaulisse$ bin/octocatalog-diff -n octonode-test.github.net --display-detail-add -q
diff origin/master/octonode-test.github.net current_working/octonode-test.github.net
*****
+ Exec[create mount point at /data/pond/work] =>
  parameters =>
    "command": "mkdir -p '/data/pond/work' && chown root:root '/data/pond/work' ...
    "logoutput": "on_failure",
    "path": "/usr/local/sbin:/usr/local/bin:/usr/bin:/usr/sbin:/bin:/sbin",
    "provider": "bundler_clean_env",
    "unless": "test -d '/data/pond/work'"
*****
- Exec[ensure data work dir is owned by deploy:deploy]
*****
- Filesystem[/dev/xvdb]
*****
+ Filesystem[/dev/xvdf] =>
  parameters =>
    "ensure": "present",
    "fs_type": "ext4"
*****
Mount[/data/pond/work] =>
  parameters =>
    device =>
      - /dev/xvdb
      + /dev/xvdf
    fstype =>
      - ext3
      + ext4
    options =>
      - defaults,noatime
      + defaults,noatime,nodiratime
*****
```

Workflow



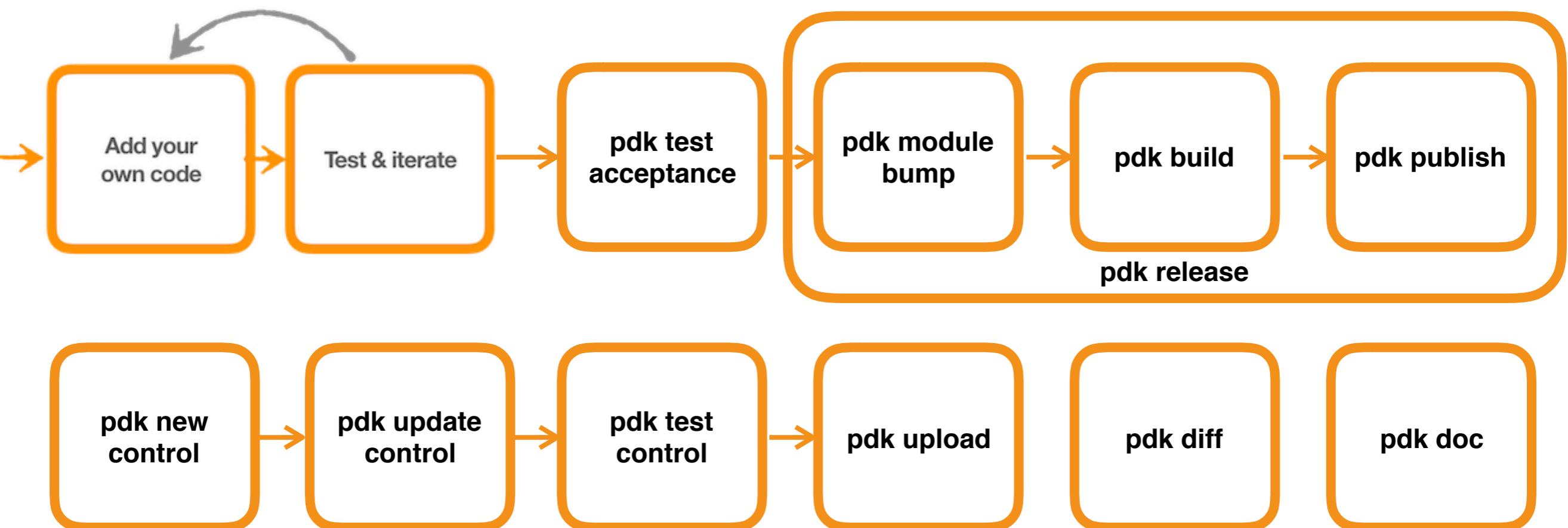
Workflow



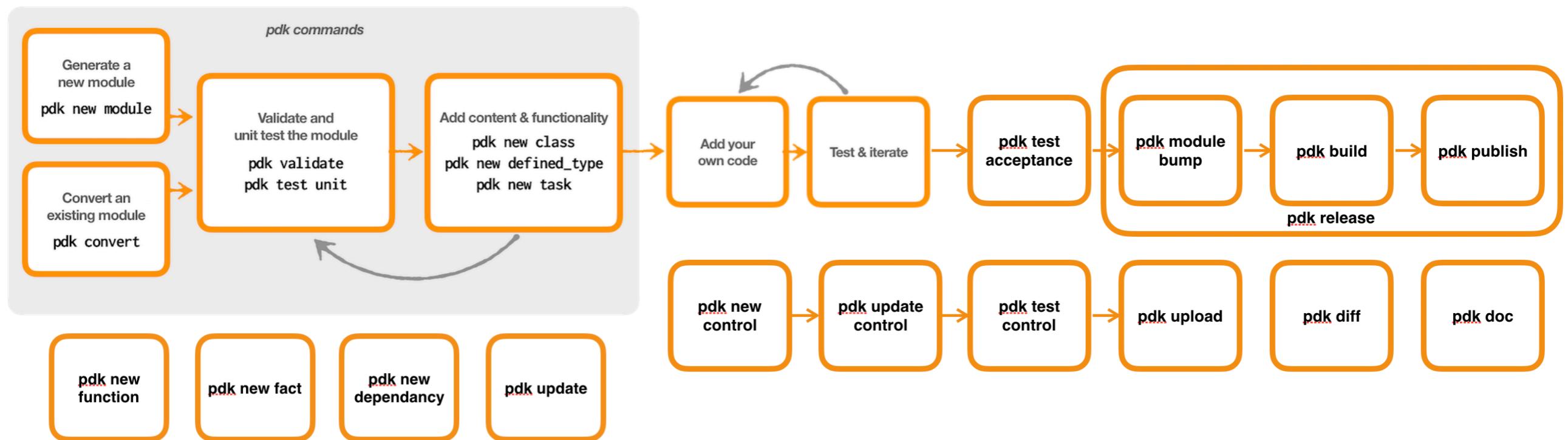
pdk doc

- CHANGELOG:
 - GitHub Changelog Generator
 - `rake changelog`
- Metadata
- Puppet strings

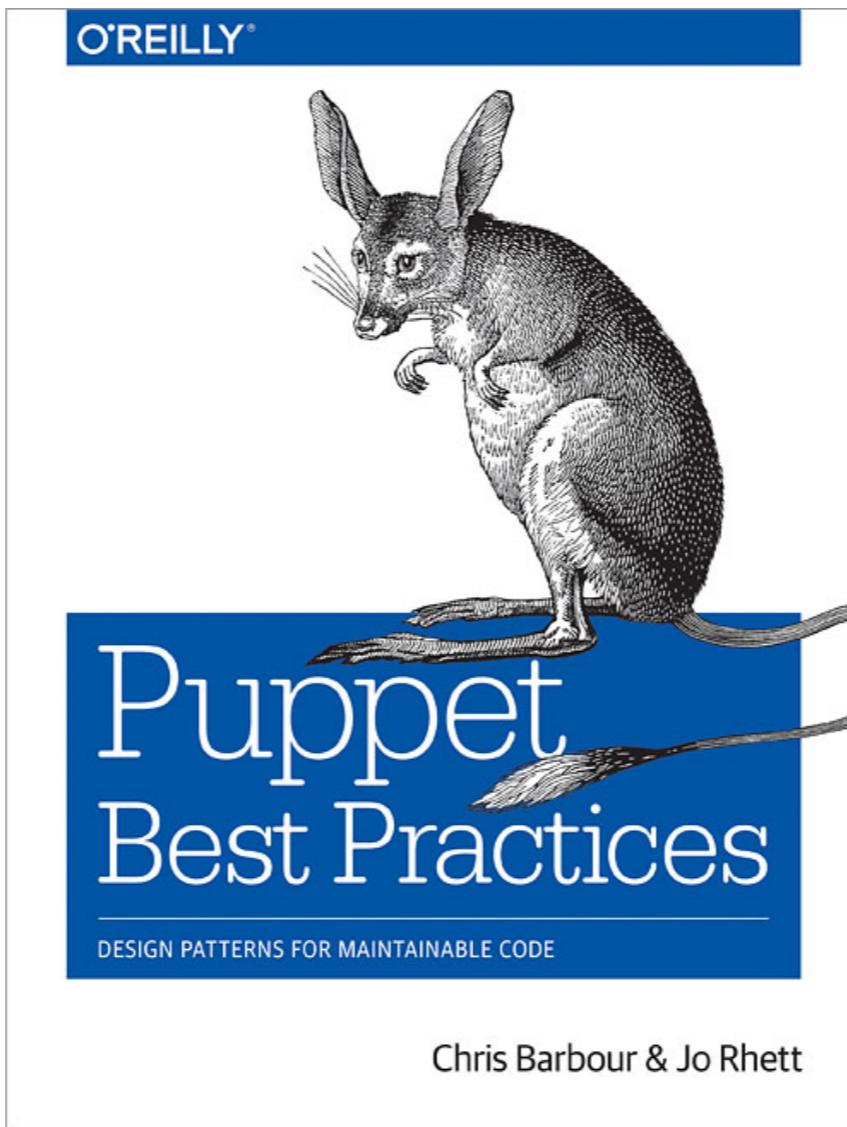
Workflow



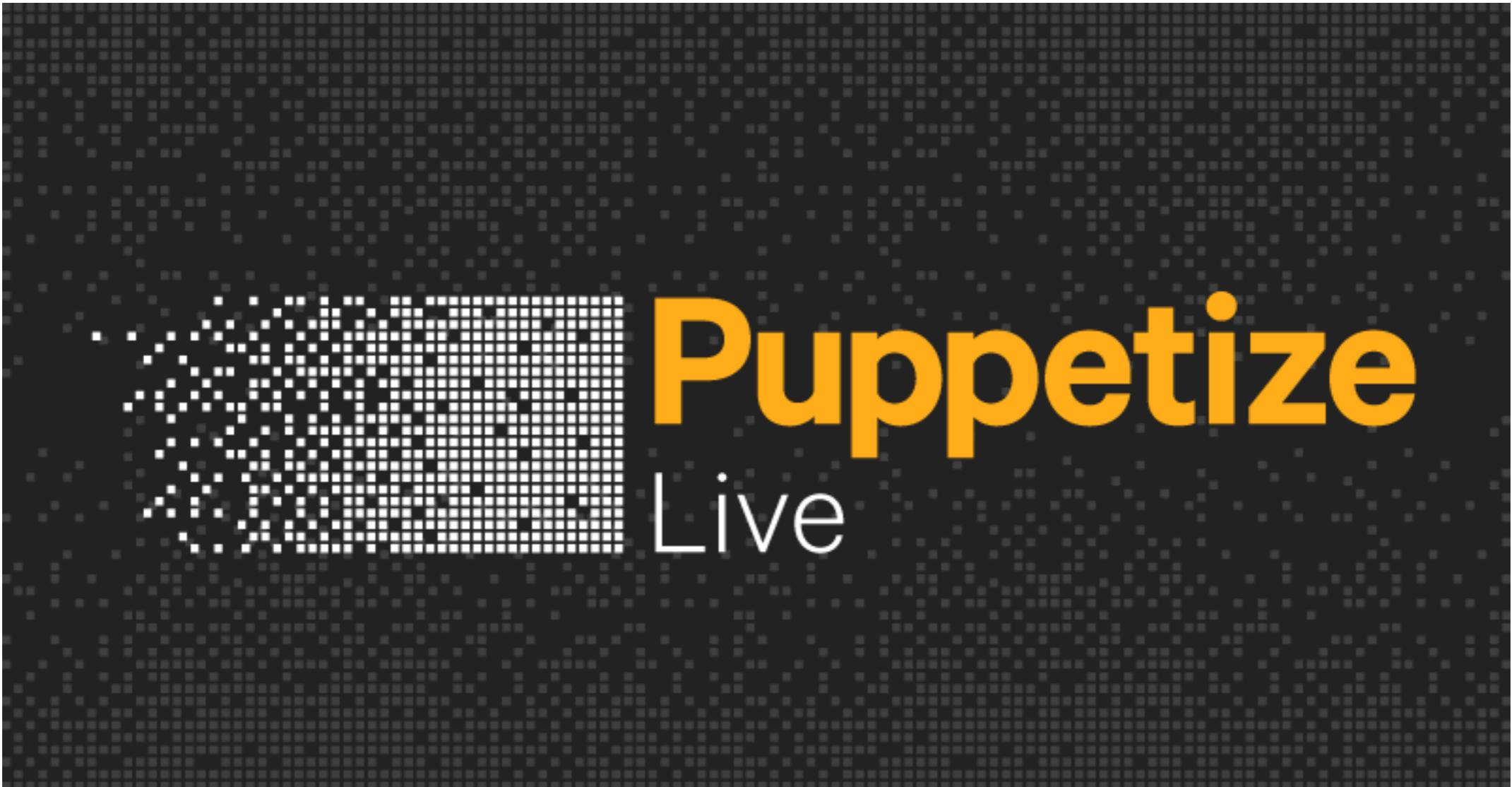
Итого



Книга



Конференция



Ссылки

- Митапы DevOps Meetup Moscow
- Подкаст и телеграм канал DevOps Deflope
- <http://hangops.ru>
 - Slack
 - Рассылка
 - Hangouts

Вакансия

- Мы ищем людей, которым это интересно
- Пишите на dontpanic@express42.com

Вопросы?

Практика

Практика и дз

- <https://github.com/express42/mc-puppet>

Результат

TASKS

PDK

Updated

3 days ago

Total downloads

4,974

Quality score

5.0 

TASKS

Modules can now contain tasks that take action outside of a desired state managed by Puppet

PDK

Modules compatible with Puppet Development Kit (PDK) validation and testing