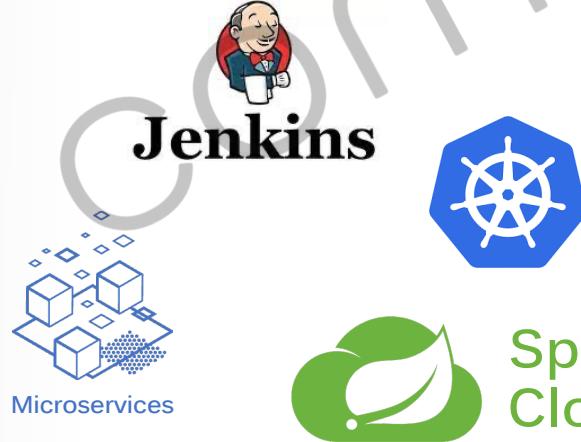


JenKins 를 이용한 CI/CD Pipeline 구축

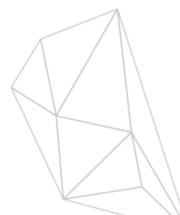


```
public static void main(String[] args)  
< servlet >  
    < servlet-name >BoardController</servlet-name>  
    < servlet-class >com.joneconsulting.controller.BoardController</servlet-class>  
    < init-param >  
        < param-name >user_name</param-name>  
        < param-value >Kenneth Lee</param-value>  
    </init-param >  
</servlet >  
@Interface NextInnovationDelegate : NSObject < UIApplicationDelegate >
```



목차

- Section 1: DevOps와 CI/CD
- Section 2: Jenkins를 이용한 CI/CD 사용
- **Section 3: Jenkins + Infrastructure as Code**
- Section 4: Jenkins + Ansible + Kubernetes 연동
- Section 5: Advanced Jenkins 사용
- Section 6: Public Cloud에 배포
- Appendix



Section 3.

Jenkins + Infrastructure as Code

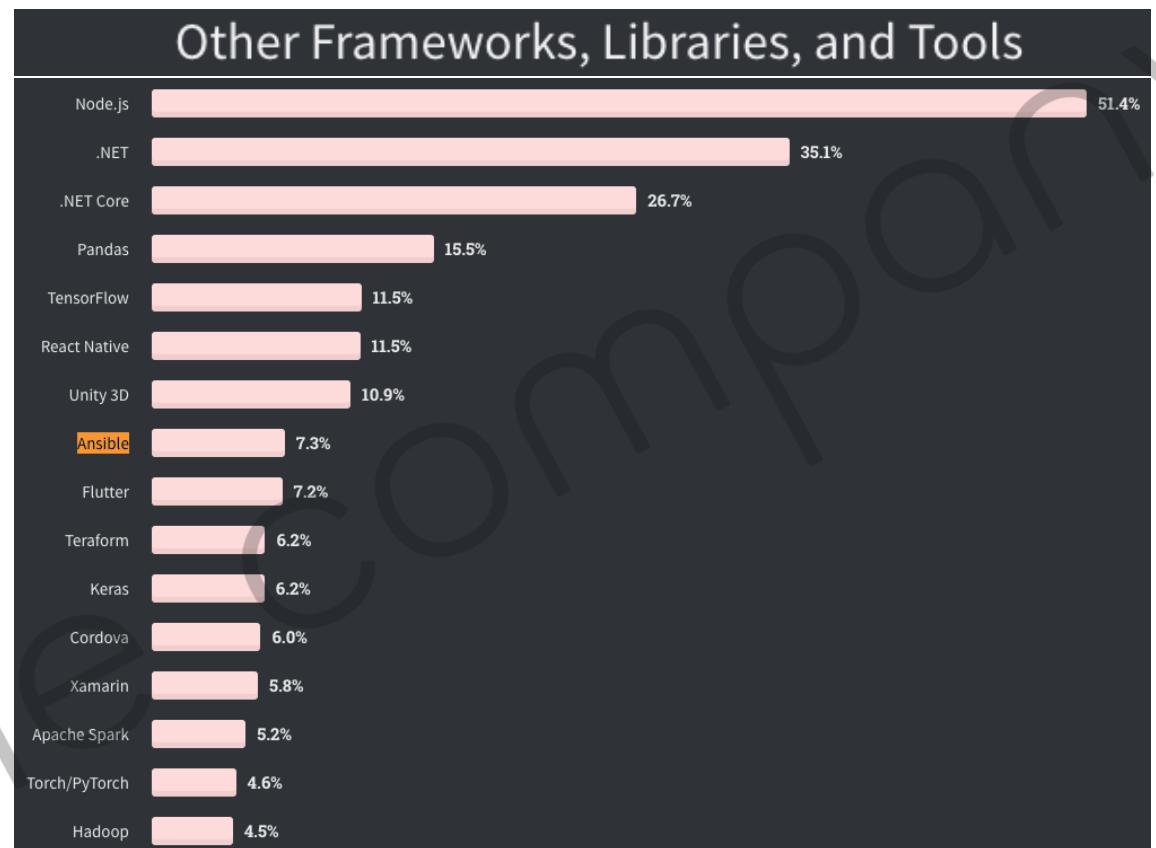
- IaC 개요
- Ansible 개요
- Ansible 설치
- Ansible Playbook
- Docker 이미지 배포

DevOps Tools

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<https://devops.com/11-open-source-devops-tools-we-love-for-2021>

1. Kubernetes
2. Docker
3. Istio
4. GitHub Actions
5. Jenkins
6. Prometheus
7. Ansible
8. Chef
9. Terraform
10. JAMStack
11. ELK Stack



<https://insights.stackoverflow.com/survey/2020#technology-other-frameworks-libraries-and-tools-all-respondents3>



Infrastructure as Code

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- 시스템, 하드웨어 또는 인터페이스의 구성정보를 파일(스크립트)을 통해 관리 및 프로비저닝
- IT 인프라스트럭처, 베어 메탈 서버 등의 물리 장비 및 가상 머신과 관련된 구성 리소스를 관리
- 버전 관리를 통한 리소스 관리



<https://docs.microsoft.com/ko-kr/devops/deliver/what-is-infrastructure-as-code>

Infrastructure as Code

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●terraform

검색어

●ansible

검색어

●aws cloudformation

검색어

●Chef infrastructure

검색어

●Puppet infrastruct...

검색어

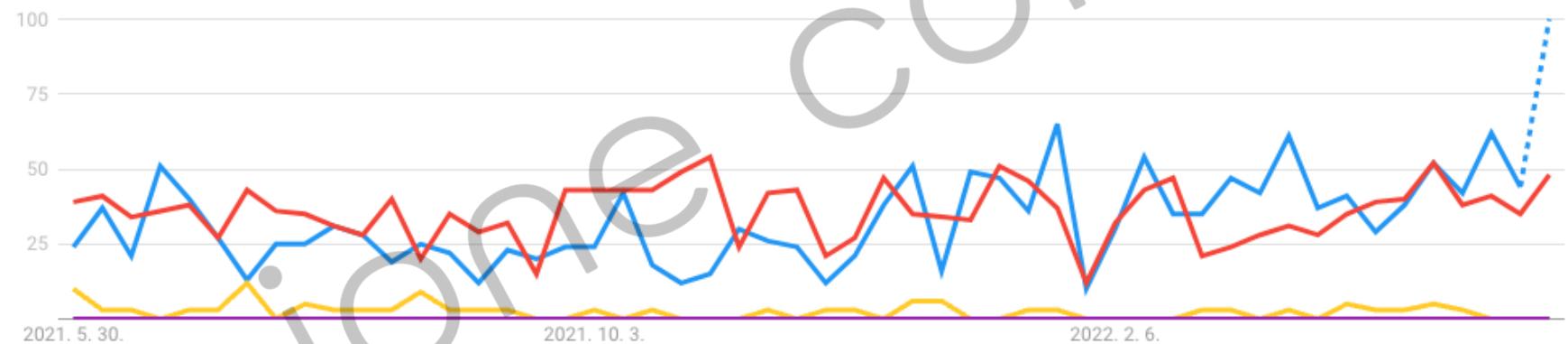
대한민국 ▾

지난 12개월 ▾

모든 카테고리 ▾

웹 검색 ▾

시간 흐름에 따른 관심도 변화 ⓘ

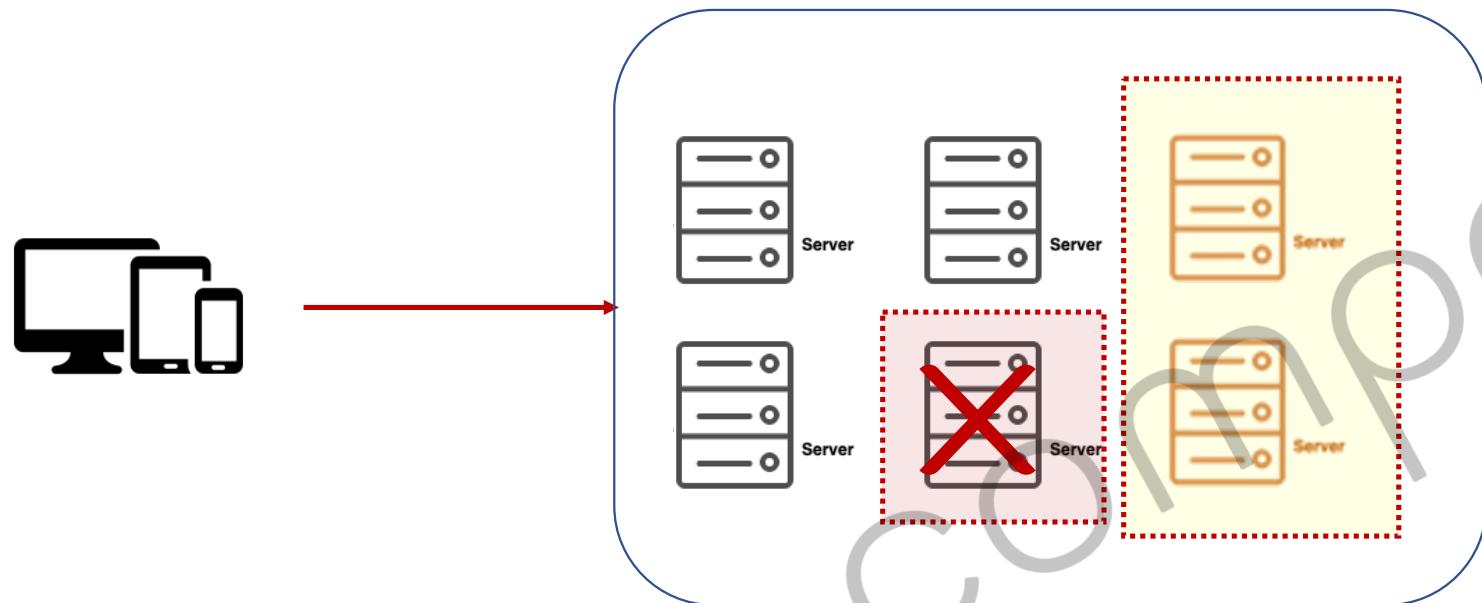




Before & After Configuration Management

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- Before

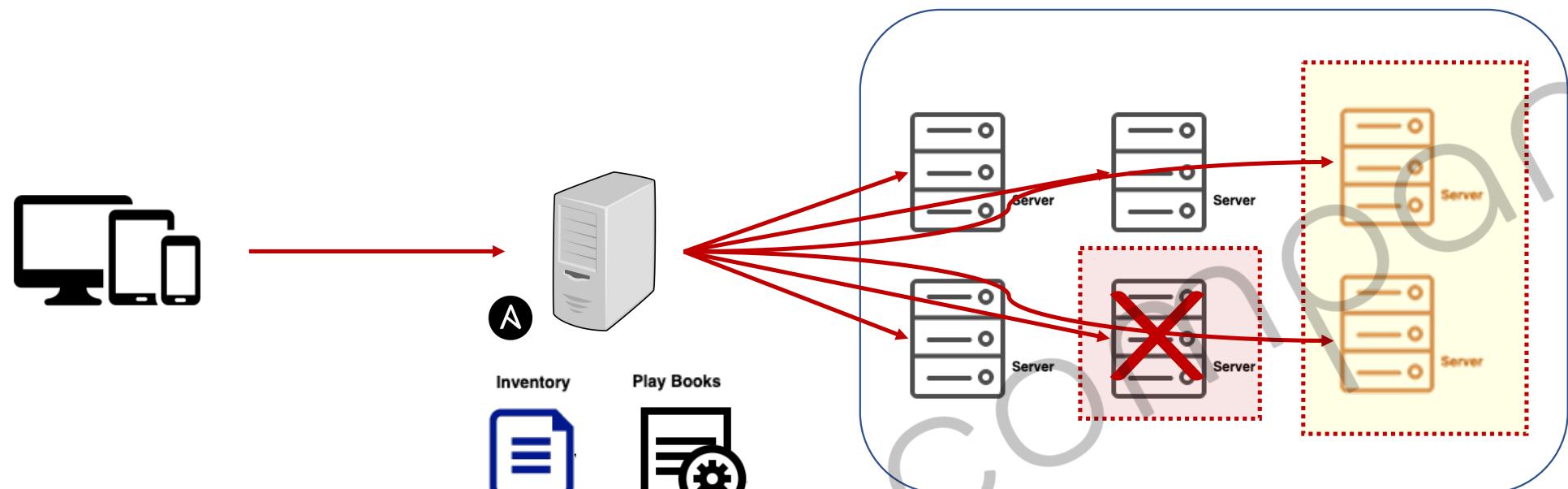




Before & After Configuration Management

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- After

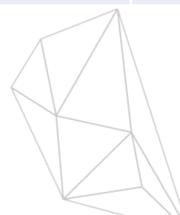




Configuration Management Tools

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	Puppet	Chef	Salt	Ansible
개발사	Puppet Labs	Opscode	SaltStack	Redhat
등장	2005.08	2009.01	2011.03	2012.03
개발언어	Ruby	Ruby, Erlang	Python	Python
주요고객	Google, ebay, Disney ...	Facebook, Ancestry.com ...	Linkedin, HP ...	Evernotes, Raskspace ...
Base	Puppet Forge	Chef Supermarket	Slag-Formula	Ansible Galaxy
Web UI	Puppet Enterprise	Chef Manage	SaltStack Enterprise	Ansible Tower
Definition File	자체 DSL, 내장 Ruby	자체 DSL (Ruby 베이스)	YAML, 자체 DSL (Python 베이스)	YAML
Agent	필요	필요	필요 or 불필요	불필요
사용률	★★★	★★★	★	★★★
사용성	★	★	★	★★★

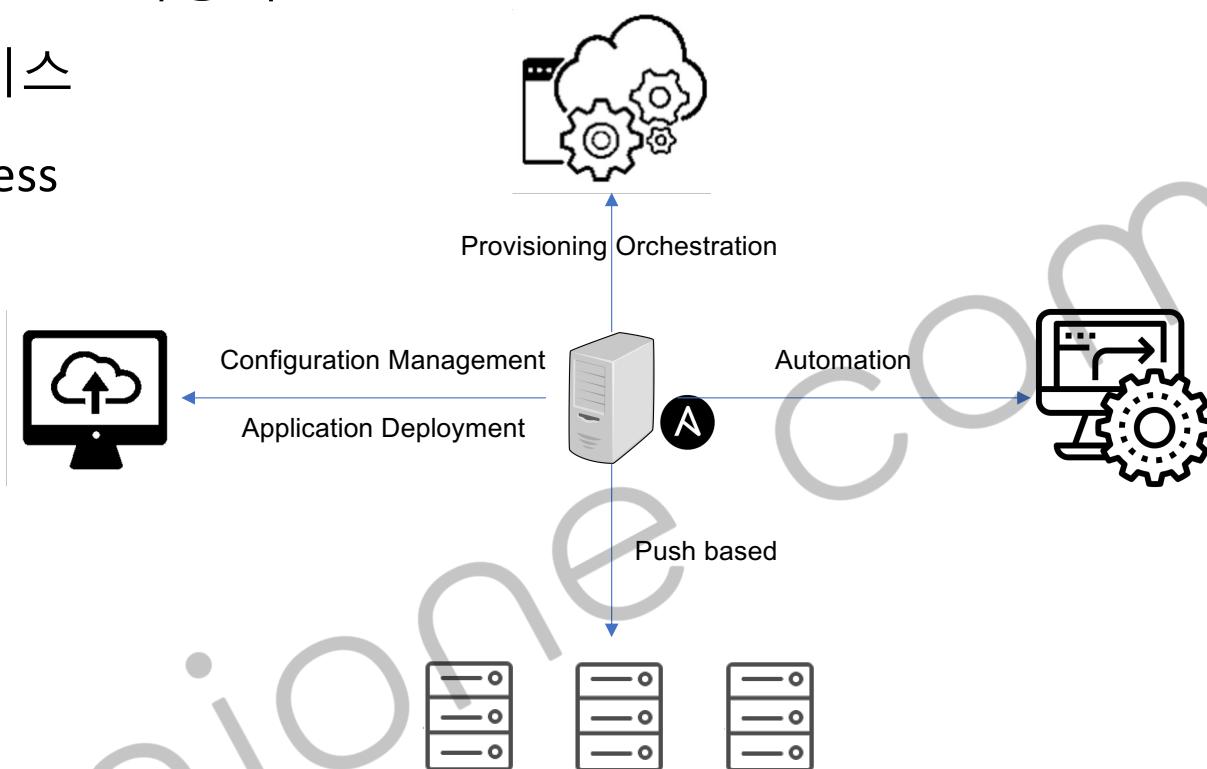




Ansible

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- 여러 개의 서버를 효율적으로 관리할 수 있게 해주는 환경 구성 자동화 도구
 - Configuration Management, Deployment & Orchestration tool
 - IT infrastructure 자동화
- Push 기반 서비스
- Simple, Agentless



Ansible

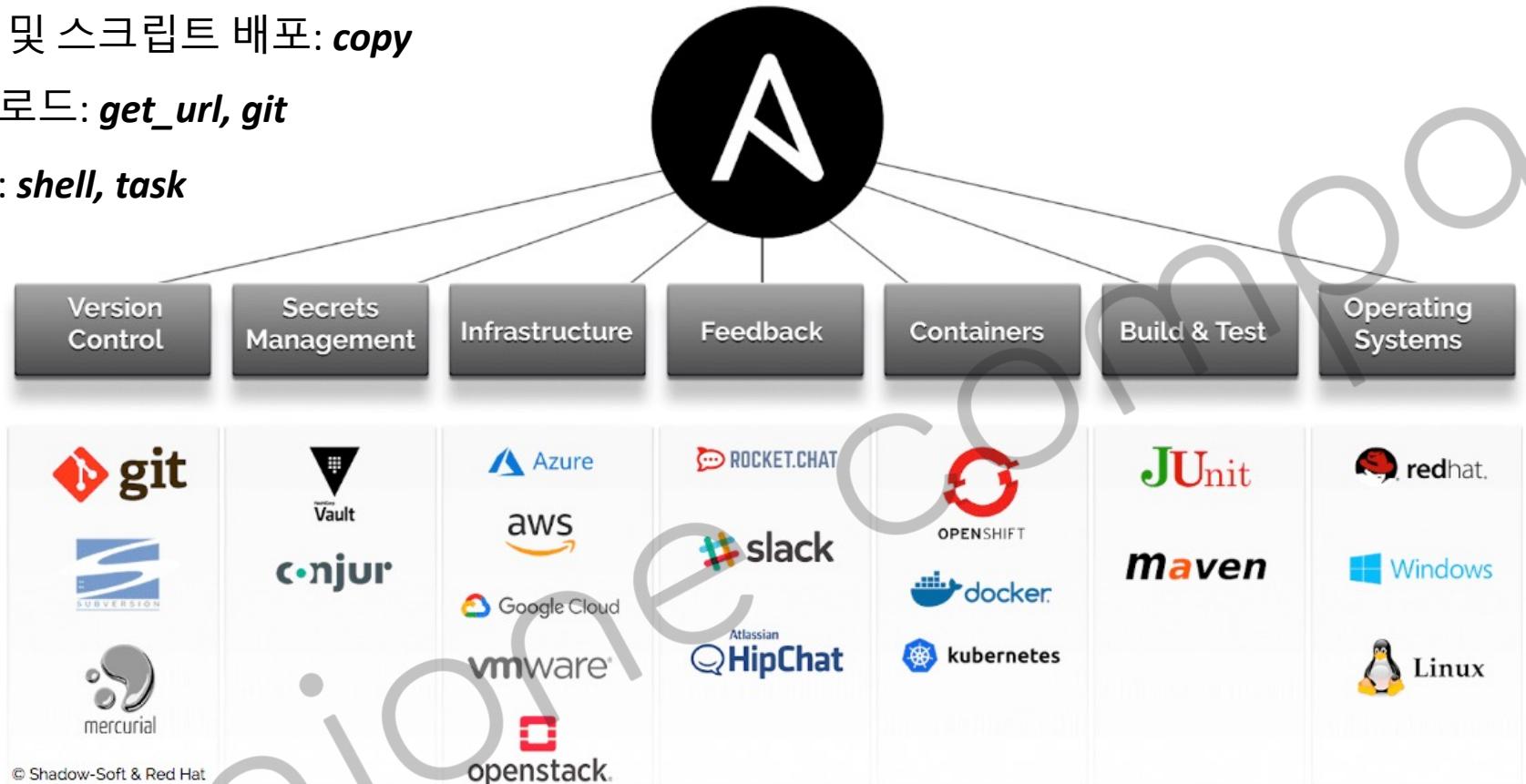
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■ 할 수 있는 일

- 설치: *apt-get, yum, homebrew*
- 파일 및 스크립트 배포: *copy*
- 다운로드: *get_url, git*
- 실행: *shell, task*

■ 결과

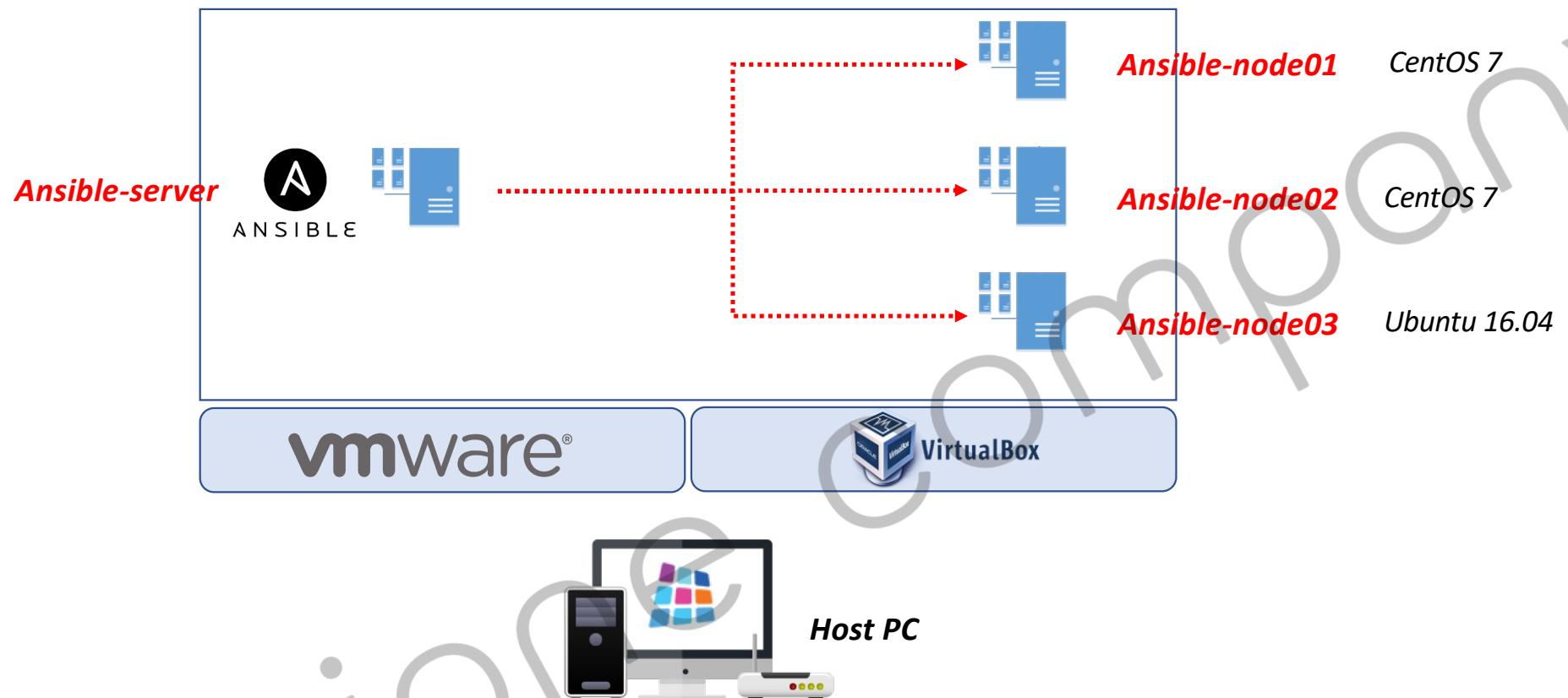
- *ok / failed / changed / unreachable*



Ansible

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- 구성도 예시





Install Ansible

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- Ansible Server 설치 (Linux)
 - \$ *yum install ansible*
 - \$ *ansible --version*
- 환경 설정 파일 → */etc/ansible/ansible.cfg*
- Ansible에서 접속하는 호스트 목록 → */etc/ansible/hosts*

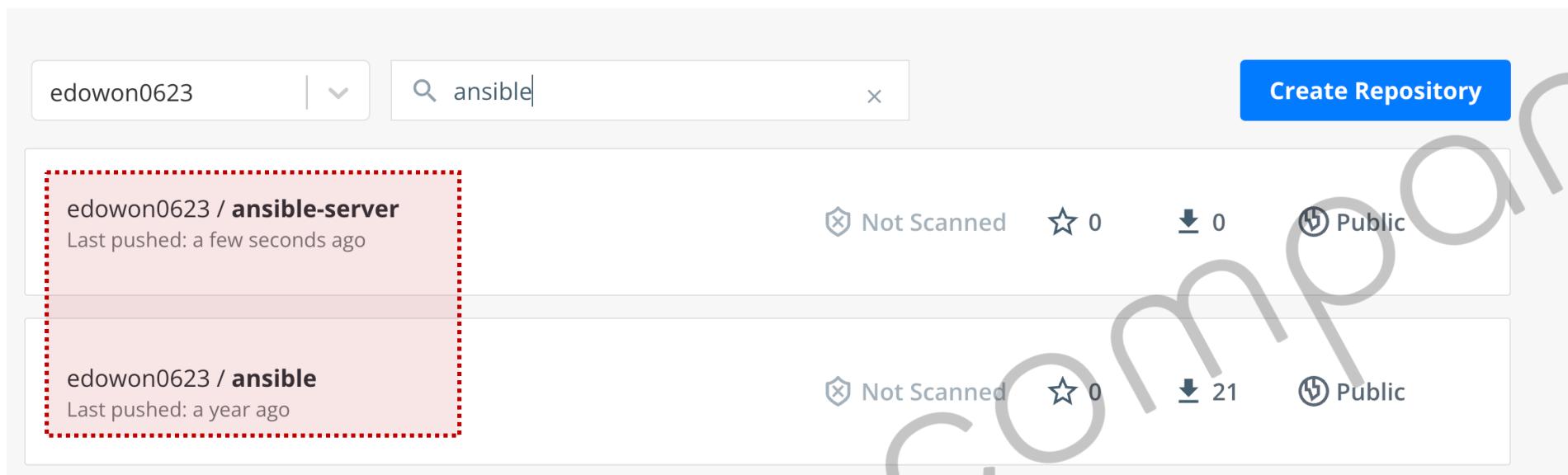
```
## db - [99:101] - node.example.com
[nginx]
172.20.10.11
172.20.10.12
172.20.10.13
```



Create a docker instance for Ansible

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- <https://hub.docker.com/r/edowon0623>



- Windows, MacOS) \$ ***docker pull edowon0623/ansible***
- Apple silicon, m1 chip) \$ ***docker pull edowon0623/ansible-server:m1***



Run Ansible Server (Windows, MacOS)

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```
$ docker run --privileged \
  --name ansible-server -itd \
  -p 20022:22 -p 8081:8080 \
  -e container=docker \
  -v /sys/fs/cgroup:/sys/fs/cgroup \
  edowon0623/ansible:latest /usr/sbin/init
```

```
$ ssh root@localhost -p 20022 (or docker exec -it ansible-server bash)
```

```
▶ ssh root@192.168.0.8 -p 20022
The authenticity of host '[192.168.0.8]:20022 ([192.168.0.8]:20022)' can't be established.
ECDSA key fingerprint is SHA256:Hpd/G+HMYEjzzkVucsl7CgliCp7M2rwQiYGBIGYZYz4.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '[192.168.0.8]:20022' (ECDSA) to the list of known hosts.
root@192.168.0.8's password: P@ssw0rd
System is booting up. See pam_nologin(8)
[root@52a39c6a2ba9 ~]#
```



Run Ansible Server (Windows, MacOS)

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```
[root@52a39c6a2ba9 ~]# vi /etc/sysconfig/docker
```

```
# /etc/sysconfig/docker

# Modify these options if you want to change the way the docker daemon Exercises
OPTIONS='--selinux-enabled=false --log-driver=journald --signature-verification=false'
if [ -z "${DOCKER_CERT_PATH}" ]; then
    DOCKER_CERT_PATH=/etc/docker
fi
```

```
[root@52a39c6a2ba9 ~]# sed -i -e 's/overlay2/vfs/g' /etc/sysconfig/docker-storage
```

```
[root@52a39c6a2ba9 ~]# systemctl start docker
```

```
[root@ae2b6f08d2dc ~]# sed -i -e 's/overlay2/vfs/g' /etc/sysconfig/docker-storage
[root@ae2b6f08d2dc ~]# systemctl start docker
[root@ae2b6f08d2dc ~]# systemctl status docker
● docker.service - Docker Application Container Engine
  Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor preset: disabled)
  Active: active (running) since Mon 2021-09-06 05:26:06 UTC; 48min ago
    Docs: http://docs.docker.com
   Main PID: 283 (dockerd-current)
```



Run Ansible Server (Apple silicon chip, m1)

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```
$ docker run --privileged \
  --name ansible-server -itd \
  -p 20022:22 -p 8081:8080 \
  -e container=docker \
  -v /sys/fs/cgroup:/sys/fs/cgroup --cgroupns=host \
  edowon0623/ansible-server:m1 /usr/sbin/init
```

```
$ ssh root@localhost -p 20022 (or docker exec -it ansible-server bash)
```

```
▶ ssh root@192.168.0.8 -p 20022
The authenticity of host '[192.168.0.8]:20022 ([192.168.0.8]:20022)' can't be established.
ECDSA key fingerprint is SHA256:Hpd/G+HMYEjzzkVucsl7CgliCp7M2rwQiYGBIGYZYz4.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '[192.168.0.8]:20022' (ECDSA) to the list of known hosts.
root@192.168.0.8's password: P@ssw0rd
System is booting up. See pam_nologin(8)
[root@52a39c6a2ba9 ~]#
```

Run Ansible Server

njone company

```
[root@8dd7ba5d82a8 ~]# ansible --version
```

```
[root@8dd7ba5d82a8 ~]# ansible --version
ansible [core 2.13.2]
  config file = None
  configured module search path = ['/root/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/local/lib/python3.8/site-packages/ansible
  ansible collection location = /root/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/local/bin/ansible
  python version = 3.8.8 (default, Aug 25 2021, 16:18:04) [GCC 8.5.0 20210514 (Red Hat 8.5.0-3)]
```

```
[root@ 8dd7ba5d82a8 ~]# vi /etc/ansible/hosts
```

```
[devops]
172.17.0.3
172.17.0.4
```

docker network inspect bridge

```
"Containers": {
  "3228c6b59416fa46a11e73f2c345a98fdc56274c4508d16a41fce18a931bb0c": {
    "Name": "docker-server",
    "IPv4Address": "172.17.0.3/16",
  },
  "8dd7ba5d82a8432ba345161b6c3fdc84bb6e82e3efb60c9e9b3a21c2ba59a16e": {
    "Name": "ansible-server",
    "IPv4Address": "172.17.0.4/16",
  },
  "e1253d619fc1da23a5bf30898e5a398bc5c08bc5a65513fd1394f35a50d7d709": {
    "Name": "jenkins-server",
    "IPv4Address": "172.17.0.2/16",
  }
}
```



Run Ansible Server

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```
[root@52a39c6a2ba9 ~]# ssh-keygen
```

```
[root@52a39c6a2ba9 ~]# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
/root/.ssh/id_rsa already exists.
Overwrite (y/n)? y
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa.
```

```
[root@52a39c6a2ba9 ~]# ssh-copy-id root@172.17.0.2
```

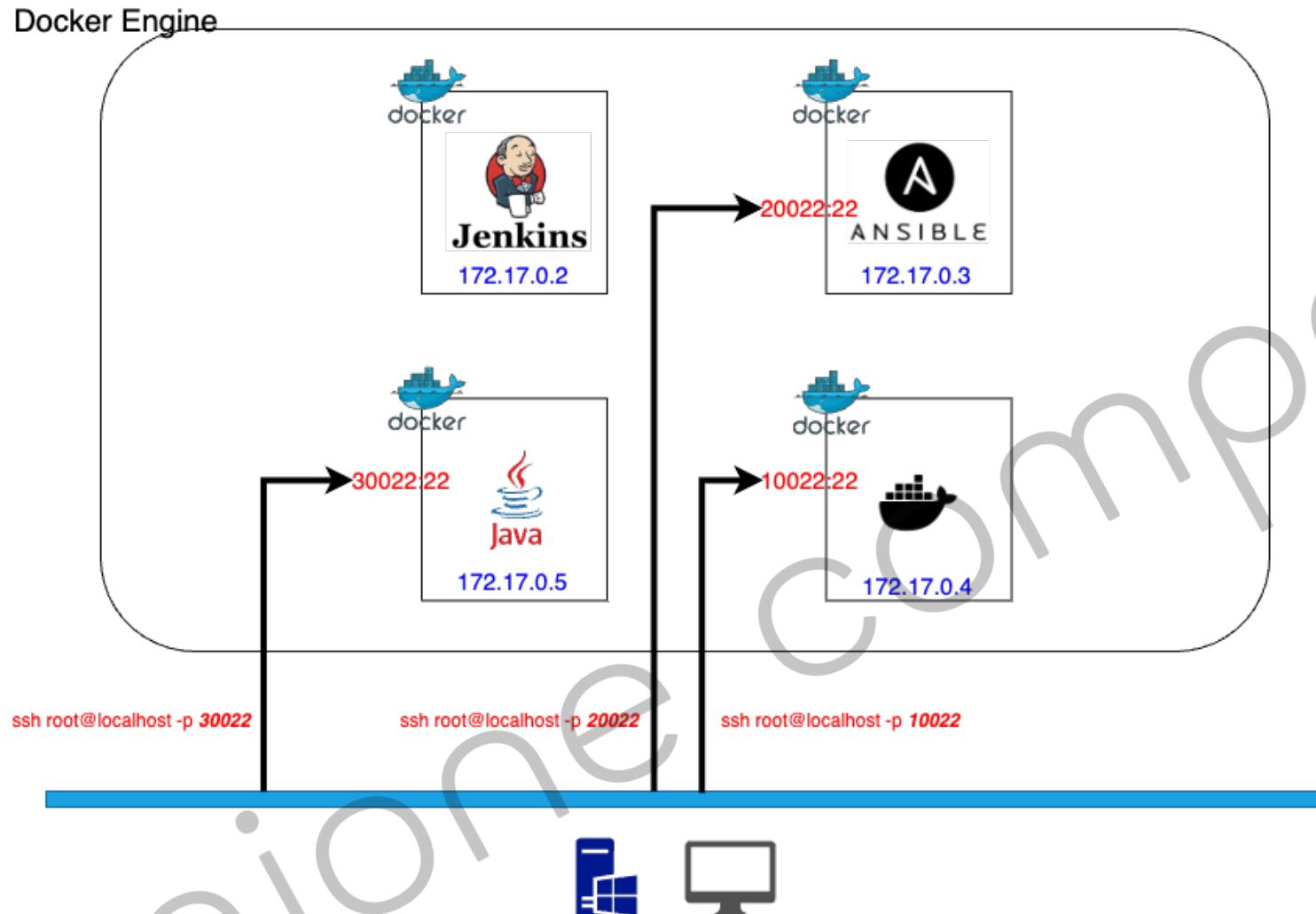
```
[root@52a39c6a2ba9 ~]# ssh-copy-id root@172.17.0.2
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/root/.ssh/id_rsa.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
root@172.17.0.2's password:

Number of key(s) added: 1

Now try logging into the machine, with:  "ssh 'root@172.17.0.2'"
and check to make sure that only the key(s) you wanted were added.
```

Run Ansible Server

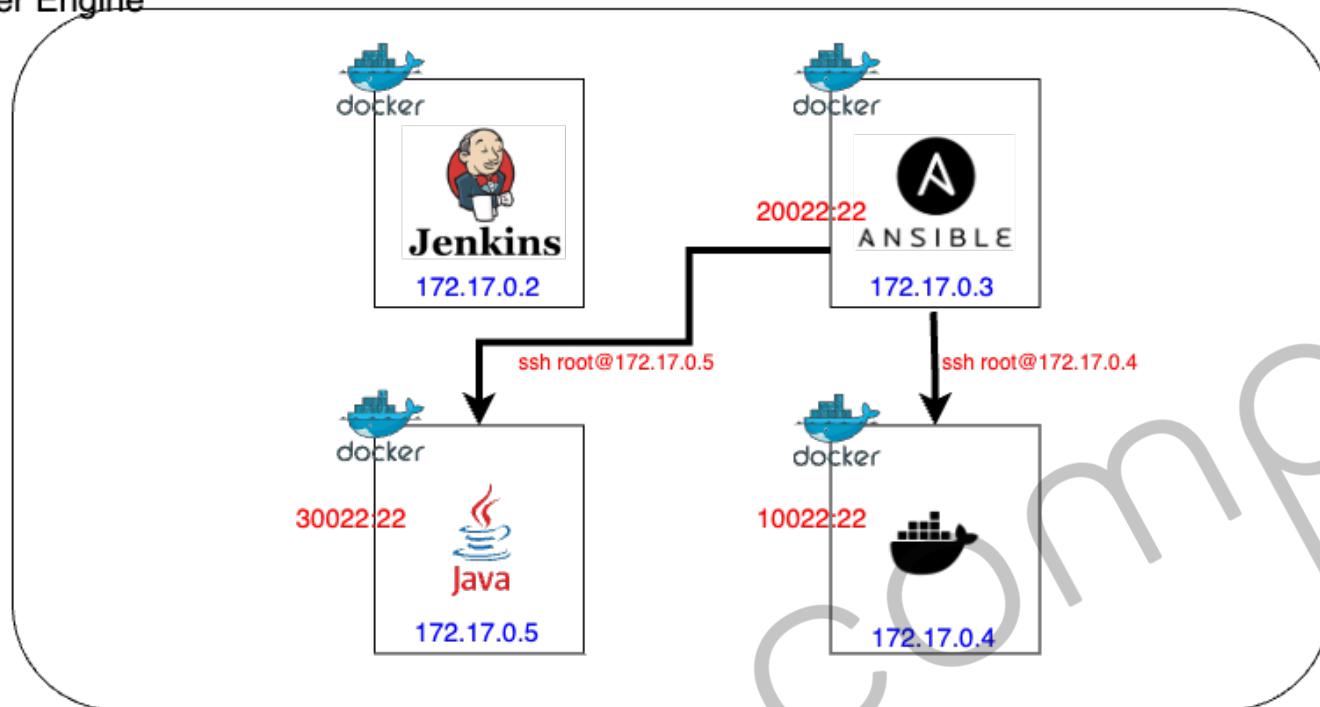
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Run Ansible Server

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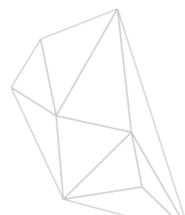
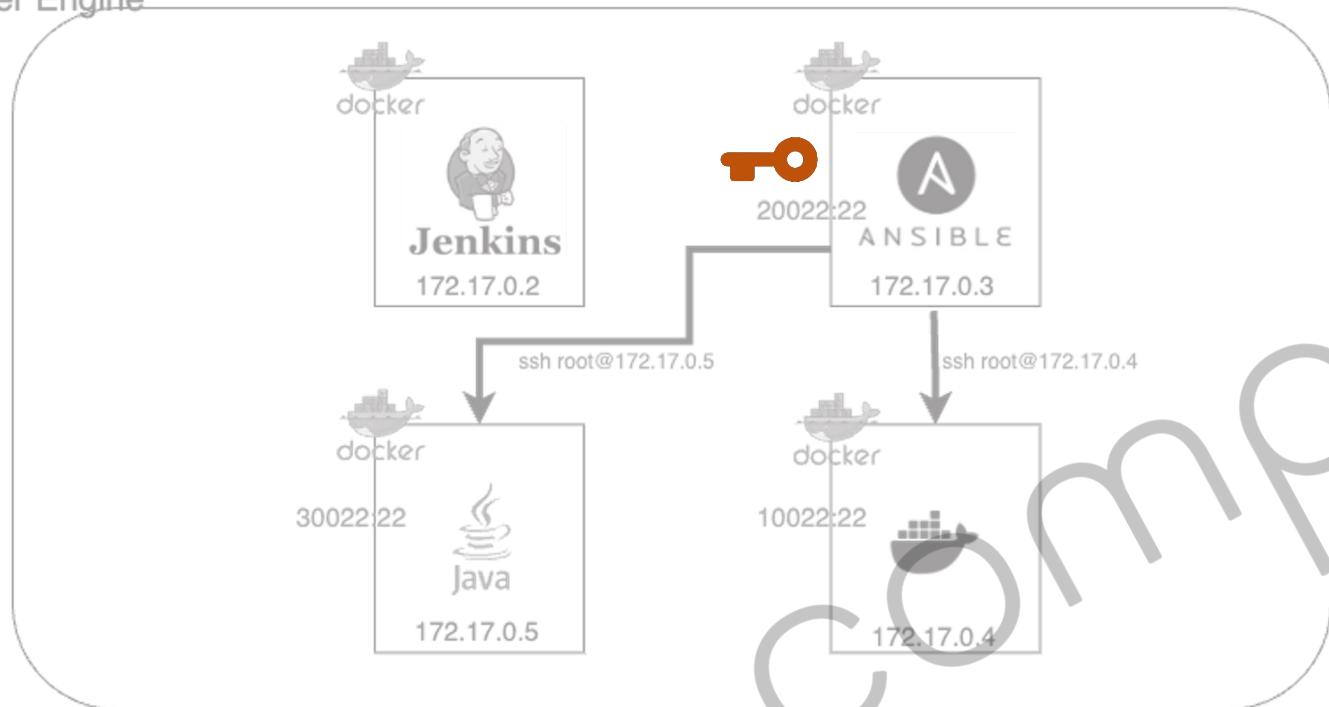
Docker Engine



Run Ansible Server

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Docker Engine



njone





Test Ansible module

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- 실행 옵션

- *i* (*--inventory-file*) → 적용 될 호스트들에 대한 파일 정보
- *m* (*--module-name*) → 모듈 선택
- *k* (*--ask-pass*) → 관리자 암호 요청
- *K* (*--ask-become-pass*) → 관리자 권한 상승
- *--list-hosts* → 적용되는 호스트 목록

- 면등성

- 같은 설정을 여러 번 적용하더라도 결과가 달라지지 않는 성질
ex) echo -e “[mygroup]\n172.20.10.11” >> /etc/ansible/hosts

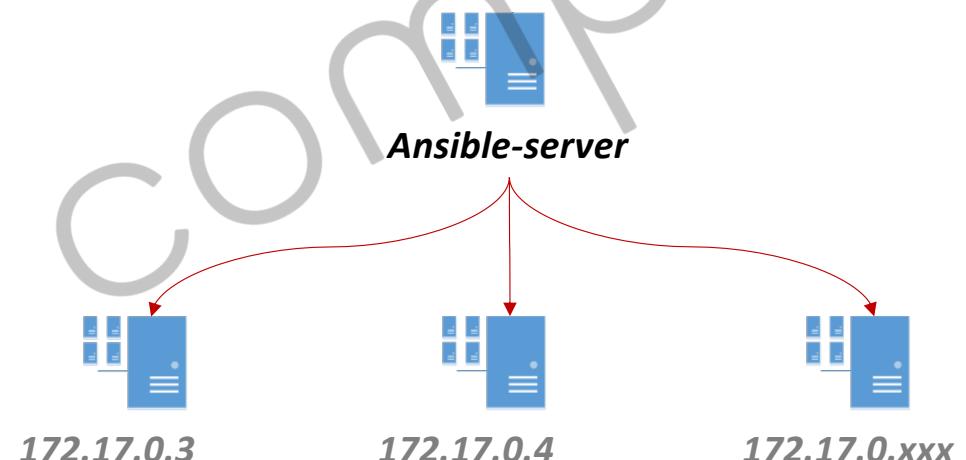
Test Ansible module

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- https://docs.ansible.com/ansible/2.9/modules/list_of_all_modules.html
- Ansible Test

- *\$ ansible all -m ping*

```
[root@8dd7ba5d82a8 ~]# ansible all -m ping
172.17.0.4 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/
    },
    "changed": false,
    "ping": "pong"
}
172.17.0.3 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/
    },
    "changed": false,
    "ping": "pong"
}
```





Test Ansible module

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- Exam1) 디스크 용량 확인

```
[root@52a39c6a2ba9 ~]# ansible all -m shell -a "free -h"
```

```
[root@52a39c6a2ba9 ~]# ansible all -m shell -a "free -h"
172.17.0.2 | CHANGED | rc=0 >>
      total        used        free      shared  buff/cache   available
Mem:       7.8G       3.3G      304M       338M       4.2G       3.9G
Swap:      1.0G       115M      908M
172.17.0.4 | CHANGED | rc=0 >>
      total        used        free      shared  buff/cache   available
Mem:       7.8G       3.3G      304M       338M       4.2G       3.9G
Swap:      1.0G       115M      908M
```



Test Ansible module

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- Exam2) 파일 전송

```
[root@52a39c6a2ba9 ~]# ansible all -m copy -a "src=./test.txt dest=/tmp"
```

```
[root@52a39c6a2ba9 ~]# ansible all -m copy -a "src=./test.txt dest=/tmp"
172.17.0.2 | CHANGED => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python"
    },
    "changed": true,
    "checksum": "ab6065a5305ad6f743c163dcd7124feaea41ac39",
    "dest": "/tmp/test.txt",
```

```
172.17.0.4 | CHANGED => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python"
    },
    "changed": true,
    "checksum": "ab6065a5305ad6f743c163dcd7124feaea41ac39",
    "dest": "/tmp/test.txt",
```



Test Ansible module

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- Exam3) 서비스 설치

```
[root@52a39c6a2ba9 ~]# ansible all -m yum -a "name=httpd state=present"
```

```
[root@52a39c6a2ba9 ~]# ansible all -m yum -a "name=httpd state=present"
172.17.0.4 | CHANGED => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python"
    },
    "changed": true,
    "changes": {
        "installed": [
            "httpd"
        ]
    },
    [root@ae2b6f08d2dc tmp]# yum list installed | grep httpd
    httpd.x86_64                  2.4.6-97.el7.centos      @updates
    httpd-tools.x86_64              2.4.6-97.el7.centos   @updates
    [root@ae2b6f08d2dc tmp]# systemctl status httpd
● httpd.service - The Apache HTTP Server
    Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; vendor preset: disabled)
    Active: inactive (dead)
      Docs: man:httpd(8)
             man:apachectl(8)
```

@updates
@updates





Ansible Playbook

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- 사용자가 원하는 내용을 미리 작성해 놓은 파일

- ex) 설치, 파일 전송, 서비스 재시작 ...
- ex) 다수의 서버에 반복 작업을 처리하는 경우

- Playbook

- \$ vi first-playbook.yml 작성
- \$ **ansible-playbook first-playbook.yml**
- \$ cat /etc/ansible/hosts

```
1 ---  
2 - name: Ansible_vim  
3 hosts: localhost  
4 tasks:  
5   - name: Add ansible hosts  
6     blockinfile:  
7       path: /etc/ansible/hosts  
8       block: |  
9         [mygroup]  
10        172.20.10.11
```

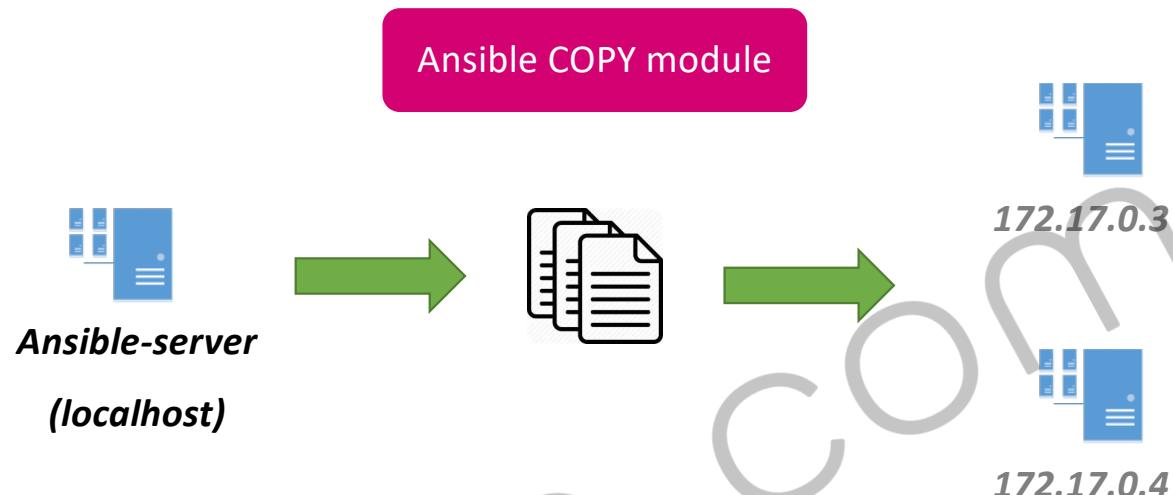
```
[root@8dd7ba5d82a8 ~]# cat /etc/ansible/hosts  
[devops]  
172.17.0.3  
172.17.0.4  
# BEGIN ANSIBLE MANAGED BLOCK  
[mygroup]  
172.17.0.5  
# END ANSIBLE MANAGED BLOCK
```



Ansible Playbook

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- Ansible Playbook 예제 – 파일 복사





Ansible Playbook

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- Ansible Playbook 예제 – 파일 복사

```
[root@8dd7ba5d82a8 ~]# ansible-playbook playbook-sample1.yml
[WARNING]: An error occurred while calling ansible.utils.display.initialize_locale (unsupported locale setting). This
Display to print incorrect line lengths

PLAY [Ansible Copy Example Local to Remote] *****

TASK [Gathering Facts] *****
ok: [172.17.0.3]
ok: [172.17.0.4]

TASK [copying file with playbook] *****
changed: [172.17.0.4]
changed: [172.17.0.3]

PLAY RECAP *****
172.17.0.3 : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
172.17.0.4 : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

```
[root@8dd7ba5d82a8 ~]# ls -al /tmp/sample.txt
-rw-r--r-- 1 root root 11 Aug  2 15:41 /tmp/sample.txt
```



Ansible Playbook

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- Ansible Playbook 예제 – 다운로드

```
1 ---
2 - name: Download Tomcat9 from tomcat.apache.org
3   hosts: devops
4   tasks:
5     - name: Create a Directory /opt/tomcat9
6       file:
7         path: /opt/tomcat9
8         state: directory
9         mode: 0755
10    - name: Download Tomcat using get_url
11      get_url:
12        url: https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.65/bin/apache-tomcat-9.0.65.tar.gz
13        dest: /opt/tomcat9
14        mode: 0755
15        checksum: sha512:https://downloads.apache.org/tomcat/tomcat-9/v9.0.65/bin/apache-tomcat-9.0.65.tar.gz.sha512
```

```
TASK [Download Tomcat using get_url] ****
changed: [172.17.0.3]
changed: [172.17.0.4]

PLAY RECAP ****
172.17.0.3 : ok=3    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
172.17.0.4 : ok=3    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```



Setup Ansible on Jenkins

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- Manage Jenkins → Configure System → Publish over SSH

- Add SSH Servers
 - Name: **ansible-host**
 - Hostname: **[Remote IP] ex) 192.168.0.8**
 - Username: **root**
 - Passphrase/Password: **P@ssw0rd**
 - Port: **20022**
- Test Configuration

SSH Server

Name: ansible-host

Hostname: 192.168.0.8

Username: root

Remote Directory: /root

Use password authentication, or use a different key

Passphrase / Password: (redacted)

Port: 20022

Exercise 5# JenKins Job 1/13

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- Item name → ***My-Ansible-Project***
 - Copy from: ***My-Docker-Project***

Enter an item name

» Required field

Freestyle project
이것은 Jenkins의 주요 기능입니다. Jenkins은 어느 빌드 시스템과 어떤 SCM(형상관리)으로 묶인 당신의 프로젝트를 빌드할 것이고, 소프트웨어 빌드보다 다른 어떤 것에 자주 사용될 수 있습니다.

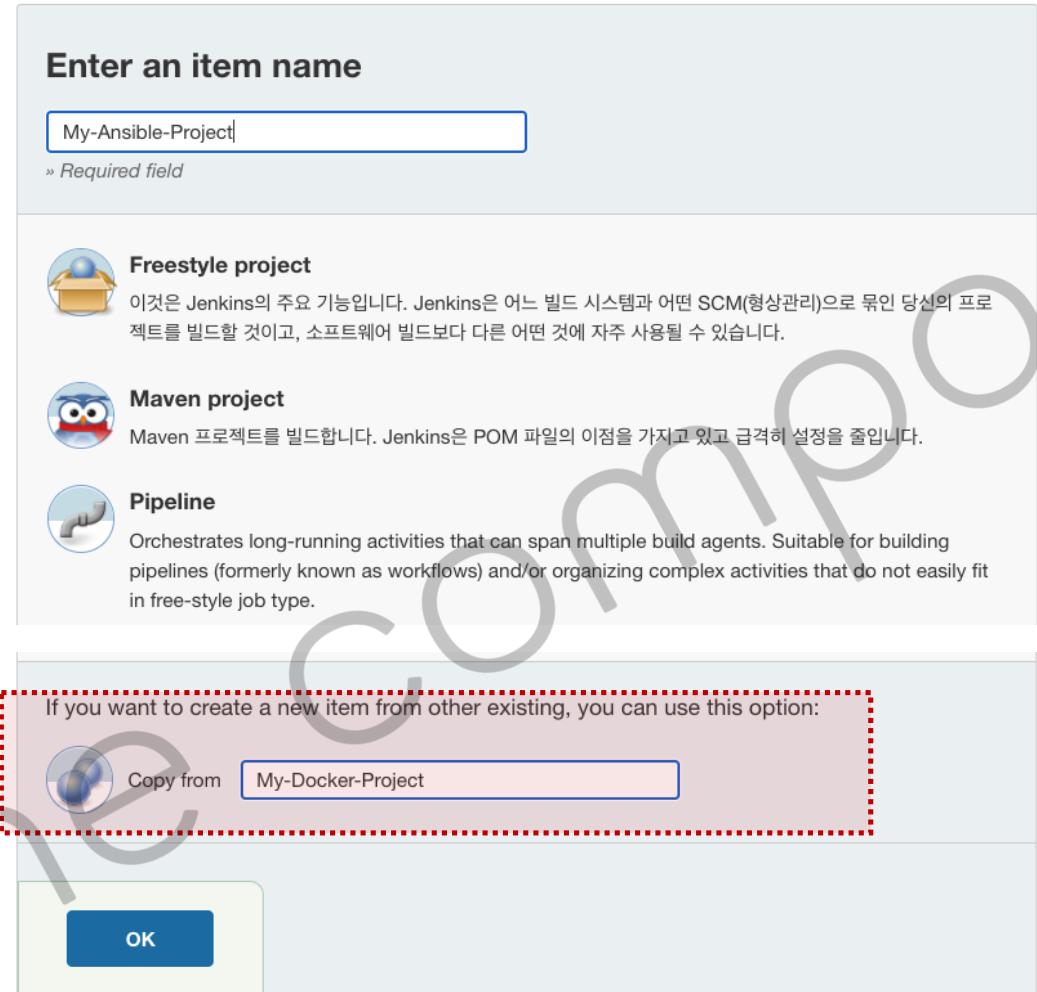
Maven project
Maven 프로젝트를 빌드합니다. Jenkins은 POM 파일의 이점을 가지고 있고 급격히 설정을 줄입니다.

Pipeline
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

If you want to create a new item from other existing, you can use this option:

Copy from **My-Docker-Project**

OK





Exercise 5# JenKins Job 2/13

njone company

- Post-build Actions

- Deploy war/ear to a container → **Delete**
- **Send build artifacts over SSH**
 - **SSH Server**

- Name: [Publish over SSH에서 설정한 이름] ex) **ansible-host**
- **Transfer Set**
 - Source files: **target/*.war**
 - Remove prefix: **target**
 - Remote directory: .

- Save > Build Now

```
[root@8dd7ba5d82a8 ~]# ls -l *.war
-rw-r--r-- 1 root root 8025885 Aug 2 07:59 hello-world.war
```



Exercise 5# JenKins Job 3/13

njone company

- Create an ansible playbook file

- *\$ vi first-devops-playbook.yml*

```
1 - hosts: all
2 #   become: true
3
4 tasks:
5   - name: build a docker image with deployed war file
6     command: docker build -t cicd-project-ansible .
7     args:
8       chdir: /root
```

- Create a hosts file

- *\$ vi hosts*

```
[root@52a39c6a2ba9 ~]# cat hosts
172.17.0.4
```



Exercise 5# JenKins Job 4/13

njone company

- **\$ ansible-playbook -i hosts first-devops-playbook.yml --check**

```
[root@52a39c6a2ba9 ~]# ansible-playbook -i hosts first-devops-playbook.yml --check

PLAY [all] ****
TASK [Gathering Facts] ****
ok: [172.17.0.4]

TASK [build docker image using war file] ****
skipping: [172.17.0.4]

PLAY RECAP ****
172.17.0.4      : ok=1    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
```



Exercise 5# JenKins Job 5/13

njone company

- **\$ ansible-playbook -i hosts first-devops-playbook.yml**

```
[root@52a39c6a2ba9 ~]# ansible-playbook -i hosts first-devops-playbook.yml

PLAY [all] ****
TASK [Gathering Facts] ****
ok: [172.17.0.4]

TASK [build a docker image with deployed war file] ****
changed: [172.17.0.4]

PLAY RECAP ****
172.17.0.4 : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

[root@52a39c6a2ba9 ~]# docker images
REPOSITORY          TAG           IMAGE ID        CREATED         SIZE
cicd-project-ansible  latest        429359784e79  8 seconds ago  680 MB
docker.io/tomcat     latest        ab1f0e1bb1a1  2 days ago   680 MB
```



Exercise 5# JenKins Job 6/13

njone company

- Add a task for create a container

```
1 - hosts: all
2 #   become: true
3
4 tasks:
5 - name: build a docker image with deployed war file
6   command: docker build -t cicd-project-ansible .
7   args:
8     chdir: /root
9 - name: create a container using cicd-project-ansible image
10  command: docker run -d --name my_cicd_project -p 8081:8080 cicd-project-ansible
```



Exercise 5# JenKins Job 7/13

njone company

- **\$ ansible-playbook -i hosts first-devops-playbook.yml**

```
[root@52a39c6a2ba9 ~]# docker images
REPOSITORY          TAG      IMAGE ID      CREATED        SIZE
cicd-project-ansible  latest   429359784e79  4 minutes ago  680 MB
docker.io/tomcat     latest   ab1f0e1bb1a1  2 days ago    680 MB
[root@52a39c6a2ba9 ~]# docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS
[root@52a39c6a2ba9 ~]# ansible-playbook -i hosts first-devops-playbook.yml

PLAY [all] ****
TASK [Gathering Facts] ****
ok: [172.17.0.4]

TASK [build a docker image with deployed war file] ****
changed: [172.17.0.4]

TASK [create a container using cicd-project-ansible image] ****
changed: [172.17.0.4]

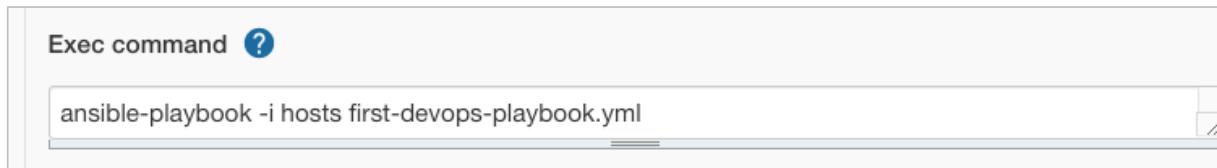
PLAY RECAP ****
172.17.0.4 : ok=3    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
[root@52a39c6a2ba9 ~]# docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS
e3fdadace3ddb     cicd-project-ansible  "catalina.sh run"  16 seconds ago   Up 8 seconds   0.0.0.0:8081->8080/tcp  my_cicd_project
```



Exercise 5# JenKins Job 8/13

njone company

- ***Delete docker image and docker container***
- ***Execute ansible-playbook file on Jenkins***
 - ***ansible-playbook -i hosts first-devops-playbook.yml***



[root@52a39c6a2ba9 ~]# docker images				
REPOSITORY	TAG	IMAGE ID		
cicd-project-ansible	latest	225086aec8a0	CREATED	SIZE
docker.io/tomcat	latest	ab1f0e1bb1a1	22 seconds ago	680 MB
[root@52a39c6a2ba9 ~]# docker ps			2 days ago	680 MB
CONTAINER ID	IMAGE	COMMAND		
f47416fc21f6	cicd-project-ansible	"catalina.sh run"	CREATED	STATUS
			23 seconds ago	Up 13 seconds

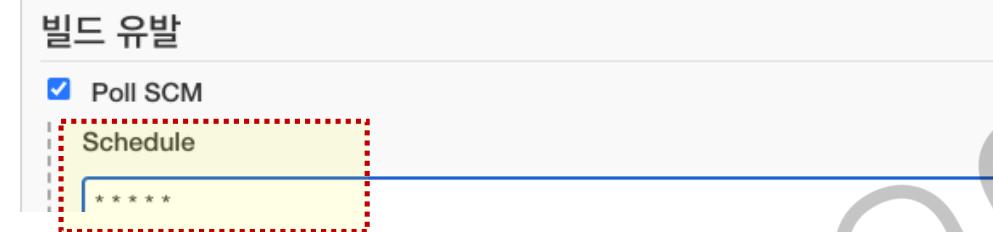


Exercise 5# JenKins Job 9/13

njone company

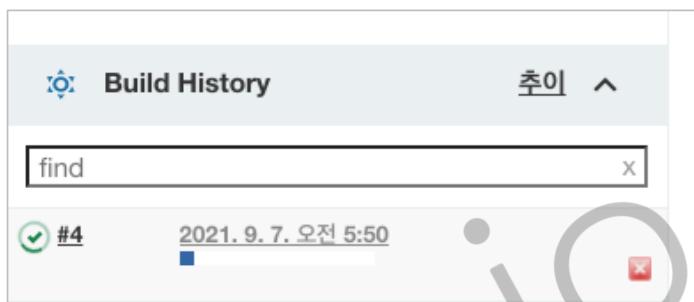
- ***Modify the source code and Git commit (push)***

- ***Build Triggers***



- ***\$ git add . && git commit -m "changed the index page" && git push***

```
1 <h1> Welcome to Simple Ecommerce ver 1.2</h1>
2 <h2> Deploy on Docker container with ansible</h2>
```



Exercise 5# JenKins Job 10/13

njone company

- **Build Now automatically → UNSTABLE**

- **Build a new images → OK**
- **Create a new container → Fail**

[root@52a39c6a2ba9 ~]# docker images				
REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
cicd-project-ansible	latest	4abd35f542cf	About a minute ago	680 MB
<none>	<none>	225086aec8a0	34 minutes ago	680 MB
docker.io/tomcat	latest	ab1f0e1bb1a1	2 days ago	680 MB
[root@52a39c6a2ba9 ~]# docker ps -a				
CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
f47416fc21f6	225086aec8a0	"catalina.sh run"	34 minutes ago	Up 34 minutes



Exercise 5# JenKins Job 11/13

njone company

- *\$ vi second-devops-playbook.yml*

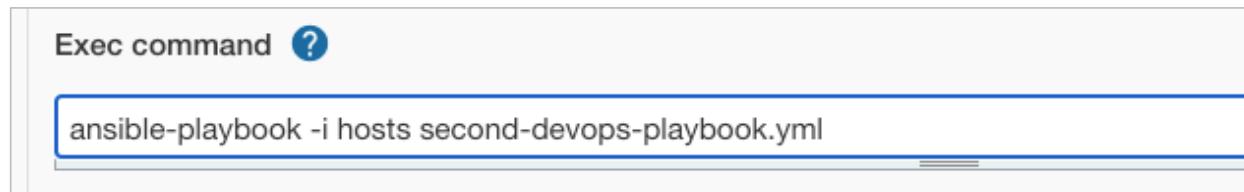
```
1  - hosts: all
2  #   become: true
3
4  tasks:
5  - name: stop current running container
6    command: docker stop my_cicd_project
7    ignore_errors: yes
8
9  - name: remove stopped container
10   command: docker rm my_cicd_project
11   ignore_errors: yes
12
13 - name: remove current docker image
14   command: docker rmi cicd-project-ansible
15   ignore_errors: yes
16
17 - name: build a docker image with deployed war file
18   command: docker build -t cicd-project-ansible .
19   args:
20     chdir: /root
21
22 - name: create a container using cicd-project-ansible image
23   command: docker run -d --name my_cicd_project -p 8081:8080 cicd-project-ansible
```

Exercise 5# JenKins Job 12/13

njone company

- ***Modify the execute command***

- ***ansible-playbook -i hosts second-devops-playbook.yml***



- ***Build Now again***

The image shows the Jenkins "Build History" page. It lists three builds:

- #3: Status is green checkmark, timestamp is 2021. 9. 7. 오전 5:16.
- #4: Status is orange exclamation mark, timestamp is 2021. 9. 7. 오전 5:50.
- #5: Status is orange exclamation mark, timestamp is 2021. 9. 7. 오전 6:09.

The image shows the Jenkins build log for build #5. An orange arrow points from the build history entry to the log output. The log output is as follows:

```
channel stopped
SSH: Connecting from host [512076bd5890]
SSH: Connecting with configuration [ansible-host] ...
SSH: EXEC: completed after 30,409 ms
SSH: Disconnecting configuration [ansible-host] ...
SSH: Transferred 1 file(s)
Finished: SUCCESS
```



Exercise 5# JenKins Job 13/13

njone company

- **Before**

[root@52a39c6a2ba9 ~]# docker images			
REPOSITORY	TAG	IMAGE ID	SIZE
cicd-project-ansible	latest	4abd35f542cf	680 MB
<none>	<none>	225086aec8a0	680 MB
docker.io/tomcat	latest	ab1f0e1bb1a1	680 MB

[root@52a39c6a2ba9 ~]# docker ps			
CONTAINER ID	IMAGE	COMMAND	STATUS
f47416fc21f6	225086aec8a0	"catalina.sh run"	Up 50 minutes

- **After**

[root@52a39c6a2ba9 ~]# docker images			
REPOSITORY	TAG	IMAGE ID	SIZE
cicd-project-ansible	latest	8694f2a9019f	680 MB
<none>	<none>	225086aec8a0	680 MB
docker.io/tomcat	latest	ab1f0e1bb1a1	680 MB

[root@52a39c6a2ba9 ~]# docker ps			
CONTAINER ID	IMAGE	COMMAND	STATUS
cc1f6bf62f99	cicd-project-ansible	"catalina.sh run"	Up About a minute

Push the image on Docker hub

njone company

- **\$ docker push edowon0623/cicd-project-ansible**

```
[root@ansible-server ~]# docker push edowon0623/cicd-project-ansible
The push refers to a repository [docker.io/edowon0623/cicd-project-ansible]
```

```
1e5688f9bb9a: Preparing
d1cda6beea3c: Preparing
136a796cca9b: Preparing
4e4de253c94d: Preparing
3891808a925b: Preparing
d402f4f1b906: Waiting
00ef5416d927: Waiting
8555e663f65b: Waiting
d00da3cd7763: Waiting
4e61e63529c2: Waiting
799760671c38: Waiting
```

```
denied: requested access to the resource is denied
```

```
[root@ansible-server ~]# docker login
```

```
Login with your Docker ID to push and pull images from Docker Hub. If you don't have a Docker ID, head over to https://hub.docker.com to create one.
```

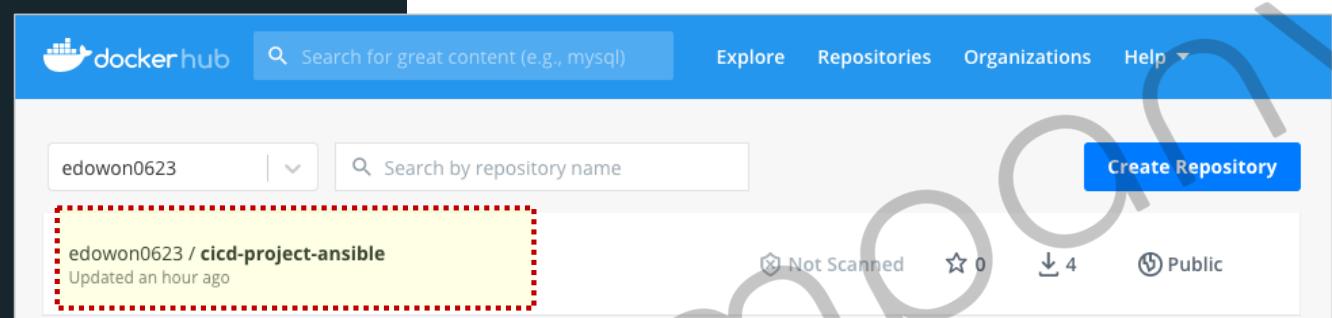
```
Username: edowon0623
```

```
Password:
```

```
Login Succeeded
```

```
[root@ansible-server ~]# docker push edowon0623/cicd-project-ansible
The push refers to a repository [docker.io/edowon0623/cicd-project-ansible]
```

```
1e5688f9bb9a: Pushing 6.144 kB
d1cda6beea3c: Pushing 2.048 kB
136a796cca9b: Pushing 4.02 MB/20.08 MB
4e4de253c94d: Pushing 3.072 kB
```





Create a new playbook file

njone company

- `$ vi create-cicd-devops-image.yml`

```
1  - hosts: all
2    #   become: true
3
4    tasks:
5      - name: create a docker image with deployed waf file
6        command: docker build -t edowon0623/cicd-project-ansible .
7        args:
8          |       chdir: /root
9
10     - name: push the image on Docker Hub
11       command: docker push edowon0623/cicd-project-ansible
12
13     - name: remove the docker image from the ansible server
14       command: docker rmi edowon0623/cicd-project-ansible
15       ignore_errors: yes
```



Create a new playbook file

njone company

- `$ ansible-playbook -i hosts create-cicd-devops-image.yml`

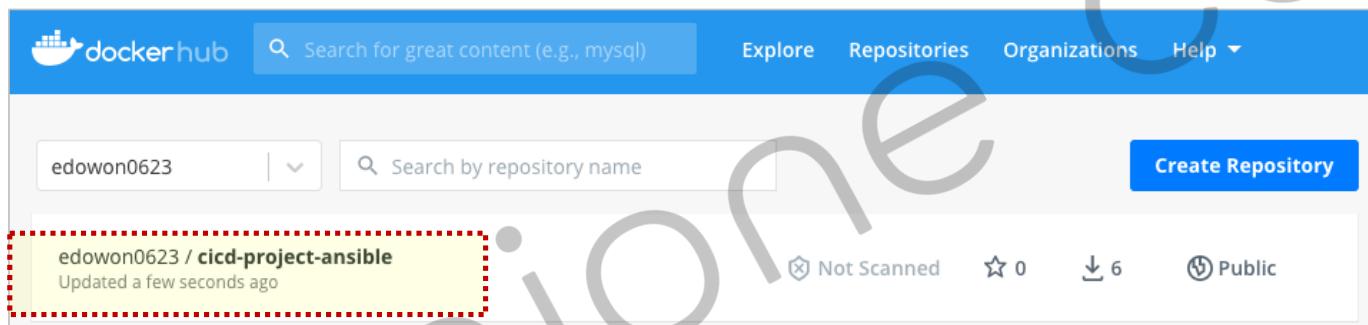
```
PLAY [all] ****
TASK [Gathering Facts] ****
ok: [172.17.0.2]

TASK [create a docker image with deployed waf file] ****
changed: [172.17.0.2]

TASK [push the image on Docker Hub] ****
changed: [172.17.0.2]

TASK [remove the docker image from the ansible server] ****
changed: [172.17.0.2]

PLAY RECAP ****
172.17.0.2 : ok=4    changed=3    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```





Modify the previous playbook file

njone company

- **\$ mv second-devops-playbook.yml create-cicd-devops-container.yml**
- **\$ vi create-cicd-devops-container.yml**

```
4   tasks:  
5     - name: stop current running container  
6       command: docker stop my_cicd_project  
7       ignore_errors: yes  
8  
9     - name: remove stopped container  
10    command: docker rm my_cicd_project  
11    ignore_errors: yes  
12  
13    - name: remove current docker image  
14      command: docker rmi edowon0623/cicd-project-ansible  
15      ignore_errors: yes  
16  
17    - name: pull the newest docker image from Docker Hub  
18      command: docker pull edowon0623/cicd-project-ansible  
19  
20    - name: create a container using cicd-project-ansible image  
21      command: docker run -d --name my_cicd_project -p 8080:8080 edowon0623/cicd-project-ansible
```



Delete all of the images and containers

njone company

- ansible-server, docker-server 에 작업

- **\$ docker rmi cicd-project-ansible**
- **\$ docker stop my_cicd_project && docker rm my_cicd_proejct**

```
[root@ansible-server ~]# docker images
REPOSITORY      TAG          IMAGE ID      CREATED        SIZE
docker.io/tomcat latest        ab1f0e1bb1a1  2 days ago   680 MB
[root@ansible-server ~]# docker ps -a
CONTAINER ID    IMAGE          COMMAND       CREATED        STATUS
[root@ansible-server ~]#
```

```
[root@docker-server ~]# docker images
REPOSITORY      TAG          IMAGE ID      CREATED        SIZE
[root@docker-server ~]# docker ps -a
CONTAINER ID    IMAGE          COMMAND       CREATED        STATUS
[root@docker-server ~]#
```

- change the hosts file (add the docker-server's ip address)

```
[root@ansible-server ~]# cat hosts
172.17.0.2
172.17.0.4
```



Execute the playbook file to create image

njone company

- **\$ ansible-playbook -i hosts create-cicd-devops-image.yml --limit 172.17.0.2**

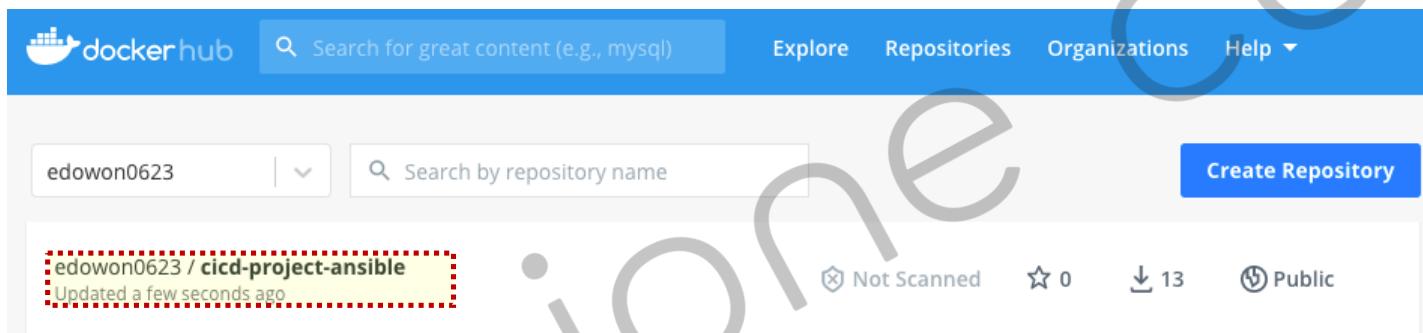
```
PLAY [all] ****
TASK [Gathering Facts] ****
ok: [172.17.0.2]

TASK [create a docker image with deployed waf file] ****
changed: [172.17.0.2]

TASK [push the image on Docker Hub] ****
changed: [172.17.0.2]

TASK [remove the docker image from the ansible server] ****
changed: [172.17.0.2]

PLAY RECAP ****
172.17.0.2 : ok=4    changed=3    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```





Execute the playbook file to create container

njone company

- **\$ ansible-playbook -i hosts create-cicd-devops-container.yml --limit 172.17.0.4**

```
[root@ansible-server ~]# ansible-playbook -i hosts create-cicd-devops-container.yml --limit 172.17.0.4

PLAY [all] ****
TASK [Gathering Facts] ****
ok: [172.17.0.4]

TASK [stop current running container] ****
...ignoring

TASK [remove stopped cotainer] ****
...ignoring

TASK [remove current docker image] ****
...ignoring

TASK [pull the newest docker image from Docker Hub] ****
changed: [172.17.0.4]

TASK [create a container using cicd-project-ansible image] ****
changed: [172.17.0.4]

PLAY RECAP ****
172.17.0.4 : ok=6    changed=5   unreachable=0   failed=0    skipped=0   rescued=0   ignored=3
```



Execute the playbook file to create container

njone company

- docker-server) \$ **docker ps -a**

[root@docker-server ~]# docker images				
REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
docker.io/edowon0623/cicd-project-ansible	latest	c94b3843675d	13 minutes ago	680 MB
docker.io/tomcat	latest	ab1f0e1bb1a1	2 days ago	680 MB
[root@docker-server ~]# docker ps -a				
CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
NAMES				PORTS
25f5997e007a	edowon0623/cicd-project-ansible	"catalina.sh run"	32 seconds ago	Up 23 seconds
my_cicd_project				0.0.0.0:8080->8080/tcp





Exercise 6# Jenkins Job 1/4

njone company

- Item name → ***My-AnsibleBook-Project***
 - Copy from: ***My-Ansible-Project***

Enter an item name

» Required field

Freestyle project
 이것은 Jenkins의 주요 기능입니다. Jenkins은 어느 빌드 시스템과 어떤 SCM(형상관리)으로 묶인 당신의 프로젝트를 빌드할 것이고, 소프트웨어 빌드보다 다른 어떤 것에 자주 사용될 수 있습니다.

Maven project
 Maven 프로젝트를 빌드합니다. Jenkins은 POM 파일의 이점을 가지고 있고 급격히 설정을 줄입니다.

Pipeline
 Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

If you want to create a new item from other existing, you can use this option:

 Copy from

OK



Exercise 6# JenKins Job 2/4

njone company

- ***Change Exec command***

- ***ansible-playbook -i hosts create-cicd-devops-image.yml --limit 172.17.0.2***
- ***ansible-playbook -i hosts create-cicd-devops-container.yml --limit 172.17.0.4***



The screenshot shows the Jenkins job configuration interface. In the 'Build' section, there is a 'Post-build script' step. Under 'Script' tab, the 'Exec command' field contains the following two commands:

```
ansible-playbook -i hosts create-cicd-devops-image.yml --limit 172.17.0.2;  
ansible-playbook -i hosts create-cicd-devops-container.yml --limit 172.17.0.4
```

The entire 'Exec command' field is highlighted with a red dashed border.

- ***Build Now***

Exercise 6# Jenkins Job 3/4

njone company

edowon0623 / cicd-project-ansible		edowon0623 / cicd-project-ansible	
Updated 29 minutes ago		Updated a minute ago	
[root@docker-server ~]# docker images		[root@docker-server ~]# docker ps -a	
REPOSITORY	TAG	IMAGE ID	CREATED
docker.io/edowon0623/cicd-project-ansible	latest	c94b3843675d	30 minutes ago
docker.io/tomcat	latest	ab1f0e1bb1a1	2 days ago
CONTAINER ID	IMAGE	COMMAND	STATUS
NAMES			
25f5997e007a	edowon0623/cicd-project-ansible	"catalina.sh run"	Up 16 minutes
[root@docker-server ~]# docker images		[root@docker-server ~]# docker ps -a	
REPOSITORY	TAG	IMAGE ID	CREATED
docker.io/edowon0623/cicd-project-ansible	latest	a932b39ee28a	About a minute ago
docker.io/tomcat	latest	ab1f0e1bb1a1	2 days ago
CONTAINER ID	IMAGE	COMMAND	STATUS
NAMES			
b7945bb60aae	edowon0623/cicd-project-ansible	"catalina.sh run"	Up 57 seconds
my_cicd_project			



Exercise 6# JenKins Job 4/4

njone company

- *modify the sources*

- *\$ git add .*
- *\$ git commit -m "changed the index page"*
- *\$ git push*





후속 강의 소개

- ~~Spring Cloud로 개발하는 마이크로서비스 애플리케이션~~
- Jenkins를 이용한 CI/CD Pipeline 구축
- Microservice Architecture 와 Patterns
- Spring Boot 와 WebFlux를 이용한 Reactive RESTful API 개발