



Ansible 驱动的 CICD 工具 Zuul

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Zuul

Zuul is the project gating system developed for use by the OpenStack project as part of its software development process.

Zuul:

- software development process
- use by the OpenStack project
 - <https://zuul-ci.org/>
- project gating system



CI / CD 要解决的问题

- 持续开发
- 持续集成
- 持续发布
- 持续部署

CICD系统的三大挑战

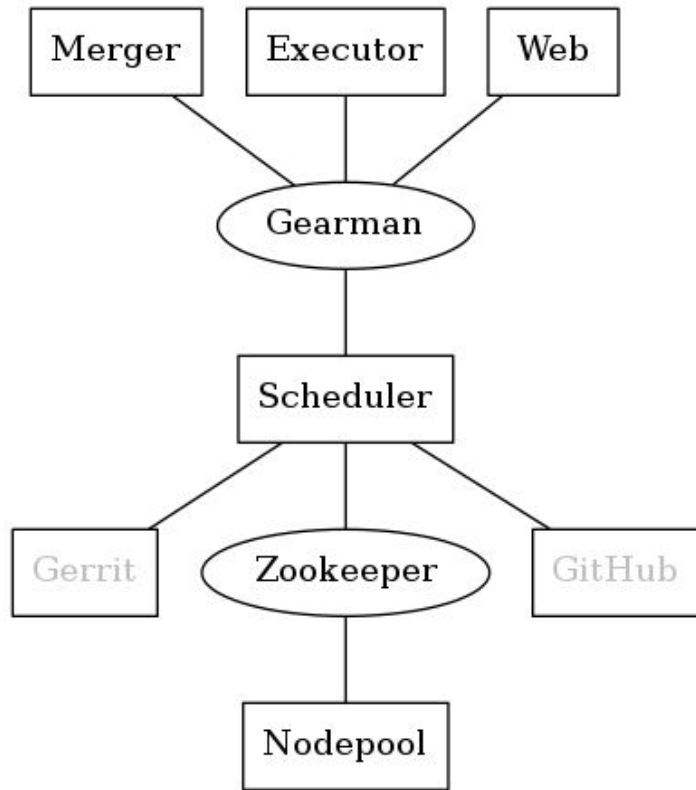
OpenStack开发	引入的问题
项目总数1000+	持续集成难度巨大, 集成测试复杂, 构建时间长
开发人员遍布全局	协同开发
每日commit数量5000+	构建数量大

Zuul提出的解决之道

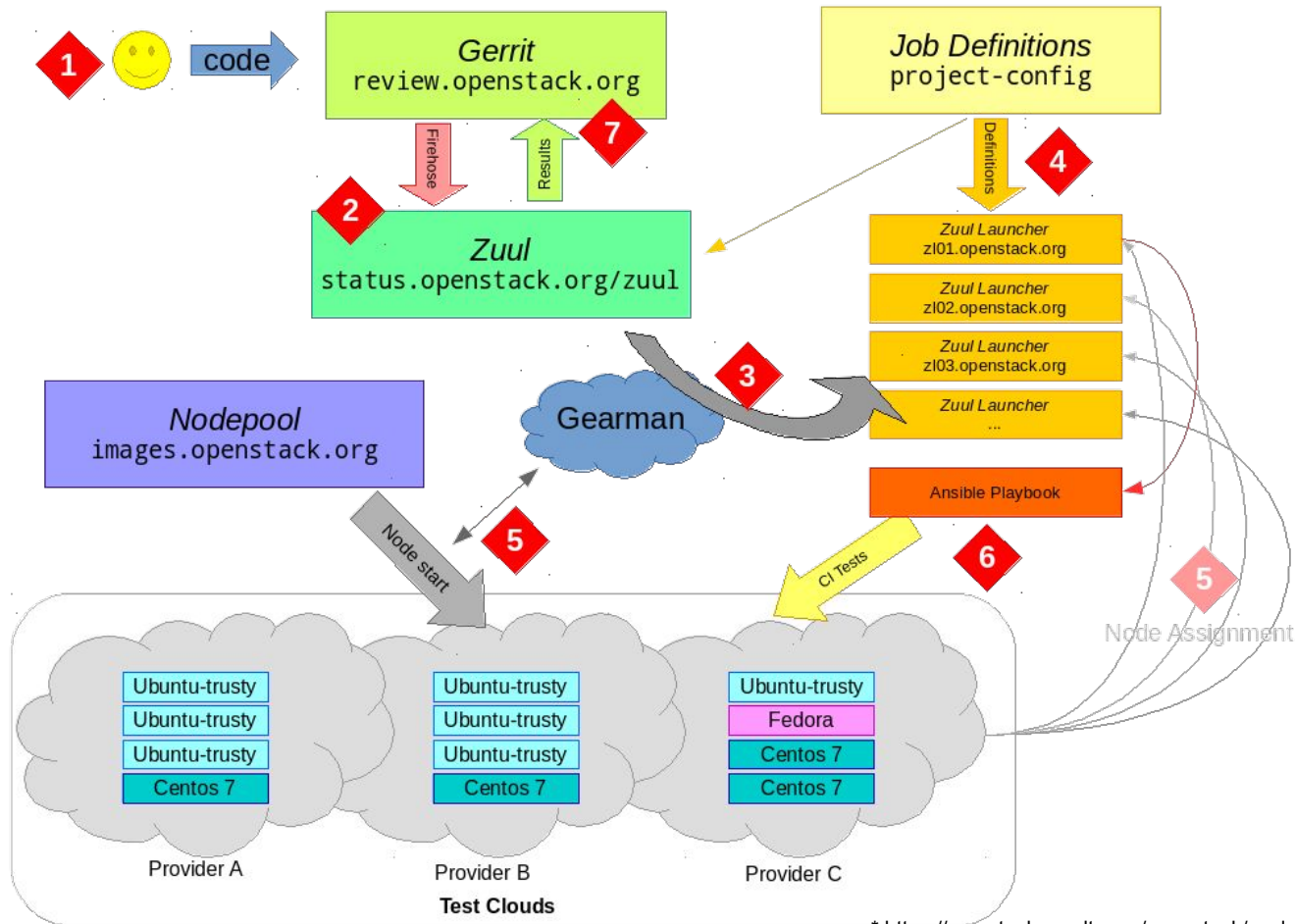
问题	解决之道
集成测试复杂	nodepool+ansible 自动构建多节点测试; ansible role重复利用; 构建任务采用继承机制;
协同开发难度大	每一个 commit 都经过严格测试 支持跨项目依赖测试
测试时间长, 数量多	并发测试

Zuul V3 架构

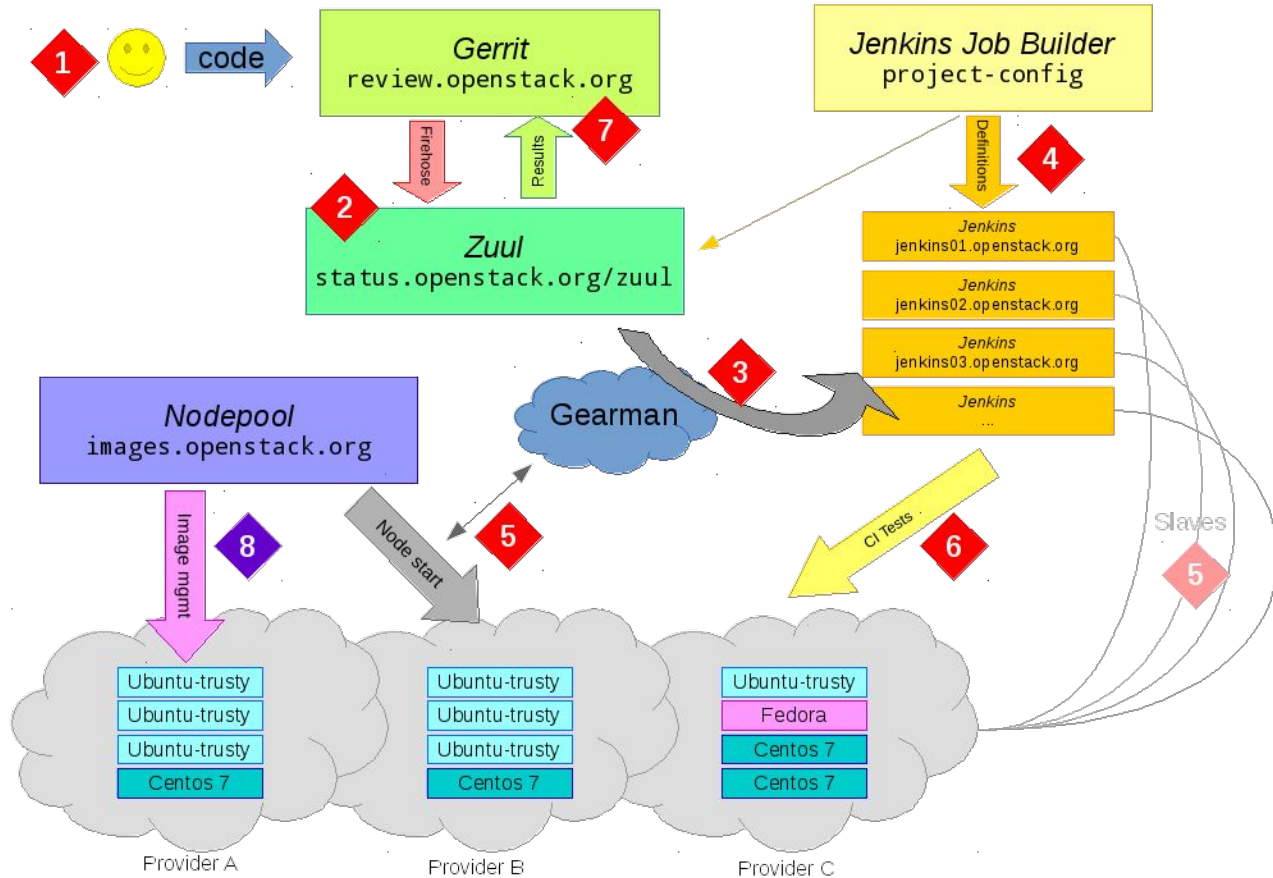
- scheduler
 - 监听resource事件 (gerrit或者github)
 - 通过zookeeper与nodepool通信, 准备测试环境
 - 通过gearman与executor通信, 触发测试任务
- executor
 - 使用ansible在nodepool准备的环境上执行测试任务
- merger
- web
- nodepool
 - 静态节点
 - 在云平台上动态创建所需要的节点



Zuul v3



Zuul v2



Features

- Pipeline
- Job
- Ansible
 - re-use
 - multinode deploy
- Encryption
- Cross patch test

zuul.yaml example

- pipeline

```
name: check / gate
manager: independent / dependent
trigger:
success:
failure:
```

- nodeset:

```
name: centos-7
nodes: [{ name: centos-7, label: centos-7 }]
```

- job

```
name: openstack-tox-py27
pre-run: playbooks/tox/pre.yaml
run: playbooks/tox/run.yaml
post-run: playbooks/tox/post.yaml
roles:
- zuul: openstack-infra/zuul-jobs
nodeset: centos-7
required-projects:
- openstack/requirements
```

- project:

```
name: openstack/nova
check:
jobs:
- openstack-tox-py27
```

```
# playbooks/tox/run.yaml
```

```
- hosts: all
roles:
- tox
```

```
# role/tox/tasks/main.yaml
```

```
...
- name: Run tox
args:
chdir: "{{ zuul_work_dir }}"
environment: "{{ tox_environment }}"
command: "tox -e py27"
...
```

Pipeline

- Pipeline中的任务是并发执行的
- Pipeline的类型分两种
 - independent
 - dependent

```
- pipeline
  name: check / gate
  manager: independent / dependent
  trigger:
    gerrit:
    github:
    timer:
  success:
    gerrit:
      Verify: 1
  failure:
    gerrit:
      Verity: -1
```

Pipeline - independent

nova: 1143

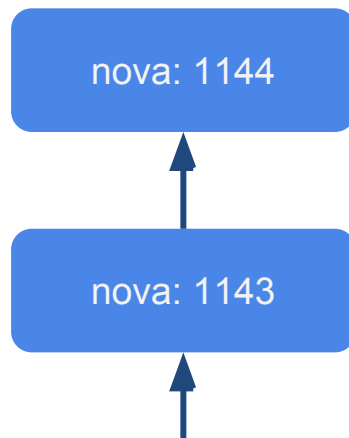
nova: 1144

Pipeline - independent

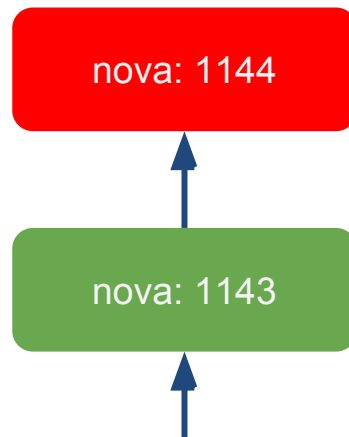
nova: 1143

nova: 1144

Pipeline - dependent



Pipeline - dependent



Pipeline - dependent

nova: 1143



Job 定义了一组完整的测试方法, 它会被加载到 pipeline 的队列中去

- Job有继承机制
- Job采用分布式编写方式, 任务可以定义在各个相关项目中
 - openstack-infra/project-config
 - openstack-infra/zuul-jobs
 - openstack/nova
 - openstack/kolla

```
- job
  name: openstack-tox-py27
  parent: base
  pre-run: playbooks/tox/pre.yaml
  run: playbooks/tox/run.yaml
  post-run: playbooks/tox/post.yaml
  timeout: 1800
  roles:
    - zuul: openstack-infra/zuul-jobs
  nodeset: centos-7
  branches:
    - ^stable/queens$
    - ^stable/pike$
  required-projects:
    - openstack/requirements
```

Job

```
# playbooks/tox/run.yaml
```

```
- hosts: all
  roles:
    - tox
  pre_tasks:
    - name: ensure file
      file: dest=/etc/dummy state=directory
```

```
# role/tox/tasks/main.yaml
```

```
...
- name: Run tox
  args:
    chdir: "{{ zuul_work_dir }}"
    environment: "{{ tox_environment }}"
    command: "tox -e py27"
...
```



2018-06-20 16:24:29

post-logs.yaml

0:00:00

> Parameters

> 1 Hosts

> 1 Plays

> 3 Files

> 16 Tasks

> 0 Records



2018-06-20 16:24:19

post-ssh.yaml

0:00:04

> Parameters

> 3 Hosts

> 1 Plays

> 2 Files

> 1 Tasks

> 0 Records

Tasks

Search:

Showing 1 to 3 of 3 Items

Task	Host	Action	Elapsed ^	Duration	Status
remove-build-sshkey : Remove the build SSH key from all nodes	primary	authorized_key	0:00:00	0:00:01	CHANGED
remove-build-sshkey : Remove the build SSH key from all nodes	secondary2	authorized_key	0:00:00	0:00:03	CHANGED
remove-build-sshkey : Remove the build SSH key from all nodes	secondary1	authorized_key	0:00:00	0:00:03	CHANGED

<< < 1 of 1 > >>

Nodeset

Nodeset 描述了一个或多个服务器信息

```
- nodeset:  
  name: nodeset1  
  nodes:  
    - name: controller  
      label: controller-label  
    - name: compute1  
      label: compute-label  
    - name: compute2  
      label: compute-label  
  groups:  
    - name: ceph-osd  
      nodes:  
        - controller  
    - name: ceph-monitor  
      nodes:  
        - controller  
        - compute1  
        - compute2
```

Project

定义项目在不同的 pipeline 里面运行的 Jobs

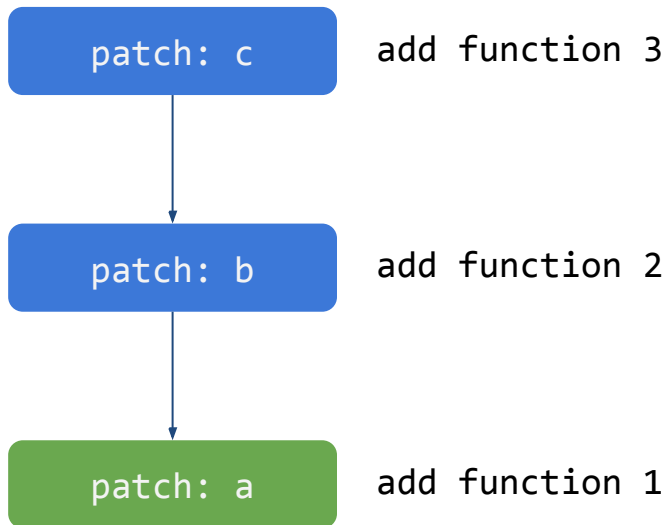
```
- project:  
  name: openstack/nova  
  check:  
    jobs:  
      - openstack-tox-py27  
  gate:  
    jobs:  
      - openstack-tox-py27  
  periodic:  
    jobs:  
      - openstack-tox-py27  
  <<pipeline>>:  
    jobs:  
      - jobs1  
      - jobs2
```

敏感数据

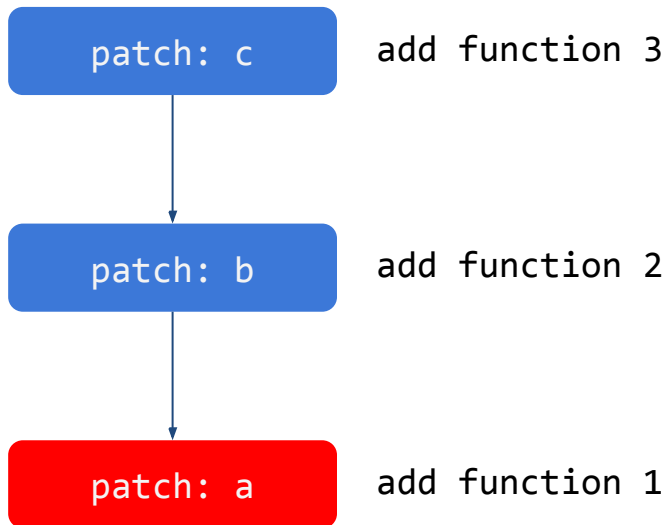
- 用来加密用密码等敏感数据
- 使用非对等加密的方式, zuul 会为每个项目提供 public key, private key 存放在服务器

```
- secret:  
  name: test_secret  
  data:  
    password: !encrypted/pkcs1-oaep |  
              BFhtdnm8uXx7kn79RFL/zJywmzLkT1GY
```

同项目依赖



同项目依赖



跨项目依赖



DependsOn: oslo.db #1438

跨项目依赖

Gate pipeline

Merged

oslo.db: 1438

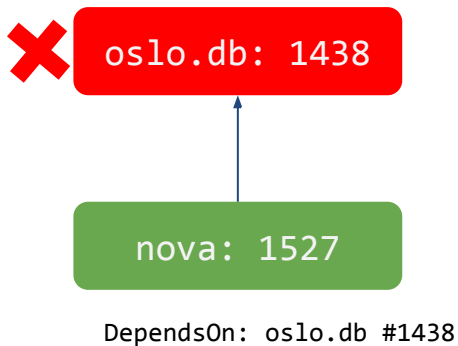
nova: 1527

DependsOn: oslo.db #1438

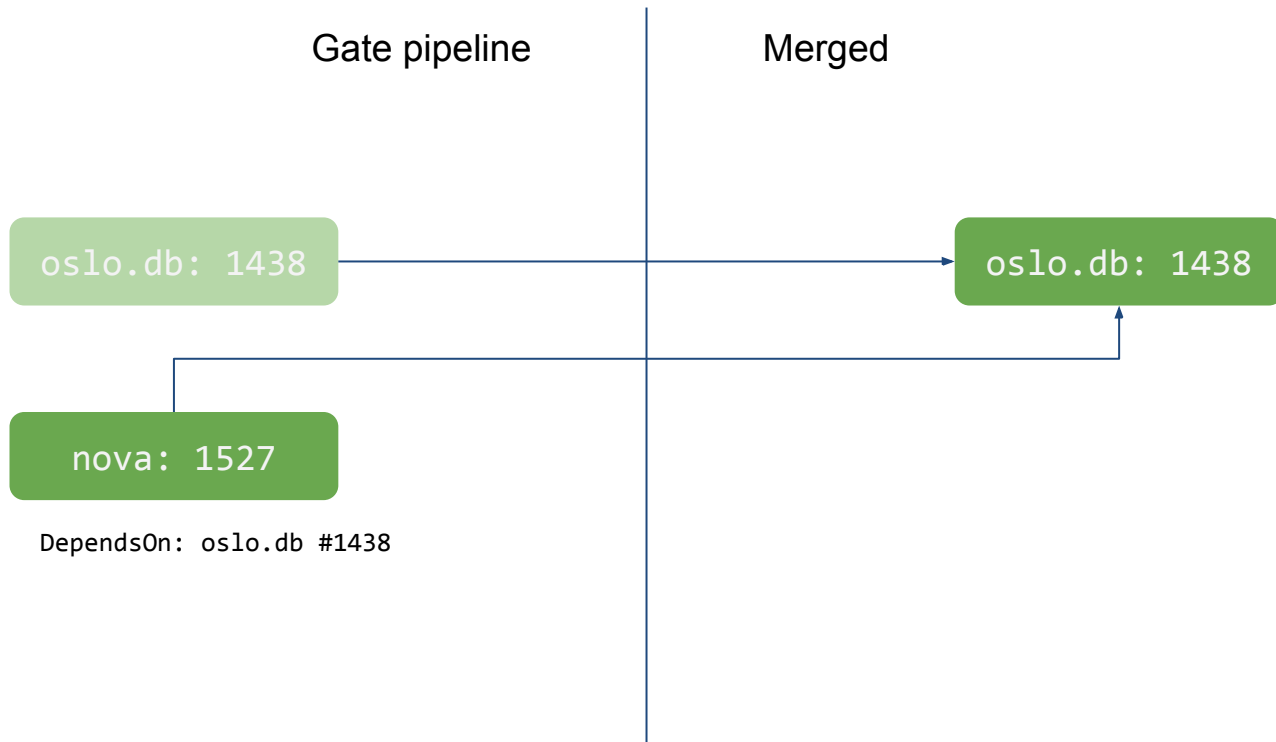
跨项目依赖

Gate pipeline

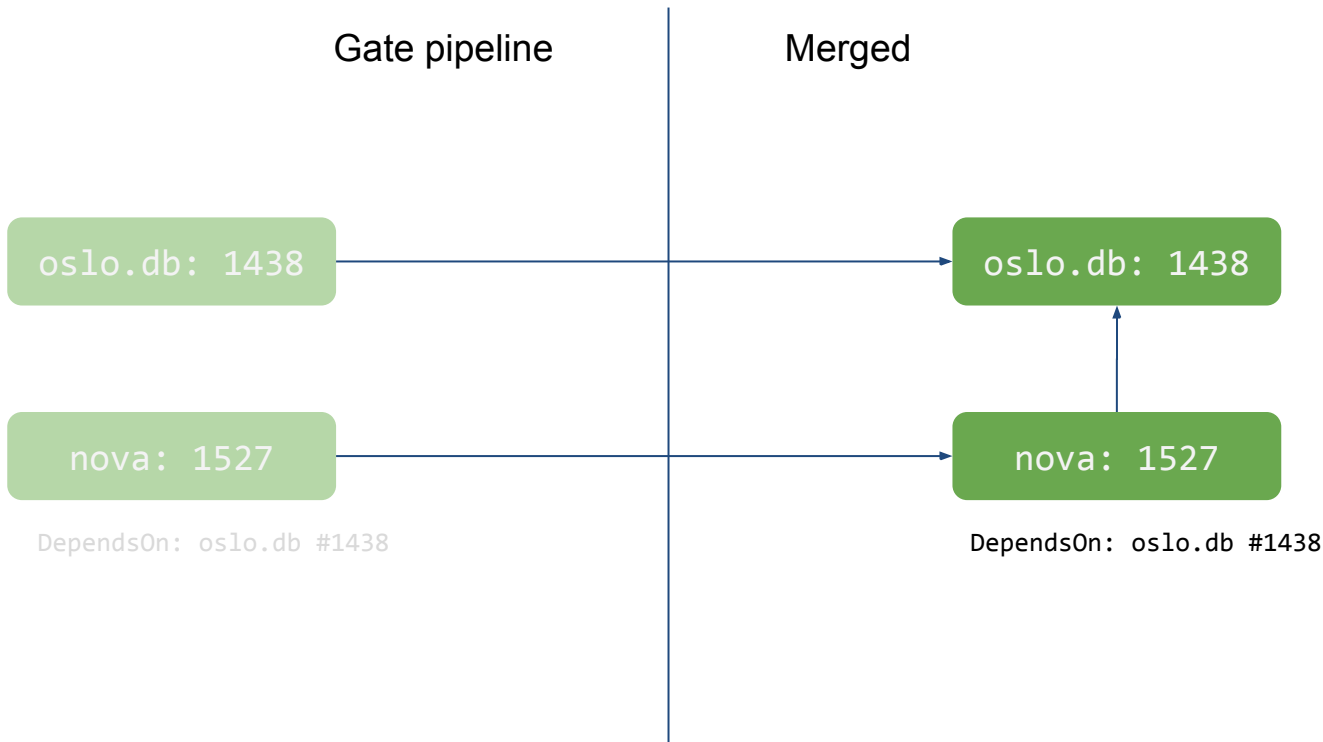
Merged



跨项目依赖



跨项目依赖





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谢谢

