



KodeKloud

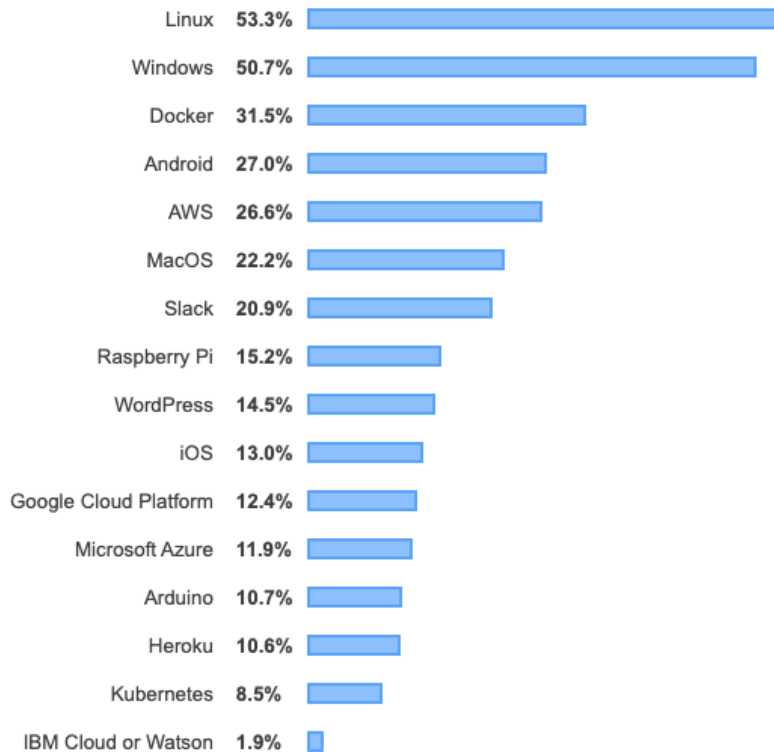
Learn more about DevOps and Cloud courses with KodeKloud: <https://kode.wiki/3N3A4kt>

Why Linux?

Platforms

All Respondents

Professional Developers



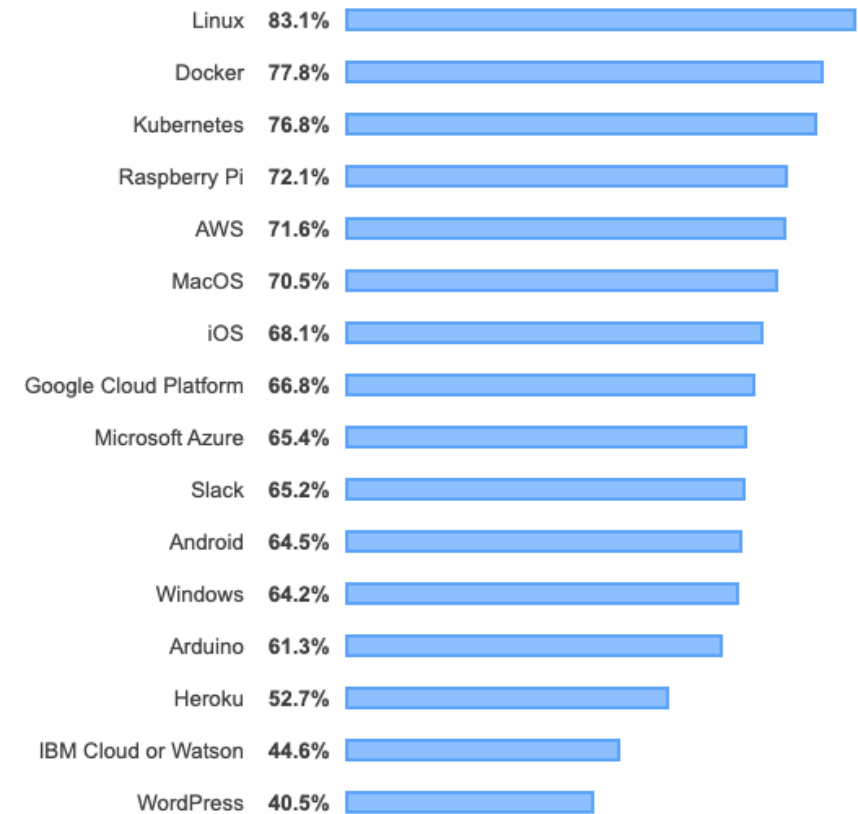
80,144 responses; select all that apply

Most Loved, Dreaded, and Wanted Platforms

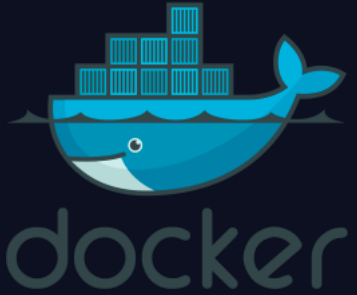
Loved

Dreaded

Wanted



Why Linux?



2013 - Docker was born
2016– Docker for Windows was born



Can Ansible run on Windows? 🔗

No, Ansible can only manage Windows hosts. Ansible cannot run on a Windows host natively, though it can run under the Windows Subsystem for Linux (WSL).

https://docs.ansible.com/ansible/latest/user_guide/windows_faq.html

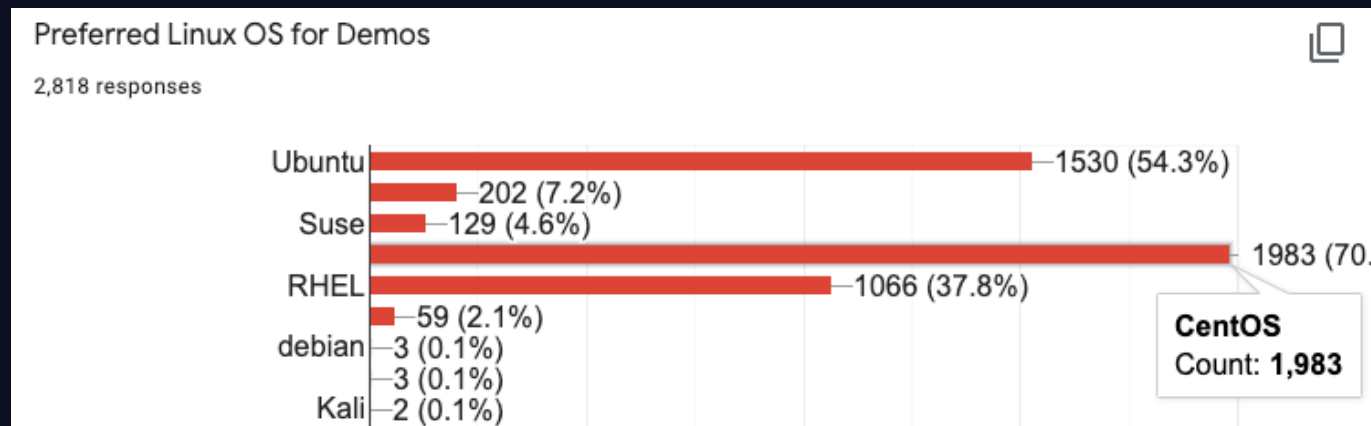


Note: The Kubernetes control plane, including the [master components](#), continues to run on Linux. There are no plans to have a Windows-only Kubernetes cluster.

[Kubernetes Documentation](#)

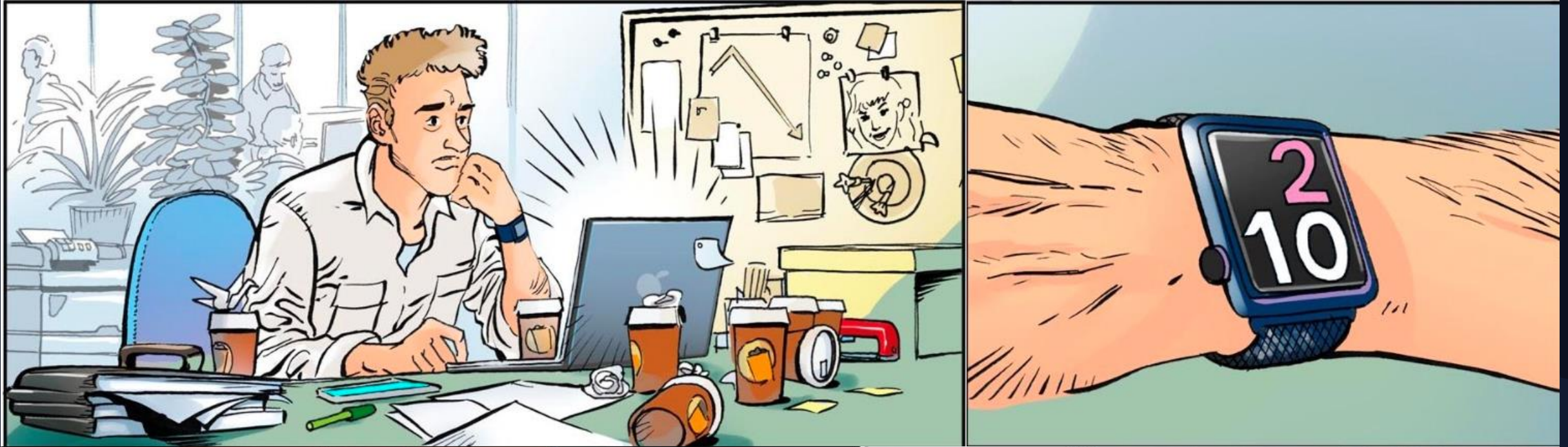
Linux Basics

- Linux CLI
- VI Editor
- Package Management
- Service Management



Linux Basics Course

www.kodecloud.com



just enough



LINUX

Shell Types

```
echo $SHELL
```

```
/bin/bash
```

Bourne Shell (sh Shell)

C Shell (csh or tcsh)

Z Shell (zsh)

Bourne again Shell (bash)

Basic Commands

```
▶ echo Hi
```

```
Hi
```

Print to screen

```
▶ ls
```

```
File.txt my_dir1 file2.conf
```

List files & folders

```
▶ cd my_dir1
```

Change directory

```
▶ pwd
```

```
/home/my_dir1
```

Present Working Directory

```
▶ mkdir new_directory
```

Make Directory

```
▶ cd new_directory; mkdir www; pwd
```

```
/home/my_dir1/new_directory
```

Multiple commands

Check out our full course on DevOps Pre-Requisites: <https://kode.wiki/43z8frg>

Commands - Directories

/tmp/asia/india/bangalore

```
▶ mkdir /tmp/asia  
▶ mkdir /tmp/asia/india  
▶ mkdir /tmp/asia/india/bangalore
```



```
▶ mkdir -p /tmp/asia/india/bangalore
```

```
▶ rm -r /tmp/my_dir1
```

```
▶ cp -r my_dir1 /tmp/my_dir1
```

Make Directory Hierarchy

Remove Directory

Copy Directory

Commands - Files

```
▶ touch new_file.txt
```

```
Hi
```

```
▶ cat > new_file.txt
```

```
This is some sample contents
```

```
CTRL+D
```

```
▶ cat new_file.txt
```

```
This is some sample contents
```

```
▶ cp new_file.txt copy_file.txt
```

```
▶ mv new_file.txt sample_file.txt
```

```
▶ rm new_file.txt
```

Create a new file (no contents)

Add contents to file

View contents of file

Copy File

Move (Rename) File

Remove (Delete) File



Labs

- NOTE: These labs should NOT have the user require to use sudo
- Have a file and folder tree structure created. Ask MCQ questions (only based on the previous slides) to users, such as
 - Identify number of files and directories in a path
 - What is a file not present in a directory
 - Navigate to some directory(don't specify the full path) and ask user to find the present working directory
- Ask user to perform operations
 - Create empty file
 - Create file with some content
 - Create directory
 - Create directory hierarchy
 - Copy file to a different place (Stage a file with some data)
 - Copy directory
 - Remove file
 - Remove directory and all contents



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Check out our full course on DevOps Pre-Requisites: <https://kode.wiki/43z8frg>

just a bit more



LINUX

User Accounts



matthew

```
▶ whoami
```

```
matthew
```

```
▶ id
```

```
uid=1001(matthew) gid=1001(matthew) groups=1001(matthew)
```

```
▶ su aparna
```

```
Password:
```

```
▶ ssh aparna@192.168.1.2
```

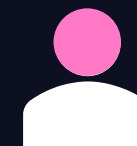
User Accounts

```
▶ ls /root
```

```
ls: cannot open directory /root: Permission denied
```

```
▶ sudo ls /root
```

```
anaconda-ks.cfg initial-setup-ks.cfg
```



matthew



root

SUDO
/etc/sudoers



Download Files

```
▶ curl http://www.some-site.com/some-file.txt -O  
some-file.txt
```

```
▶ wget http://www.some-site.com/some-file.txt -O some-file.txt  
some-file.txt
```


Check OS Version

```
▶ ls /etc/*release*
```

```
/etc/centos-release    /etc/os-release  /etc/system-release  
/etc/centos-release-upstream /etc/redhat-release /etc/system-release-cpe
```

```
▶ cat /etc/*release*
```

```
CentOS Linux release 7.7.1908 (Core)  
Derived from Red Hat Enterprise Linux 7.7 (Source)  
NAME="CentOS Linux"  
VERSION="7 (Core)"  
ID="centos"  
ID_LIKE="rhel fedora"  
VERSION_ID="7"  
PRETTY_NAME="CentOS Linux 7 (Core)"  
ANSI_COLOR="0;31"  
CPE_NAME="cpe:/o:centos:centos:7"  
HOME_URL="https://www.centos.org/"  
BUG_REPORT_URL="https://bugs.centos.org/"
```

- 
- 
- Wget
 - Curl
 - Cat /etc/*release*



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Check out our full course on DevOps Pre-Requisites: <https://kode.wiki/43z8frg>



Package Managers

RPM (Red Hat Package Manager)

```
▶ rpm -i telnet.rpm
```

```
▶ rpm -e telnet.rpm
```

```
▶ rpm -q telnet.rpm
```

Install Package

Uninstall Package

Query Package

??
?
?
?



RPM

YUM

```
▶ yum install ansible
```

Install Package

/etc/yum.repos.d

YUM

RPM

ansible

PyYAML

python

sshpass

YUM Repos

Extra Packages for Enterprise Linux (EPEL)

Welcome to the home of the EPEL Special Interest Group.

Quickstart

- [epel-release-latest-6](#)
- [epel-release-latest-7](#)
- [epel-release-latest-8](#)

You may retrieve signed binary configuration files from one the above two links (varying by the major release number) and automatically installed by root thus:

- RHEL/CentOS 6:

```
# yum install https://dl.fedoraproject.org/pub/epel/epel-release-latest-6.noarch.rpm
```

- RHEL/CentOS 7:

```
# yum install https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rpm
```

script

YUM

```
▶ yum list ansible
```

Installed Packages

ansible.noarch	2.9.6-1.el7	@epel
----------------	-------------	-------

```
▶ yum remove ansible
```

```
▶ yum --showduplicates list ansible
```

Available Packages

ansible.noarch	2.4.2.0-2.el7	extras
ansible.noarch	2.9.6-1.el7	epel

```
▶ yum install ansible-2.4.2.0
```




Labs

- View installed packages
- Identify versions of installed packages
- Install specific packages using yum
- Install specific packages using yum with specific versions
- Remove packages



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Services

Services

▶ `service httpd start`

Or

▶ `systemctl start httpd`

▶ `systemctl stop httpd`

▶ `systemctl status httpd`

▶ `systemctl enable httpd`

▶ `systemctl disable httpd`

Start HTTPD service

Start HTTPD service

Stop HTTPD service

Check HTTPD service Status

Configure HTTPD to start at
startup

Configure HTTPD to not start at
startup

Services

```
▶ /usr/bin/python3 /opt/code/my_app.py
```

```
* Serving Flask app "my_app" (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: off
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

```
▶ curl http://localhost:5000
```

```
Hello, World!
```

```
▶ systemctl start my_app
```

```
▶ systemctl stop my_app
```

`/etc/systemd/system`

Services

/etc/systemd/system

```
▶ /usr/bin/python3 -m http.server --directory /opt/code/ my_app.py
```

```
* Serving Flask app "my_app" (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: off
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

```
▶ curl http://localhost:5000
```

```
Hello, World!
```

```
my_app.service
```

```
[Service]
ExecStart=
```

```
▶ systemctl daemon-reload
```

```
▶ systemctl start my_app
```

Services

/etc/systemd/system

▶ `systemctl status my_app`

```
● my_app.service
  Loaded: loaded (/etc/systemd/system/my_app.service; static; vendor preset: disabled)
  Active: active (running) since Tue 2020-04-07 09:01:39 UTC; 2s ago
  Main PID: 5038 (python3)
  CGroup: /system.slice/my_app.service
          └─5038 /usr/bin/python3 /tmp/app/my_app.py
```

```
Apr 07 09:01:39 systemd[1]: Started my_app.service.
Apr 07 09:01:39 python3[5038]: * Serving Flask app "my_app" (lazy loading)
Apr 07 09:01:39 python3[5038]: * Environment: production
Apr 07 09:01:39 python3[5038]: WARNING: This is a development server. Do not use it in a produ...ent.
Apr 07 09:01:39 python3[5038]: Use a production WSGI server instead.
Apr 07 09:01:39 python3[5038]: * Debug mode: off
Apr 07 09:01:39 python3[5038]: * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
Hint: Some lines were ellipsized, use -l to show in full.
```

my_app.service

[Service]

ExecStart= /usr/bin/python3 /opt/code/my_app.py

▶ `systemctl daemon-reload`

▶ `systemctl start my_app`

▶ `systemctl stop my_app`

▶ `curl http://localhost:5000`

Hello, World!

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Services

/etc/systemd/system

```
▶ systemctl status my_app
```

```
● my_app.service
  Loaded: loaded (/etc/systemd/system/my_app.service; static; vendor preset: disabled)
  Active: active (running) since Tue 2020-04-07 09:01:39 UTC; 2s ago
  Main PID: 5038 (python3)
  CGroup: /system.slice/my_app.service
          └─5038 /usr/bin/python3 /tmp/app/my_app.py

Apr 07 09:01:39 systemd[1]: Started my_app.service.
Apr 07 09:01:39 python3[5038]: * Serving Flask app "my_app" (lazy loading)
Apr 07 09:01:39 python3[5038]: * Environment: production
Apr 07 09:01:39 python3[5038]: WARNING: This is a development server. Do not use it in a produ...ent.
Apr 07 09:01:39 python3[5038]: Use a production WSGI server instead.
Apr 07 09:01:39 python3[5038]: * Debug mode: off
Apr 07 09:01:39 python3[5038]: * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
Hint: Some lines were ellipsized, use -l to show in full.
```

```
▶ curl http://localhost:5000
```

Hello, World!

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```
my_app.service
```

```
[Service]
```

```
ExecStart=/usr/bin/python3 /opt/code/my_app.py
```

```
[Install]
```

```
WantedBy=multi-user.target
```

```
▶ systemctl daemon-reload
```

```
▶ systemctl start my_app
```

```
▶ systemctl stop my_app
```

```
Check ▶ systemctl enable my_app
```

[wiki/43z8frg](#)

Services

/etc/systemd/system

```
▶ systemctl status my_app
```

```
● my_app.service
  Loaded: loaded (/etc/systemd/system/my_app.service; static; vendor preset: disabled)
  Active: active (running) since Tue 2020-04-07 09:01:39 UTC; 2s ago
  Main PID: 5038 (python3)
  CGroup: /system.slice/my_app.service
          └─5038 /usr/bin/python3 /tmp/app/my_app.py

Apr 07 09:01:39 systemd[1]: Started my_app.service.
Apr 07 09:01:39 python3[5038]: * Serving Flask app "my_app" (lazy loading)
Apr 07 09:01:39 python3[5038]: * Environment: production
Apr 07 09:01:39 python3[5038]: WARNING: This is a development server. Do not use it in a produ...ent.
Apr 07 09:01:39 python3[5038]: Use a production WSGI server instead.
Apr 07 09:01:39 python3[5038]: * Debug mode: off
Apr 07 09:01:39 python3[5038]: * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
Hint: Some lines were ellipsized, use -l to show in full.
```

```
▶ curl http://localhost:5000
```

Hello, World!

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```
my_app.service
```

```
[Unit]
```

```
Description=My python web application
```

```
[Service]
```

```
ExecStart= /usr/bin/python3 /opt/code/my_app.py
```

```
ExecStartPre=/opt/code/configure_db.sh
```

```
ExecStartPost=/opt/code/email_status.sh
```

```
[Install]
```

```
WantedBy=multi-user.target
```

```
▶ systemctl daemon-reload
```

```
▶ systemctl start my_app
```

Check out our full course on DevOps Dev Requirements <https://kodekloud.com/wiki/43z8frg>

Services

/etc/systemd/system

```
▶ systemctl status my_app
```

```
● my_app.service
  Loaded: loaded (/etc/systemd/system/my_app.service; static; vendor preset: disabled)
  Active: active (running) since Tue 2020-04-07 09:01:39 UTC; 2s ago
  Main PID: 5038 (python3)
  CGroup: /system.slice/my_app.service
          └─5038 /usr/bin/python3 /tmp/app/my_app.py

Apr 07 09:01:39 systemd[1]: Started my_app.service.
Apr 07 09:01:39 python3[5038]: * Serving Flask app "my_app" (lazy loading)
Apr 07 09:01:39 python3[5038]: * Environment: production
Apr 07 09:01:39 python3[5038]: WARNING: This is a development server. Do not use it in a produ...ent.
Apr 07 09:01:39 python3[5038]: Use a production WSGI server instead.
Apr 07 09:01:39 python3[5038]: * Debug mode: off
Apr 07 09:01:39 python3[5038]: * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
Hint: Some lines were ellipsized, use -l to show in full.
```

```
▶ curl http://localhost:5000
```

Hello, World!

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```
my_app.service
```

```
[Unit]
```

```
Description=My python web application
```

```
[Service]
```

```
ExecStart= /usr/bin/python3 /opt/code/my_app.py
```

```
ExecStartPre=/opt/code/configure_db.sh
```

```
ExecStartPost=/opt/code/email_status.sh
```

```
Restart=always
```

```
[Install]
```

```
WantedBy=multi-user.target
```

```
▶ systemctl daemon-reload
```

```
▶ systemctl start my_app
```

Check out our full course on DevOps Dev Requirements <https://kodacloud.com/wiki/43z8frg>

Service Unit File - Docker

```
/lib/systemd/system/docker.service
```

```
[Unit]
```

```
Description=Docker Application Container Engine
```

```
Documentation=https://docs.docker.com
```

```
Bindsto=containerd.service
```

```
After=network-online.target firewalld.service containerd.service
```

```
Wants=network-online.target
```

```
Requires=docker.socket
```

```
[Service]
```

```
Type=notify
```

```
ExecStart=/usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock
```

```
ExecReload=/bin/kill -s HUP $MAINPID
```

```
Restart=always
```

```
StartLimitBurst=3
```

```
StartLimitInterval=60s
```

```
LimitNOFILE=infinity
```

```
LimitNPROC=infinity
```

```
LimitCORE=infinity
```

```
[Install]
```

```
WantedBy=multi-user.target
```



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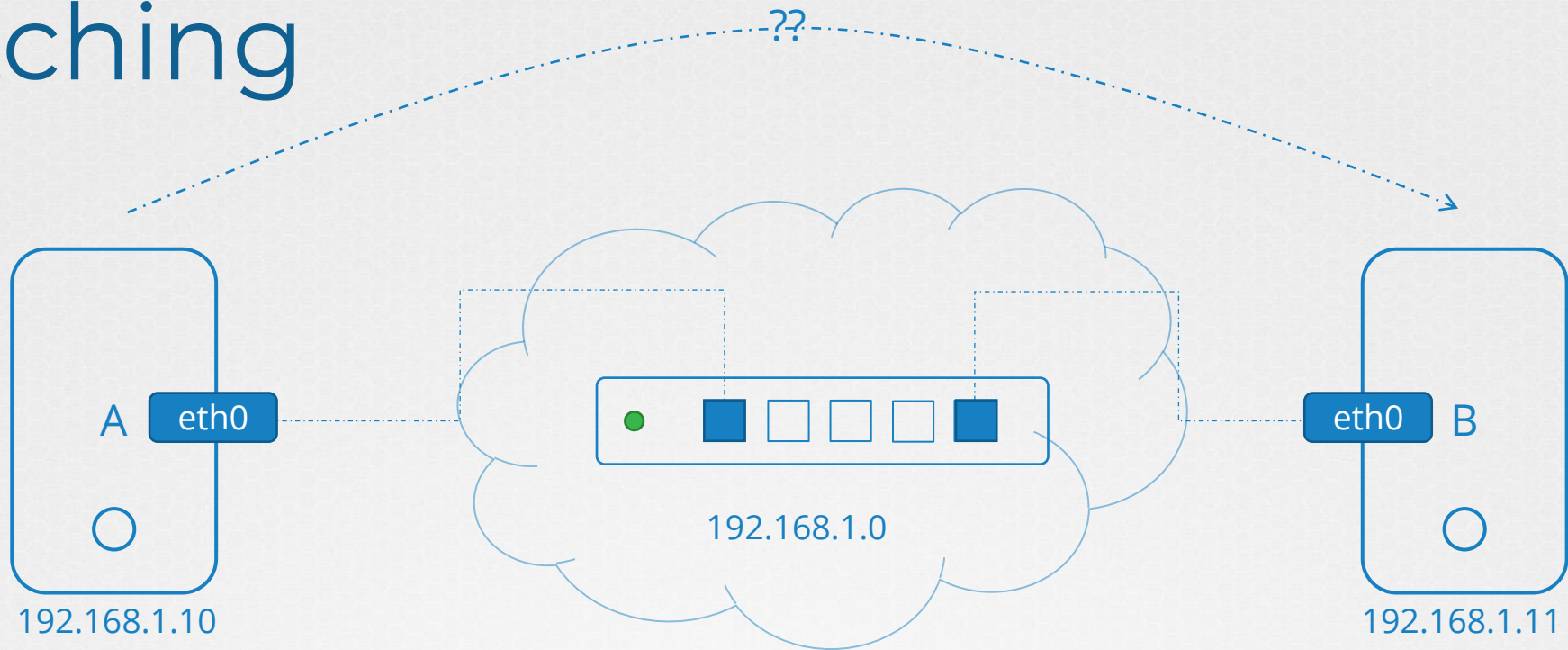
Networking Basics



Networking Pre-Requisite

- Switching
- Routing
- Default Gateway
- DNS Configuration on Linux

Switching



```
▶ ip link
```

```
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group default qlen 1000
```

```
▶ ip addr add 192.168.1.10/24 dev eth0
```

```
▶ ip link
```

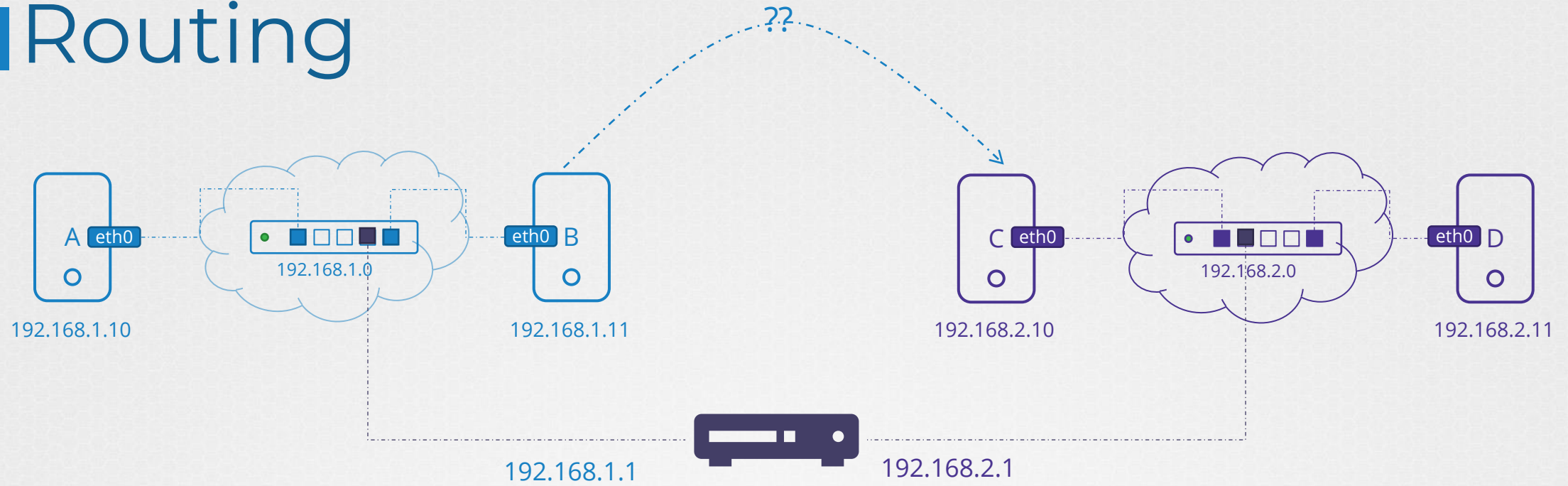
```
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group default qlen 1000
```

```
▶ ip addr add 192.168.1.11/24 dev eth0
```

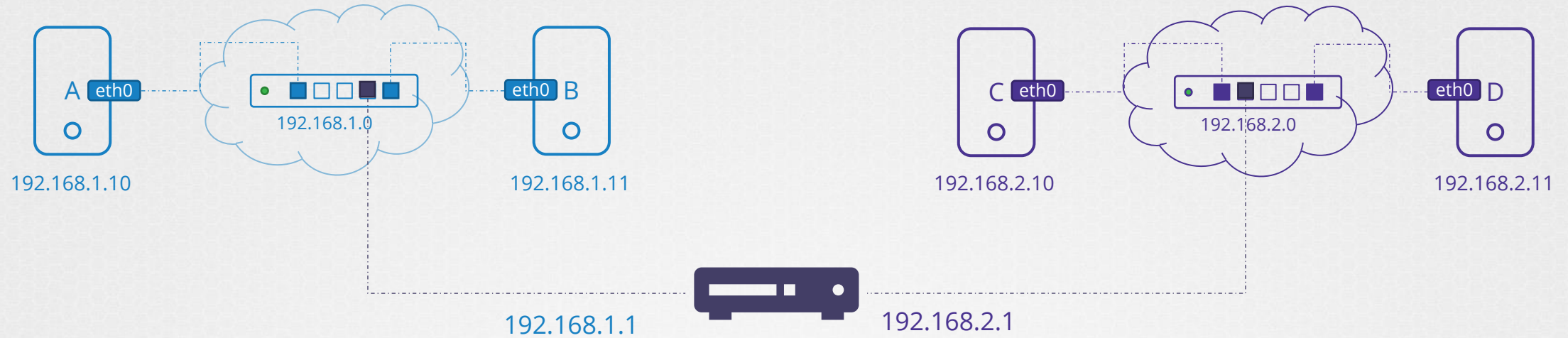
```
▶ ping 192.168.1.11
```

```
Reply from 192.168.1.11: bytes=32 time=4ms TTL=117  
Reply from 192.168.1.11: bytes=32 time=4ms TTL=117
```

Routing



Gateway



► route

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
-------------	---------	---------	-------	--------	-----	-----	-------

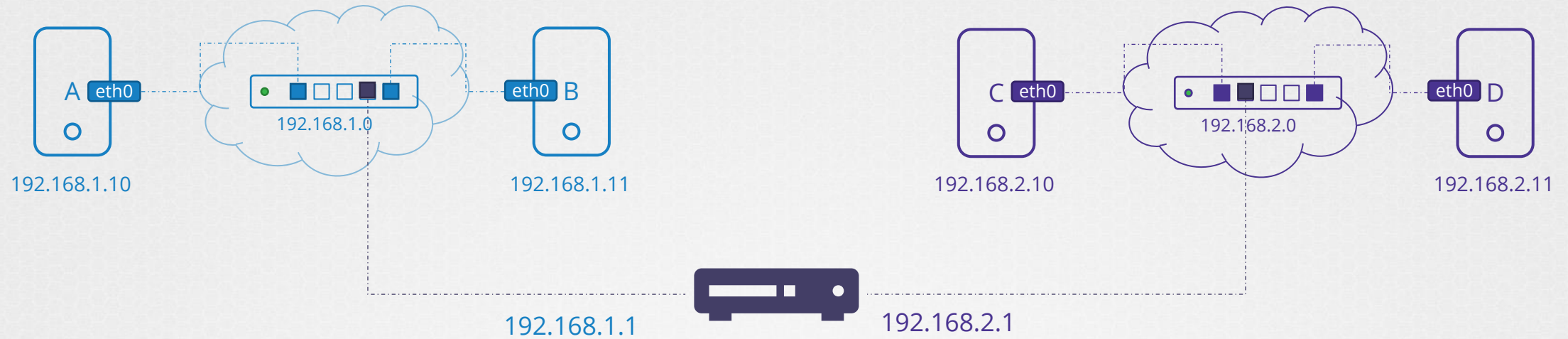
► ip route add 192.168.2.0/24 via 192.168.1.1

► route

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
192.168.2.0	192.168.1.1	255.255.255.0	UG	0	0	0	eth0

Gateway



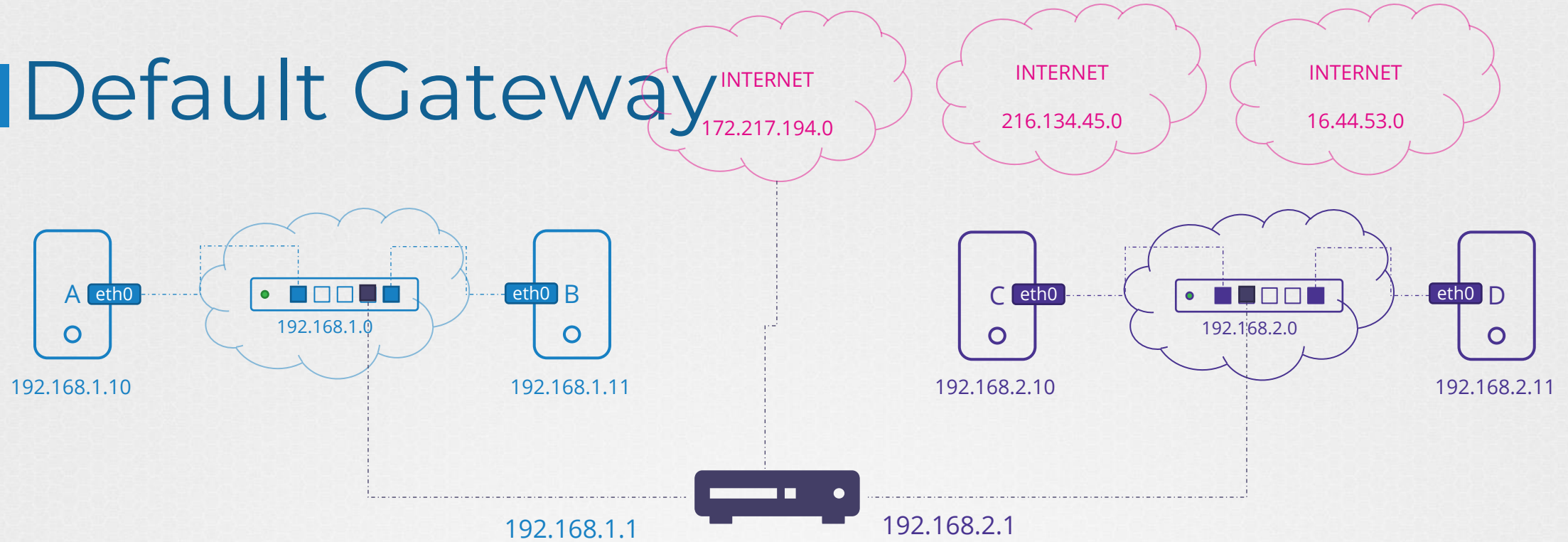
```
▶ ip route add 192.168.1.0/24 via 192.168.2.1
```

```
▶ route
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
192.168.1.0	192.168.2.1	255.255.255.0	UG	0	0	0	eth0

Default Gateway



```
▶ ip route add 192.168.1.0/24 via 192.168.2.1
```

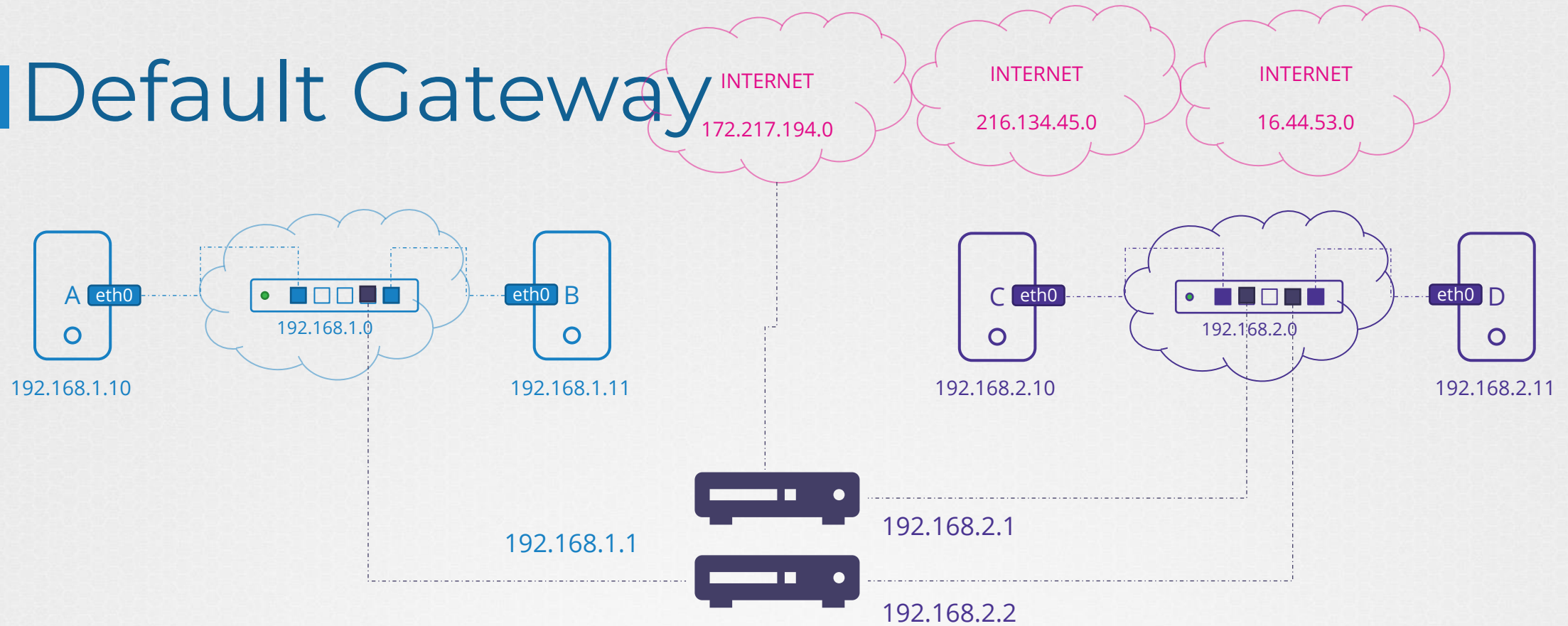
```
▶ ip route add default via 192.168.2.1
```

```
▶ route
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
192.168.1.0	192.168.2.1	255.255.255.0	UG	0	0	0	eth0
0.0.0.0	192.168.2.1	255.255.255.0	UG	0	0	0	eth0
192.168.2.0	0.0.0.0	255.255.255.0	UG	0	0	0	eth0

Default Gateway

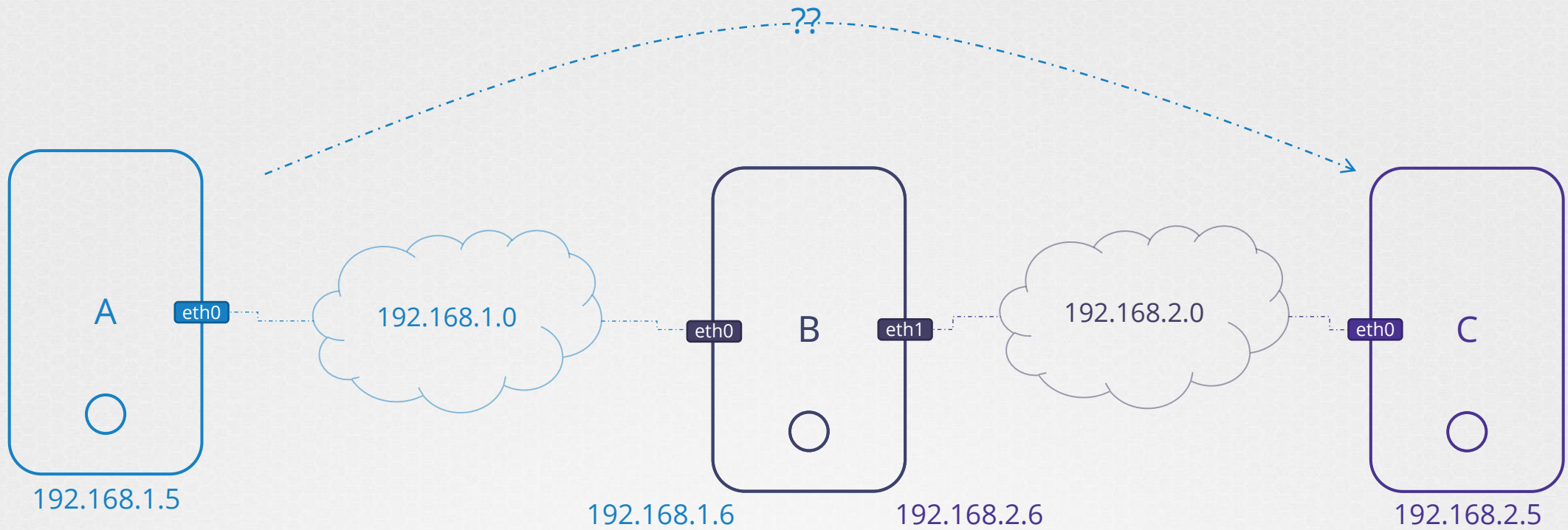


```
ip route add 192.168.1.0/24 via 192.168.2.2
```

```
route
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
default	192.168.2.1	255.255.255.0	UG	0	0	0	eth0
192.168.1.0	192.168.2.2	255.255.255.0	UG	0	0	0	eth0



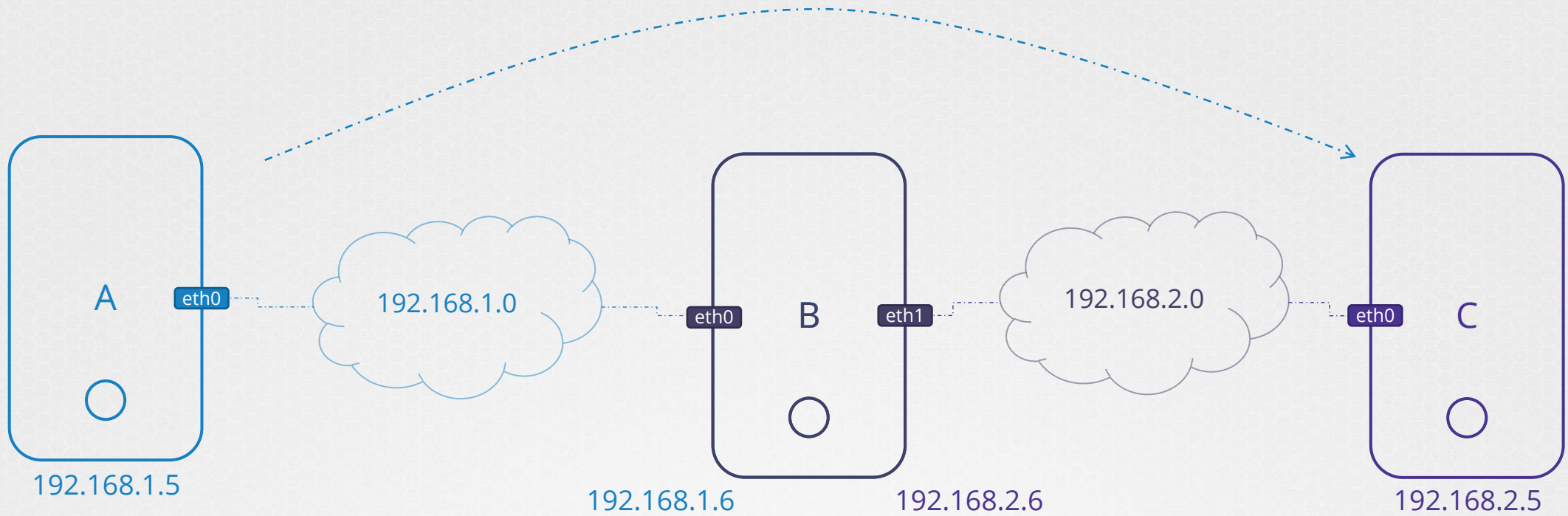
```
▶ ping 192.168.2.5
```

```
Connect: Network is unreachable
```

```
▶ ip route add 192.168.2.0/24 via 192.168.1.6
```

```
▶ ip route add 192.168.1.0/24 via 192.168.2.6
```

```
▶ ping 192.168.2.5
```



```
▶ cat /proc/sys/net/ipv4/ip_forward
```

```
0
```

```
▶ echo 1 > /proc/sys/net/ipv4/ip_forward
```

```
1
```

```
/etc/sysctl.conf
```

```
...  
net.ipv4.ip_forward = 1  
...
```

```
▶ ping 192.168.2.5
```

```
Reply from 192.168.2.5: bytes=32 time=4ms TTL=117  
Reply from 192.168.2.5: bytes=32 time=4ms TTL=117  
Reply from 192.168.2.5: bytes=32 time=4ms TTL=117  
Reply from 192.168.2.5: bytes=32 time=4ms TTL=117
```

Take Aways

```
▶ ip link
```

```
▶ ip addr
```

```
▶ ip addr add 192.168.1.10/24 dev eth0
```

```
▶ ip route
```

```
▶ route
```

```
▶ ip route add 192.168.1.0/24 via 192.168.2.1
```

```
▶ cat /proc/sys/net/ipv4/ip_forward
```

```
1
```




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just enough



Introduction

About Java

- Free
- Open-source
- Huge Community



Version	Date
13	2019
12	2019
11	2018
10	2018
9	2017
8	2014
7	2011
6	2006
5	2004

Install Java

```
▶ wget https://download.java.net....
```

```
openjdk-13.0.2_linux-x64_bin.tar.gz
```

```
▶ tar -xvf openjdk-13.0.2_linux-x64_bin.tar.gz
```

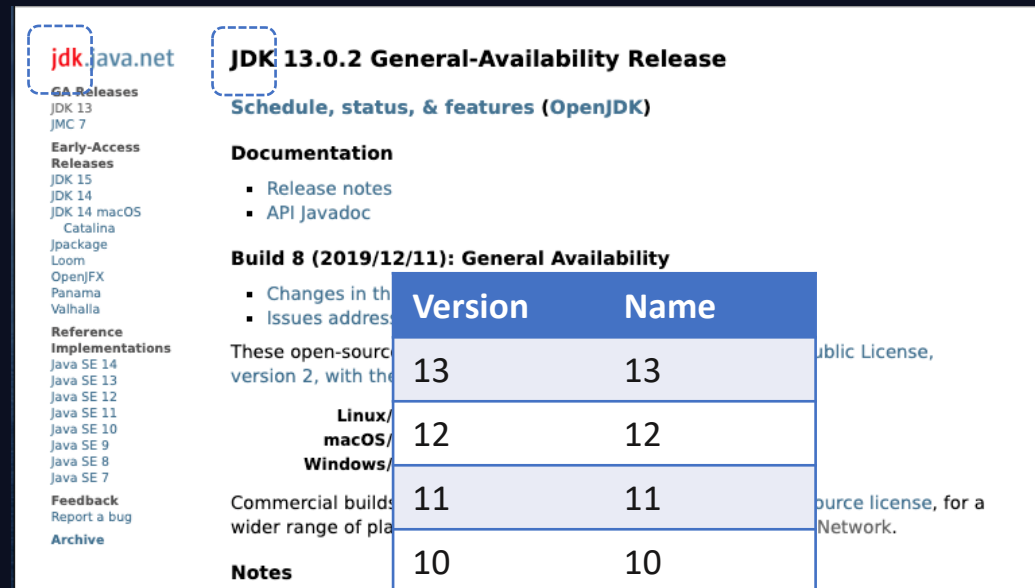
```
/opt/jdk-13/bin/java -version
```

```
▶ jdk-13.0.2/bin/java -version
```

```
openjdk version "13.0.2" 2020-01-14
OpenJDK Runtime Environment (build 13.0.2+8)
OpenJDK 64-Bit Server VM (build 13.0.2+8, mixed mode,
sharing)
```

```
▶ java -version
```

```
openjdk version "1.8.0_242"
OpenJDK Runtime Environment (build 1.8.0_242-b08)
OpenJDK 64-Bit Server VM (build 25.242-b08, mixed mode)
```



JDK 13.0.2 General-Availability Release

Schedule, status, & features (OpenJDK)

Documentation

- Release notes
- API Javadoc

Build 8 (2019/12/11): General Availability

- Changes in this release
- Issues addressed

These open-source builds are available under the OpenJDK Community License, for a wider range of platforms.

Version	Name
13	13
12	12
11	11
10	10
9	9
8	1.8
7	1.7
6	1.6
5	1.5

Notes



Java Development Kit (JDK)

Develop

 jdb

 javadoc

Build

 javac

 jar

Run

 JRE

(Java Runtime Environment)

 java

```
ls jdk-13.0.2/bin
```


```
jaotc  javadoc  jdeprscan  jinfo  jps    jstatd  rmiregistry
jar    javap    jdeps    jjs    jrunscript  keytool  serialver
jarsigner  jcmd    jfr      jlink  jshell    pack200  unpack200
java   jconsole  jhsdb   jmap   jstack    rmic
javac  jdb      jimage. jmod   jstat    rmid
```

Before v9

Java Development Kit (JDK)

Develop

 jdb


 javadoc

Build

 javac

 jar

Run

 java



JRE

(Java Runtime Environment)

Download JDK

.tar.gz - 188 MB

Checksum

Download JRE

.tar.gz - 38 MB

Checksum


After v9



Java Development Kit (JDK)

Develop

 jdb

 javadoc

Build

 javac

 jar

Run



JRE

(Java Runtime Environment)

 java



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Build

Compile

1. Develop Source Code

MyClass.java

```
public class MyClass {  
    public static void main(String[] args) {  
        System.out.println("Hello World");  
    }  
}
```

2. Compile

```
▶ javac MyClass.java
```

MyClass.class

3. Run

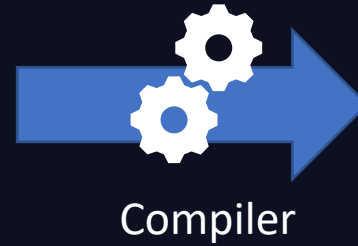
```
▶ java MyClass
```

Hello World

Compile

MyClass.java

```
public class MyClass {  
    public static void main(String[] args) {  
        System.out.println("Hello World");  
    }  
}
```



Machine Code

```
01101000 10111100 10000001  
01100100 01011100 00010111  
00001010 00001110 11111010  
10110001 01101000 10111100  
10000001 01100100 01011100  
00010111 00001010 00001110  
11111010 10110001 10110001
```

Human Readable
Source Code

Machine Readable
Machine Code

Java Virtual Machine

MyClass.java

```
public class MyClass {  
    public static void main(String[] args) {  
        System.out.println("Hello World");  
    }  
}
```



Compiler

MyClass.class

```
0: iconst_2  
1: istore_1  
2: iload_1  
3: sipush 1000  
6: if_icmpge 44  
9: iconst_2  
10: istore_2  
11: iload_2  
12: iload_1  
13: if_icmpge 31
```



JVM

Machine Code

```
01101000 10111100 10000001  
01100100 01011100 00010111  
00001010 00001110 11111010  
10110001 01101000 10111100  
10000001 01100100 01011100  
00010111 00001010 00001110  
11111010 10110001 10110001
```

Human Readable
Source Code

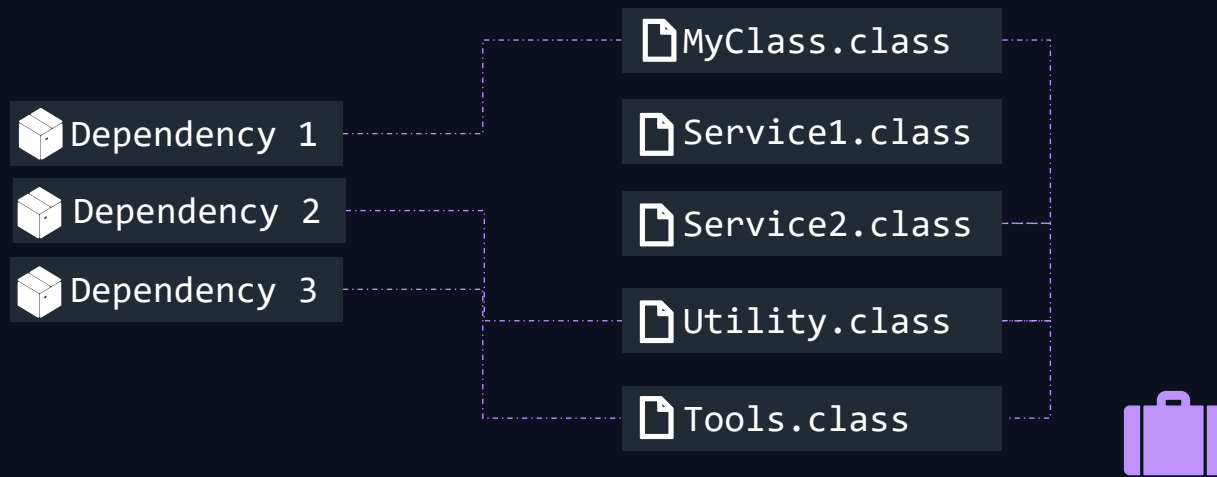
Intermediary
Byte Code

Machine Readable
Machine Code

```
javac MyClass.java  
MyClass.class
```

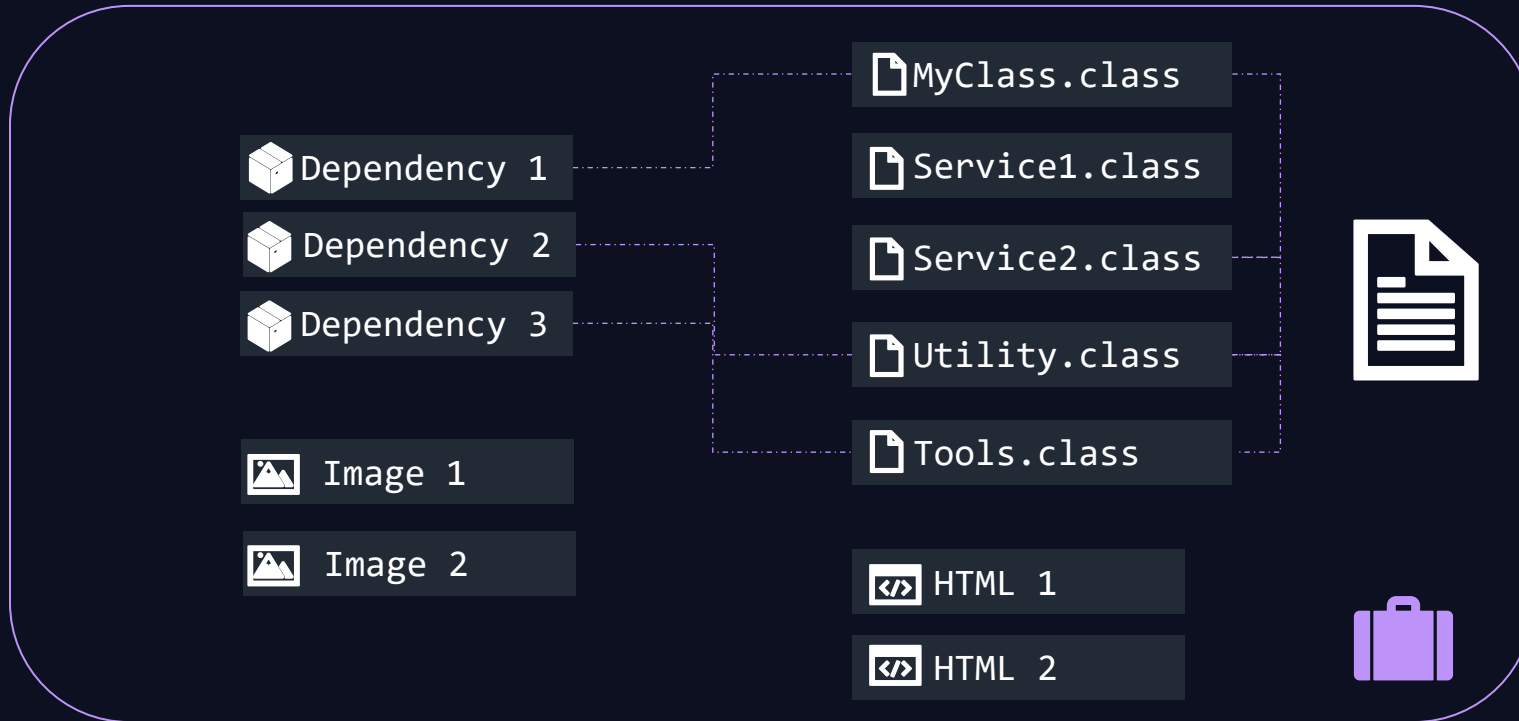
```
java MyClass  
Hello World
```

Package



Java Archive
(JAR)

Package



META-INF/MANIFEST.MF

```
Manifest-Version: 1.0
Created-By: 1.8.0_242 (Private Build)
Main-Class: MyClass
```

Java Archive (JAR) Web Archive (WAR)

```
▶ jar cf MyApp.jar MyClass.class Service1.class Service2.class ...
MyApp.jar
```

```
▶ java -jar MyApp.jar
Hello World
```

Document

```
▶ javadoc -d doc MyClass.java
```

[PACKAGE](#) **CLASS** [TREE](#) [DEPRECATED](#) [INDEX](#) [HELP](#)

[PREV CLASS](#) [NEXT CLASS](#) [FRAMES](#) [NO FRAMES](#)

[SUMMARY: NESTED](#) | [FIELD](#) | [CONSTR](#) | [METHOD](#) [DETAIL: FIELD](#) | [CONSTR](#) | [METHOD](#)

Class MyClass

java.lang.Object
MyClass

```
public class MyClass  
extends java.lang.Object
```

Prints Hello World Message

Constructor Summary

Constructors

[Constructor and Description](#)

MyClass ()

Build Process



Develop



Compile



Package



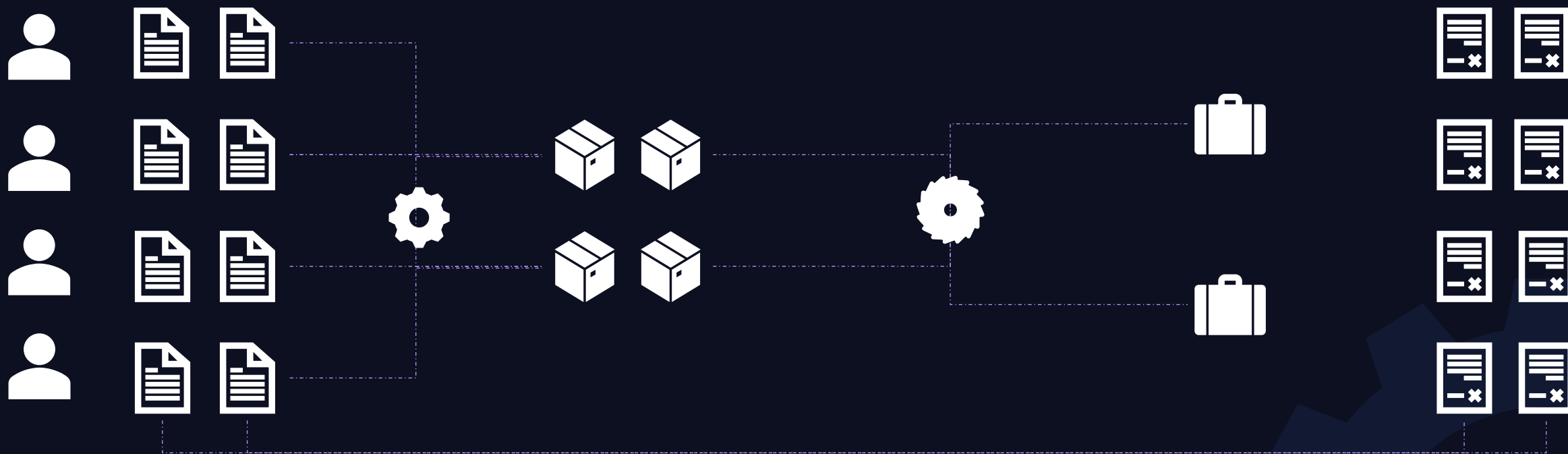
Document

```
▶ javac MyClass.java
```

```
▶ jar cf MyClass.jar ..
```

```
▶ javadoc MyClass.java
```

Build Process





Build Tools

- Maven
- Gradle
- ANT

Build Steps

1.Compile

2.Package

3.Document

ANT

▶ ant compile jar

BUILD SUCCESSFUL

Total time: 2 seconds

build.xml

```
<?xml version="1.0"?>
<project name="Ant" default="main" basedir=".">
  <!-- Compiles the java code (including the usage of library for JUnit -->
  <target name="compile">
    <javac srcdir="/app/src" destdir="/app/build">
    </javac>
  </target>
  <!-- Creates Javadoc -->
  <target name="docs" depends="compile">
    <javadoc packagenames="src" sourcepath="/app/src" destdir="/app/docs">
      <!-- Define which files / directory should get included, we include all -->
      <fileset dir="/app/src">
        <include name="*" />
      </fileset>
    </javadoc>
  </target>
  <!--Creates the deployable jar file -->
  <target name="jar" depends="compile">
    <jar basedir="/app/build" destfile="/app/dist/MyClass.jar" >
      <manifest>
        <attribute name="Main-Class" value="MyClass" />
      </manifest>
    </jar>
  </target>
  <target name="main" depends="compile, jar, docs">
    <description>Main target</description>
  </target>
</project>
```

▶ javac MyClass.java

▶ javadoc MyClass.java

▶ jar cf MyClass.jar ..

Maven

```
Branch: 2.9.0 shopizer / pom.xml

Dima removed duplicate dependencies

4 contributors

677 lines (592 sloc) 20.7 KB

1 <?xml version="1.0" encoding="UTF-8"?>
2 <project xmlns="http://maven.apache.org/POM/4.0.0"
3   xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.ap
4   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
5   <modelVersion>4.0.0</modelVersion>
6
7   <groupId>com.shopizer</groupId>
8   <artifactId>shopizer</artifactId>
9   <version>2.9.0</version>
10  <packaging>pom</packaging>
11
12  <name>shopizer</name>
13  <url>http://maven.apache.org</url>
14
15  <licenses>
16    <license>
17      <name>Apache License, Version 2.0</name>
18      <url>https://www.apache.org/licenses/LICENSE-2.0.txt</url>
19    </license>
20  </licenses>
21
```

Get the code:

Clone the repository:

```
$ git clone git://github.com/shopizer-ecomme
```

If this is your first time using Github, review <http://help.g>

You can also download the zip file containing the code

To build the application:

From the command line with Maven installed:

```
$ cd shopizer
$ mvnw clean install
```

Gradle

Branch: master ▾ [docker-java-sample](#) / build.gradle

 arun-gupta upgrading the version to 3.0.6

2 contributors 

45 lines (35 sloc) | 961 Bytes

```
1  buildscript {
2      repositories {
3          jcenter()
4      }
5
6      dependencies {
7          classpath 'com.bmuschko:gradle-docker-plugin:3.0.6'
8      }
9  }
10
11  apply plugin: 'java'
12  apply plugin: 'application'
13  apply plugin: 'com.bmuschko.docker-java-application'
14
15  import com.bmuschko.gradle.docker.tasks.container.*
16  import com.bmuschko.gradle.docker.tasks.image.*
17
```

Gradle

Classical

1. Build app: `./gradlew build`
2. Run app: `./gradlew run`



Summary

- Java
- Java Runtime Environment
- Java Development Kit
- Compiling a Java application
- Packaging a given application to JARs
- What are Build Tools?



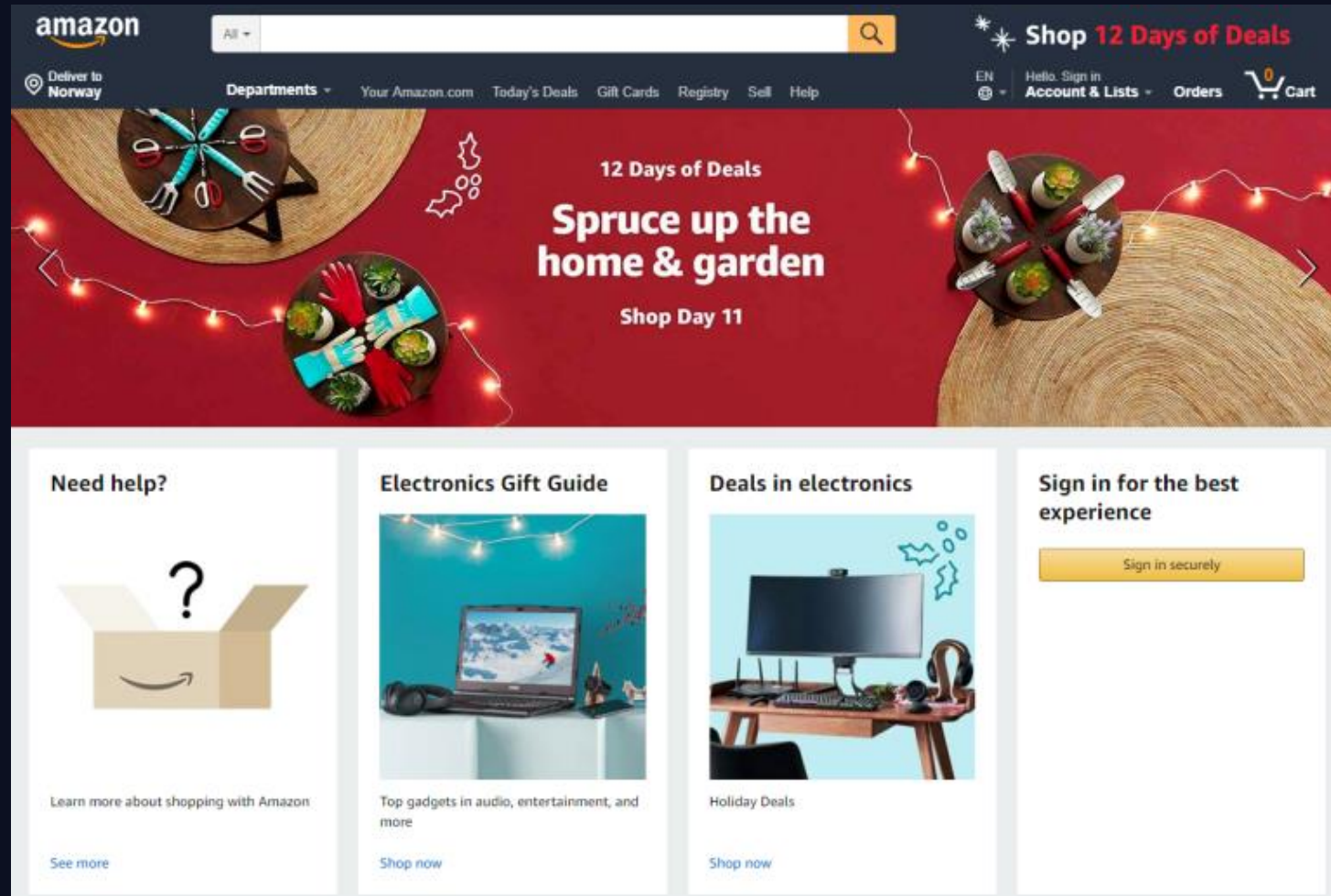
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JavaScript



jQuery



NodeJS

- Free
- Open source
- Cross Platform Compatible



[Node.js 13.x](#)

[Node.js 12.x](#)

[Node.js 11.x](#)

[Node.js 10.x](#)

[Node.js 9.x](#)

[Node.js 8.x](#)

[Node.js 7.x](#)

[Node.js 6.x](#)

[Node.js 5.x](#)

[Node.js 4.x](#)

[Node.js 0.12.x](#)

[Node.js 0.10.x](#)

Install NodeJS

NodeSource Node.js Binary Distributions



ubuntu



CentOS



```
▶ curl -sL https://rpm.nodesource.com/setup_13.x | bash -
```

```
▶ yum install nodejs
```

NodeJS Commands

```
▶ node -v
```

```
V13.10.1
```

```
▶ node add.js
```

```
Addition : 15
```

```
add.js
```

```
// Returns addition of two numbers  
let add = function (a, b) {  
    return a+b;  
};  
  
const a = 10, b = 5;  
  
console.log("Addition : "+ add(a,b));
```



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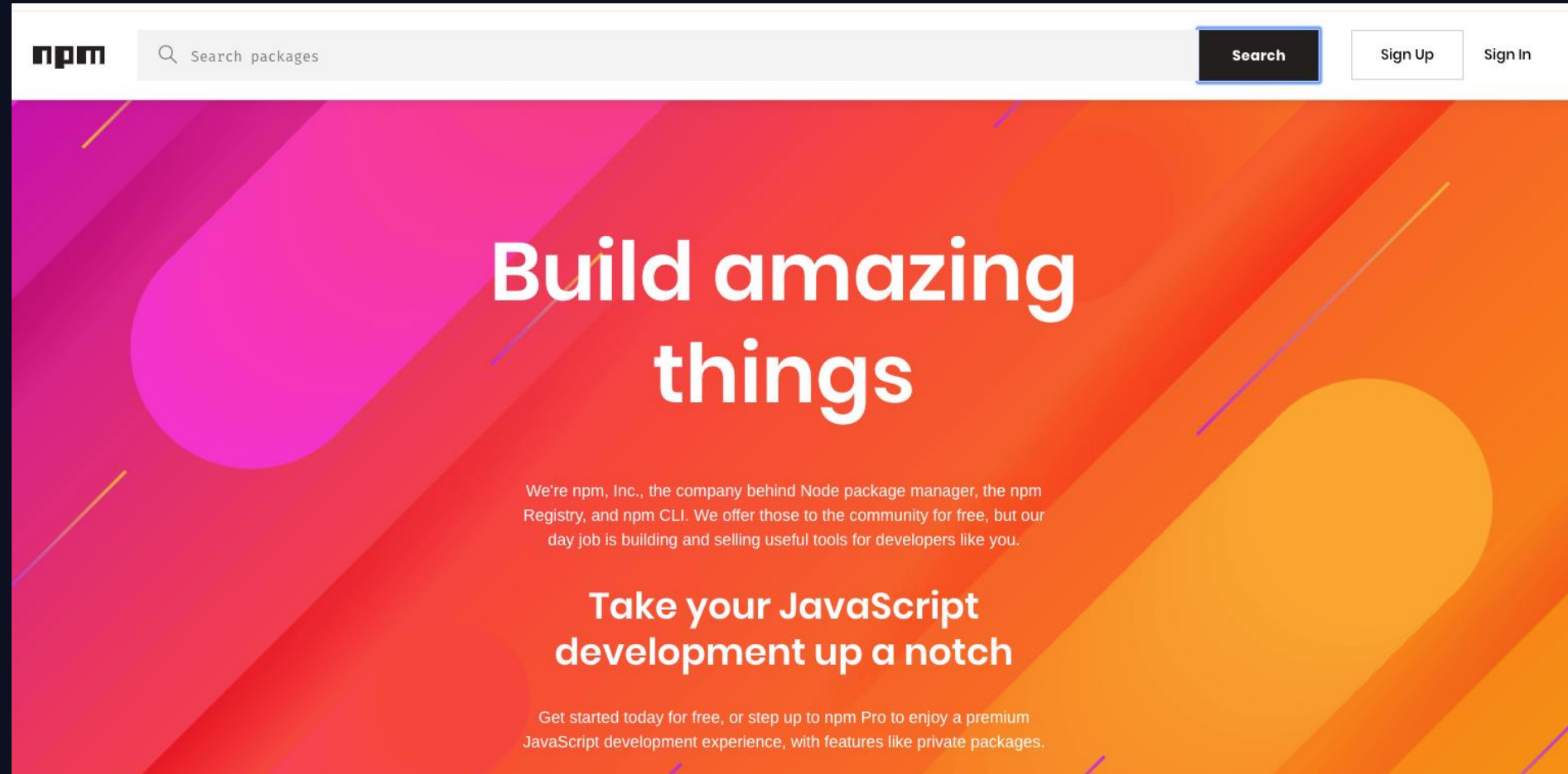
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Node Package Manager (NPM)

- Files
- Web Servers
- Databases
- Security
- Many More



NPM Commands

```
npm -v
```

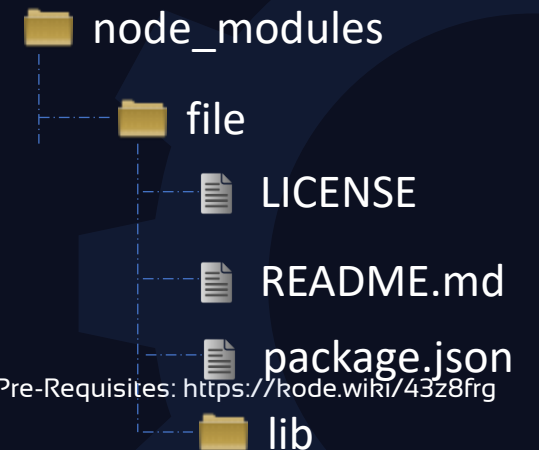
```
6.13.7
```

```
npm search file
```

NAME	DESCRIPTION	AUTHOR	DATE
file	Higher level path...	=aconbere	2014-02-21
File	HTML5 FileAPI...	=coolaj86 =narf	2014-10-24
dotenv	Loads environment...	=~jcblw...	2019-10-16
fs-extra	fs-extra contains...	=jprichardson...	2019-06-28
file-loader	A file loader...	=d3viantOne...	2020-02-19

```
npm install file
```

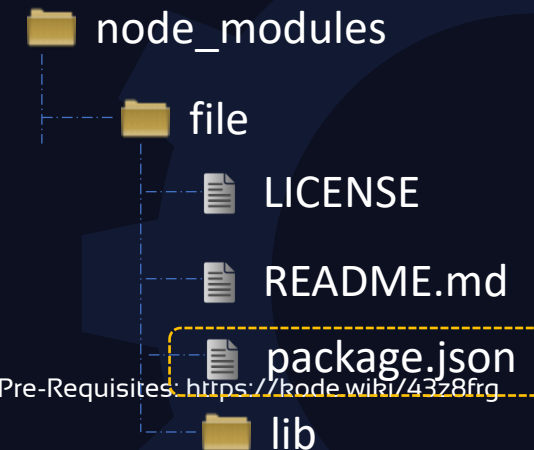
```
+ file@0.2.2
added 1 package from 1 contributor and audited 1 package in 1.072s
found 0 vulnerabilities
```



NPM Commands

package.json

```
{
  "author": {
    "name": "Anders Conbere",
    "email": "aconbere@gmail.com"
  },
  "bundleDependencies": false,
  "devDependencies": {
    "mocha": "1.9.x"
  },
  "directories": {
    "lib": "lib"
  },
  "homepage": "https://github.com/aconbere/node-file-utils#readme",
  "license": "MIT",
  "main": "./lib/file",
  "name": "file",
  "repository": {
    "type": "git",
    "url": "git+ssh://git@github.com/aconbere/node-file-utils.git"
  },
  "tags": [
    "file",
    "path",
    "fs",
    "walk"
  ],
  "version": "0.2.2"
}
```



ps Pre-Requisites: <https://node.wiki/43z8frg>

NPM Commands

```
▶ npm install file
```

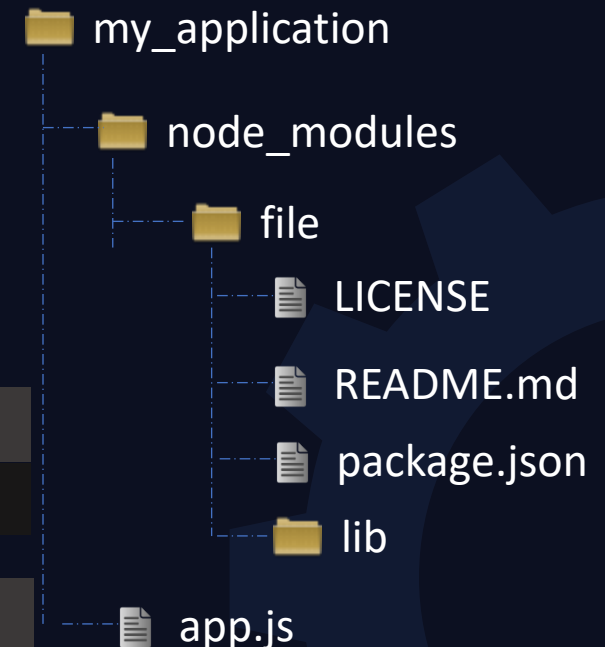
```
+ file@0.2.2  
added 1 package from 1 contributor and audited 1 package in 1.072s  
found 0 vulnerabilities
```

```
app.js
```

```
var file = require("file");  
  
file.mkdirs("/tmp/dir1")
```

```
▶ node -e "console.log(module.paths)"  
['/app/node_modules', '/node_modules']
```

```
▶ npm install file -g
```



Common Modules

Built-In Modules

fs	To handle filesystem
http	To host an HTTP server
os	To work with the Operating System
events	To handle events
tls	To implement TLS and SSL
url	To Parse URL Strings

External Modules

express	Fast, unopinionated, minimalist web framework
react	To create user interfaces
debug	To debug applications
async	To work with asynchronous JS
lodash	To work with arrays, objects, strings etc

```
ls /usr/lib/node_modules/npm/node_modules/
```

```
ls /usr/lib/node_modules/
```

Application Dependencies

package.json

```
{
  "name": "example-contentful-theExampleApp-js",
  "version": "0.0.0",
  "private": true,
  "dependencies": {
    "body-parser": "^1.18.2",
    "contentful": "^6.0.0",
    "cookie-parser": "~1.4.3",
    "dotenv": "^5.0.0",
    "execa": "^0.9.0",
    "express": "^4.16.2",
    "helmet": "^3.11.0",
    "lodash": "^4.17.5",
    "marked": "^0.3.16",
    "morgan": "^1.9.1",
    "pug": "~2.0.0-beta6"
  }
}
```



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Python

- Free
- Open source
- Cross Platform Compatible



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Looking for Python 2.7? See below for specific releases





Versions

- Python2 – (2000 – 2010)
- Python3 – (2008 to Present)

Install

```
▶ yum install python2
```

```
▶ python2
```

```
Python 2.7.16 (default, Nov 17 2019, 00:07:27)
[GCC 8.3.1 20190507 (Red Hat 8.3.1-4)] on linux2
Type "help", "copyright", "credits" or "license"
for more information.
>>> exit()
```

```
▶ python2 -V
```

```
Python 2.7.16
```

```
▶ yum install python36
```

```
▶ python3
```

```
Python 3.6.8 (default, Nov 21 2019, 19:31:34)
[GCC 8.3.1 20190507 (Red Hat 8.3.1-4)] on linux
Type "help", "copyright", "credits" or "license"
for more information.
>>> exit()
```

```
▶ python3 -V
```

```
Python 3.6.8
```

Python Commands

```
▶ python2 main.py
```

```
Hello World
```

```
main.py
```

```
def print_message():  
    print("Hello World")  
  
if __name__ == '__main__':  
    print_message()
```



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Python Package Manager (pip)

```
▶ python2 -V
```

```
Python 2.7.16
```

```
▶ python3 -V
```

```
Python 3.6.8
```

```
▶ pip2 -V
```

```
pip 9.0.3 from /usr/lib/python2.7/site-packages  
(python 2.7)
```

```
▶ pip3 -V
```

```
pip 9.0.3 from /usr/lib/python3.6/site-packages  
(python 3.6)
```

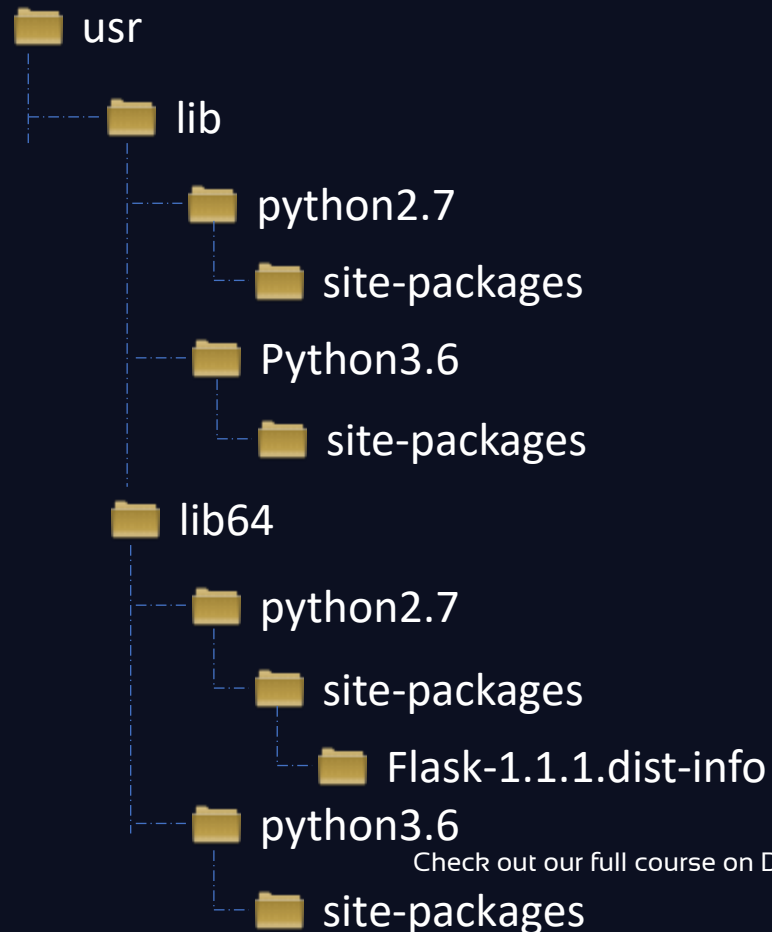
```
▶ pip -V
```

```
pip 9.0.3 from /usr/lib/python2.7/site-packages (python 2.7)
```

```
▶ pip install flask
```

Python Package Manager (pip)

```
▶ pip install flask
```



Python Package Manager (pip)

```
▶ pip install flask
```

```
▶ pip show flask
```

```
Name: Flask
Version: 1.1.1
Summary: A simple framework for building complex
web applications.
Home-page: https://palletsprojects.com/p/flask/
Author: Armin Ronacher
Author-email: armin.ronacher@active-4.com
License: BSD-3-Clause
Location: /usr/lib64/python2.7/site-packages
Requires: Werkzeug, click, Jinja2, itsdangerous
```

```
▶ python2 -c "import sys; print(sys.path)"
```

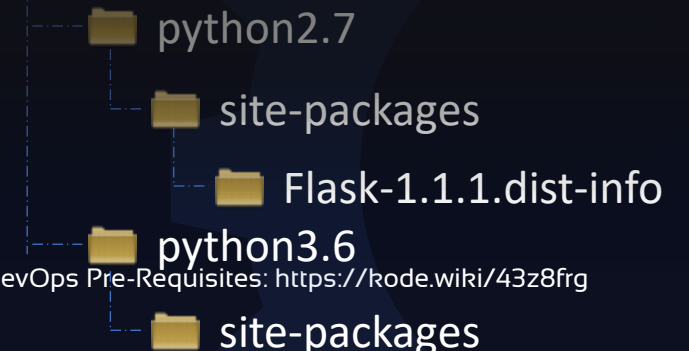
```
['/usr/lib/python2.7.zip', '/usr/lib64/python2.7',
'/usr/lib64/python2.7/plat-linux2',
'/usr/lib64/python2.7/lib-tk',
'/usr/lib64/python2.7/lib-old',
'/usr/lib64/python2.7/lib-dynload',
'/usr/lib64/python2.7/site-packages',
'/usr/lib/python2.7/site-packages']
```

```
main.py
```

```
from flask import Flask, request

app = Flask(__name__)

@app.route('/')
def hello():
    return 'Hello, World'
```



Check out our full course on DevOps Pre-Requisites: <https://kode.wiki/43z8frg>

Requirements

```
▶ pip install flask
```

```
▶ pip install jinja2
```

```
▶ pip install markupsafe
```

```
▶ pip install Werkzeug
```

```
▶ pip install requests
```

```
▶ pip install gunicorn
```

```
▶ pip install flask jinja2 markupsafe
```

```
requirements.txt
```

```
Flask==0.10.1
```

```
Jinja2==2.7.3
```

```
MarkupSafe==0.23
```

```
Werkzeug==0.9.6
```

```
requests==2.3.0
```

```
gunicorn==18.0
```

```
▶ pip install -r requirements.txt
```


Upgrade/Uninstall Package

▶ `pip install flask --upgrade`

```
Installing collected packages: click, flask
  Attempting uninstall: flask
    Found existing installation: Flask 0.10.1
    Uninstalling Flask-0.10.1:
      Successfully uninstalled Flask-0.10.1
  Successfully installed click-7.1.1 flask-1.1.1
```

▶ `pip uninstall flask`

```
Found existing installation: Flask 1.1.1
Uninstalling Flask-1.1.1:
  Would remove:
    /home/vagrant/.local/bin/flask
    /home/vagrant/.local/lib/python3.5/site-
packages/Flask-1.1.1.dist-info/*
    /home/vagrant/.local/lib/python3.5/site-
packages/flask/*
  Proceed (y/n)? y
  Successfully uninstalled Flask-1.1.1
```

Other Package Managers

- `easy_install`

```
▶ easy_install install app
```



- `wheels`

```
▶ pip install app.whl
```





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