

# СРЕДСТВА АВТОМАТИЗАЦИИ

**Author:**

# Contents

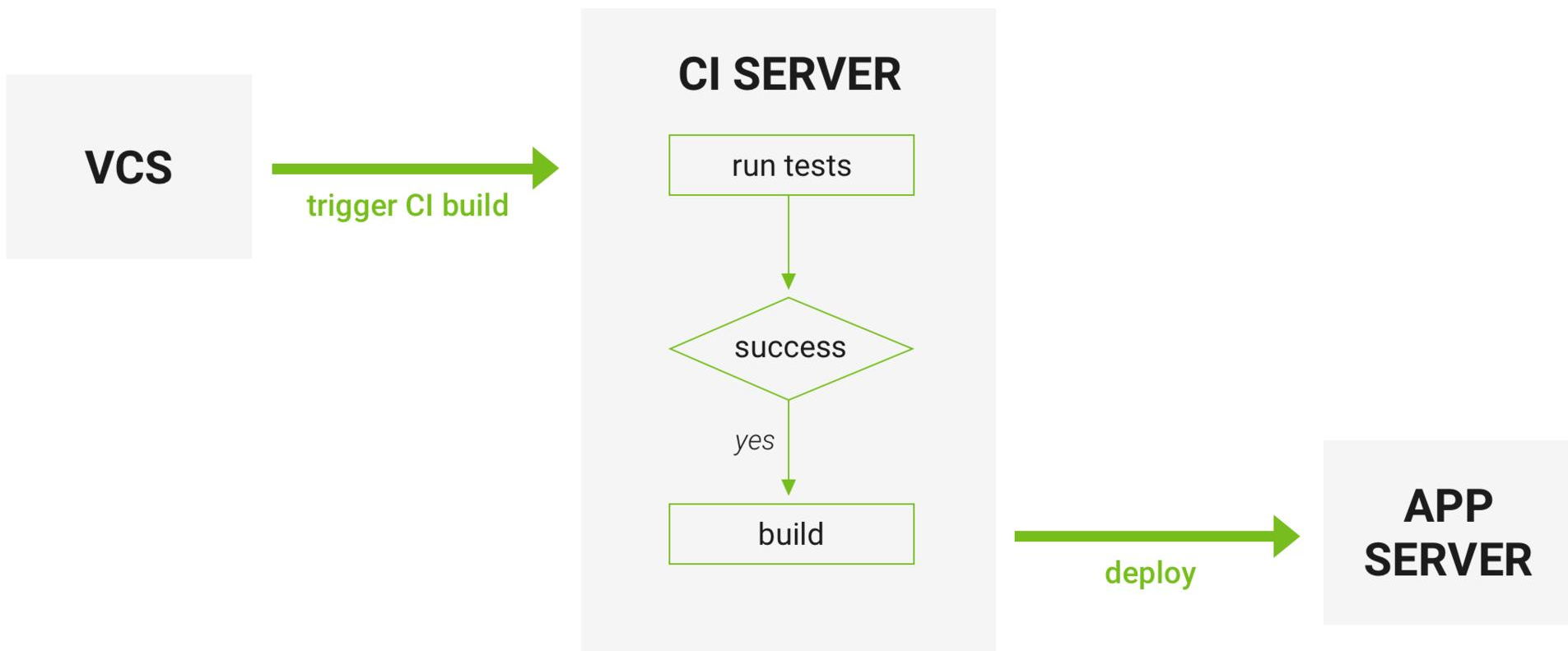
1. CI/CD Tools
2. Configuration management

## CI/CD Tools



# Jenkins

## Как это работает



**Jenkins**



**Jenkins**



- New Item
- People
- Build History
- Manage Jenkins
- Credentials
- My Views

All					
S	W	Name ↓	Last Success	Last Failure	Last Duration
		<a href="#">OpenShift Sample</a>	N/A	N/A	N/A
		<a href="#">Test OpenShift Job</a>	14 hr - <a href="#">#1</a>	N/A	12 sec

Icon: [S](#) [M](#) [L](#)[Legend](#) [RSS for all](#) [RSS for failures](#) [RSS for just latest builds](#)**Build Queue**

No builds in the queue.

**Build Executor Status** **jenkins-slave-5-hz9if-0253fc22**

1 Idle

**jenkins-slave-5-p2oih-6d33f3d0**

1 Idle



## Scripted Pipeline

### Pipeline

Definition

Pipeline script

Script

```
1 node('master'){
2   stage('Echo 1') {
3     echo "Running stage 1"
4     sleep 10
5   }
6
7   stage('Echo 2') {
8     echo "Running stage 2"
9     sleep 10
10  }
11 }
```

☒ Use Groovy Sandbox

[Pipeline Syntax](#)

## Declarative Pipeline

Pipeline script

Script

```
1 pipeline {
2   agent {
3     node {
4       label "master"
5     }
6   }
7   stages {
8     stage('Echo 1') {
9       steps {
10        echo "Running stage 1"
11      }
12    }
13    stage('Echo 2') {
14      steps {
15        echo "Running stage 2"
16      }
17    }
18  }
```

try sample Pipeline...



### **Достоинства Jenkins:**

- цена (он бесплатен);
- возможности по настройке;
- система плагинов;
- полный контроль над системой.

### **Недостатки Jenkins:**

- требуется выделенный сервер;
- на настройку необходимо время.

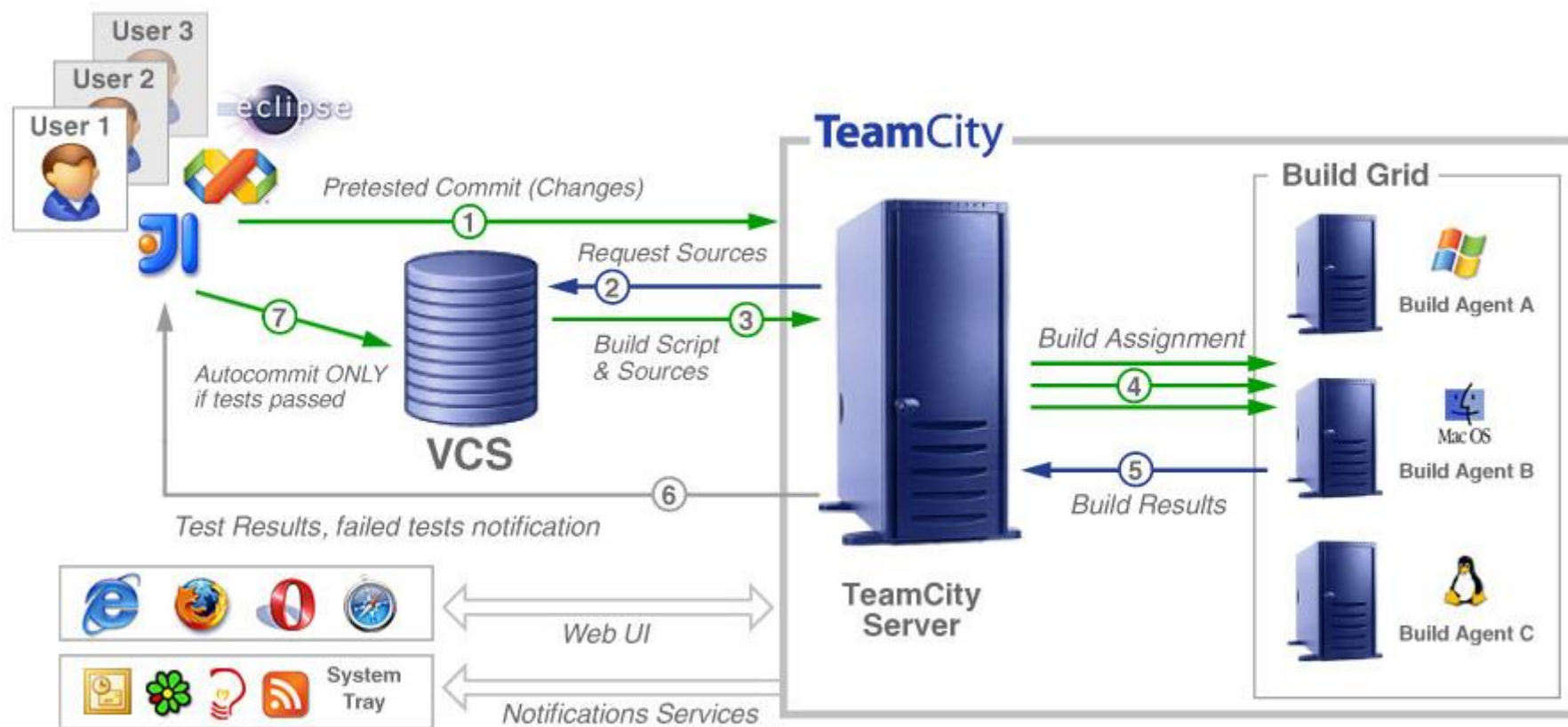


**TeamCity**





Groovy The Groovy language						<Active branches>	no hidden
JDK 5 Build						Run	
refs/..._2_2_X	#566	Tests passed: 7326	No artifacts	cedric.champea... (1)	2 months ago (7m:04s)		
JDK 6 Build						Idle	Run
JDK 7 Build						Run	
216/merge	#3501	Tests passed: 18577	No artifacts	john.wagenleit... (2)	one hour ago (20m:45s)		
589/merge	#3500	Tests passed: 18543	No artifacts	bsideup@gmail.... (2)	one hour ago (23m:47s)		
577/merge	#3499	Tests passed: 18543	No artifacts	paulk@asert.co... (2)	one day ago (22m:05s)		
565/merge	#3498	Tests passed: 18613	No artifacts	cedric.champea... (13)	2 days ago (21m:52s)		
572/merge	#3497	Tests passed: 18543	No artifacts	paolo.ditommas... (2)	2 days ago (21m:56s)		
master	#3496	Tests passed: 18543	Artifacts	cedric.champea... (1)	3 days ago (27m:10s)		
GROOV...4_RC_X	#3492	Tests passed: 18521	Artifacts	cedric.champea... (1)	4 days ago (20m:48s)		
552/merge	#3483	Tests passed: 18593	No artifacts	Changes (46)	4 days ago (21m:22s)		
569/merge	#3482	Tests passed: 18617	No artifacts	john.b.hurst@g... (3)	4 days ago (21m:54s)		
478/merge	#3443	Tests passed: 18535	No artifacts	yukoba@accelar... (2)	5 days ago (21m:56s)		
JDK 7 snapshot build						Run	
master	#595	Tests passed: 18543	No artifacts	cedric.champea... (1)	3 days ago (16m:20s)		
JDK 8 Build						Run	
master	#696	Tests passed: 18543	No artifacts	cedric.champea... (1)	3 days ago (21m:19s)		
JDK 8 snapshot build						Run	
master	#545	Tests passed: 18543	No artifacts	cedric.champea... (1)	3 days ago (13m:02s)		
JDK 9 snapshot build						Run	
master	#260	Gradle exception: exit code 1	No artifacts	cedric.champea... (1)	3 days ago (5s)		



## GitLab CI





stages:

- lint-css
- lint-js
- unit-test

image: node:6.11.2

lint css:

stage: lint-css

before\_script:

- npm install

cache:

untracked: true

only:

- master

script:

- ./node\_modules/gulp/bin/gulp.js lint-css

lint js:

stage: lint-js

cache:

untracked: true

policy: pull

only:

- master

script:

- ./node\_modules/gulp/bin/gulp.js lint-js

run unit test:

stage: unit-test

cache:

untracked: true

policy: pull

only:

- master

script:

- ./node\_modules/gulp/bin/gulp.js test



GitLab

ProjectsGroupsSnippetsHelp

Ggitlab-ci-demo

Overview

Repository

Registry

Issues0

Merge Requests0

CI / CD

Pipelines

Jobs

Schedules

Charts

Wiki

Snippets

Members

Ying Rik Yuan · gitlab-ci-demo · Pipelines

All ?Pending0Running0Finished7BranchesTags

Status	Pipeline	Commit	Stages	
passed	#12275413 by	P master < 75ed9e3b. Fix it.		00:02:59 2 weeks ago
failed	#12274499 by	P master < 98879d9c Let's make some errors.		00:01:48 2 weeks ago
passed	#11159893 by	P master < 3d6dd276 Use non-alpine linux and see if it could ...		00:02:18 a month ago
canceled	#11159770 by	P master < 5bcb2686 fix the gulp binary name.		00:03:43 a month ago
failed	#11159734 by	P master < 6973f308 Use cache to retain the npm_modules f..		00:00:54 a month ago
failed	#11159318 by	P master < 1ce71962 Pull policy should be set in runner config.		00:01:09 a month ago
failed	#11159199 by	P master < 82e589df First trial.		a month ago



GitLab Projects Groups Snippets Help

G gitlab-ci-demo

Overview

Repository

Registry

Issues 0

Merge Requests 0

CI / CD

Pipelines

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Schedules

Charts

Wiki

Snippets

Members

Ying Kit Yuen > gitlab-ci-demo > Jobs > #34454518

failed

 Job #34454518 triggered 2 weeks ago by Ying Kit Yuen

```
Running with gitlab-runner 10.0.0-rc.1 (6331f360)
on docker-auto-scale (4e4528ca)
Using Docker executor with image node:6.11.2 ...
Using docker image sha256:56c011a7fd67418b4e3fcdc7b29be220a3602b79445e45b70ecec528f192032c for predefined container...
Pulling docker image node:6.11.2 ...
Using docker image node:6.11.2 ID=sha256:cb4fff641acfb1b04bad81356caadd17143dadecdbef06930235660b18ad97 for build container...
Running on runner-4e4528ca-project-3995257-concurrent-0 via runner-4e4528ca-machine-1506671699-f2f6a4d8-digital-ocean-2gb...
Cloning repository...
Cloning into '/builds/ykyuen/gitlab-ci-demo'...
Checking out 98879d9c as master...
Skipping Git submodules setup
Checking cache for default...
Downloading cache.zip from http://runners-cache-5-internal.gitlab.com:444/runner/project/3995257/default
Successfully extracted cache
$ ./node_modules/gulp/bin/gulp.js lint-js
[07:56:55] Using gulpfile /builds/ykyuen/gitlab-ci-demo/gulpfile.js
[07:56:55] Starting 'lint-js'...
[07:56:56]
/builds/ykyuen/gitlab-ci-demo/script.js
  3:1  error  Use the global form of 'use strict'  strict
  3:56 error  Missing semicolon                   semi

✖ 2 problems (2 errors, 0 warnings)
  1 error, 0 warnings potentially fixable with the '--fix' option.

[07:56:56] 'lint-js' errored after 533 ms
[07:56:56] ESLintError in plugin 'gulp-eslint'
Message:
    Failed with 2 errors
ERROR: Job failed: exit code 1
```

## CONFIGURATION MANAGEMENT



ANSIBLE



CHEF



puppet

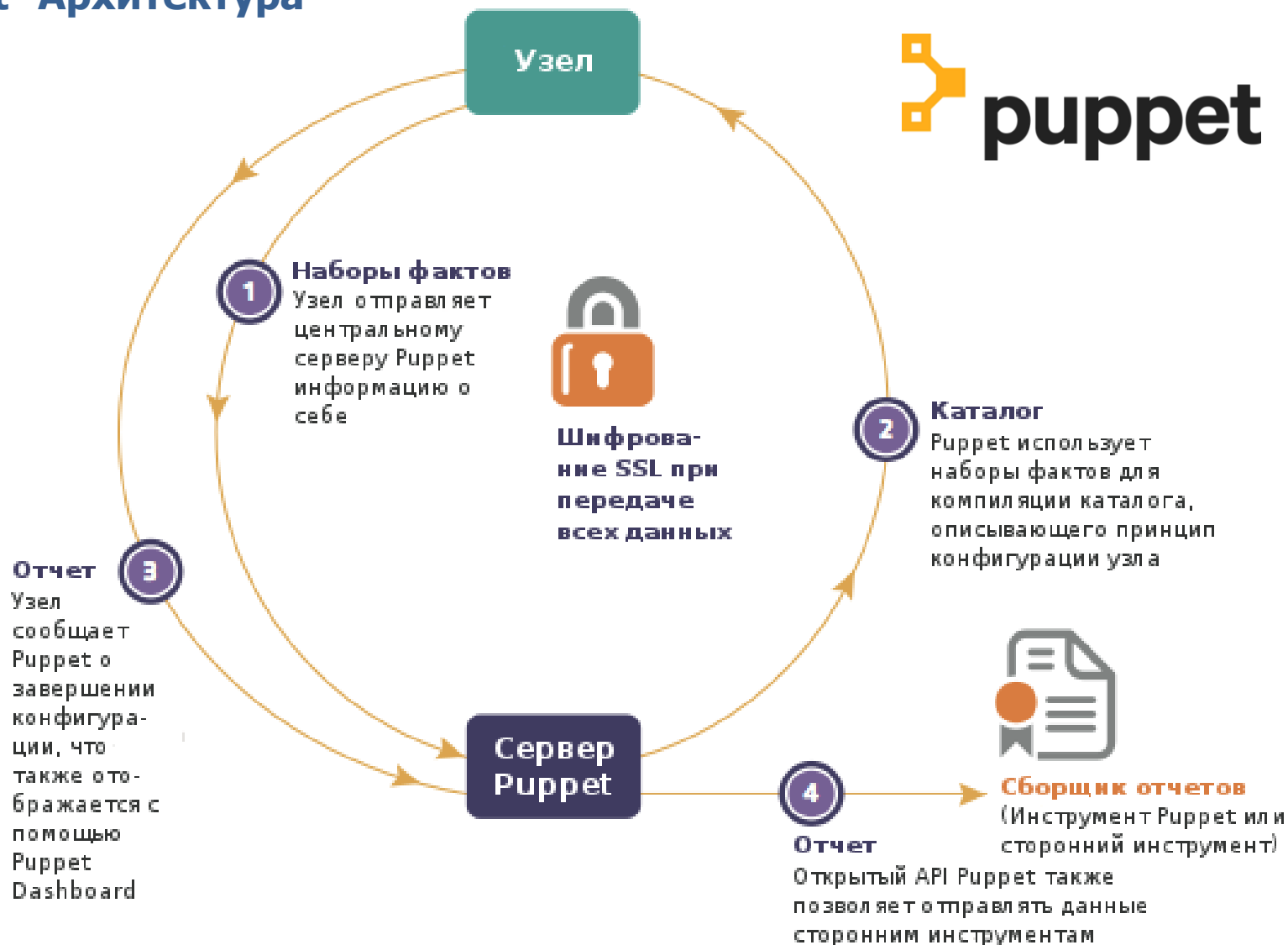


# Puppet

- Клиент-серверная архитектура
- Конфигурация основана на «Фактах»
- Написан на Ruby
- Ruby-подобный синтаксис



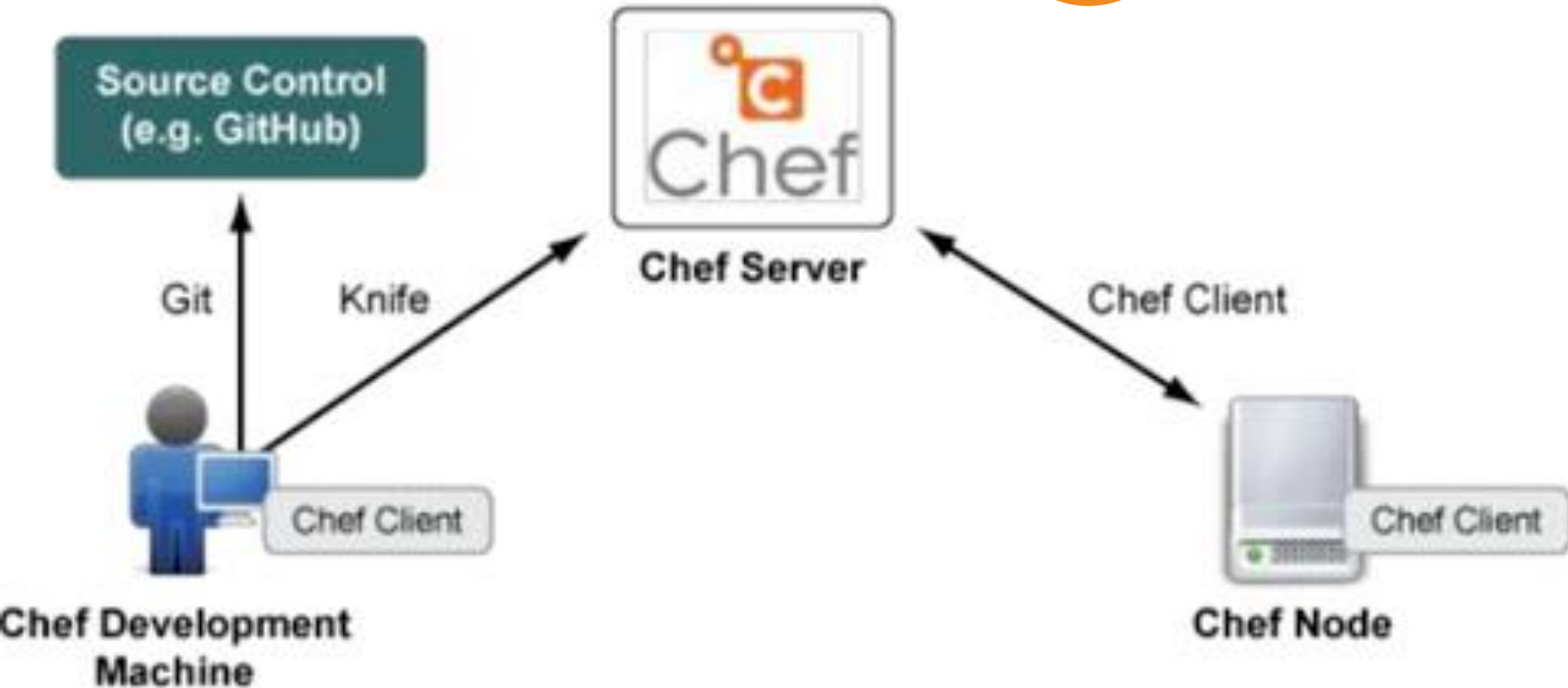
# Puppet - Архитектура



## Chef

- Клиент-серверная архитектура
- Написан на Ruby
- Ruby-подобный синтаксис

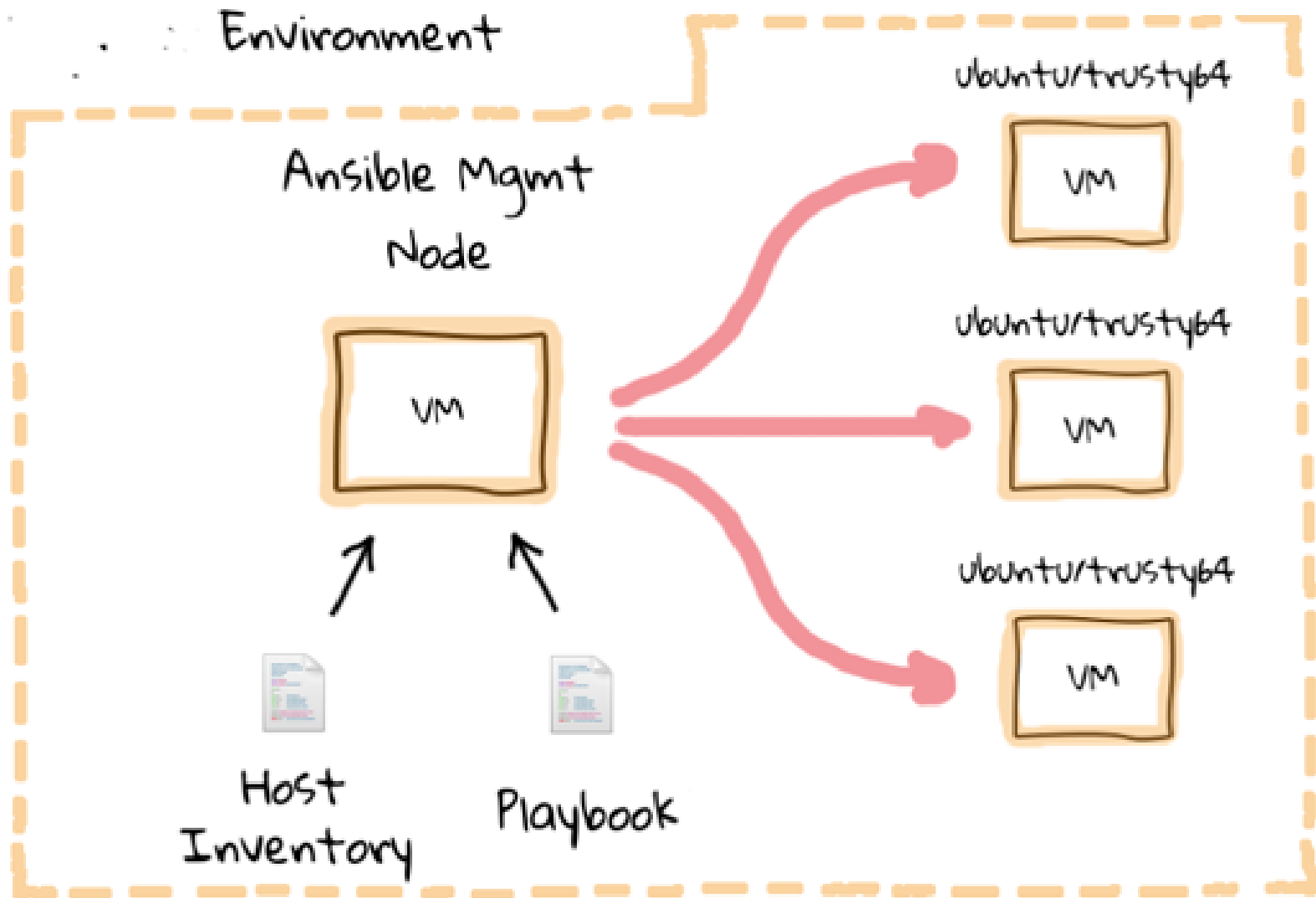




## Ansible

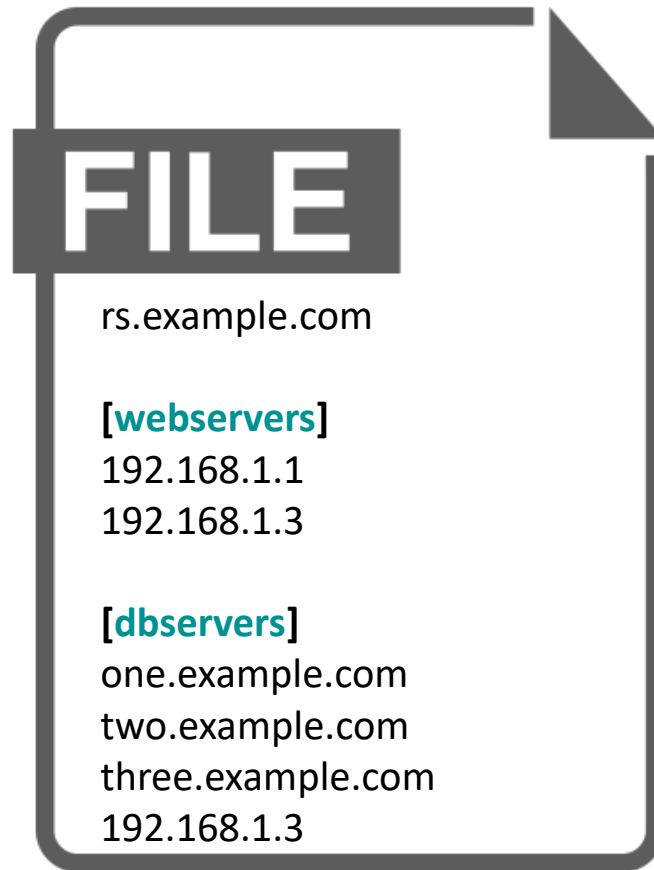
- Без-агентная архитектура
- Написан на Python
- Yaml-подобный синтаксис







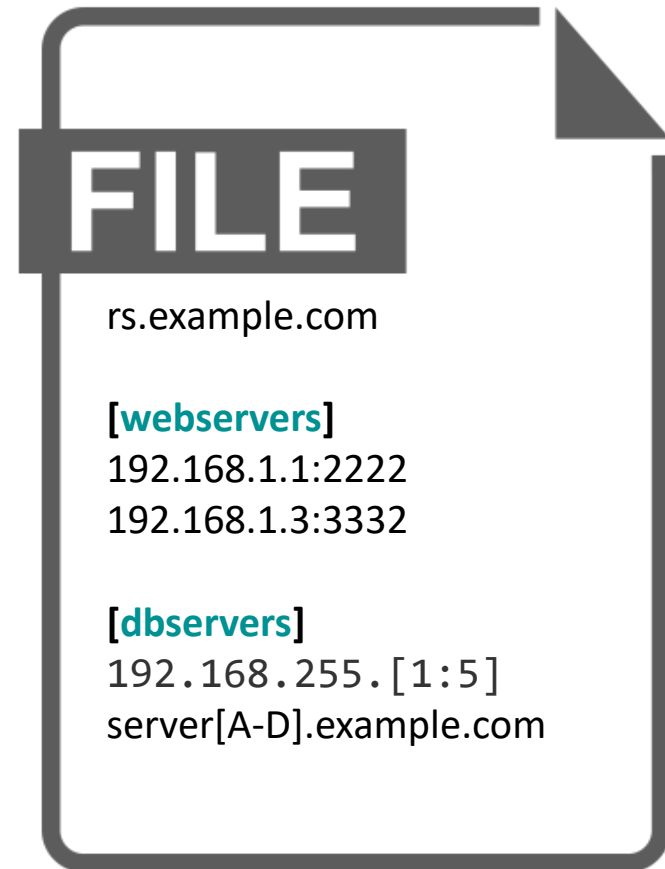
# Inventory



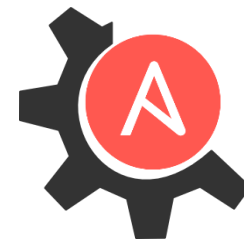


# Inventory

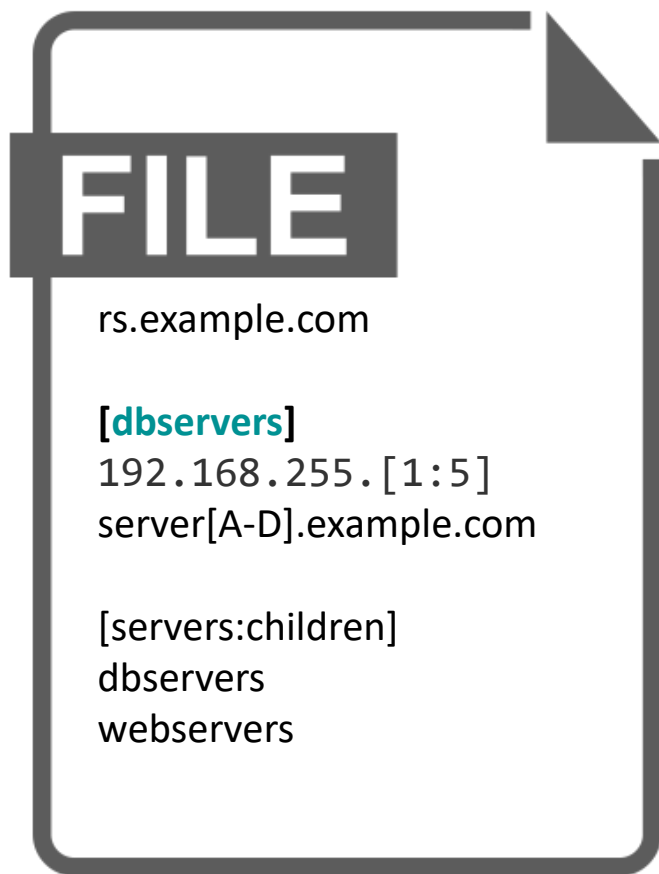
```
inventories/  
├── branch-A  
│   ├── dbservers  
│   └── webservers  
├── branch-B  
│   ├── dbservers  
│   └── webservers  
└── headquarter  
    ├── dbservers  
    └── webservers
```

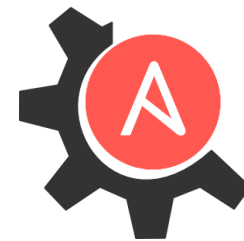






# Inventory

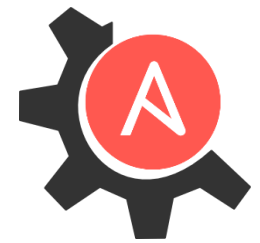




## Ад Нос команды

```
[root@k8smaster ansible]# ansible 172.0.0.10 -i ./myhosts -a 'ip route' -u root --ask-pass
SSH password:
172.0.0.10 | CHANGED | rc=0 >>
default via 10.0.2.2 dev eth0 proto dhcp metric 100
10.0.2.0/24 dev eth0 proto kernel scope link src 10.0.2.15 metric 100
172.0.0.0/24 dev eth1 proto kernel scope link src 172.0.0.10 metric 101
172.17.0.0/16 dev docker0 proto kernel scope link src 172.17.0.1

[root@k8smaster ansible]#
```



## Конфигурационные файлы

- **ANSIBLE\_CONFIG** - переменная окружения
- **ansible.cfg** - в текущем каталоге
- **.ansible.cfg** - в домашнем каталоге пользователя)
- **/etc/ansible/ansible.cfg**



```
[root@k8smaster ansible]# cat ansible.cfg
[defaults]

inventory = ./myhosts
remote_user = user
ask_pass = True
[root@k8smaster ansible]#
```

# ansible dbservers -a 'hostname'



# Gathering

```
[root@k8smaster ansible]# ansible dbbservers -m setup
SSH password:
172.0.0.10 | SUCCESS => {
  "ansible_facts": {
    "ansible_all_ipv4_addresses": [
      "172.0.0.10",
      "10.0.2.15",
      "172.17.0.1"
    ],
    "ansible_all_ipv6_addresses": [
      "fe80::a00:27ff:fe25:dc43",
      "fe80::5054:ff:fe26:1060"
    ],
    "ansible_apparmor": {
      "status": "disabled"
    },
    "ansible_architecture": "x86_64",
    "ansible_bios_date": "12/01/2006",
    "ansible_bios_version": "VirtualBox",
    "ansible_cmdline": {
      "BOOT_IMAGE": "/boot/vmlinuz-3.10.0-957.5.1.el7.x86_64",
      "LANG": "en_US.UTF-8",
      "biosdevname": "0",
      "console": "ttyS0,115200n8",
      "crashkernel": "auto",
      "elevator": "noop",
      "net.ifnames": "0",
      "no_timer_check": true,
      "ro": true,
      "root": "UUID=f52f361a-dala-4ea0-8c7f-ca2706e86b46"
    },
    "ansible_date_time": {
      "date": "2019-09-29",
      "day": "29",
      "epoch": "1569791355",
      "hour": "21",
      "iso8601": "2019-09-29T21:09:15Z",
```



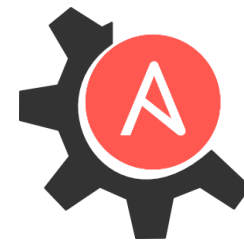
## Модули

```
[root@k8smaster ansible]# ansible dbservers -m raw -a 'hostname'
SSH password:
172.0.0.10 | CHANGED | rc=0 >>
k8smaster.my.home
Shared connection to 172.0.0.10 closed.
```



## Основы playbooks

- play
- task



# Hello world

```
name: Hello World
hosts: all

tasks:
  - debug: var=ansible_user_id
  - shell: echo Hello World!
```

```
[root@k8smaster ansible]# ansible-playbook hello_world.yml -i localhost, -c local -v
Using /etc/ansible/ansible.cfg as config file

PLAY [Hello World] *****

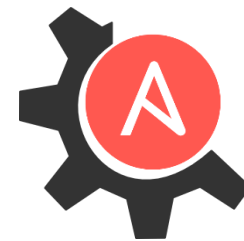
TASK [Gathering Facts] *****
ok: [localhost]

TASK [debug] *****
ok: [localhost] => {
  "ansible_user_id": "root"
}

TASK [shell] *****
changed: [localhost] => {"changed": true, "cmd": "echo Hello World!", "delta": "0:00:00.003136",
  "end": "2019-09-29 19:27:34.847406", "rc": 0, "start": "2019-09-29 19:27:34.844270", "stderr":
  "", "stderr_lines": [], "stdout": "Hello World!", "stdout_lines": ["Hello World!"]}

PLAY RECAP *****
localhost                : ok=3    changed=1    unreachable=0    failed=0    skipped=0    resc
ued=0    ignored=0

[root@k8smaster ansible]#
```



## Example

```
[root@k8smaster ansible]# cat example2.yml
---

- name: Run show commands on servers
  hosts: dbservers
  gather_facts: false

  tasks:

    - name: run docker ps
      raw: docker ps

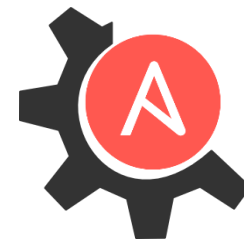
- name: Run show commands on servers
  hosts: dbservers
  gather_facts: false

  tasks:

    - name: run ip route
      raw: ip route

    - name: run ip addr
      raw: ip addr
[root@k8smaster ansible]#
```





# Результат выывода

```
[root@k8smaster ansible]# ansible-playbook example2.yml
SSH password:

PLAY [Run show commands on servers] *****

TASK [run docker ps] *****
changed: [172.0.0.10]

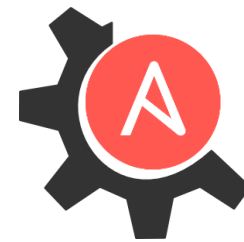
PLAY [Run show commands on servers] *****

TASK [run ip route] *****
changed: [172.0.0.10]

TASK [run ip addr] *****
changed: [172.0.0.10]

PLAY RECAP *****
172.0.0.10 : ok=3    changed=3    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

[root@k8smaster ansible]#
```



# Результат выывода

```
TASK [run ip route] *****
changed: [172.0.0.10] => {"changed": true, "rc": 0, "stderr": "Shared connection to 172.0.0.10 closed.\r\n", "stderr_lines": ["Shared connection to 172.0.0.10 closed."], "stdout": "default via 10.0.2.2 dev eth0 proto dhcp metric 100 \r\n10.0.2.0/24 dev eth0 proto kernel scope link src 10.0.2.15 metric 100 \r\n172.0.0.0/24 dev eth1 proto kernel scope link src 172.0.0.10 metric 101 \r\n172.17.0.0/16 dev docker0 proto kernel scope link src 172.17.0.1 \r\n", "stdout_lines": ["default via 10.0.2.2 dev eth0 proto dhcp metric 100 ", "10.0.2.0/24 dev eth0 proto kernel scope link src 10.0.2.15 metric 100 ", "172.0.0.0/24 dev eth1 proto kernel scope link src 172.0.0.10 metric 101 ", "172.17.0.0/16 dev docker0 proto kernel scope link src 172.17.0.1 "]}

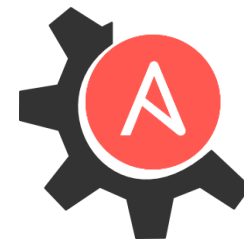
```

```
TASK [run ip addr] *****
changed: [172.0.0.10] => {"changed": true, "rc": 0, "stderr": "Shared connection to 172.0.0.10 closed.\r\n", "stderr_lines": ["Shared connection to 172.0.0.10 closed."], "stdout": "1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000\r\n    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00\r\n        inet 127.0.0.1/8 scope host lo\r\n            valid_lft forever preferred_lft forever\r\n        inet6 ::1/128 scope host \r\n            valid_lft forever preferred_lft forever\r\n2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000\r\n    link/ether 52:54:00:26:10:60 brd ff:ff:ff:ff:ff:ff\r\n        inet 10.0.2.15/24 brd 10.0.2.255 scope global noprefixroute dynamic eth0\r\n            valid_lft 82837sec preferred_lft 82837sec\r\n        inet6 fe80::5054:ff:fe26:1060/64 scope link \r\n            valid_lft forever preferred_lft forever\r\n3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000\r\n    link/ether 08:00:27:25:dc:43 brd ff:ff:ff:ff:ff:ff\r\n        inet 172.0.0.10/24 brd 172.0.0.255 scope global noprefixroute eth1\r\n            valid_lft forever preferred_lft forever\r\n        inet6 fe80::a00:27ff:fe25:dc43/64 scope link \r\n            valid_lft forever preferred_lft forever\r\n4: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default \r\n    link/ether 02:42:4f:03:21:12 brd ff:ff:ff:ff:ff:ff\r\n        inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0\r\n            valid_lft forever preferred_lft forever\r\n", "stdout_lines": ["1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000", "    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00", "        inet 127.0.0.1/8 scope host lo", "            valid_lft forever preferred_lft forever", "        inet6 ::1/128 scope host ", "            valid_lft forever preferred_lft forever", "2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000", "    link/ether 52:54:00:26:10:60 brd ff:ff:ff:ff:ff:ff", "        inet 10.0.2.15/24 brd 10.0.2.255 scope global noprefixroute dynamic eth0", "            valid_lft 82837sec preferred_lft 82837sec", "        inet6 fe80::5054:ff:fe26:1060/64 scope link ", "            valid_lft forever preferred_lft forever", "3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000", "    link/ether 08:00:27:25:dc:43 brd ff:ff:ff:ff:ff:ff", "        inet 172.0.0.10/24 brd 172.0.0.255 scope global noprefixroute eth1", "            valid_lft forever preferred_lft forever", "        inet6 fe80::a00:27ff:fe25:dc43/64 scope link ", "            valid_lft forever preferred_lft forever", "4: docker0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group default ", "    link/ether 02:42:4f:03:21:12 brd ff:ff:ff:ff:ff:ff", "        inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0", "            valid_lft forever preferred_lft forever"]}]

```

```
PLAY RECAP *****
172.0.0.10      : ok=3    changed=3    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

```



## Порядок выполнения

```
[root@k8smaster ansible]# cat example2.yml
---
- name: Run show commands on servers
  hosts: dbservers
  gather_facts: false

  tasks:
    - name: run docker ps
      raw: docker ps

- name: Run show commands on servers
  hosts: dbservers
  gather_facts: false

  tasks:
    - name: run ip route
      raw: ip route

    - name: run ip addr
      raw: ip addr
[root@k8smaster ansible]#
```



### # Простые переменные:

bool\_var1: True

bool\_var2: false

bool\_var3: yes

bool\_var4: no

str1: string

str2: 'string'

str3: "string"

### # Списки:

skills:

- ansible

- aws

- docker

- terraform

### # Списки:

skills: [ansible, aws, docker, terraform]



### #Словарь:

R1:

IP: 10.1.1.1/24

DG: 10.1.1.100

### # Обращение к переменным

R1['IP']

R1.IP



```
[root@k8smaster ansible]# cat myhosts
[dbservers]
172.0.0.10

[dbservers:vars]
ntp_server=172.0.0.12
[root@k8smaster ansible]#
```



```
--  
  
- name: Run show commands on servers  
  hosts: dbservers  
  gather_facts: false  
  
  vars:  
    ntp_server: 10.0.12.3  
  
  tasks:  
  
    - name: run docker ps  
      raw: docker ps  
  
- name: Run show commands on servers  
  hosts: dbservers  
  gather_facts: false  
  
  tasks:  
  
    - name: run ip route  
      raw: ip route  
  
    - name: run ip addr  
      raw: ip addr
```

# Ansible

## Handlers



```
[root@k8smaster ansible]# cat example3.yml
---
- hosts: testbox
  sudo: yes
  tasks:
    - name: Install Nginx
      yum: pkg=nginx state=latest
      notify:
        - NGINX start

  handlers:
    - name: NGINX start
      service: name=nginx state=started
[root@k8smaster ansible]#
```





В playbook можно добавлять:

- задачи
- handlers
- сценарий (play)
- playbook
- файлы с переменными (используют другое ключевое слово)

# Ansible

## Templates



ANSIBLE

```
[root@k8smaster ansible]# cat vars/main.yml
worker_processes: auto
worker_connections: 2048
client_max_body_size: 512M
[root@k8smaster ansible]#
```

# Ansible

## Templates



ANSIBLE

```
[root@k8smaster ansible]# cat templates/nginx.conf
user {{ nginx_user }};
worker_processes {{ worker_processes }};
worker_priority -1;

error_log /var/log/nginx/error.log warn;
pid /var/run/nginx.pid;

events {
    worker_connections {{ worker_connections }};
}

http {
    include /etc/nginx/mime.types;
    default_type application/octet-stream;

    log_format main '$remote_addr - $remote_user [$time_local] "$request" '
        '$status $body_bytes_sent "$http_referer" '
        '"$http_user_agent" "$http_x_forwarded_for"';
    access_log /var/log/nginx/access.log main;

    sendfile on;
    tcp_nopush on;
    tcp_nodelay on;
    keepalive_timeout 65;
    reset_timedout_connection on;
    client_body_timeout 35;
    send_timeout 30;

    gzip on;
    gzip_min_length 1000;
    gzip_vary on;
    gzip_proxied expired no-cache no-store private auth;
    gzip_types text/plain text/css application/json application/x-javascript text/xml application/xml application/xml+rss text/javascript application/javascript;
    gzip_disable "msie6";

    types_hash_max_size 2048;
    client_max_body_size {{ client_max_body_size }};
    proxy_buffer_size 64k;
    proxy_buffers 4 64k;
    proxy_busy_buffers_size 64k;
    server_names_hash_bucket_size 64;

    include /etc/nginx/modules-enabled/*.conf;
    include /etc/nginx/conf.d/*.conf;
    include /etc/nginx/sites-enabled/*;
}

[root@k8smaster ansible]#
```

# Ansible

## Templates



```
[root@k8smaster ansible]# cat tasks/main.yml
- name: Replace nginx.conf
  template:
    src=templates/nginx.conf
    dest=/etc/nginx/nginx.conf
[root@k8smaster ansible]#
```

# Thanks for Your Attention

## Questions?

Introduction to Devops

**Author:**