DevOps with Gitlab, Jenkins and Kubernetes

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สมหมาย กรังพานิช

ตำแหน่งปัจจุบัน

- กรรมการสมาคมอุตสาหกรรมซอฟต์แวร์ไทย ATSI
- กรรมการผู้จัดการบริษัท พี เอ็น พี โซลูชั่น จำกัด

ด้านความเชี่ยวชาญ

- ผู้เชี่ยวชาญด้านการออกแบบและพัฒนา Software ด้วย Framework ดังนี้
  i. Java, Springboot, Go, Node.js
  ii. Full Stack, Angular, Vue, React, Svelte
  iii. Apollo GraphQL
  iv. Docker, Docker Swarm, K8s
  v. Flutter, Dart
  vi. MongoDB, Oracle, MySQL, SQL Server, DB2, PostgreSQL
- ผู้เชี่ยวชาญด้านการออกแบบและประยุกต์ใช้ DevOps ในการพัฒนา Software
- ผู้เชี่ยวชาญด้านการออกแบบและประยุกต์ใช้ Cloud Native ในการพัฒนา Software
- ผู้เชี่ยวชาญด้านการออกแบบและพัฒนาระบบงานในรูปแบบ Microservice

Introduction to

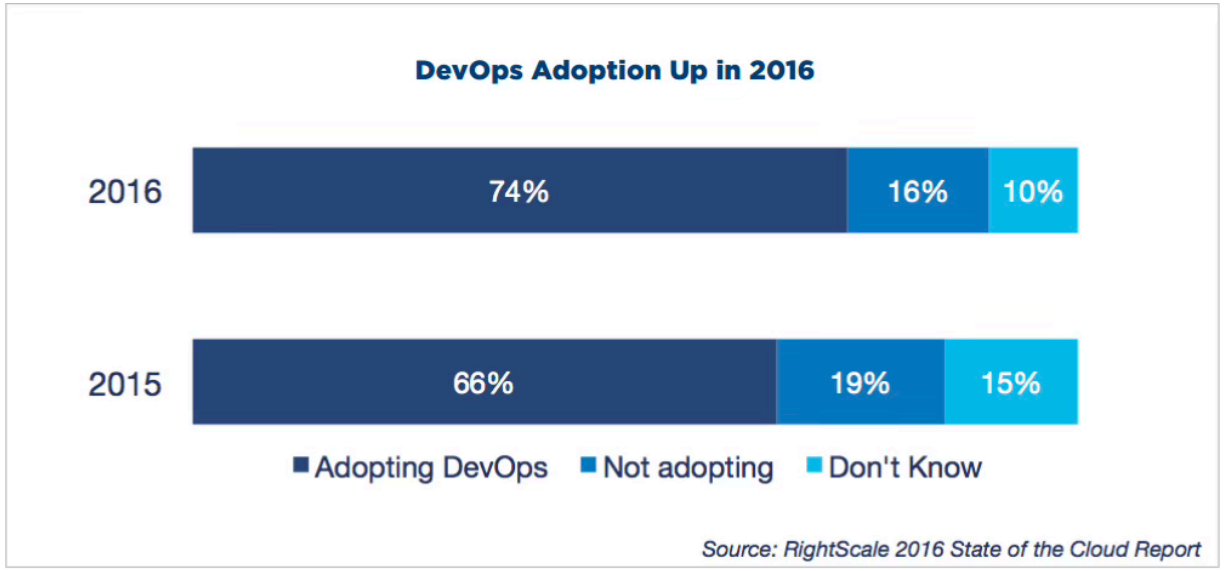
DEVOPS

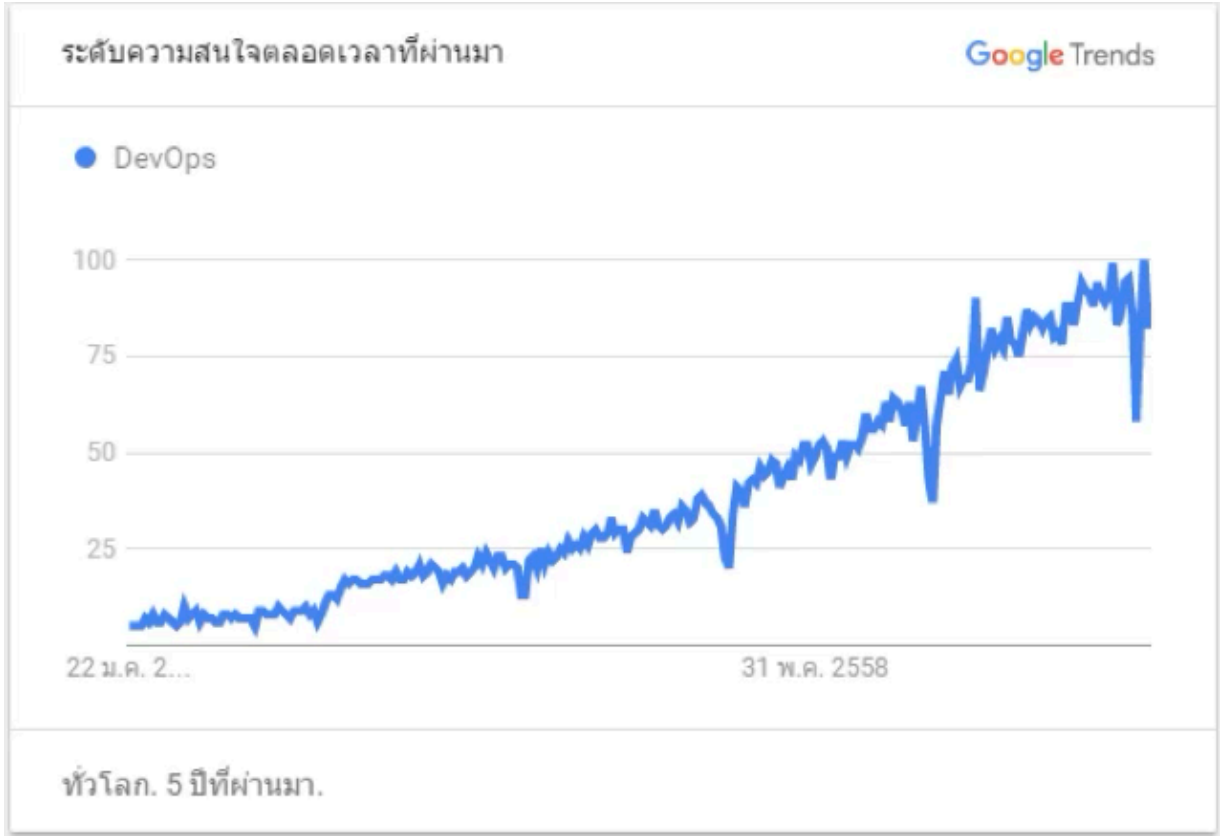
Definitions and History

ในปี ค.ศ. 2009 ที่ Velocity Conference John Allspaw และ Paul Hammond ได้นำเสนอเรื่อง 10 Deploys per Day: Dev and Ops Cooperation at Flickr ซึ่งกล่าวถึงวิธีการสร้างเป้าหมายร่วมกันระหว่างแผนก Development และแผนก Operation และวิธีการที่ทำให้การ Deployment เป็นเรื่องทั่วไปที่ทำกันในชีวิตประจำวัน การนำเสนอเรื่องนี้เป็นแรงบันดาลใจให้ Patrick Debois จัดงาน DevOpsDay ขึ้นมาในปีเดียวกัน คำว่า DevOps ที่ย่อมาจาก Development และ Operations จึงถูกสร้างขึ้นตั้งแต่นั้นเป็นต้นมา

ปัจจุบัน DevOps เป็นแนวคิดที่มีประสิทธิภาพและแพร่หลายออกไปทั่วโลก จากผลสำรวจองค์กรกว่า 1,000 แห่งจากรายงาน RightScale 2016 State of the Cloud Report: DevOps Trends พบว่าในปี 2016 มีองค์กรนำ DevOps ไปปรับใช้แล้วถึง 74% ซึ่งเพิ่มขึ้นจากปีที่แล้วถึง 8% และจำนวนการ Search คำว่า DevOps ใน google ก็ยังเพิ่มขึ้นเรื่อยๆ ด้วย

ระดับความน่าสนใจ



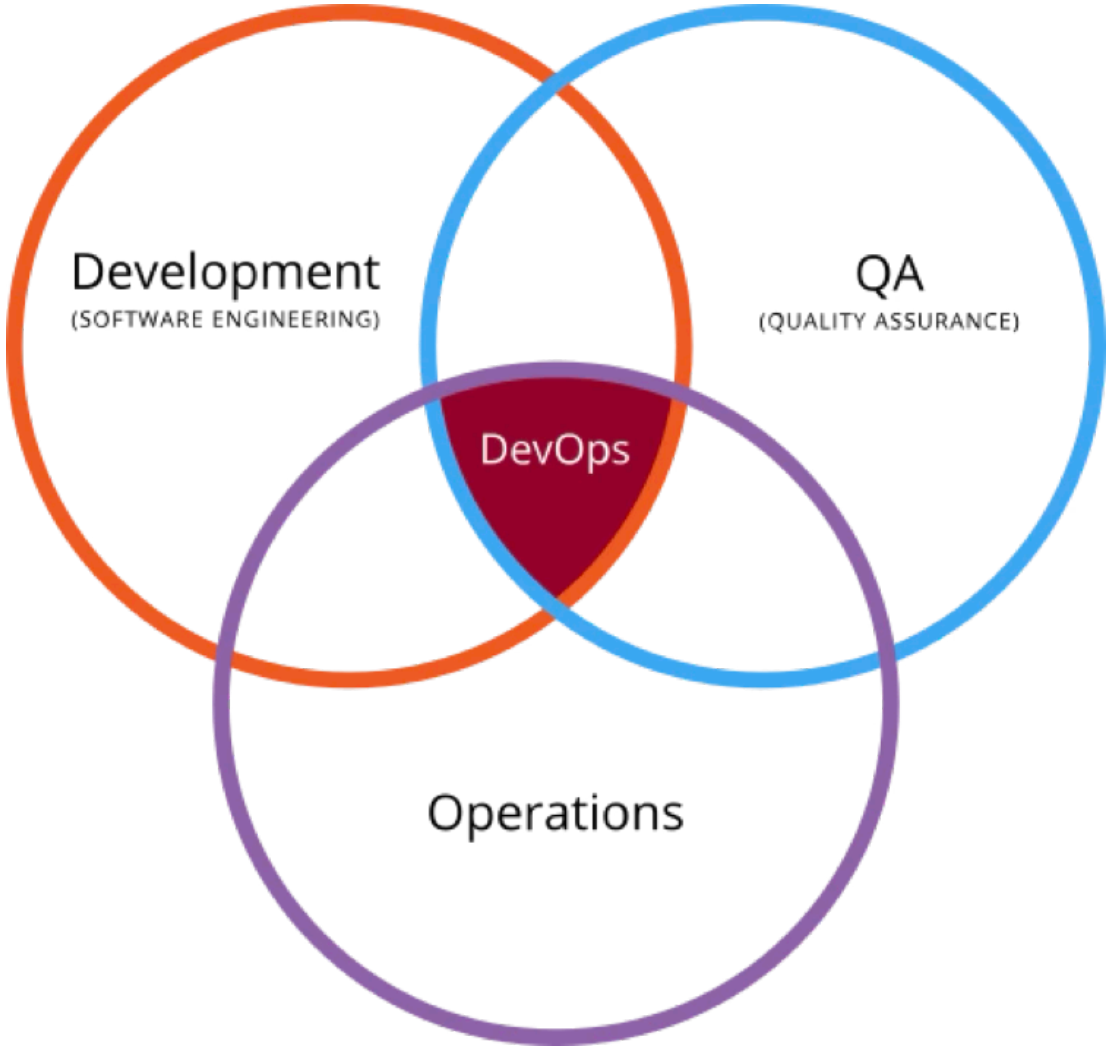


Cultural change

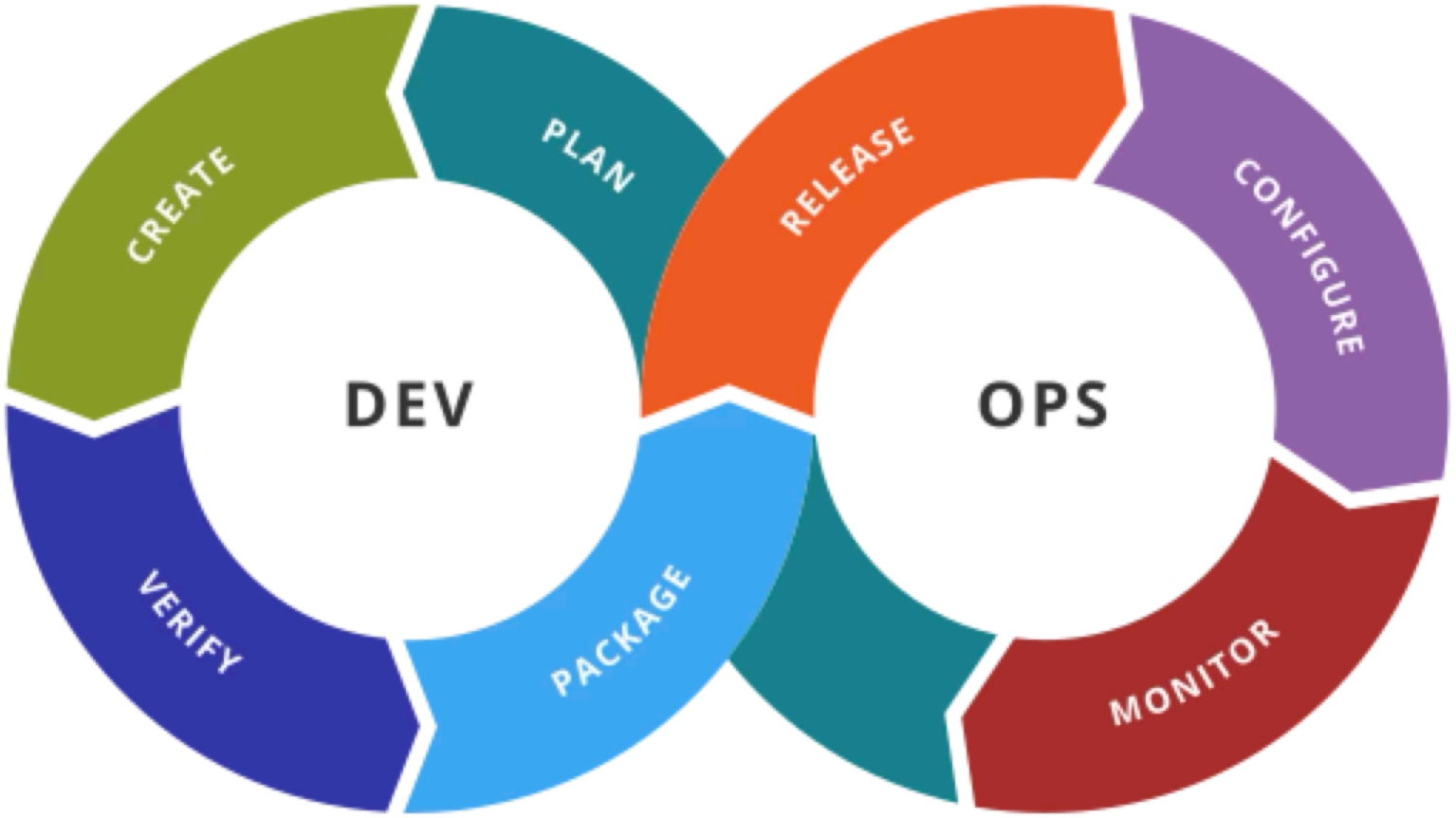
DevOps is more than just a tool or a process change.

- Operations — seeks organizational stability
- Developers — seek change
- Testers — seek risk reduction

Overview


Development
(SOFTWARE ENGINEERING)
QA
(QUALITY ASSURANCE)
DevOps
Operations

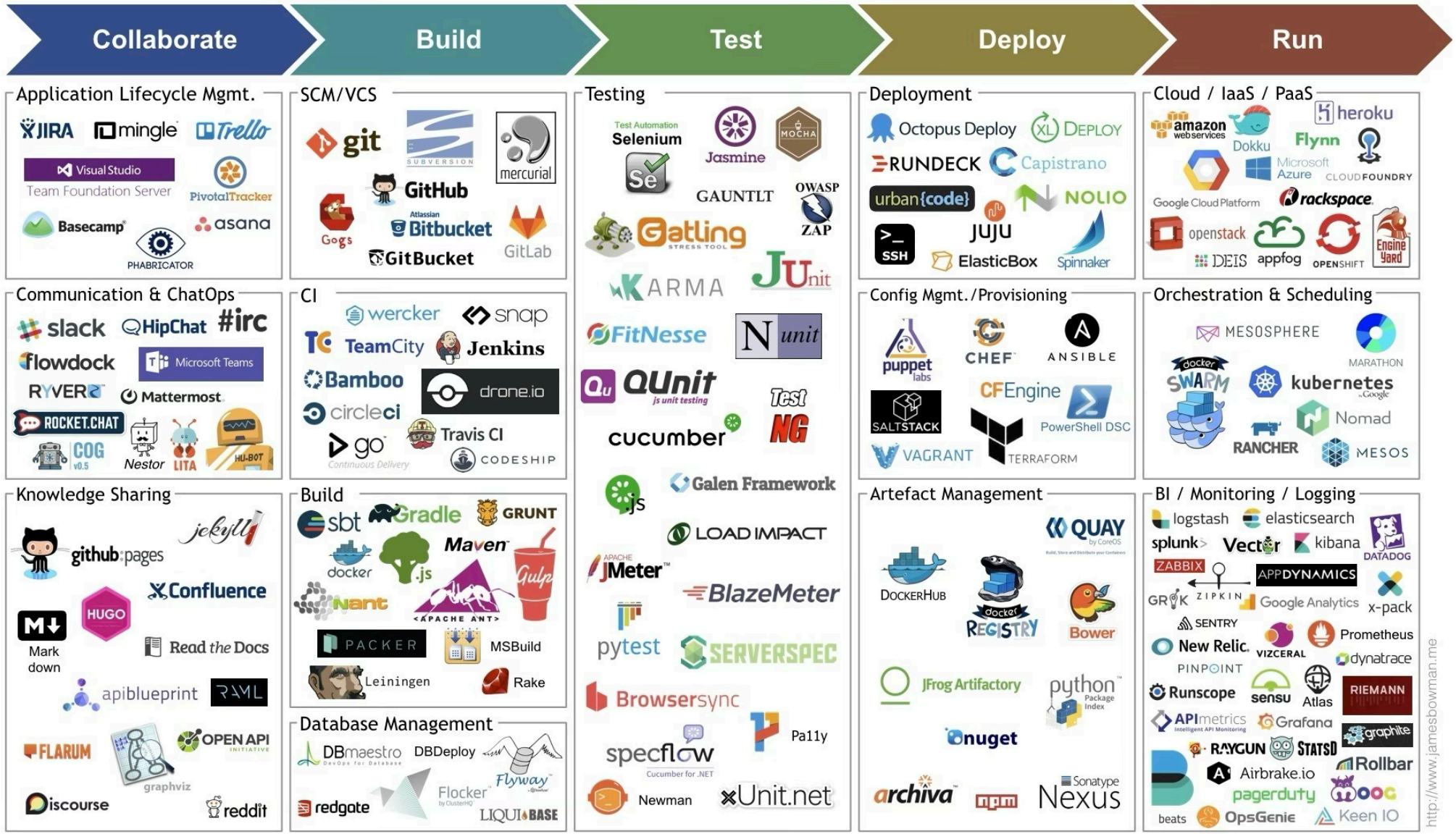
Workflow


CREATE
PLAN
RELEASE
CONFIGURE
DEV
OPS
VERIFY
PACKAGE
MONITOR

7 Ways to Get Started with DevOps

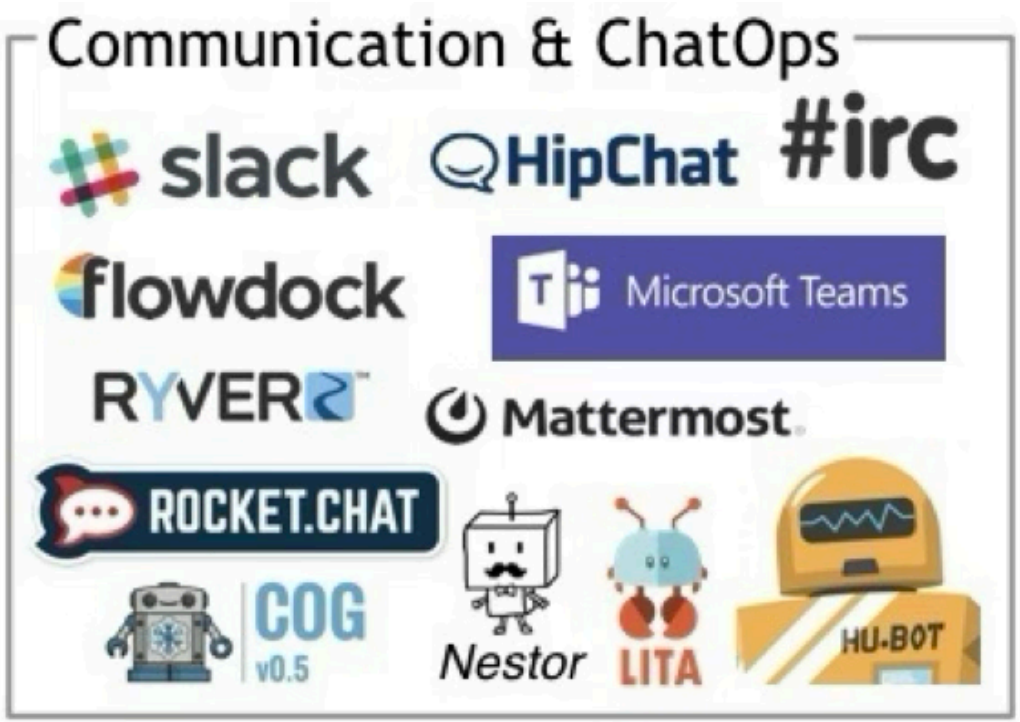
- Invite Your Operations Team Into Your Development Process
- Visualize the Work Together
- Automate Your Test/Build Process
- Create a Deployment Plan
- Identify Fragile Systems
- Smooth Out Wait States
- Link Your Work to Your Value

DevOps Ecosystem



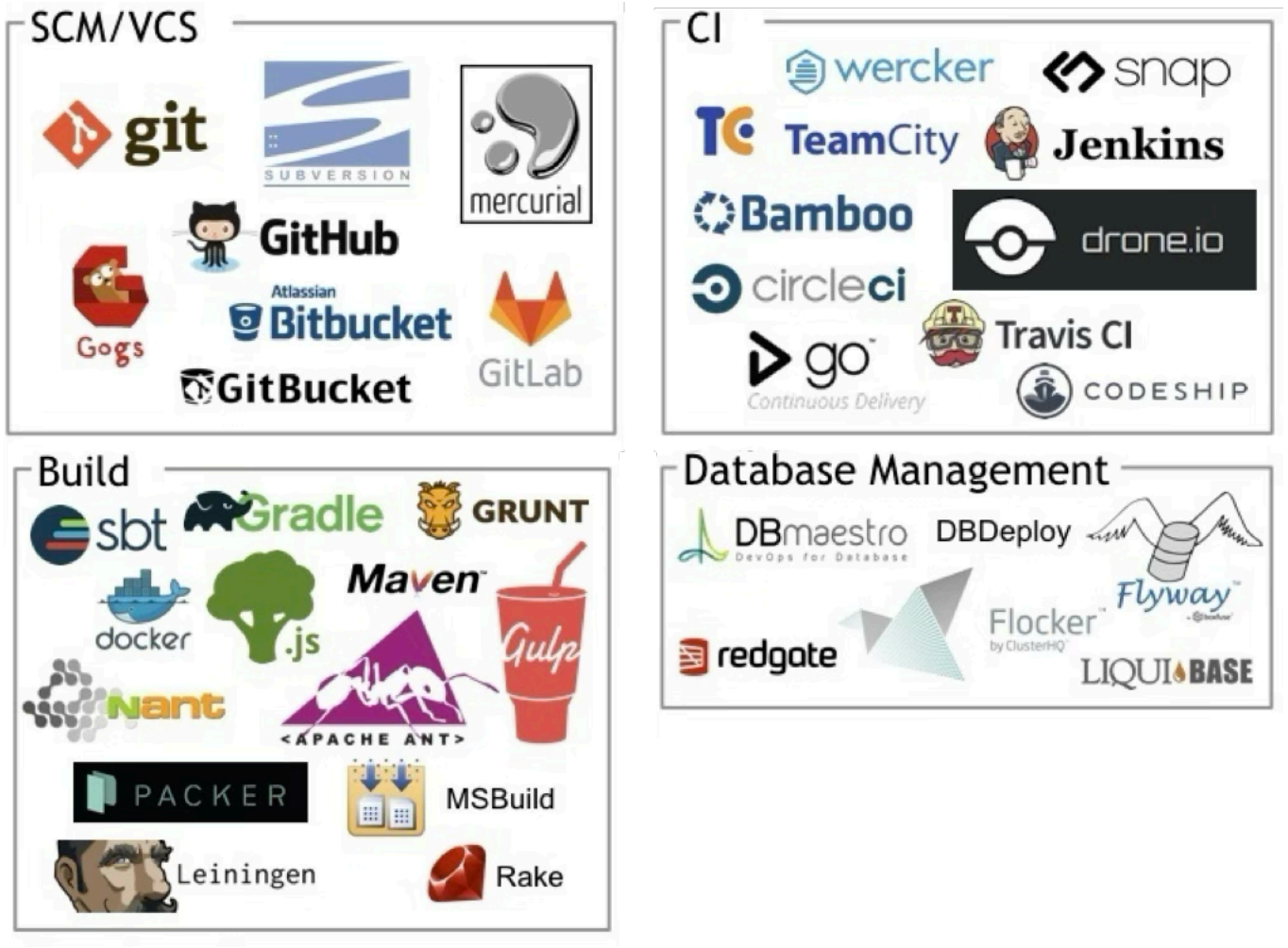
http://www.jamesbowman.me

Collaborate



Collaborate #2

Build


SCM/VCS
git
SUBVERSION
mercurial
GitHub
Gogs
Atlassian
Bitbucket
GitLab
GitBucket
CI
wercker
snap
TeamCity
Jenkins
Bamboo
drone.io
circleci
Travis CI
go
Continuous Delivery
CODESHIP
Build
sbt
Gradle
GRUNT
Maven
docker
.js
Gulp
Nant
<APACHE ANT>
PACKER
MSBuild
Leiningen
Rake
Database Management
DBmaestro
DevOps for Database
DBDeploy
Flyway
redgate
Flocker
by ClusterHQ
LIQUIBASE

Test


Test Automation
Selenium
Jasmine
MOCHA
GAUNTLT
OWASP
ZAP
Gatling
STRESS TOOL
KARMA
JUnit
FitNesse
N unit
QUnit
js unit testing
Test
NG
cucumber
Galen Framework
.js
LOAD IMPACT
APACHE
JMeter™
BlazeMeter
pytest
SERVERSPEC
Browsersync
Pa11y
specflow
Cucumber for .NET
Newman
xUnit.net
sonarqube

Deploy


Deployment
Octopus Deploy
XL DEPLOY
RUNDECK
Capistrano
urban{code}
NOLIO
juju
>_ SSH
ElasticBox
Spinnaker
Config Mgmt./Provisioning
puppet labs
CHEF
ANSIBLE
CFEngine
SALTSTACK
PowerShell DSC
VAGRANT
TERRAFORM


Artefact Management
QUAY
by CoreOS
DOCKERHUB
docker REGISTRY
Bower
JFrog Artifactory
python Package Index
nuget
archiva
npm
Sonatype Nexus

Run


Cloud / IaaS / PaaS
amazon web services
heroku
Dokku
Flynn
Microsoft Azure
CLOUDFOUNDRY
Google Cloud Platform
rackspace
openstack
DEIS
appfog
OPENSHIFT
Engine Yard
Orchestration & Scheduling
MESOSPHERE
MARATHON
docker SWARM
kubernetes
Google
Nomad
RANCHER
MESOS


BI / Monitoring / Logging
logstash
elasticsearch
splunk>
Vector
kibana
DATADOG
ZABBIX
APPDYNAMICS
GROK
ZIPKIN
Google Analytics
x-pack
SENTRY
New Relic.
VIZCERAL
Prometheus
dynatrace
PINPOINT
Runscope
sensu
Atlas
RIEMANN
APImetrics
Intelligent API Monitoring
Grafana
graphite
RAYGUN
STATSD
Rollbar
Airbrake.io
pagerduty
beats
OpsGenie
Keen IO

Everything as code

Everything as code

Everything as code is a software development practice that seeks to apply the same principles of version control, testing, and deployment to enhance maintainability and scalability of all aspects of the development lifecycle, including networking infrastructure, documentation, and configuration.

This practice adds the ability to automate more, leading to faster, more consistent, and more reliable development cycles. By using code for as many use cases as possible, developers can achieve a higher level of quality, reduce the risk of errors, and increase the speed at which they can deploy new features and updates.

Everything as code

- Infrastructure as Code (IaC)
- Diagram as Code
- Presentation Slide as Code

What is Infrastructure as Code (IaC)

Infrastructure as code (IaC) is the ability to provision and support your computing infrastructure using code instead of manual processes and settings. Any application environment requires many infrastructure components like operating systems, database connections, and storage. Developers have to regularly set up, update, and maintain the infrastructure to develop, test, and deploy applications.

Manual infrastructure management is time-consuming and prone to error—especially when you manage applications at scale. Infrastructure as code lets you define your infrastructure's desired state without including all the steps to get to that state. It automates infrastructure management so developers can focus on building and improving applications instead of managing environments. Organizations use infrastructure as code to control costs, reduce risks, and respond with speed to new business opportunities.

What is diagram as code

Diagram-as-code is a way to quickly draw beautiful diagrams using a simple DSL instead of dragging boxes and arrows with your mouse.

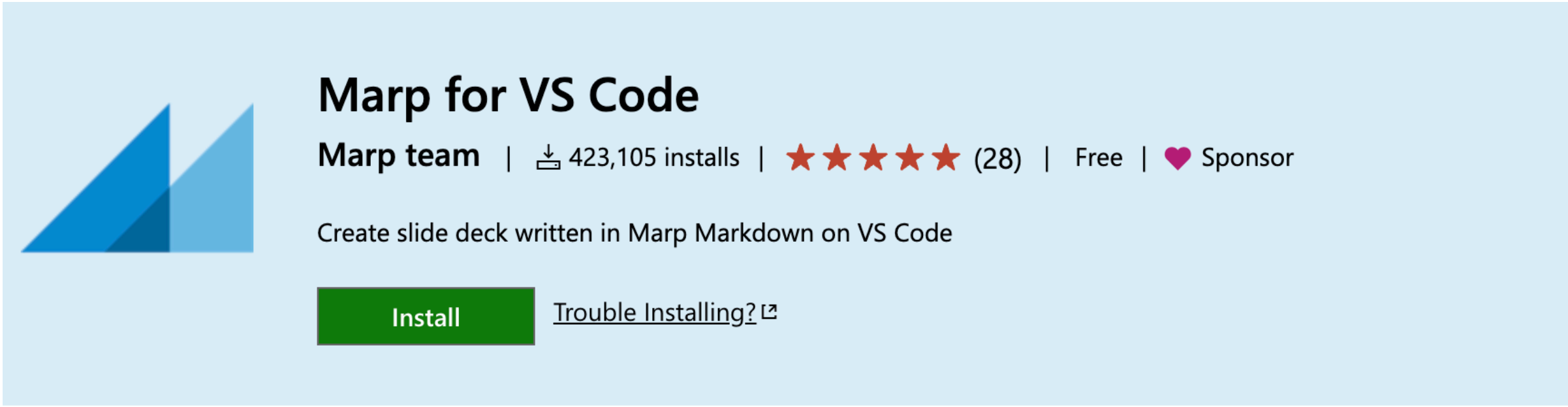
Types of diagrams

- Flow Charts: Visualize process flows, user flows, logic flows
- Entity Relationship Diagrams: Visualize data models
- Cloud Architecture Diagrams: Visualize cloud infrastructure and data flow
- Sequence Diagrams: Visualize system flows and interactions

เอกสารประกอบการบรรยายนี้

สร้างด้วย Slide as code โดยใช้เครื่องมือดังนี้

- visual studio code
- markdown
- extension: Marp for VS Code



CI/CD

CI/CD

- Continuous Integration (CI)
- Continuous Deployment (CD)
- Continuous Delivery (CD)

Continuous Integration (CI)

- Continuous Integration uses automation tools that empower development teams to build and test code after each merge as seamlessly as possible

Continuous Delivery (CD)

- Focused on keeping the code ready to deploy at any given time.
- It's not about making bugged-code available for the production environment.
- Rather, all the sets of features are ready to go, and the latest build is ready to be delivered at any time given.

Continuous Deployment

- Production deployment of every change done to the code.
- The changes are ideally automated, without human intervention.
- The approach works well in a corporate environment, where the user and the tester are ultimately one person.

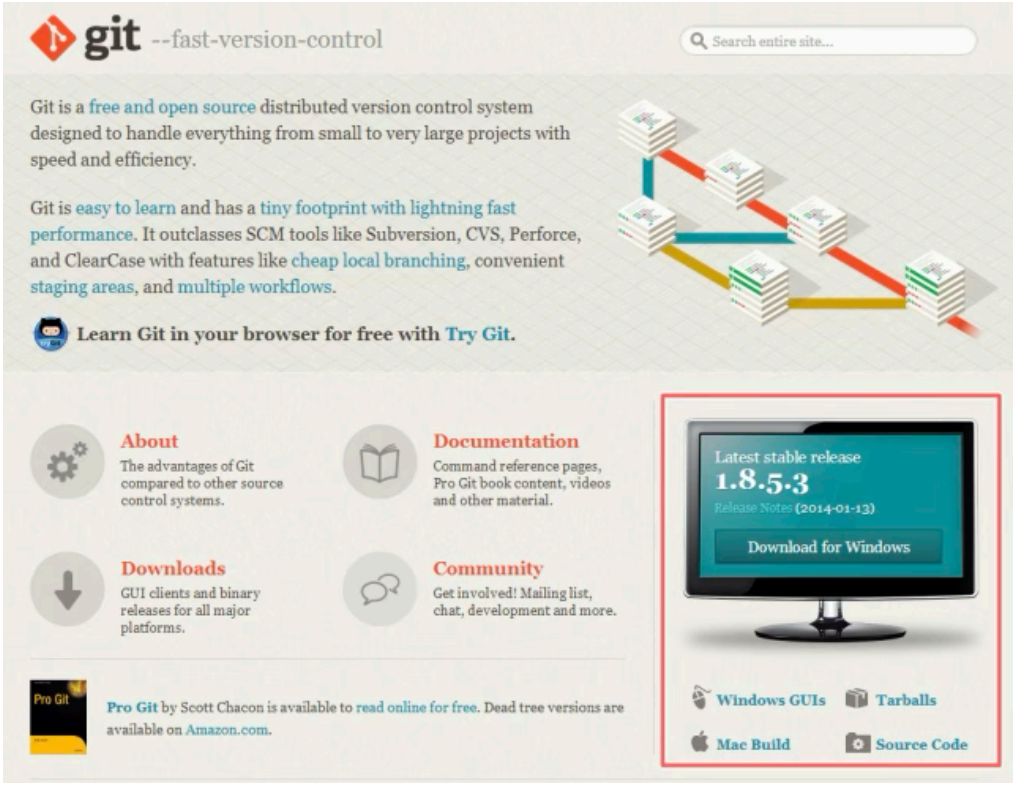
Software Installation

การติดตั้ง

GIT FOR WINDOWS

การติดตั้ง git สำหรับ windows

- เข้า website https://git-scm.com/downloads
- เลือก Download Git เพื่อติดตั้งบน Windows

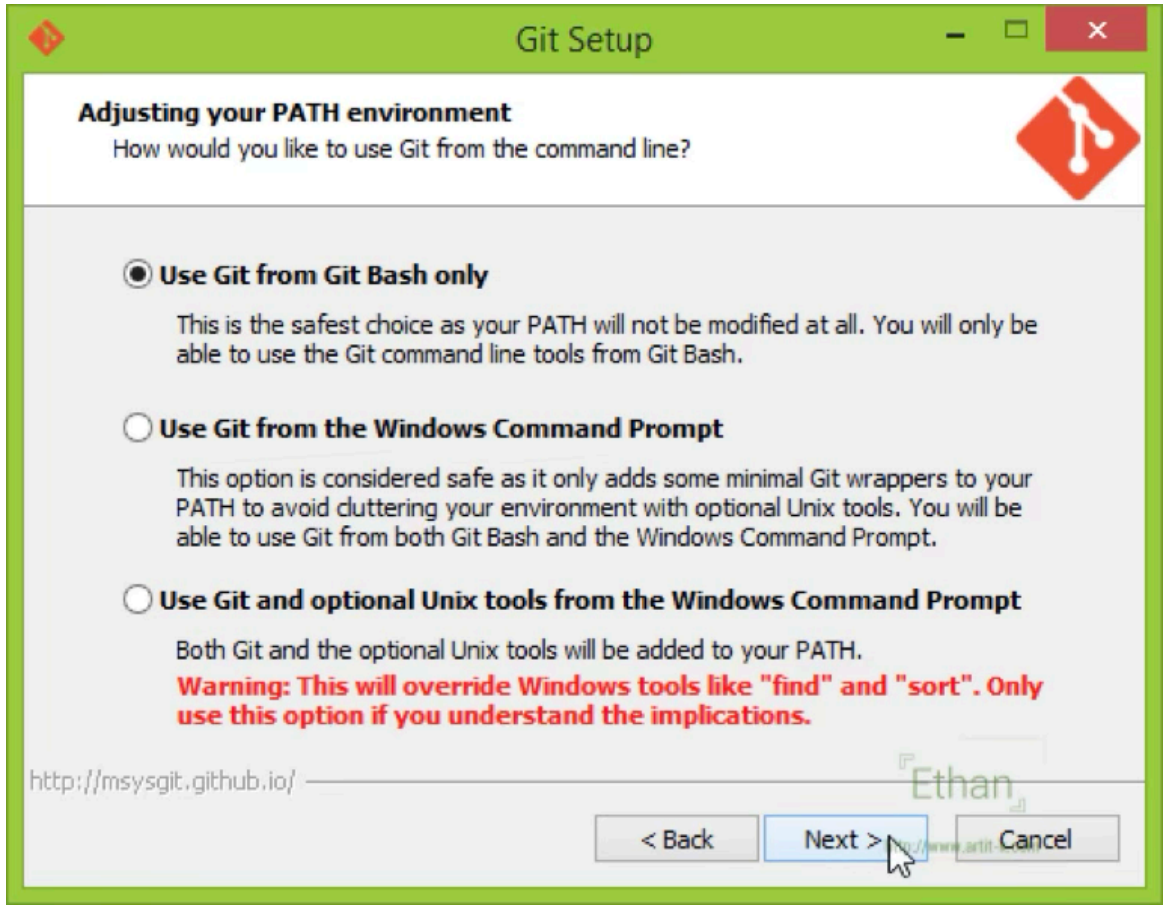


การติดตั้ง GIT สำหรับ Windows #2

ติดตั้งโดยใช้สิทธิ Administrator ในการติดตั้ง

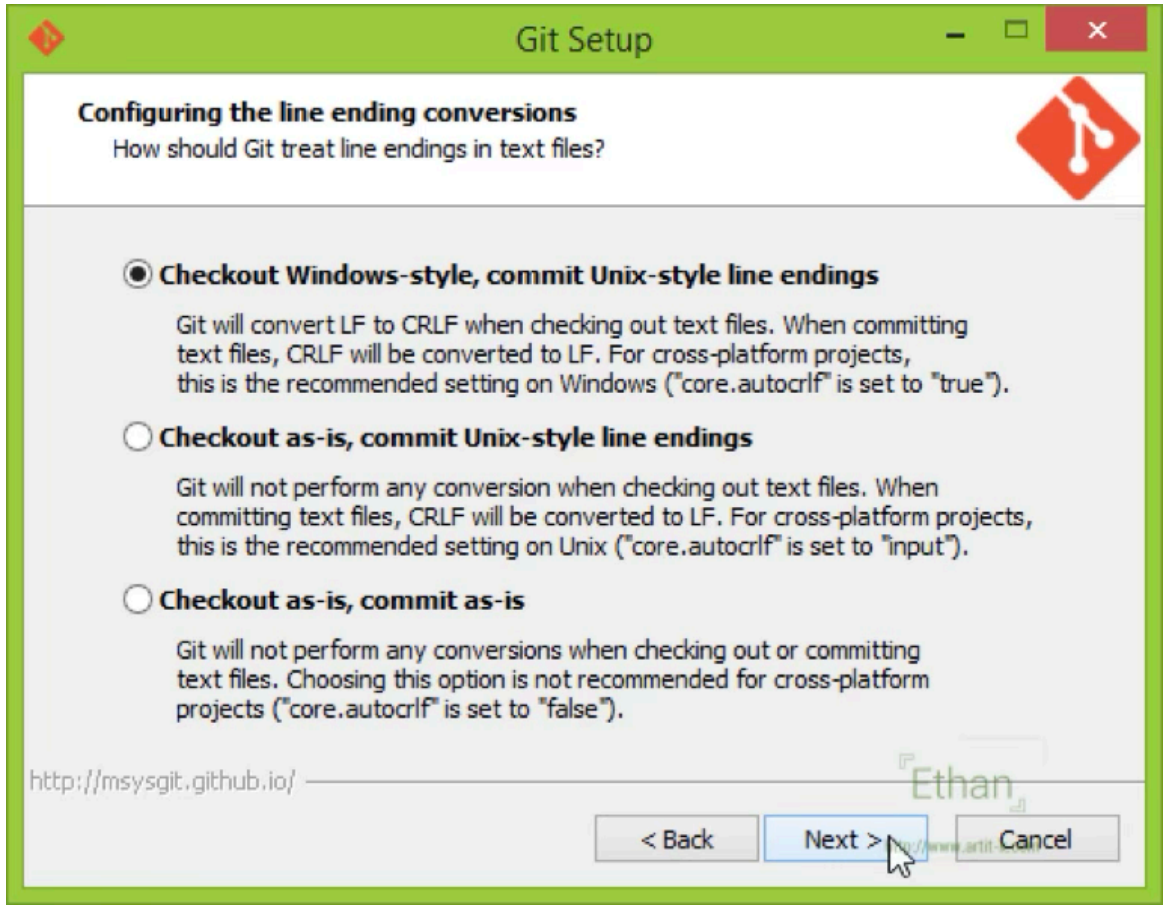
การติดตั้ง GIT สำหรับ Windows #3

เลือกติดตั้งแบบ Use Git from the Windows Command Prompt



การติดตั้ง GIT สำหรับ Windows #4

เลือกเป็น Checkout Windows-style, commit Unix-style line endings

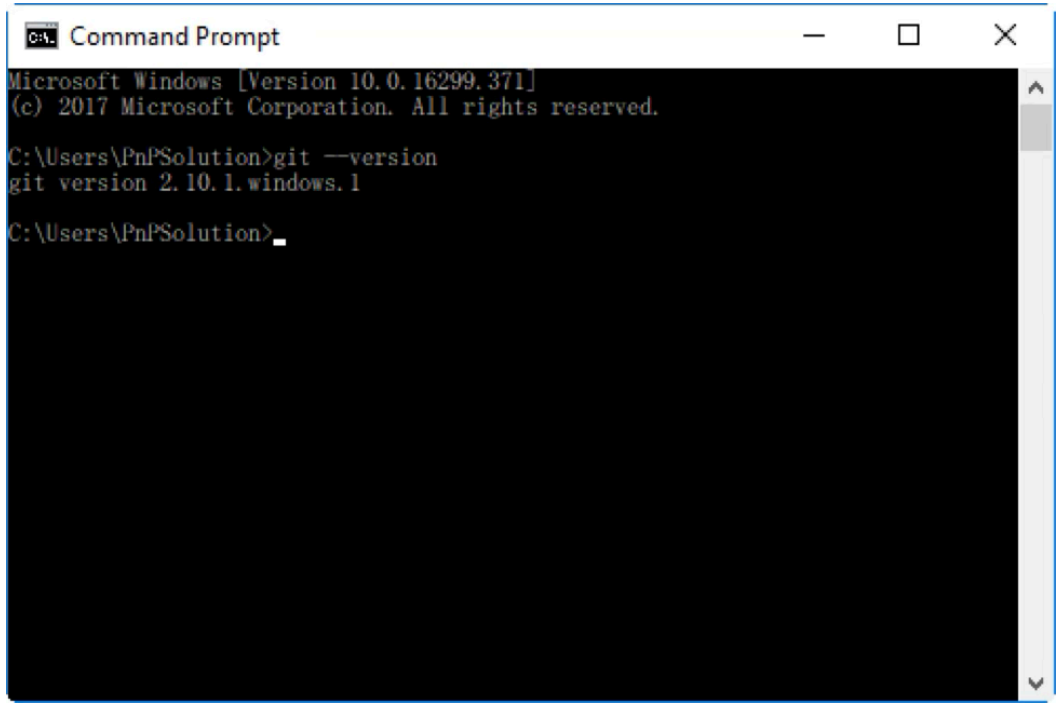


การติดตั้ง GIT สำหรับ Windows #5

กดปุ่ม next ไปจนถึงหน้าสุดท้าย

ทดสอบหลังการติดตั้ง Git

เปิดโปรแกรม cmd แล้วพิมพ์คำสั่ง `git --version`



ผลลัพธ์จะได้เป็นเลข version ของ git

การติดตั้ง

DOCKER DESKTOP

การติดตั้ง Docker สำหรับ Windows

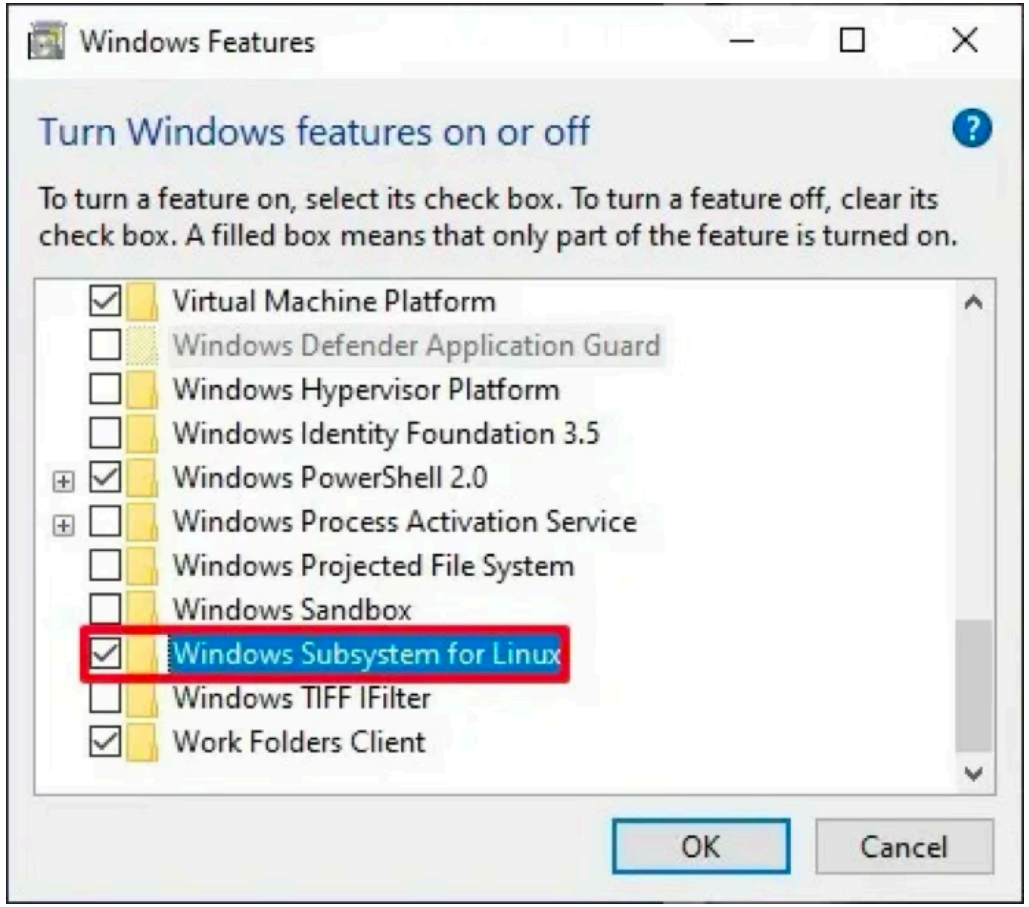
ความต้องการขั้นพื้นฐานสำหรับการติดตั้ง Docker for windows

- Windows ต้องเป็น version 64bit เท่านั้น
- Windows 10 pro ขึ้นไป
- CPU ต้องมีความสามารถ VTx เพื่อรองรับการทำงานของ Hyper-v โดยสามารถเข้าไปเปิดได้ที่ BIOS ของเครื่อง

ตัวอย่างการเปิดใช้งาน VTx ใน BIOS

การติดตั้ง Docker สำหรับ Windows #2

เปิดใช้ WSL2



การติดตั้ง Docker สำหรับ Windows #3

- run คำสั่งดังต่อไปนี้ ใน Power Shell แบบ Administrator

```
dism.exe /online /enable-feature /featurename:Microsoft-Windows-Subsystem-Linux /all /norestart
dism.exe /online /enable-feature /featurename:VirtualMachinePlatform /all /norestart
```

- download and install patch จาก link

```
https://wslstorestorage.blob.core.windows.net/wslblob/wsl_update_x64.msi
```

- run คำสั่งดังนี้เพื่อตั้งค่า wsl เป็น version 2

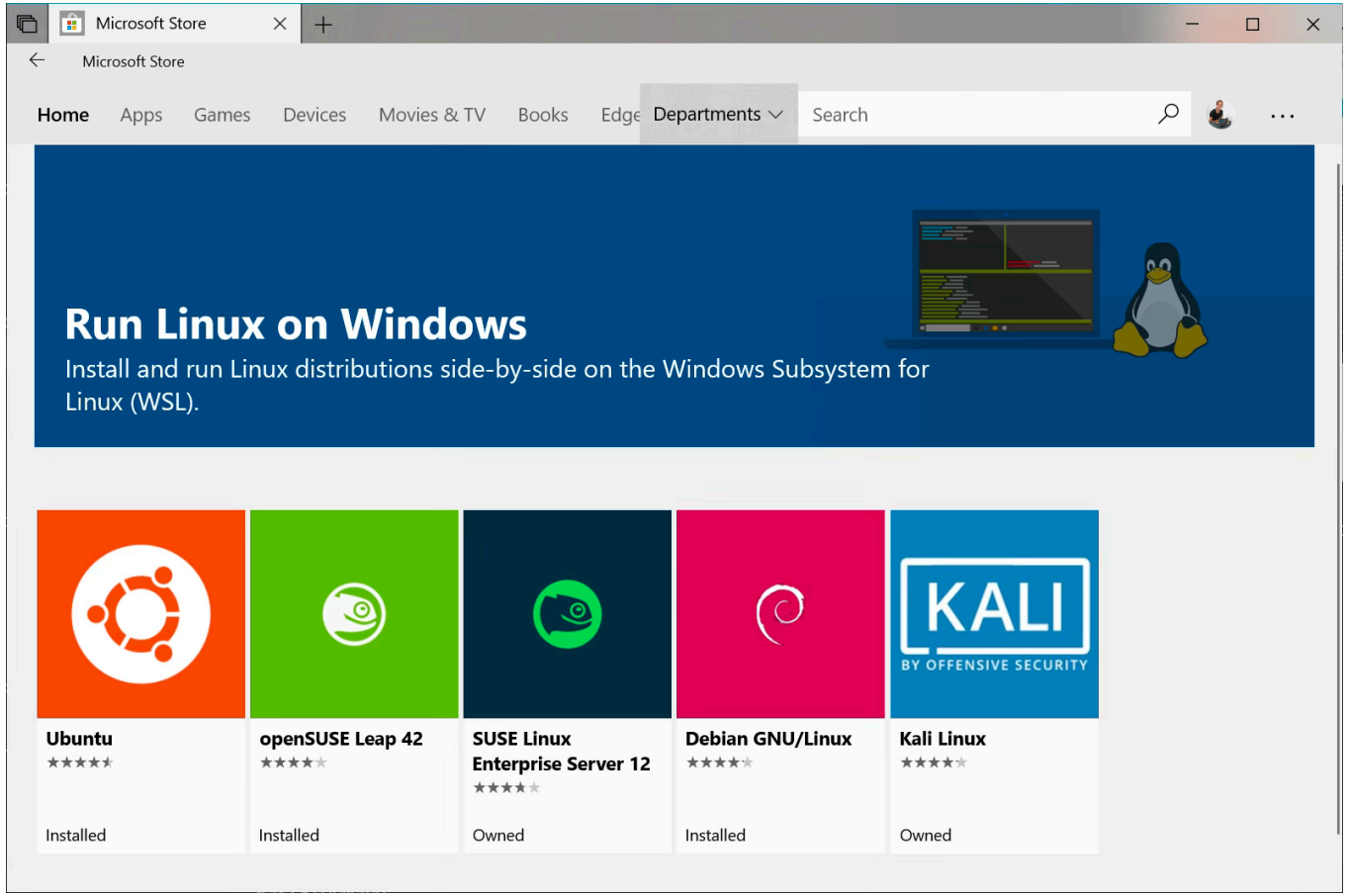
```
wsl --set-default-version 2
wsl --update --web-download
```

การติดตั้ง Docker สำหรับ Windows #4

- เข้า link https://www.docker.com/products/docker-desktop/
- กด next ไปเรื่อยๆ จนสิ้นสุดการติดตั้ง

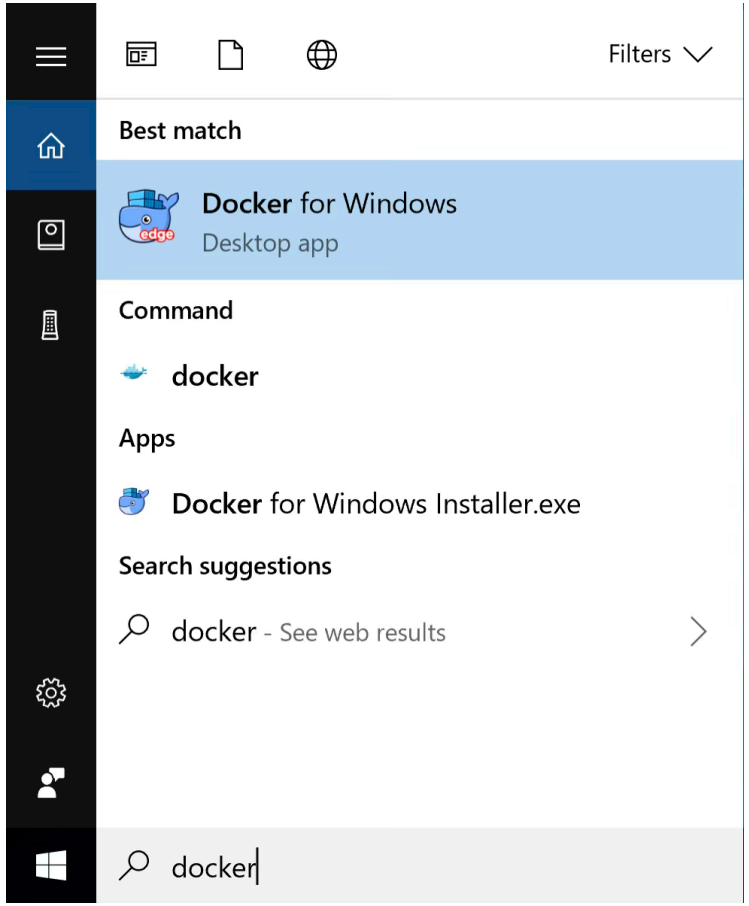
การติดตั้ง Docker สำหรับ Windows #5

ติดตั้ง linux distro สำหรับ wsl



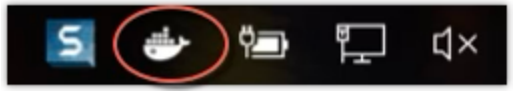
ทดสอบหลังการติดตั้ง #1

หลังจากติดตั้งเสร็จแล้วให้ทำการเปิด docker desktop ดังนี้



ทดสอบหลังการติดตั้ง #2

จะมี docker run อยู่ที่ taskbar ดังภาพ



ทดสอบการติดตั้งโดยการเปิด cmd แล้วพิมพคำสั่งดังนี้

```
docker ps
```

ผลที่ได้จากการ run คำสั่ง

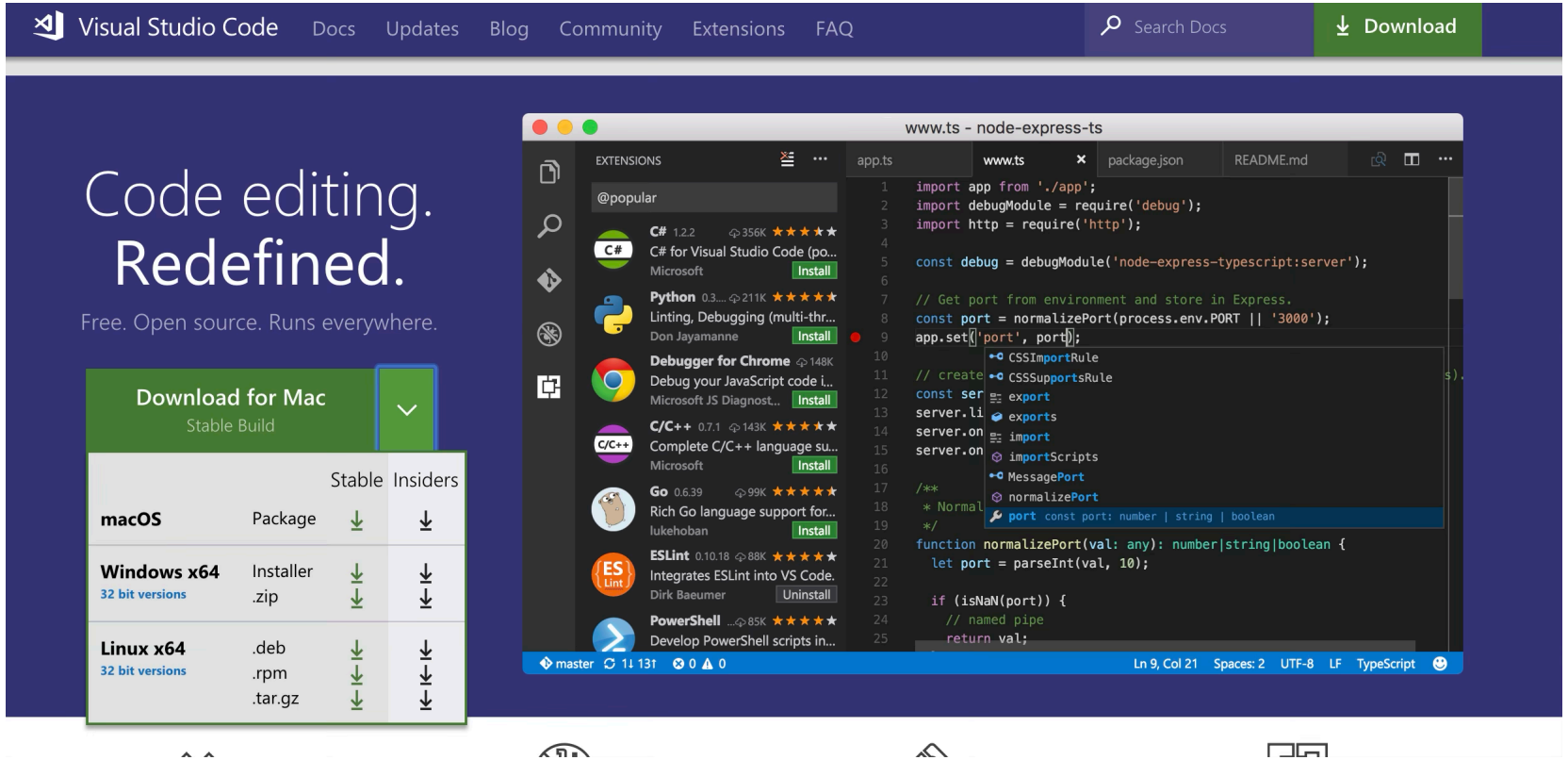
```
[Sommais-MacBook-Pro:~ sommaik$ docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES
```

การติดตั้ง

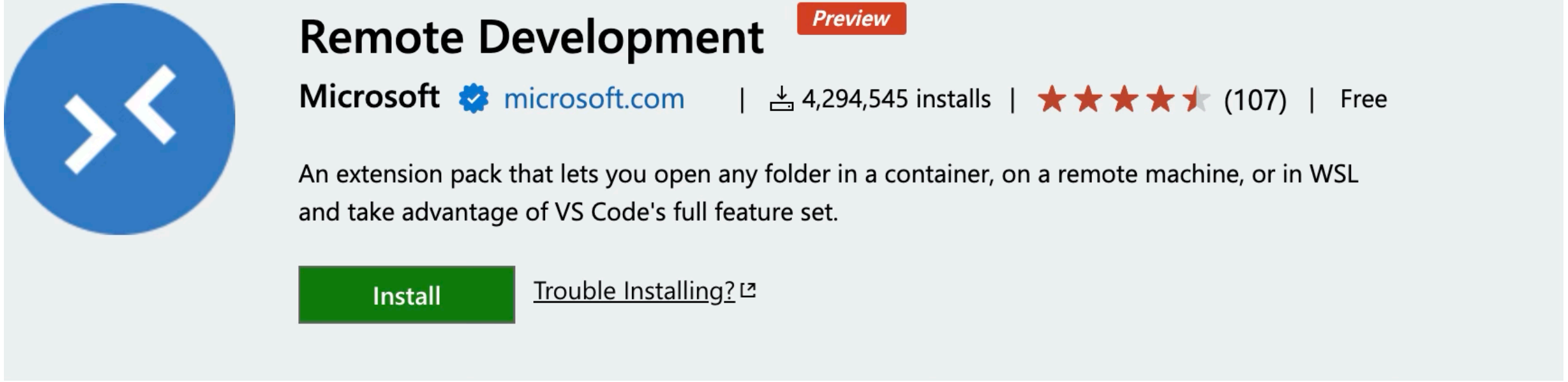
VISUAL STUDIO CODE

การติดตั้ง Visual Studio Code (VSC)

1. เข้าไปที่ website https://code.visualstudio.com/
2. เลือก download สำหรับ windows (stable)



Install extension ดังนี้

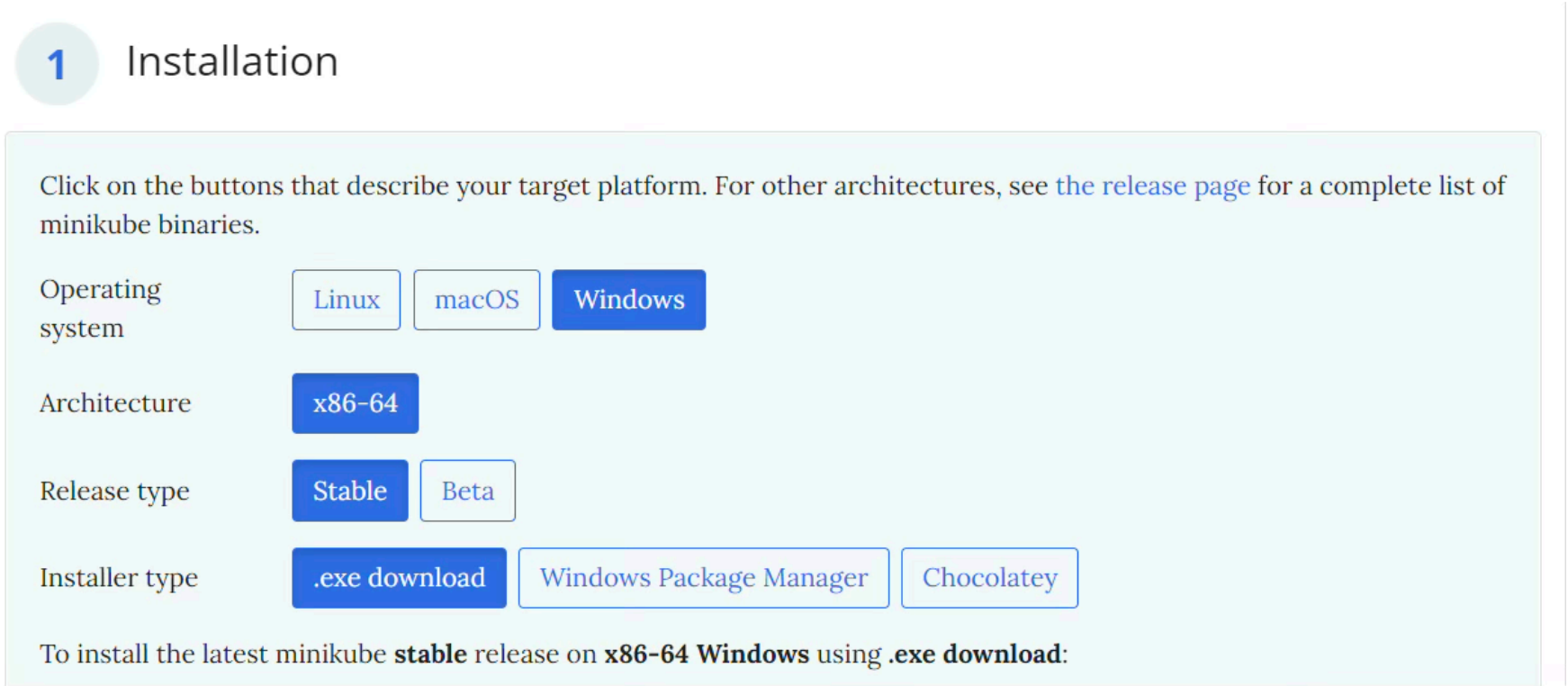


การติดตั้ง

MINIKUBE

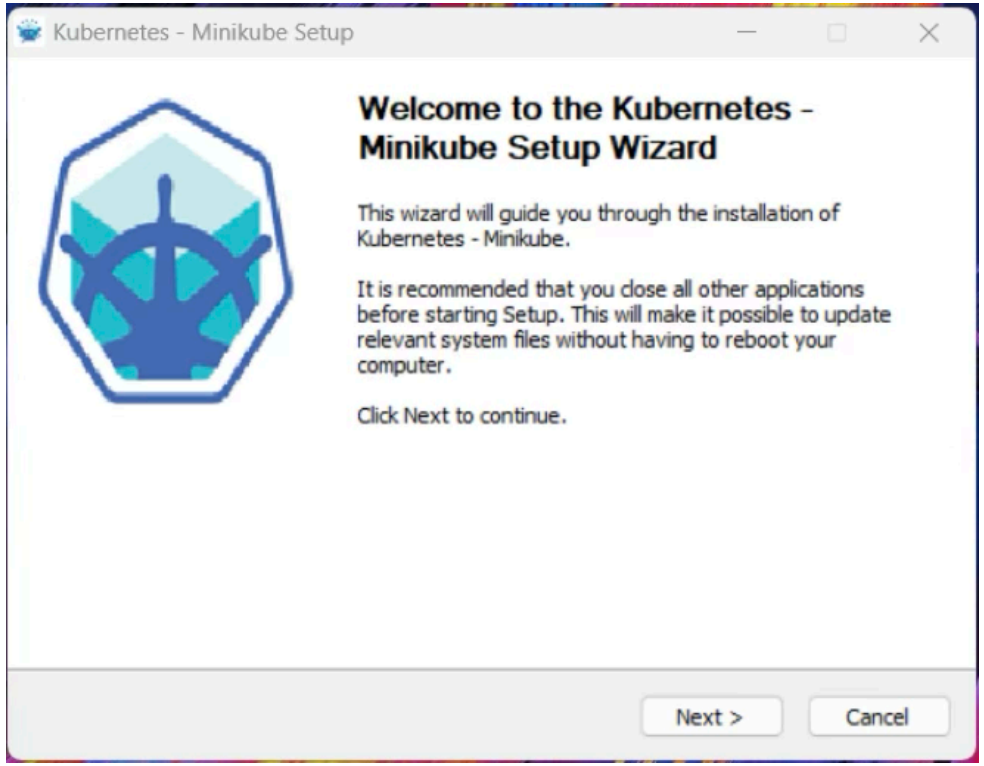
Step 1

- เข้า website https://minikube.sigs.k8s.io/docs/start/
- เลือก Download Version ที่ต้องการ

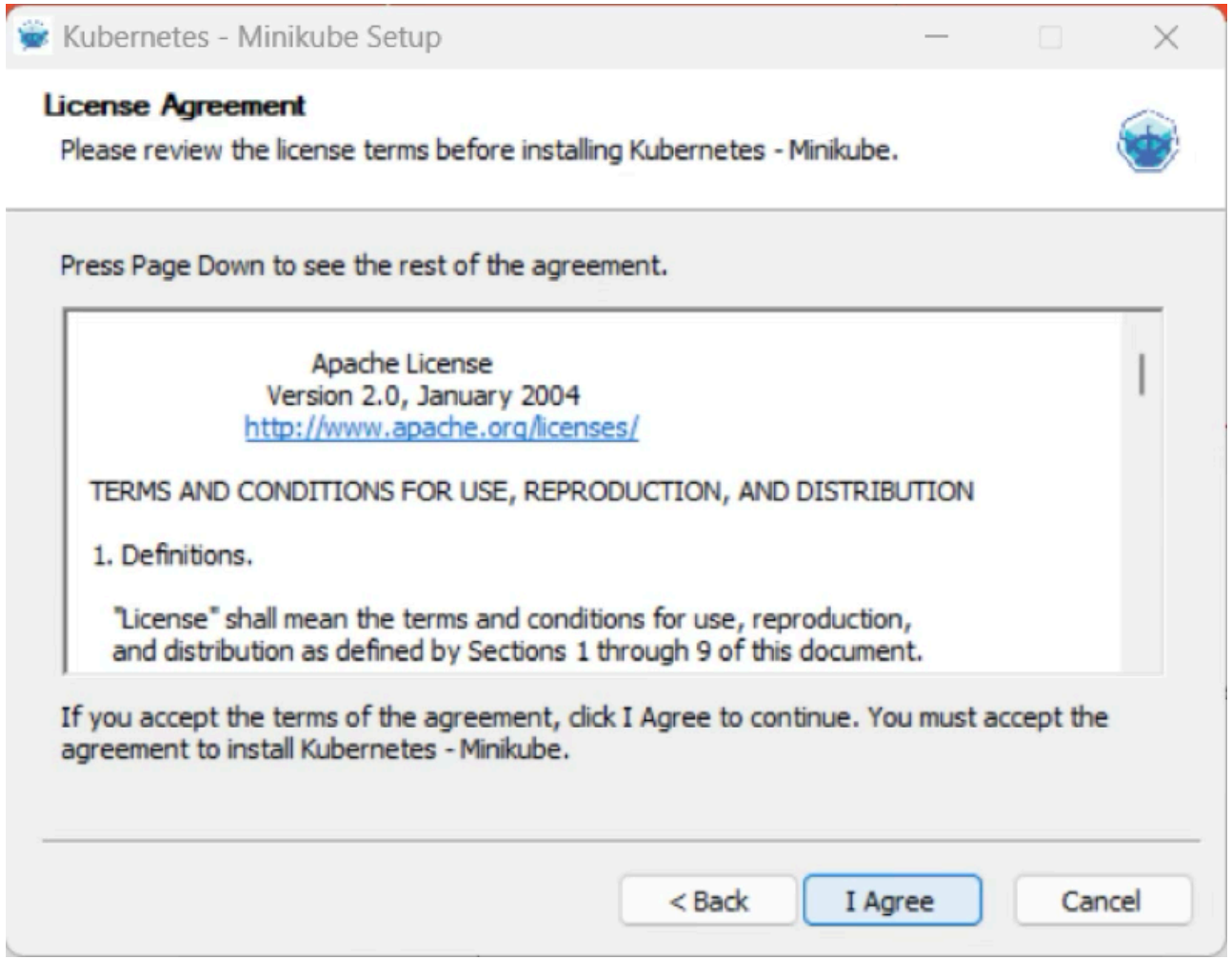


Step 2

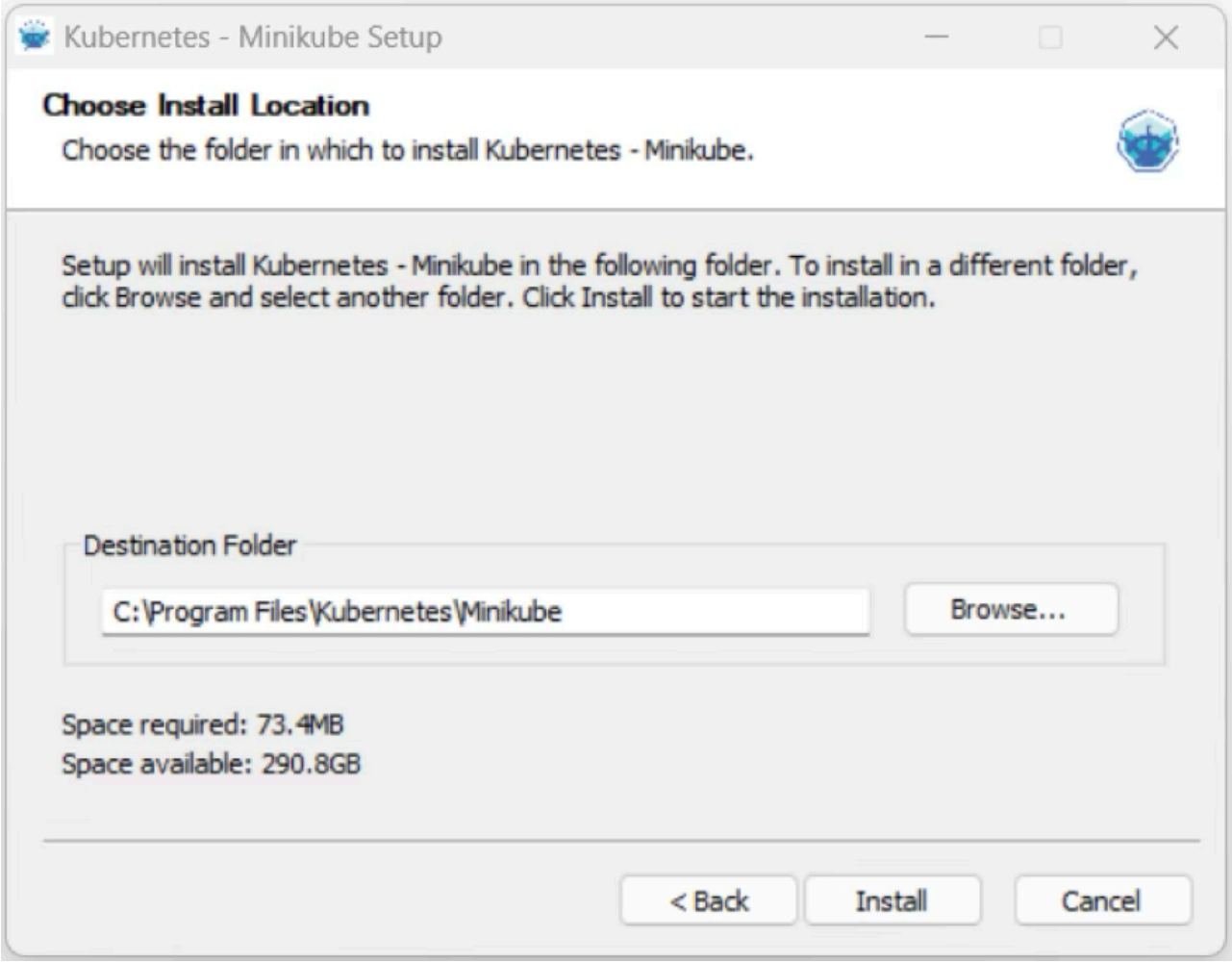
- ติดตั้งโดยใช้สิทธิ Administrator ในการติดตั้ง



Step 3


Kubernetes - Minikube Setup
License Agreement
Please review the license terms before installing Kubernetes - Minikube.
Press Page Down to see the rest of the agreement.
Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/
TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION
1. Definitions.
"License" shall mean the terms and conditions for use, reproduction,
and distribution as defined by Sections 1 through 9 of this document.
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install Kubernetes - Minikube.
< Back
I Agree
Cancel

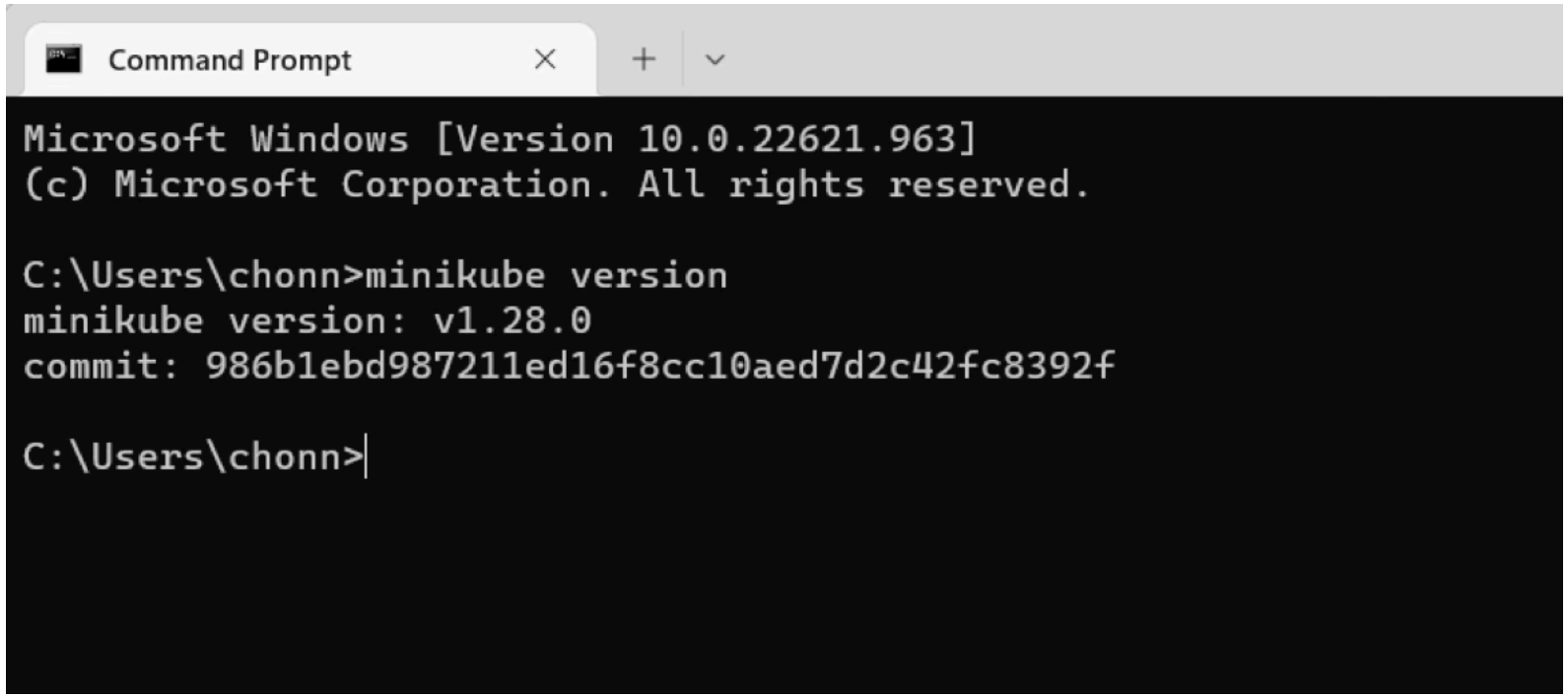
Step 4


Kubernetes - Minikube Setup
Choose Install Location
Choose the folder in which to install Kubernetes - Minikube.
Setup will install Kubernetes - Minikube in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder
C:\Program Files\Kubernetes\Minikube
Browse...
Space required: 73.4MB
Space available: 290.8GB
< Back
Install
Cancel

Step 5 ทดสอบหลังการติดตั้ง MINIKUBE

- เปิดโปรแกรม cmd แล้วพิมพ์คำสั่ง

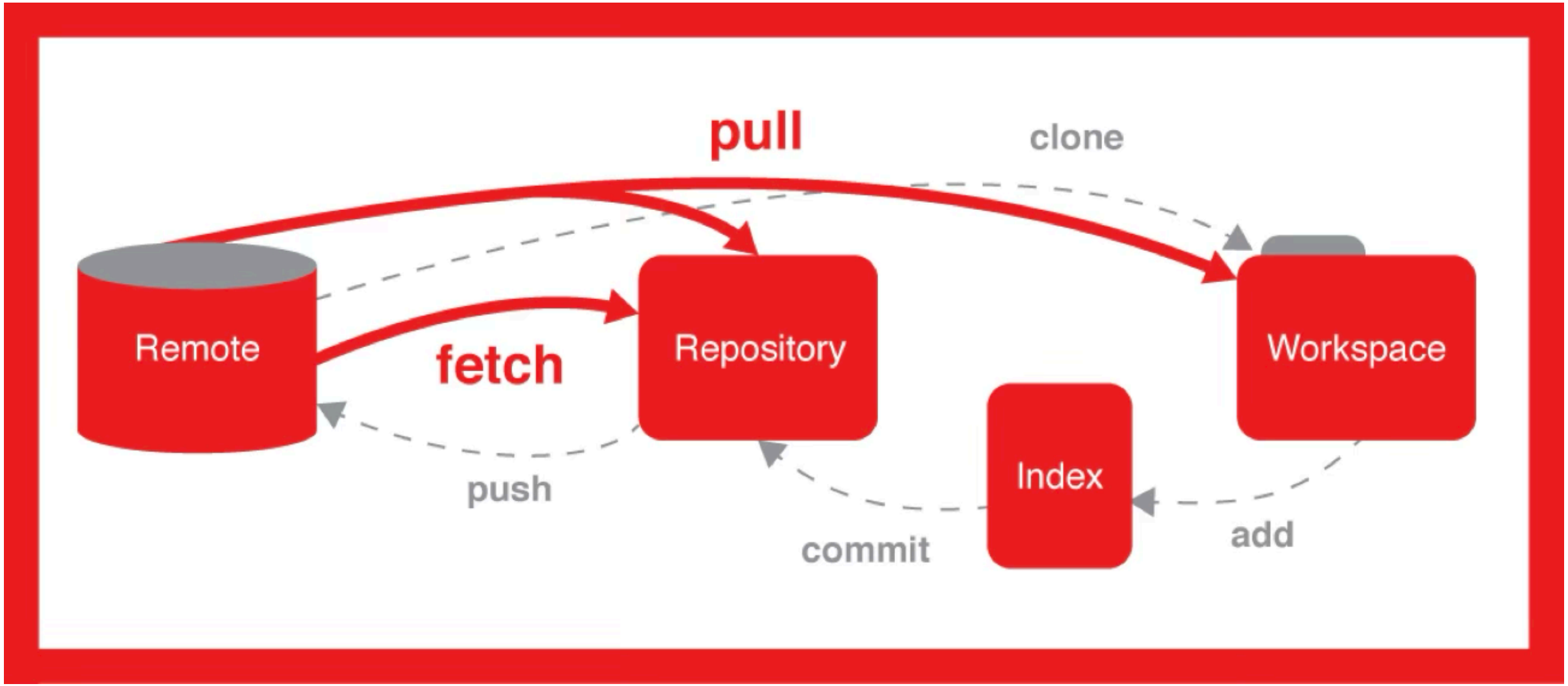
```
minikube version
```



Software version control with

GIT

Overview

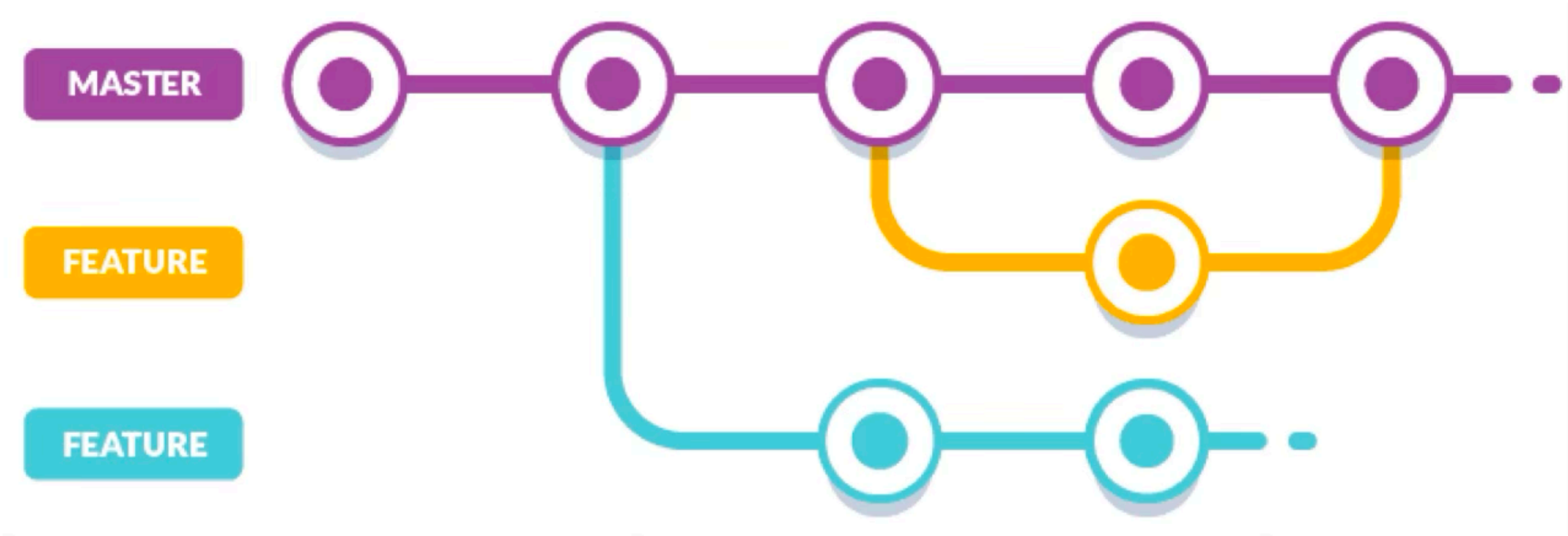

pull
clone
Remote
fetch
Repository
Workspace
push
Index
commit
add

Git workflow type

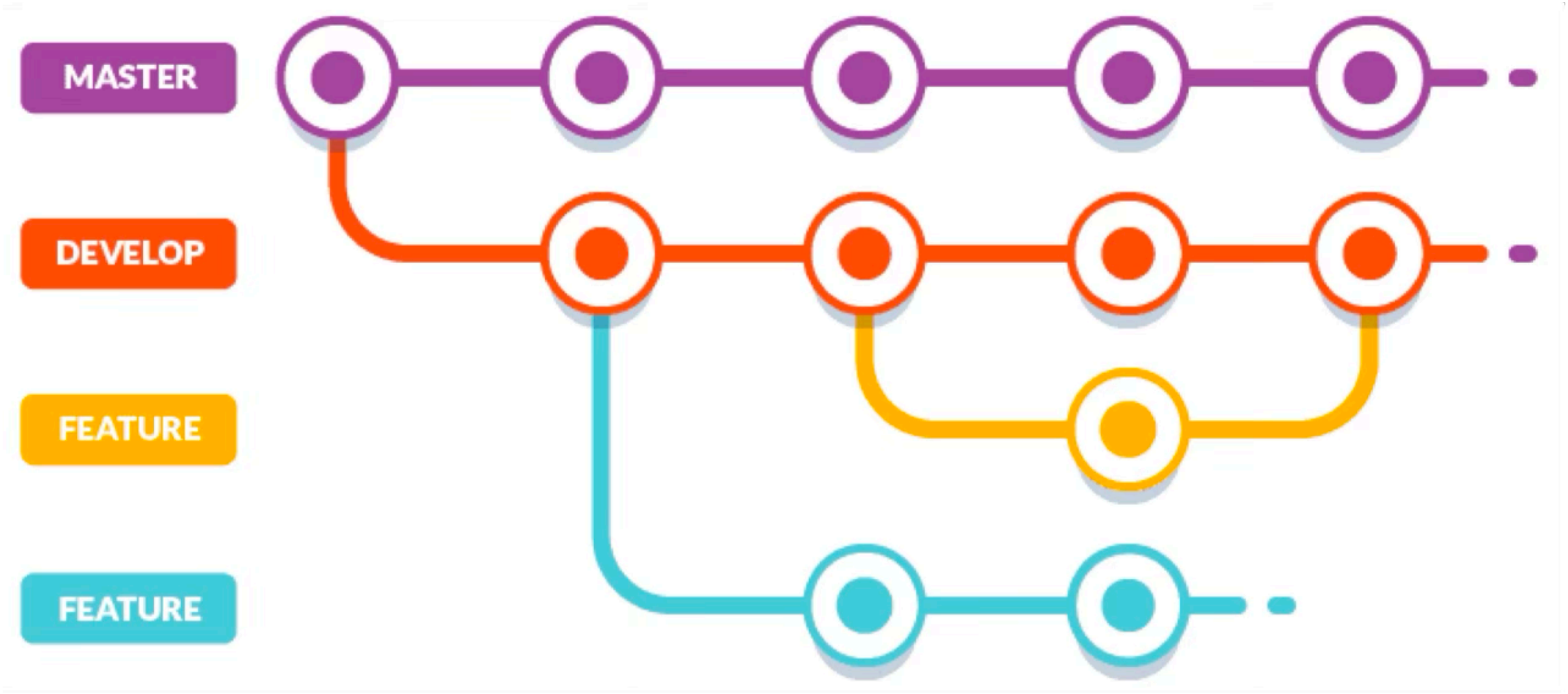
- Basic เหมาะกับ Project ขนาดเล็ก
- Feature Branch เหมาะกับ Project ขนาดกลาง
- Gitflow เหมาะกับ Project ขนาดใหญ่

Basic

Feature Branch

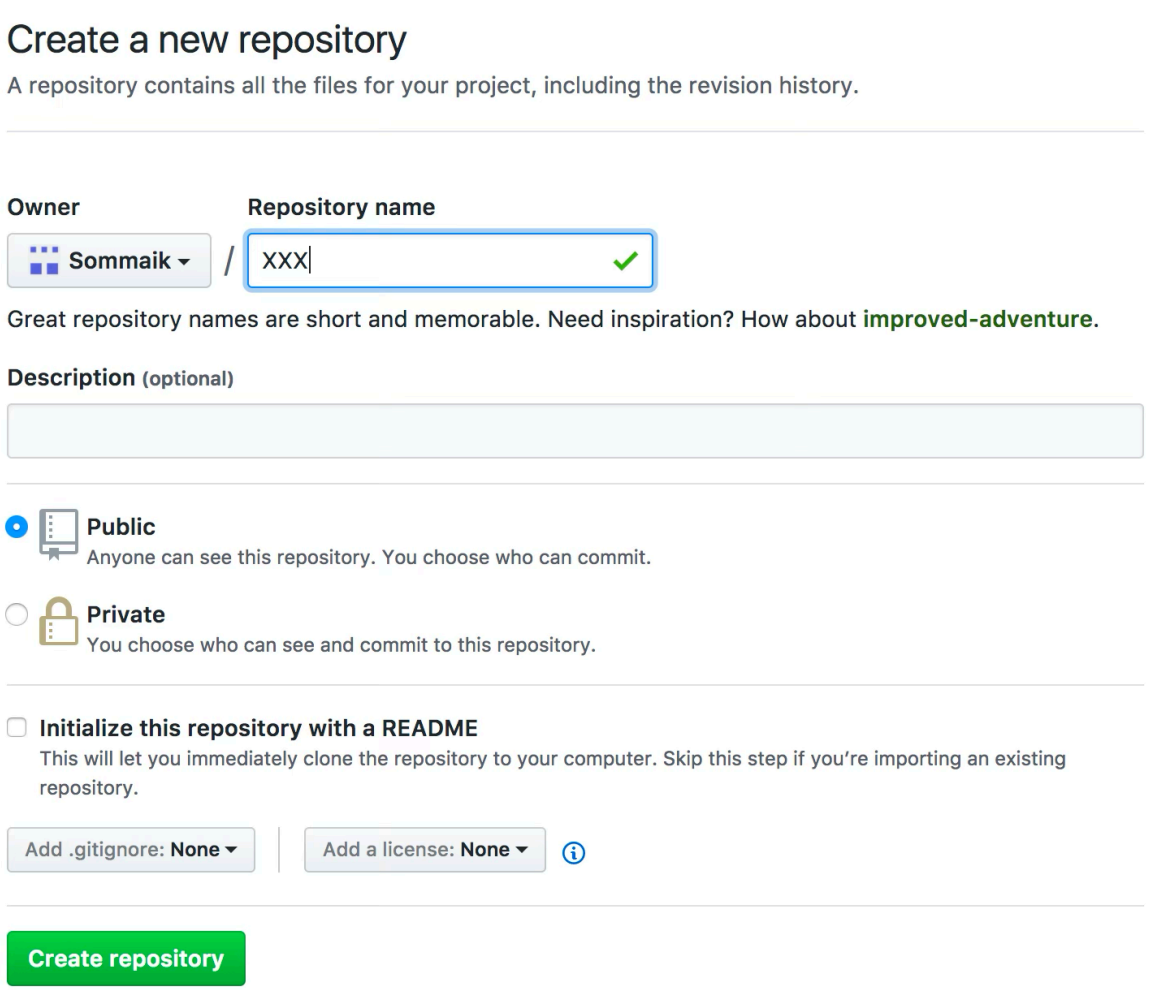


Gitflow



Git Workshop

Create a new Git Repository (Remote)



CONFIGURE TOOLING (First Time)

Sets the name you want atached to your commit transactions

```
git config --global user.name  "[name]"
git config --global user.name  "XXX“
```

Sets the email you want atached to your commit transactions

```
git config --global user.email  "[email address]"
git config --global user.email  “XXXX@hotmail.com"
```

Enables helpful colorization of command line output

```
git config --global color.ui auto
```

CREATE REPOSITORIES

Creates a new local repository with the specified name

```
git init [project-name]
git init XXX
```

Downloads a project and its entire version history

```
git clone [url]
git clone https://github.com/Sommaik/XXX.git
```

MAKE CHANGES

Lists all new or modified files to be commited

```
git status
```

Shows file differences not yet staged

```
git diff
```

Snapshots the file in preparation for versioning

```
git add [file]
git add readme.txt
git add .
```

MAKE CHANGES #2

Shows file differences between staging and the last file version

```
git diff --staged
```

Unstages the file, but preserve its contents

```
git reset [file]
git reset readme.txt
```

Records file snapshots permanently in version history

```
git commit -m "[descriptive message]"
git commit -m "Initial Project"
```

GROUP CHANGES #3

Lists all local branches in the current repository

```
git branch
```

Creates a new branch

```
git branch [branch-name]
git branch XXX
```

Switches to the specified branch and updates the working directory

```
git checkout [branch-name]
git checkout XXX
```

GROUP CHANGES #4

Combines the specified branch's history into the current branch

```
git merge [branch]
git merge XXX
```

Deletes the specified branch

```
git branch -d [branch-name]
git branch -d XXX
```

REFACTOR FILENAMES

Deletes the file from the working directory and stages the deletion

```
git rm [file]
git rm XXX.txt
```

Removes the file from version control but preserves the file locally

```
git rm --cached [file]
git rm --cached XXX.txt
```

Changes the file name and prepares it for commit

```
git mv [file-original] [file-renamed]
git mv XXX.txt YYY.txt
```

SUPPRESS TRACKING

A text file named .**gitignore** suppresses accidental versioning of files and paths matching the specified paterns

```
*.log
build/
temp-*
```

Lists all ignored files in this project

```
git ls-files --other --ignored --exclude-standard
```

SAVE FRAGMENTS

Temporarily stores all modified tracked files

```
git stash
```

Restores the most recently stashed files

```
git stash pop
```

Lists all stashed changesets

```
git stash list
```

Discards the most recently stashed changeset

```
git stash drop
```

REVIEW HISTORY

Lists version history for the current branch

```
git log
```

Lists version history for a file, including renames

```
git log --follow [file]
git log --follow XXX.txt
```

Shows content differences between two branches

```
git diff [first-branch]...[second-branch]
```

Outputs metadata and content changes of the specified commit

```
git show [commit]
git show XXX
```

REDO COMMITS

Undoes all commits after [commit], preserving changes locally

```
git reset [commit]
git reset XXX
```

Discards all history and changes back to the specified commit

```
git reset --hard [commit]
git reset --hard XXX
```

SYNCHRONIZE CHANGES

Downloads all history from the repository bookmark

```
git fetch [bookmark]
git fetch origin
```

Combines bookmark's branch into current local branch

```
git merge [bookmark]/[branch]
git merge origin/master2
```

SYNCHRONIZE CHANGES #2

Uploads all local branch commits to Git

```
git push [alias] [branch]
git push origin master
```

Downloads bookmark history and incorporates changes

```
git pull
```

How to push source to

GITLAB SERVER REPOSITORY

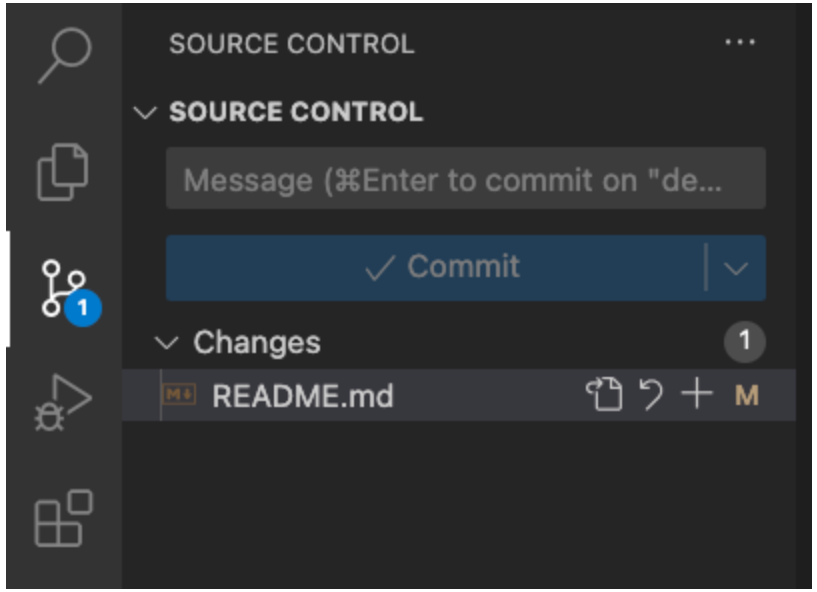
Step 1/5

- สร้าง file ชื่อ README.md

```
# H1
## H2
### H3
#### H4
##### H5
###### H6
```

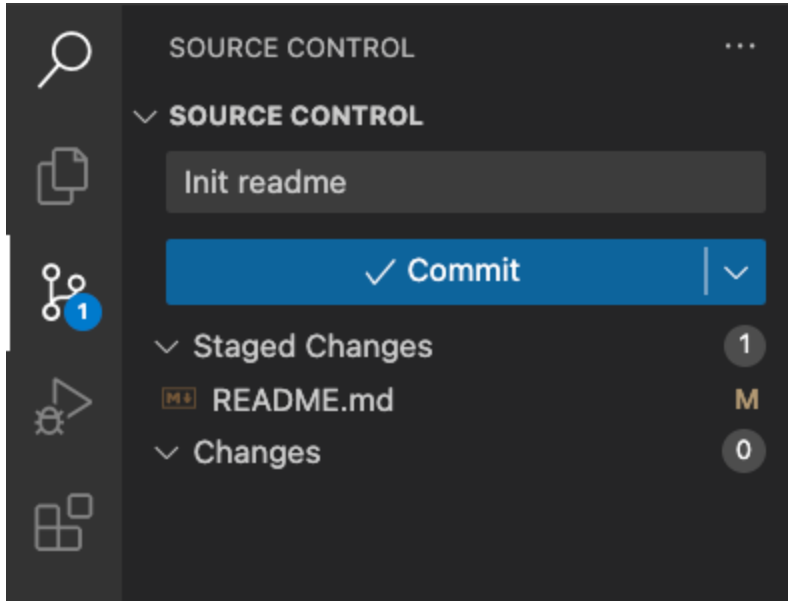
Step 2/5

- กดเครื่องหมาย + ด้านหลัง file README.md
- ระบบจะเปลี่ยนจาก Changes เป็น Staged Changes



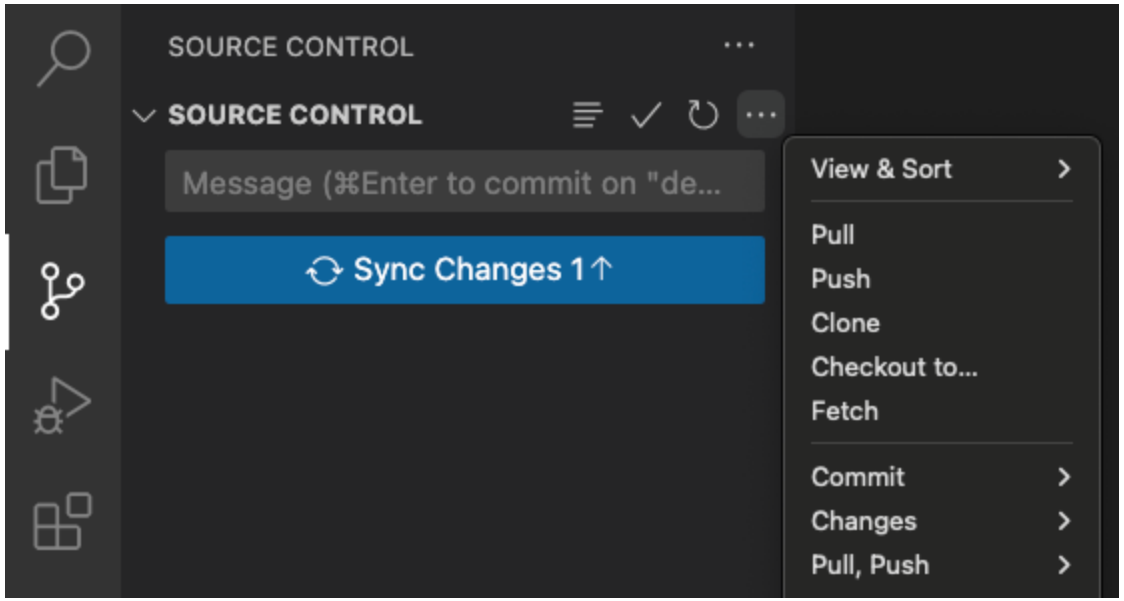
Step 3/5

- ใส่ข้อความในช่อง Message แล้วกดปุ่ม commit



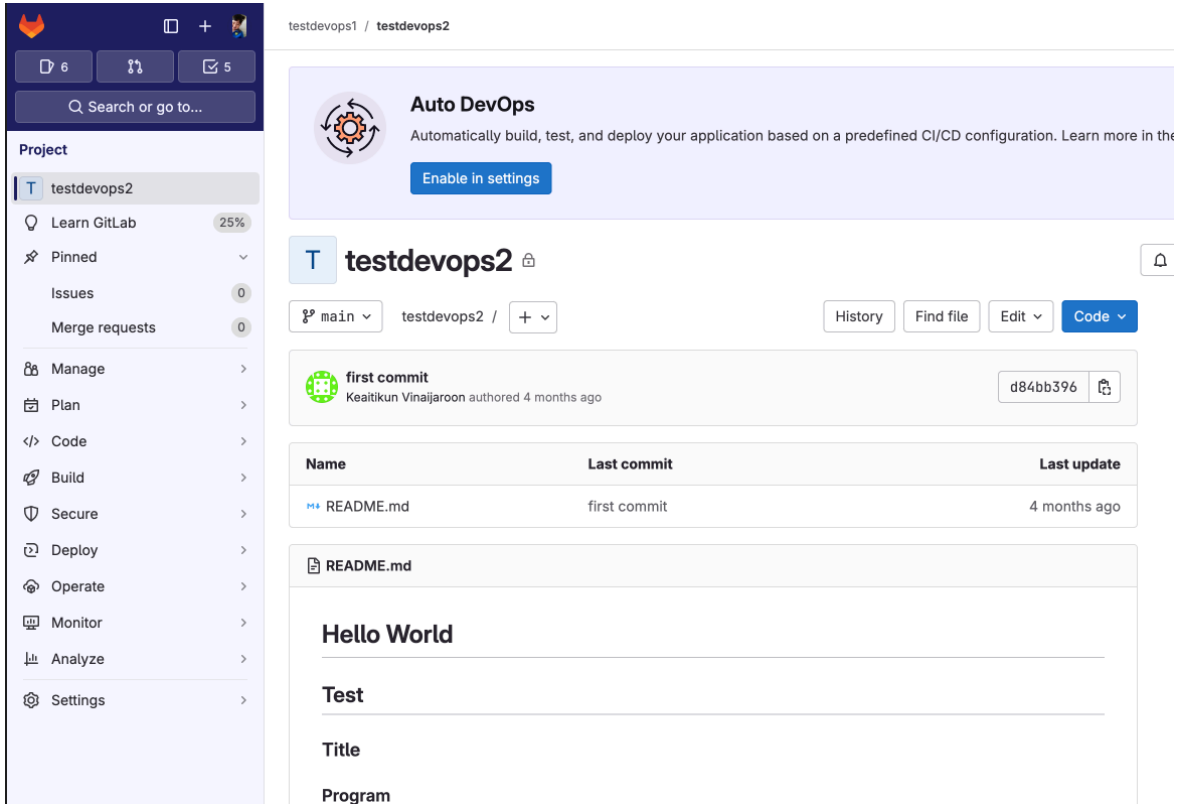
Step 4/5

- กดปุ่ม Sync Changes
- หรือไปกดที่ menu Push (ในกรณีที่เป็นการใช้งานครั้งแรก ปุ่ม sync changes อาจจะไม่แสดงขึ้นมา)



Step 5/5

- สามารถไปดูผลการ push code ได้ที่หน้า project บน Gitlab Server ของเรา
- โดยให้ตรวจสอบว่ามี code ของเรา update ขึ้นไปหรือไม่



How to use

MARKDOWN

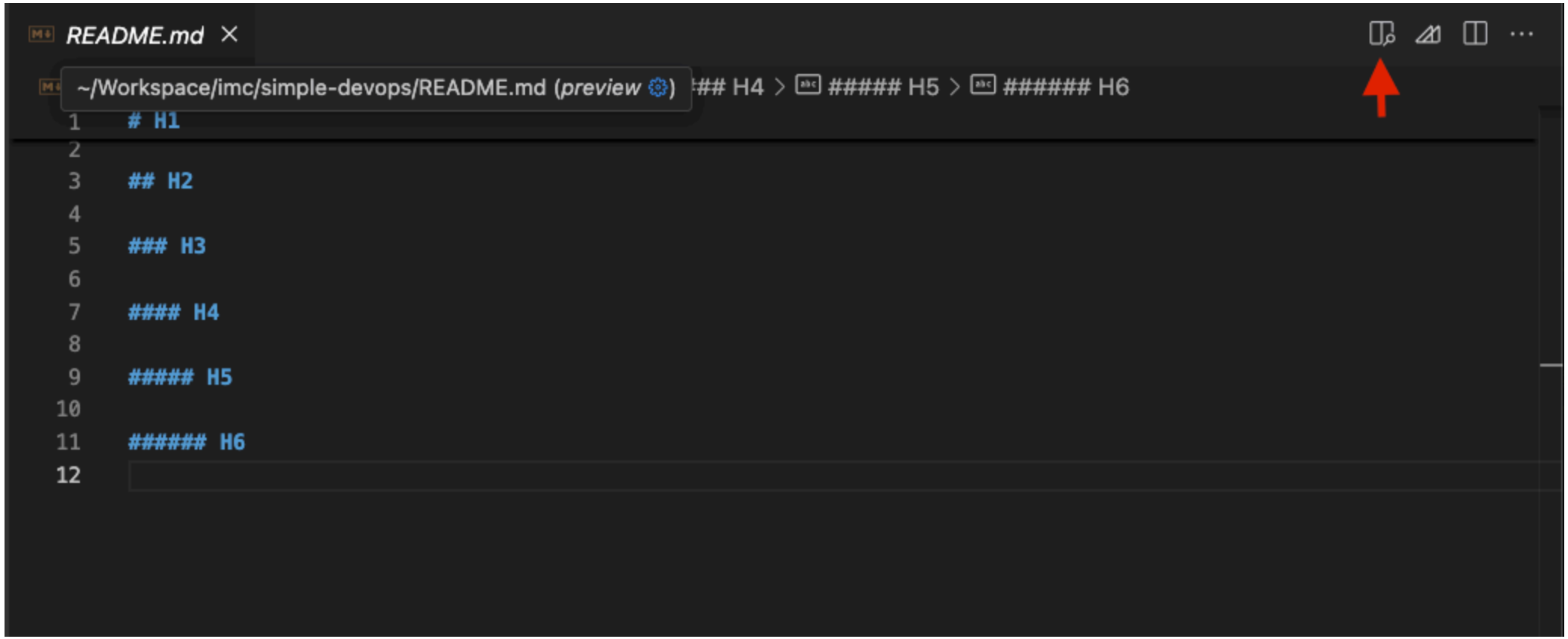
Step 1/8

- update file README.md

```
Orderd list

1. One
1. Two
1. Three

Unorderd list

- Line 1
- Line 2
- Line 3
```

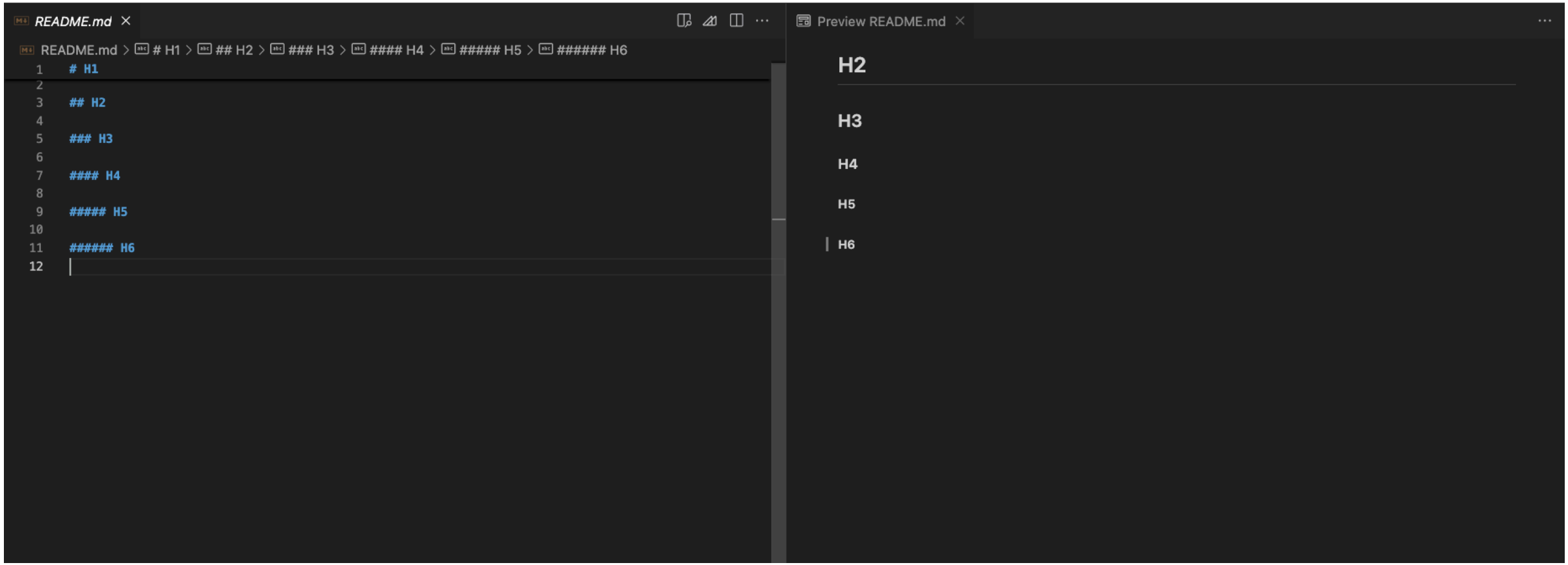
Step 2/8

- กดปุ่มตามลูกศรเพื่อเป็นการแสดงผล live preview ของ markdown



Step 3/8

- เมื่อเราแก้ไข code ทางด้านซ้าย vs-code จะทำการแสดงผลการทำงานที่ด้านขวา



Step 4/8

- เพิ่มเติม code เข้าไปที่ README.md

```
Image

![](https://placehold.co/600x400)

Table

Code | Name | Age |
---- | ---- | --- |
001  | Jame | 24  |
```

Step 5/8

- เพิ่ม code สำหรับการสร้าง code block

````
```javascript
let a = 0;
```


```python
print("Hello World")
```
````

Step 6/8

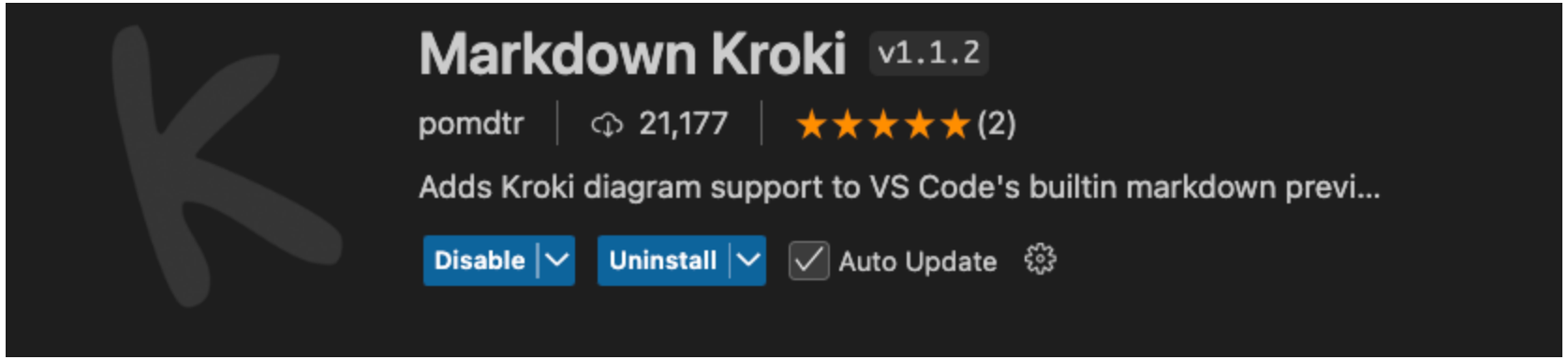
- เพิ่ม code สำหรับ สร้าง diagram เข้าไปที่ README.md

````
```mermaid
sequenceDiagram
    Alice->>John: Hello John, how are you?
    John-->>Alice: Great!
    Alice-)John: See you later!
```
````

Reference : Mermaid.js.org

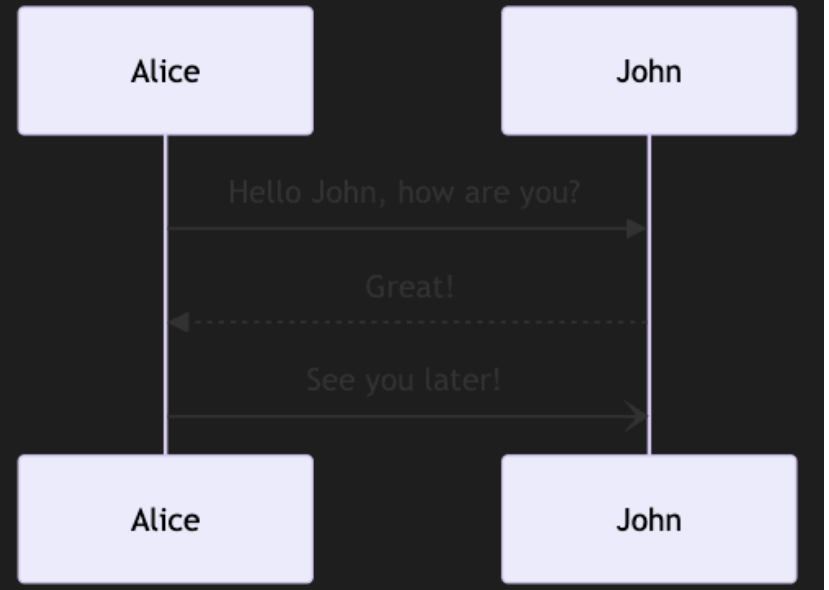
Step 7/8

- ติดตั้ง Extensions : Markdown Kroki เพื่อช่วยการ preview diagram



Step 8/8

````
```mermaid
sequenceDiagram
    Alice->>John: Hello John, how are you?
    John-->>Alice: Great!
    Alice-)John: See you later!
```
````

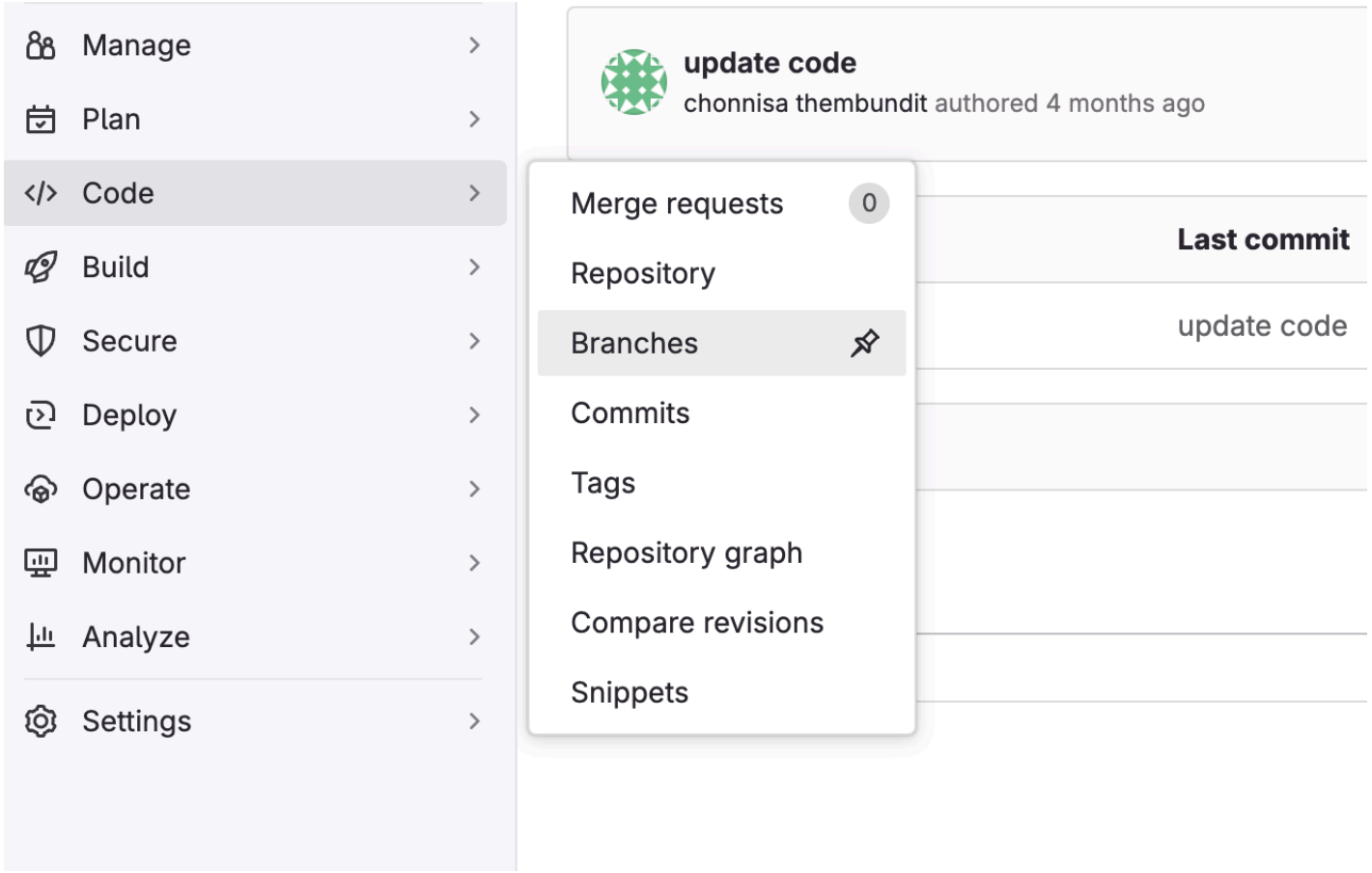


How to create new

BRANCH

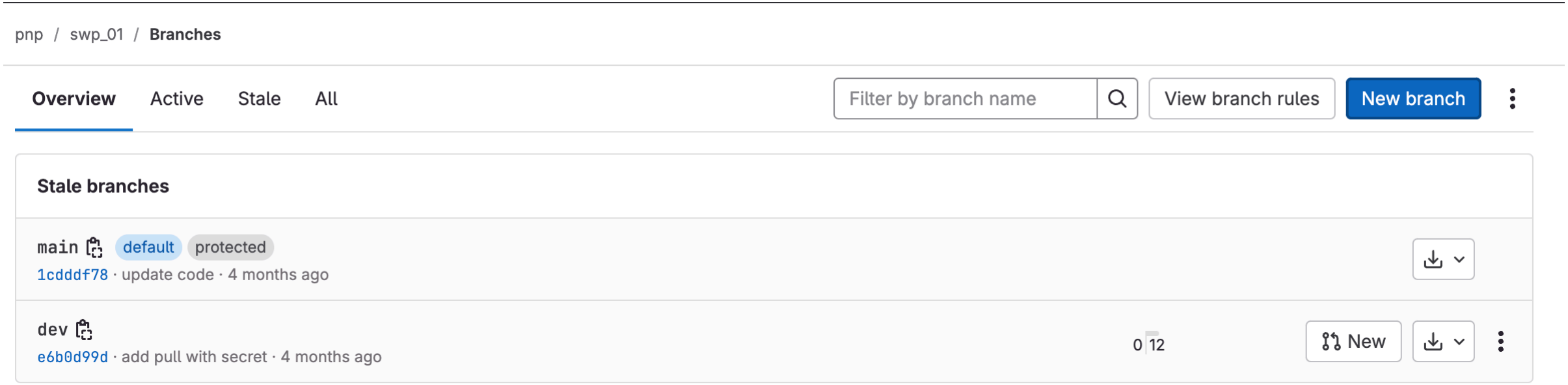
Step 1/4

- เข้าเมนูเพื่อเข้าสู่หน้าร Branch



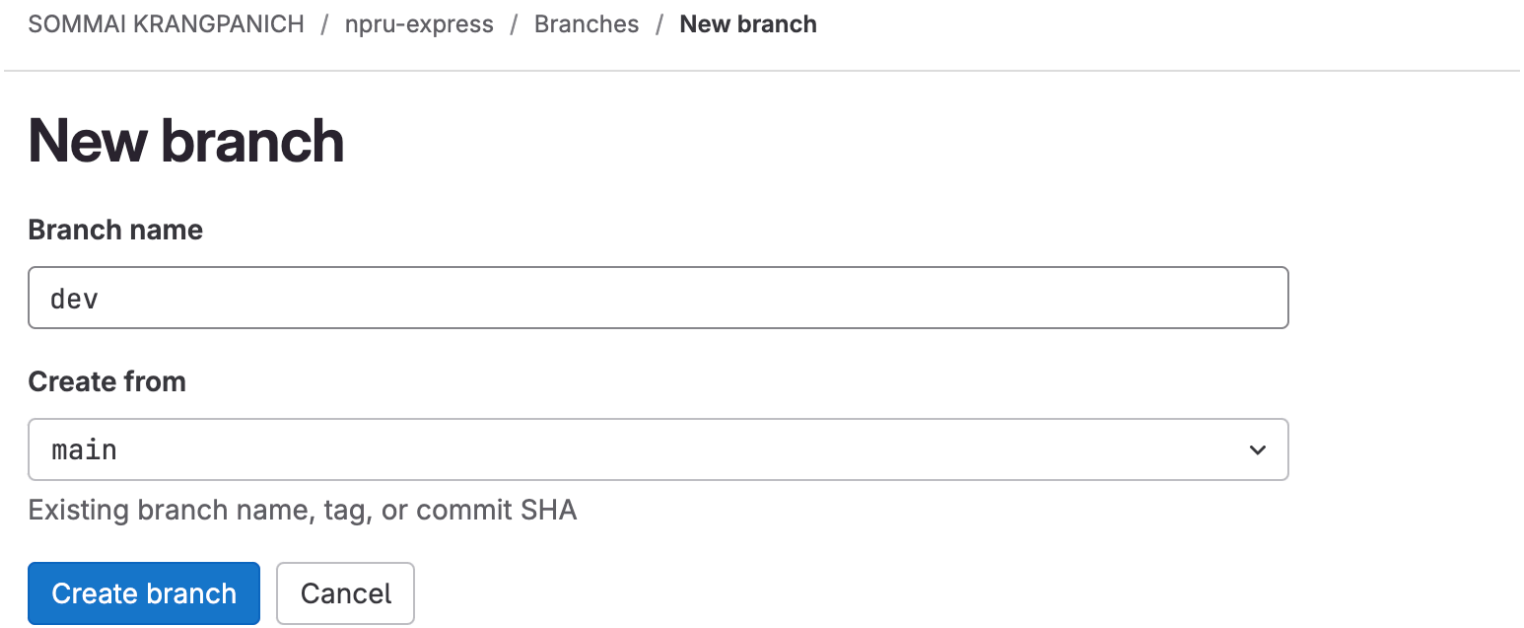
Step 2/4

- กดปุ่ม New Branch



Step 3/4

- ช่อง Branch name คือชื่อของ branch ที่ต้องการสร้าง
- ช่อง Create from คือชื่อของ branch ต้นทางที่เราต้องการตั้งต้นมา



Step 4/4

- ใช้คำสั่งดังนี้ใน terminal ของ vs-code เพื่อให้ vs-code ทำการ sync ข้อมูลเข้า branch ใหม่ที่เราได้สร้างขึ้นมาใหม่

```
git fetch
git switch <branch name>
```

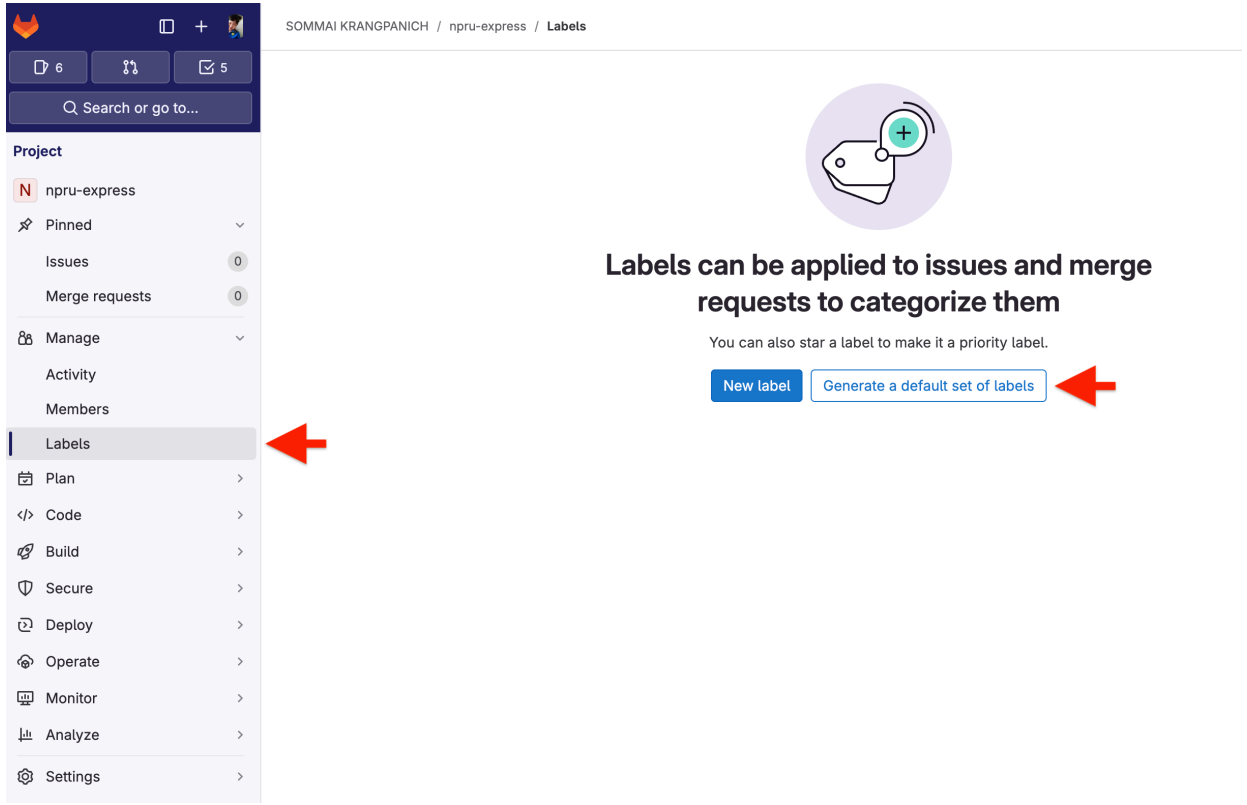
หมายเหตุ ให้เปลี่ยน `<branch name>` เป็นชื่อ branch ที่ต้องการ sync code ด้วย

Software life cycle management process with

GITLAB ISSUE

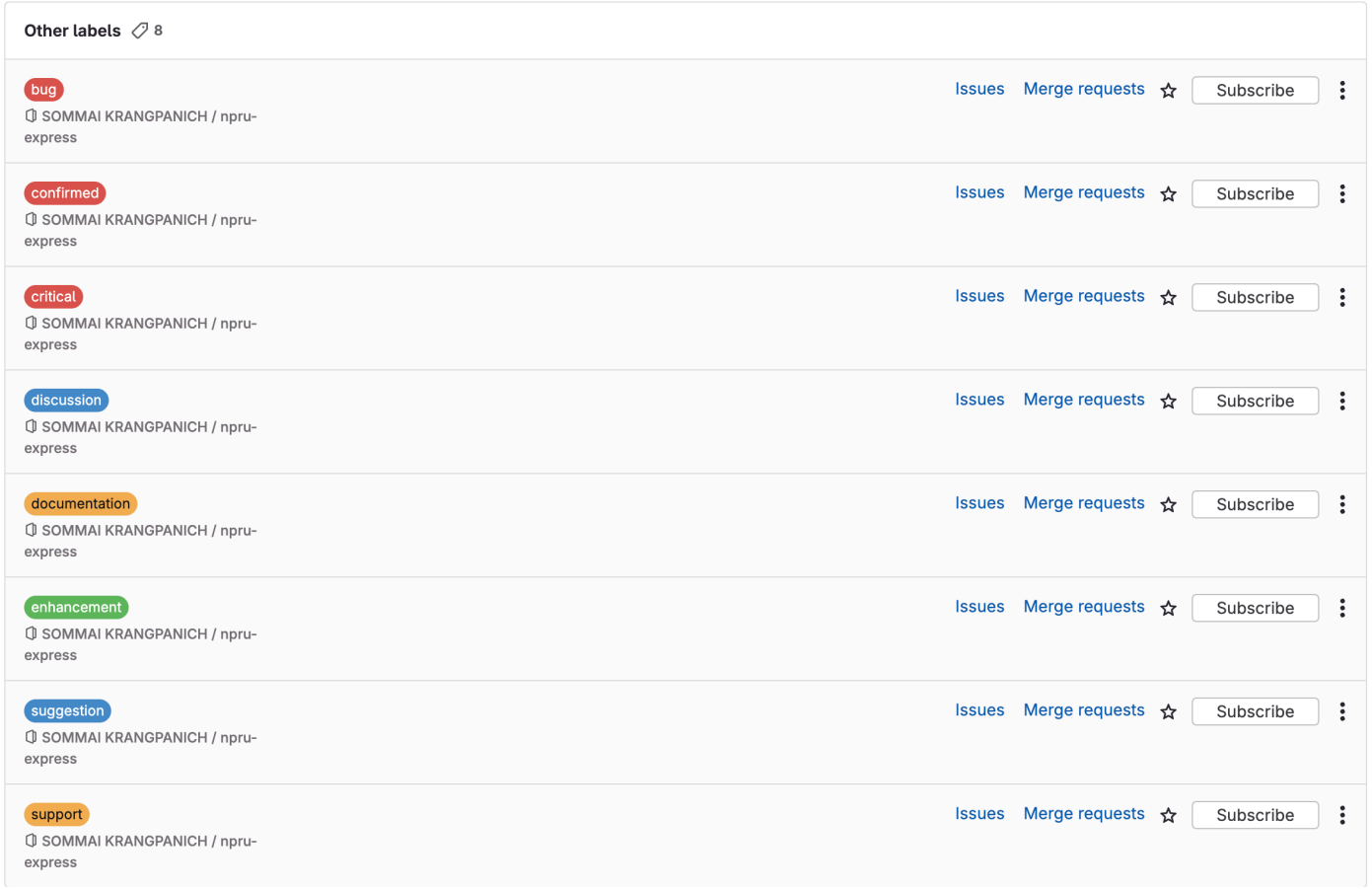
Step 1/8

- เข้าเมนู Manage / Labels
- กดปุ่ม Generate a default set of labels



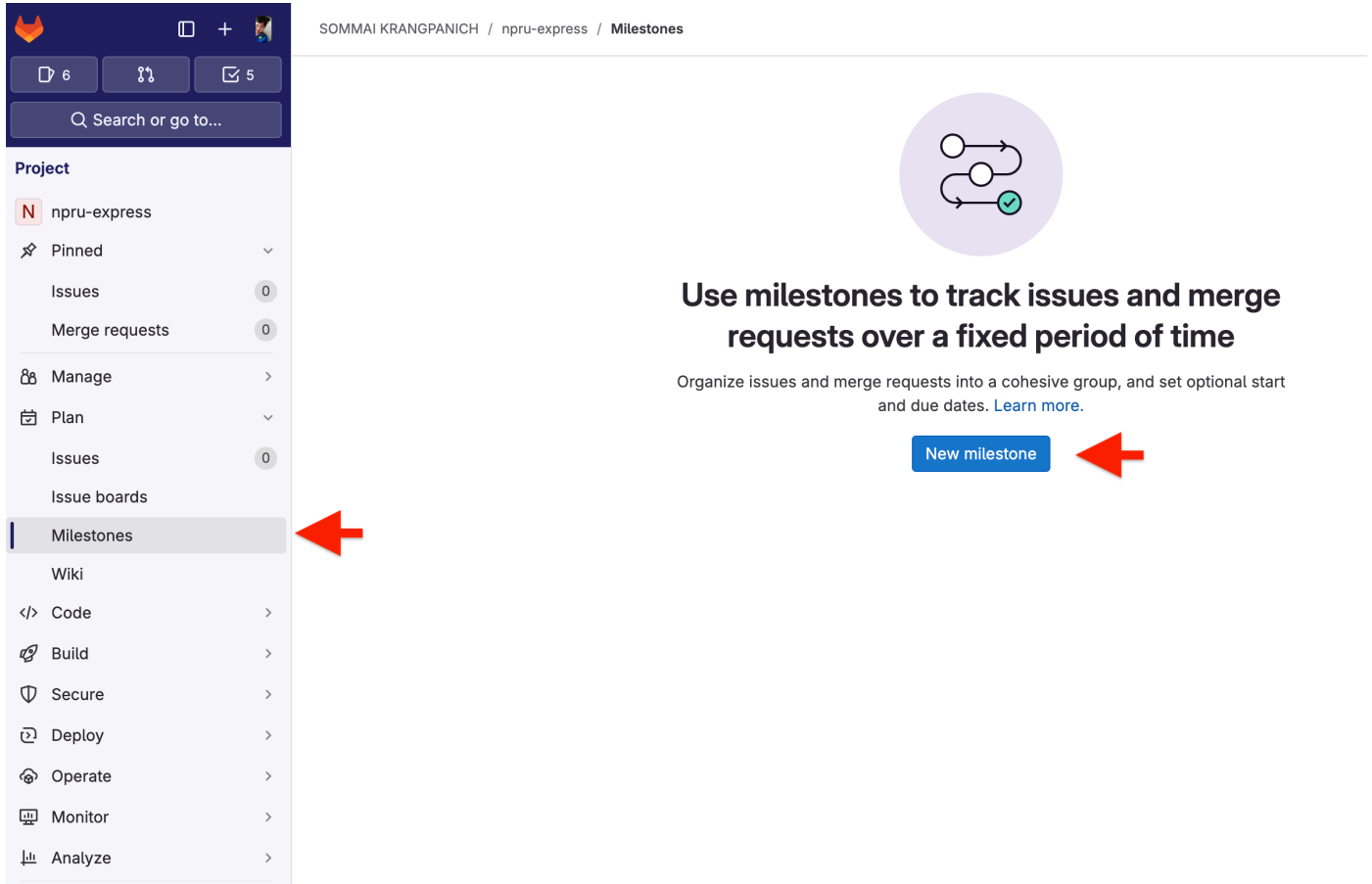
Step 2/8

- ผลจากการ generate



Step 3/8

- Create new milestone



Step 3/8

Title

Start Date

Select start date

Clear start date

Due Date

Select due date

Clear due date

Description

Preview

Write milestone description...

Switch to rich text editing

Create milestone | Cancel

Step 4/8

- รายละเอียดขอหน้าจอ Milestone

Field	Description	Example
Title	ชื่อ	Sprint #01
Start Date	วันที่เริ่มต้น	2023-01-01
Due Date	วันที่สิ้นสุด	2023-01-31
Description	รายละเอียด	รายชื่อ feature ที่จะส่งมอบ

Step 5/8

- ผลลัพธ์ของการสร้าง Milestone

Open **Milestone** Nov 1, 2024–Nov 30, 2024

Close milestone

Sprint #01

Issues 0 | Merge requests 0 | Participants 0 | Labels 0

Unstarted Issues (open and unassigned)	Ongoing Issues (open and assigned)	Completed Issues (closed)
0	0	0

0% complete

Start date Edit
Nov 1, 2024

Due date Edit
Nov 30, 2024 (26 days remaining)

Issues 0 New issue
Open: 0 **Closed: 0**

Time tracking
No estimate or time spent

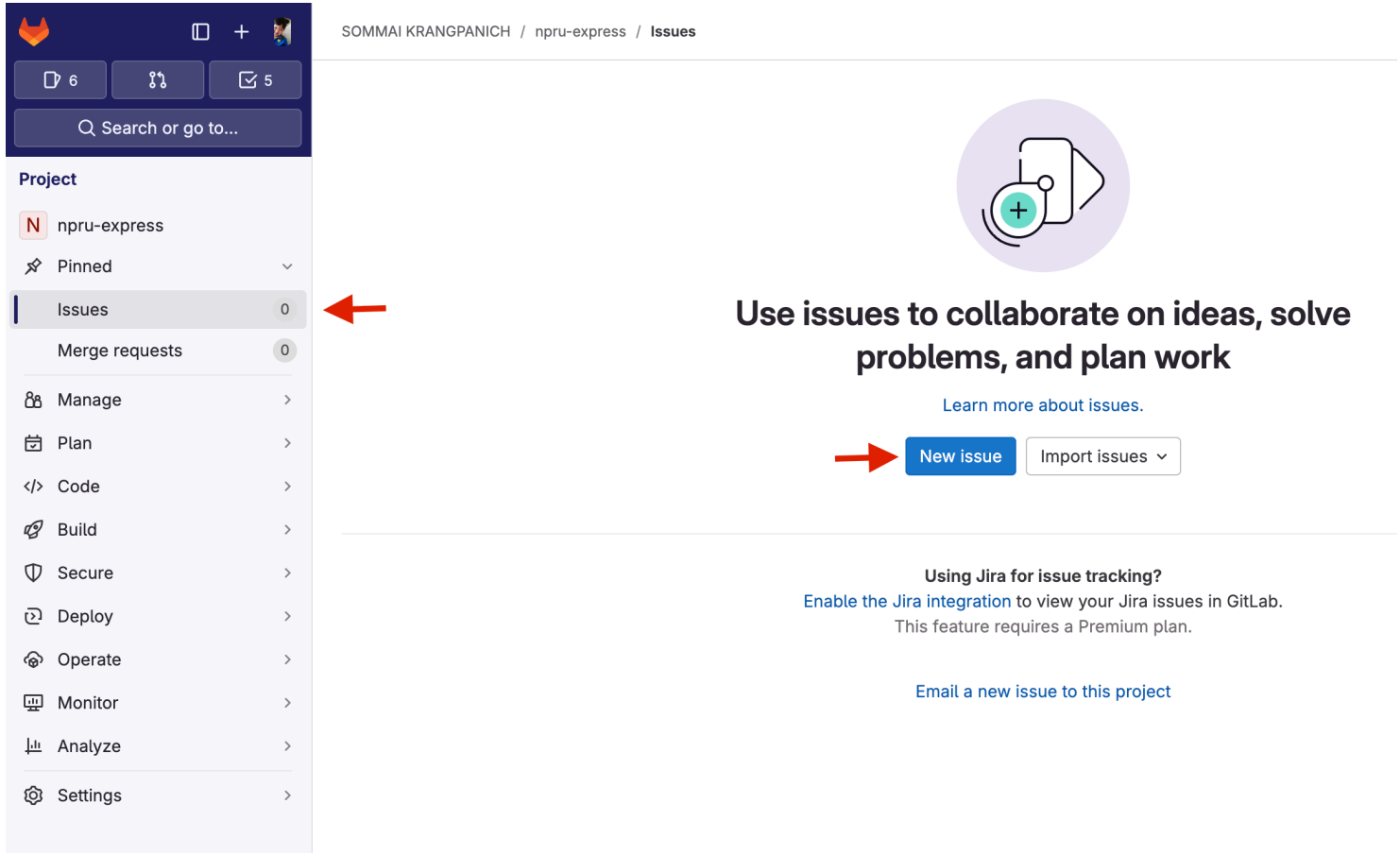
Merge requests 0
Open: 0 **Closed: 0** **Merged: 0**

Releases
None

Reference: sommai.k/npru-expr...

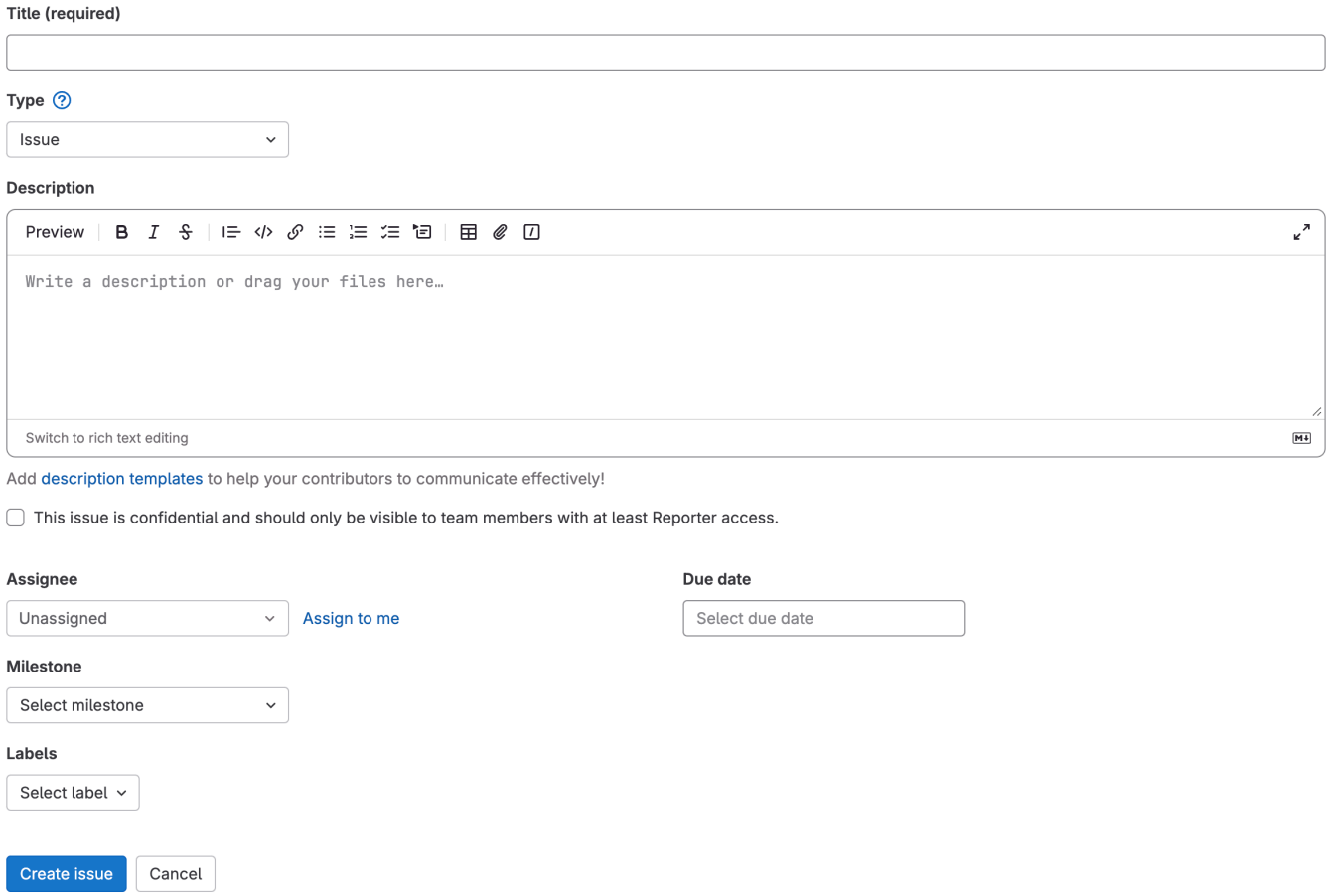
Step 6/8

- เข้าเมนู plan / issue



Step 7/8

- Create new issue



Step 8/8

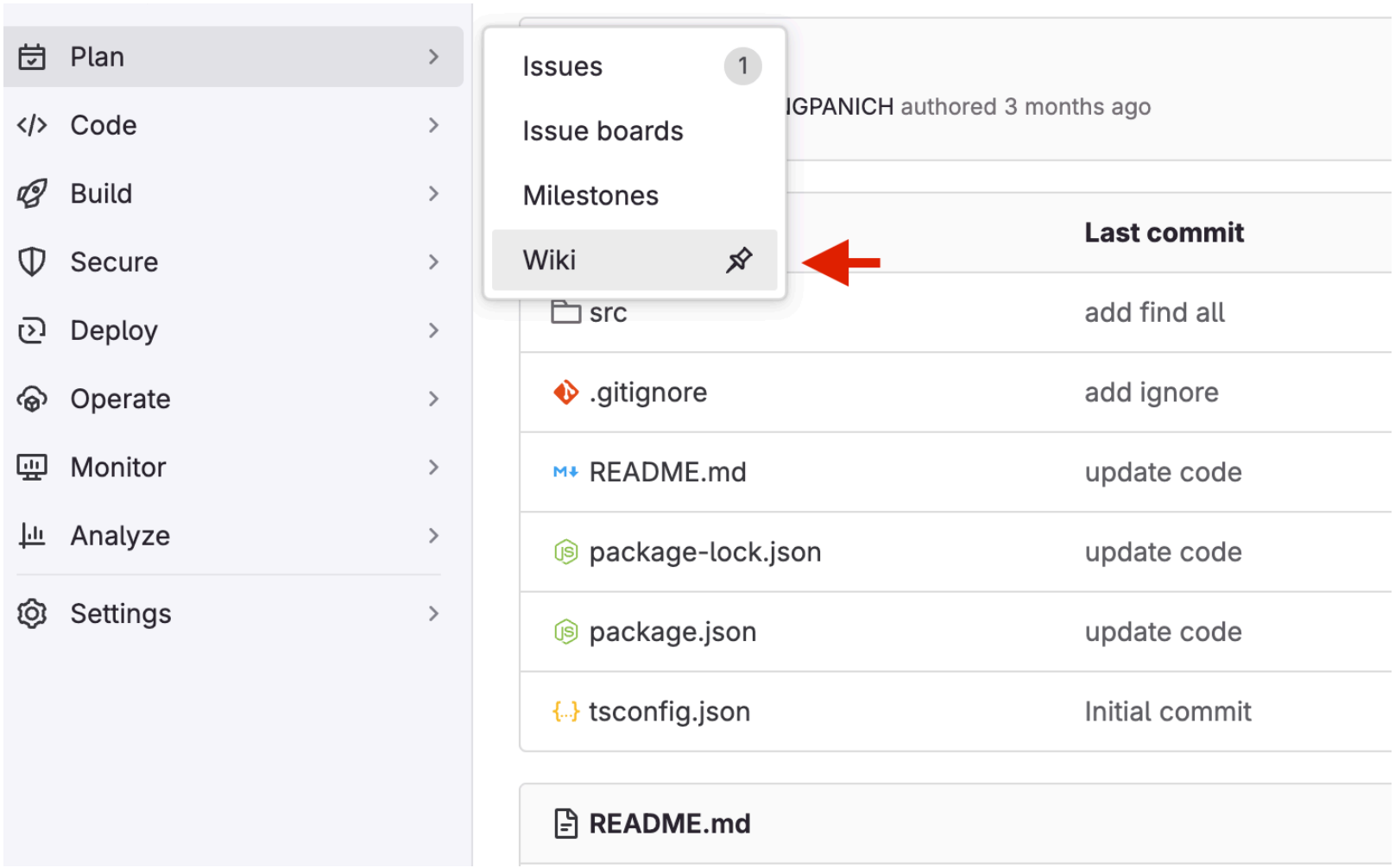
- รายละเอียดขอหน้าจอ Issue

Field	Description	Example
Title	ชื่อ	สร้างหน้าจอ Login
Type	ประเภท	Issue
Description	รายละเอียด	รายชื่อ feature ที่จะส่งมอบ
Assignee	ผู้รับผิดชอบ	
Due Date	วันที่สิ้นสุด	
Milestone	กรอบเวลา	
Lables	tag ประเภท	bug

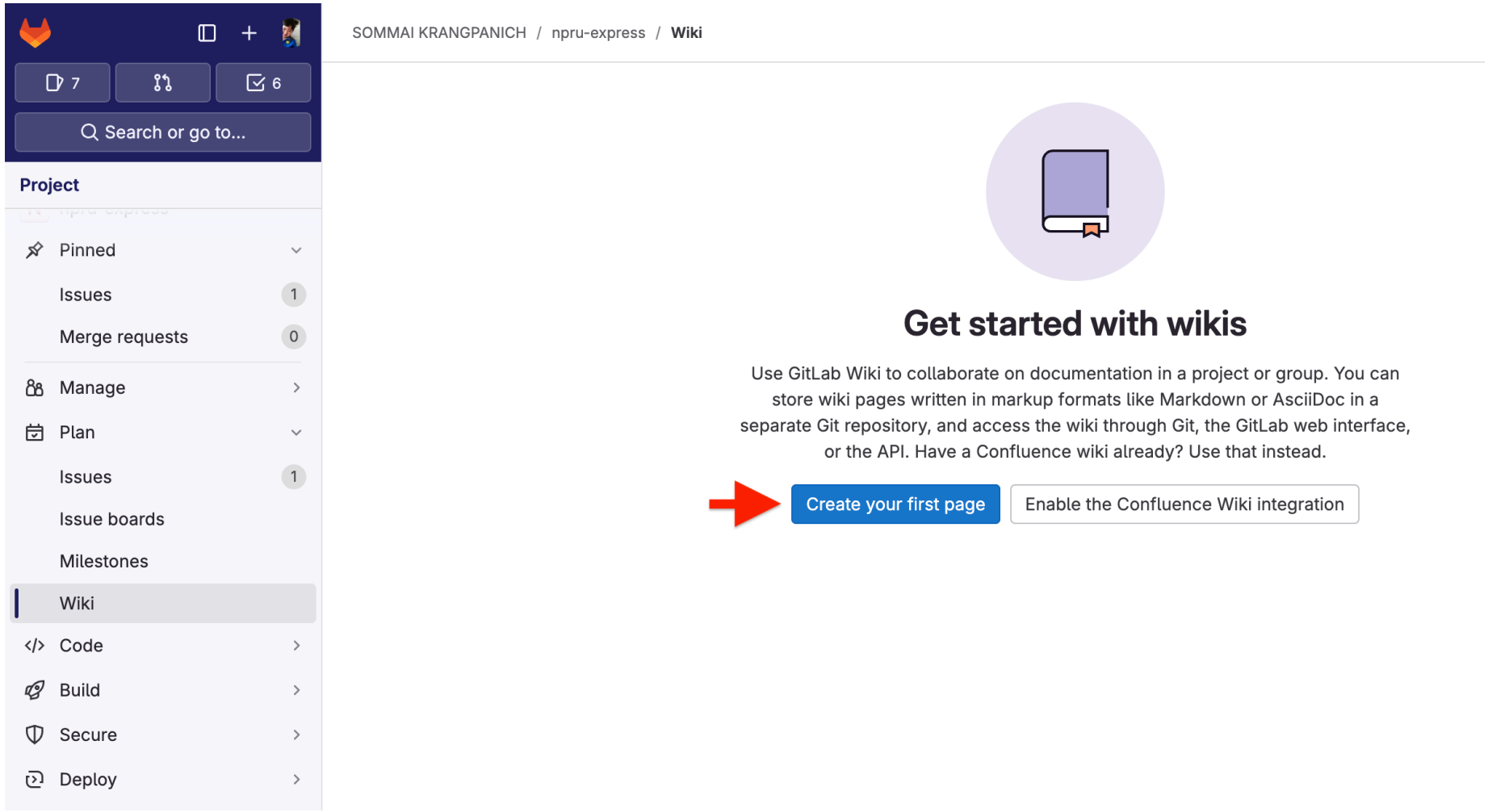
Knowledge sharing process with

GITLAB WIKI

Step 1/3


Plan
Code
Build
Secure
Deploy
Operate
Monitor
Analyze
Settings
Issues 1
Issue boards
Milestones
Wiki
IGPANICH authored 3 months ago
Last commit
src
add find all
.gitignore
add ignore
README.md
update code
package-lock.json
update code
package.json
update code
tsconfig.json
Initial commit
README.md

Step 2/3


7
6
Search or go to...
Project
Pinned
Issues 1
Merge requests 0
Manage
Plan
Issues 1
Issue boards
Milestones
Wiki
Code
Build
Secure
Deploy
SOMMAI KRANGPANICH / npru-express / Wiki
Get started with wikis
Use GitLab Wiki to collaborate on documentation in a project or group. You can store wiki pages written in markup formats like Markdown or AsciiDoc in a separate Git repository, and access the wiki through Git, the GitLab web interface, or the API. Have a Confluence wiki already? Use that instead.
Create your first page
Enable the Confluence Wiki integration

Step 3/3

Title

home

Path

home

Generate page path from title

Format

Markdown

Content

Preview

Write your content or drag files here…

Switch to rich text editing

To link to a (new) page, simply type `[Link Title](page-slug)`. More examples are in the documentation.

Commit message

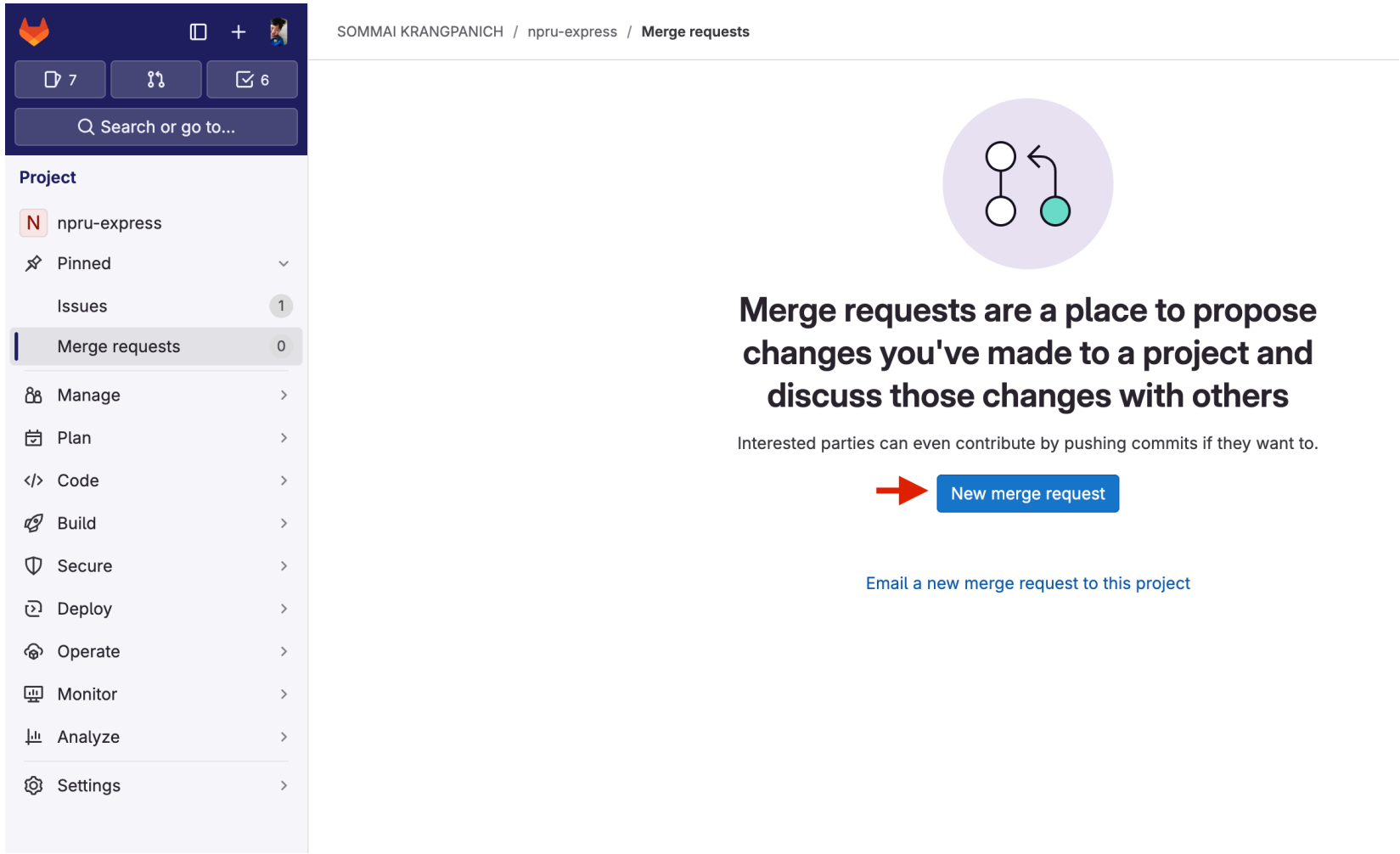
Create home

Create page Cancel

How to use

MERGE REQUEST PROCESS

Step 1/5


7
6
Search or go to...
Project
npru-express
Pinned
Issues 1
Merge requests 0
Manage
Plan
Code
Build
Secure
Deploy
Operate
Monitor
Analyze
Settings
SOMMAI KRANGPANICH / npru-express / Merge requests
Merge requests are a place to propose changes you've made to a project and discuss those changes with others
Interested parties can even contribute by pushing commits if they want to.
New merge request
Email a new merge request to this project

Step 2/5

New merge request

Source branch

sommai.k/npru-express | dev

add find all
SOMMAI KRANGPANICH authored Jul 26, 2024

717aa15f

Target branch

sommai.k/npru-express | main

add find all
SOMMAI KRANGPANICH authored Jul 26, 2024

717aa15f

Compare branches and continue

Step 3/5

New merge request

From `dev` into `main` Change branches

Title (required)

Draft: Dev

Mark as draft
Drafts cannot be merged until marked ready.

Description

Preview

Describe the goal of the changes and what reviewers should be aware of.

Switch to rich text editing

Add description templates to help your contributors to communicate effectively!

Step 4/5

Assignee

Unassigned Assign to me

Reviewer

Unassigned

Milestone

Select milestone

Labels

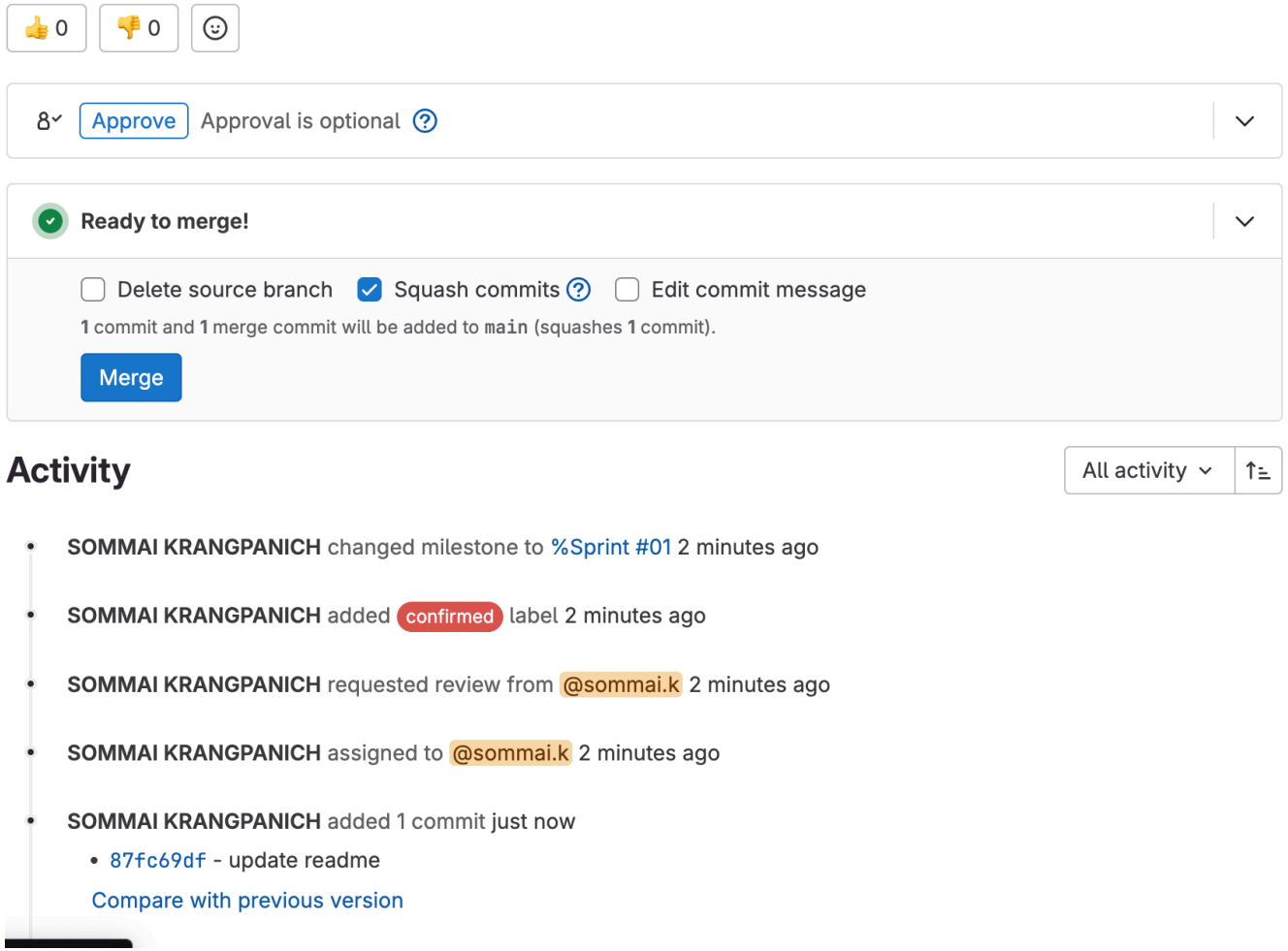
Select label

Merge options

- [x] Delete source branch when merge request is accepted.
- [ ] Squash commits when merge request is accepted.

Create merge request Cancel

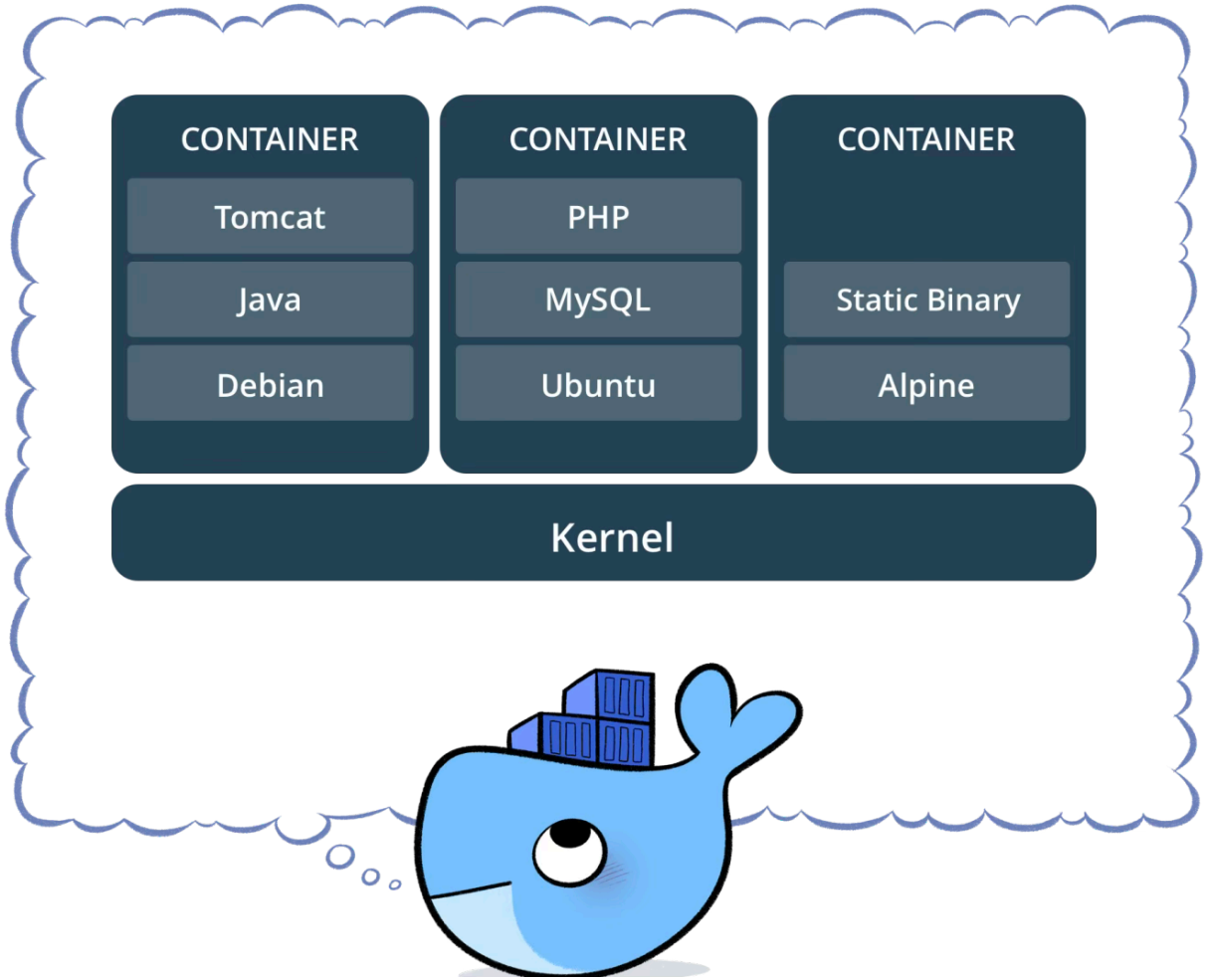
Step 5/5


0
0
Approve
Approval is optional
Ready to merge!
Delete source branch
Squash commits
Edit commit message
1 commit and 1 merge commit will be added to main (squashes 1 commit).
Merge
Activity
All activity
SOMMAI KRANGPANICH changed milestone to %Sprint #01 2 minutes ago
SOMMAI KRANGPANICH added confirmed label 2 minutes ago
SOMMAI KRANGPANICH requested review from @sommai.k 2 minutes ago
SOMMAI KRANGPANICH assigned to @sommai.k 2 minutes ago
SOMMAI KRANGPANICH added 1 commit just now
87fc69df - update readme
Compare with previous version

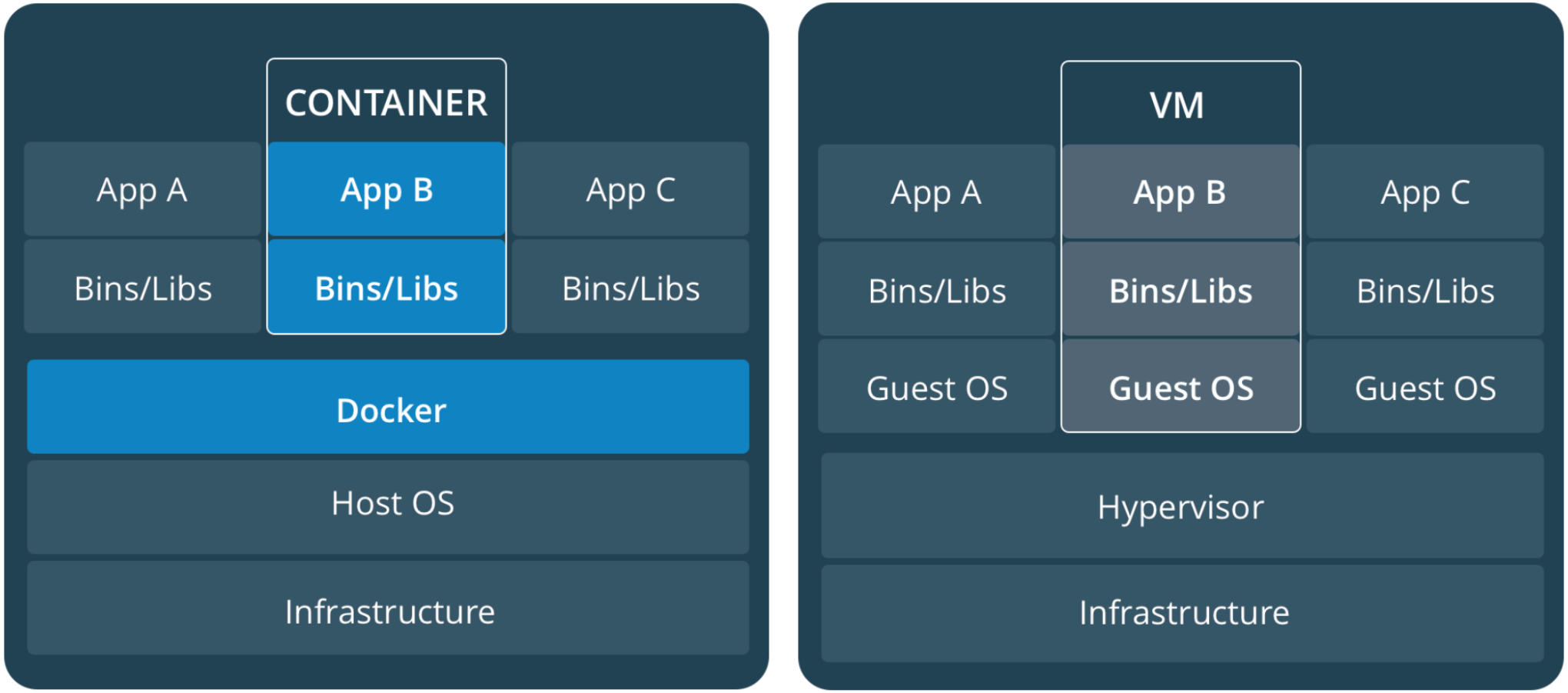
Containers vitualize with

DOCKER

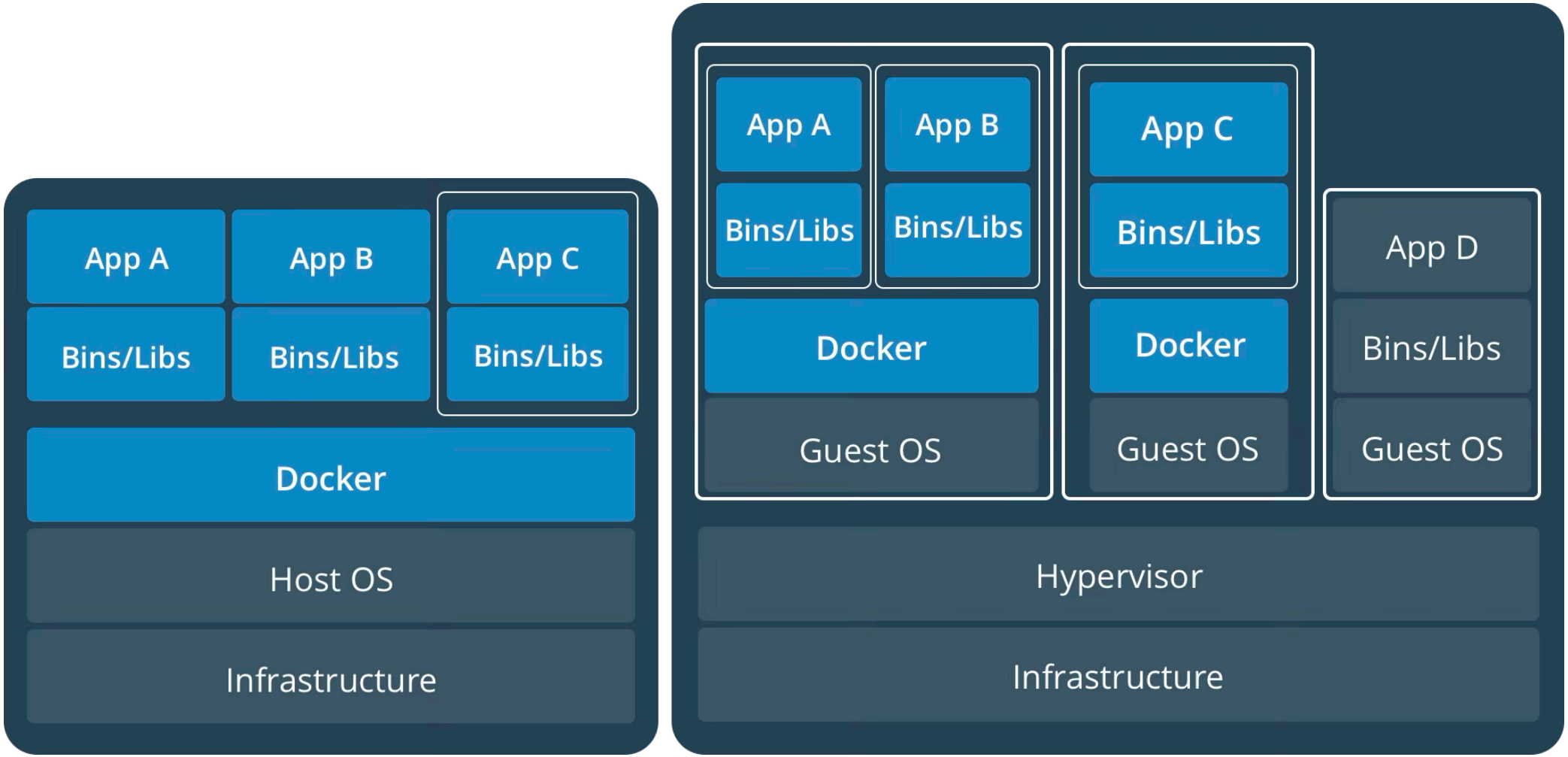
About Container



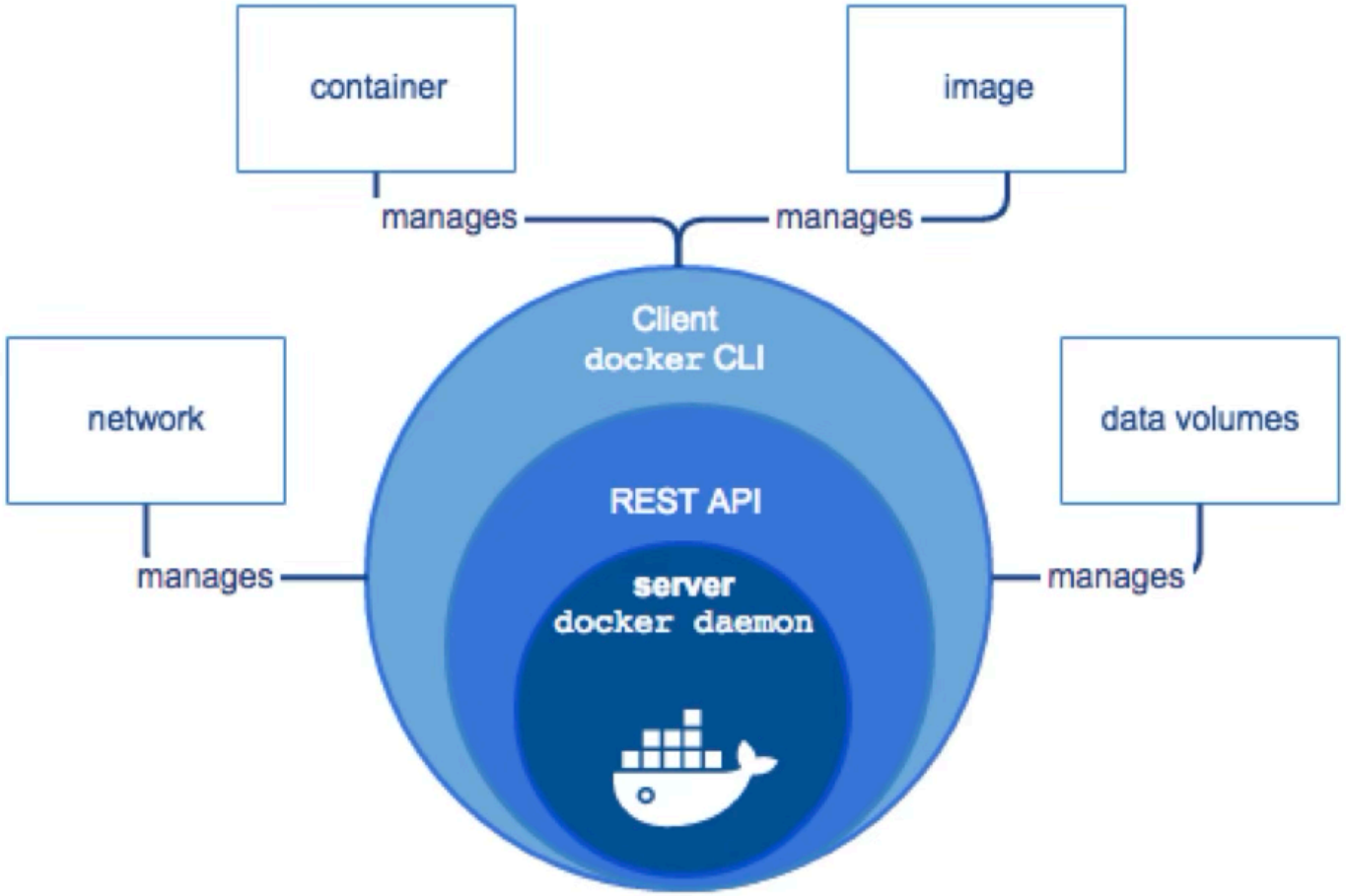
Comparing Containers and Virtual Machines



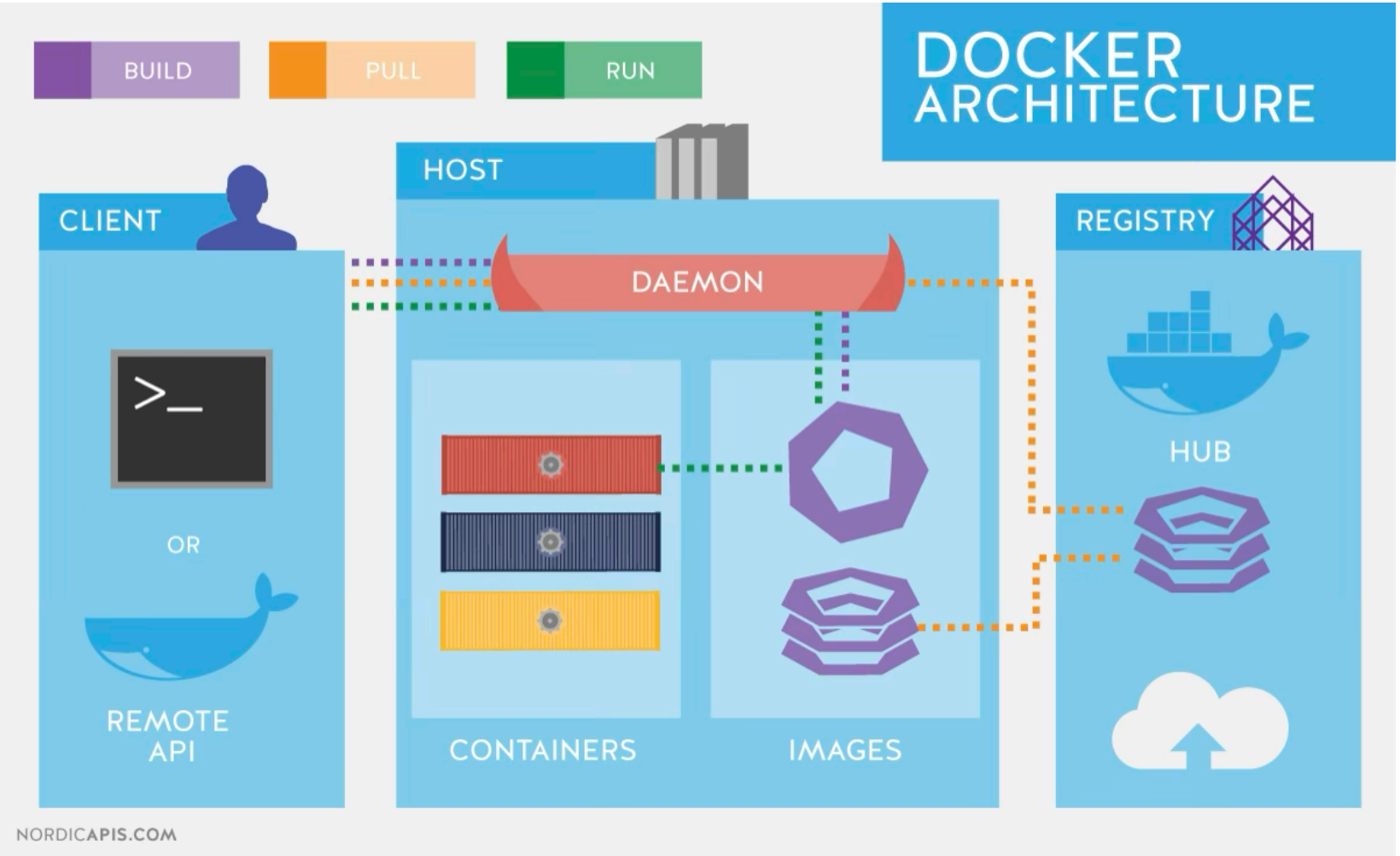
Containers and Virtual Machines Together



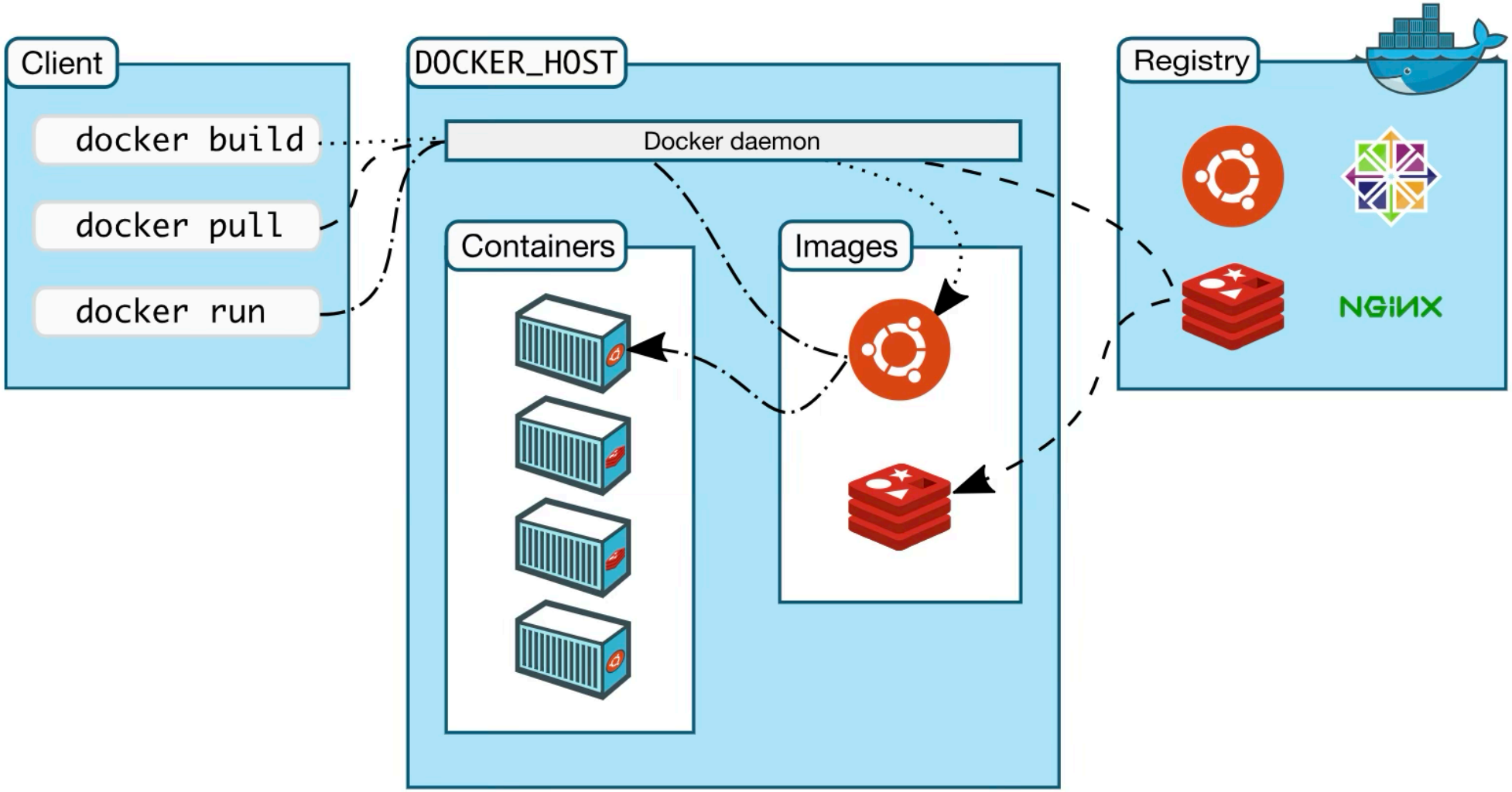
Docker engine



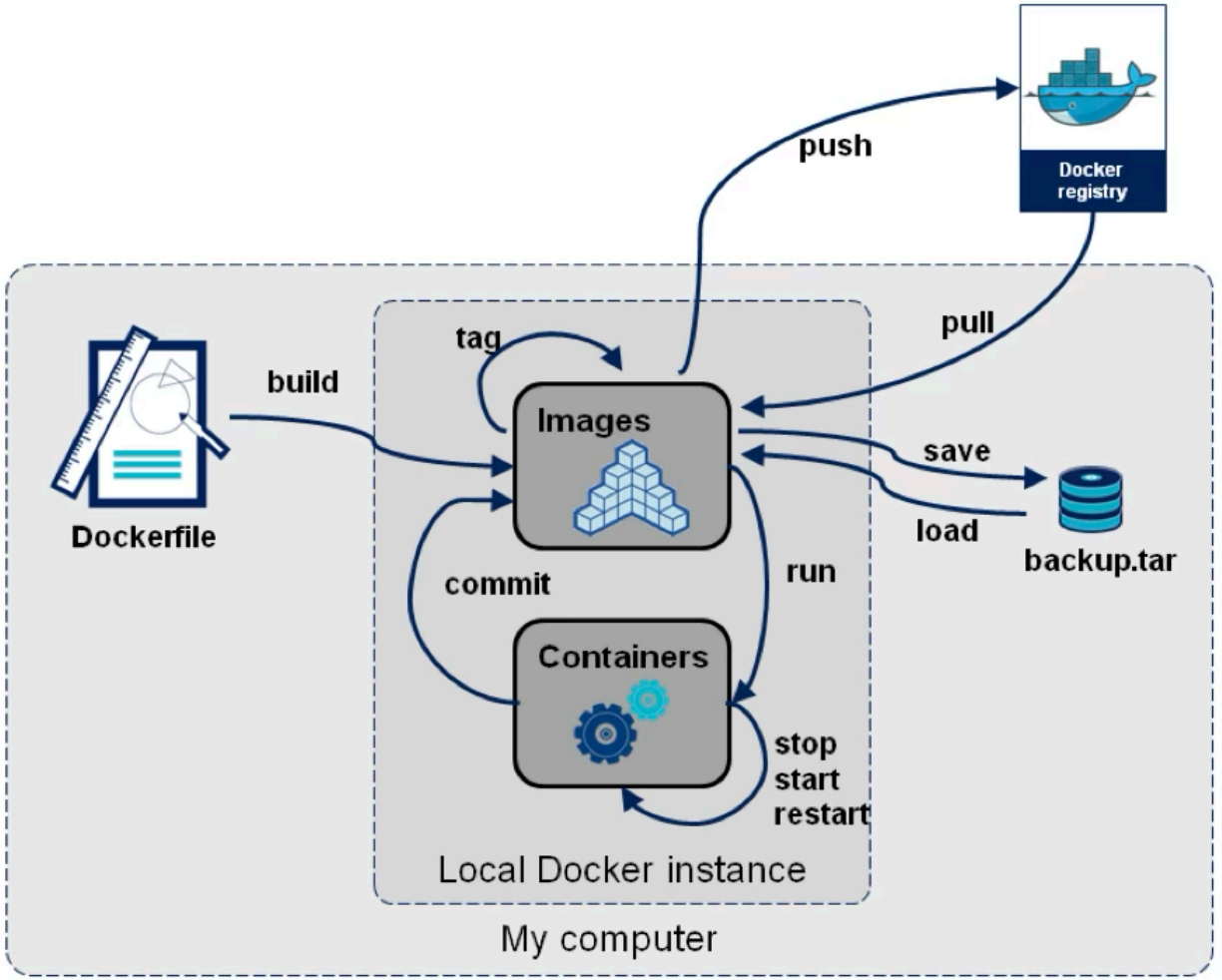
Docker Architecture



Docker Architecture #2



Docker Architecture #3



Docker Workshop

Hello World Docker

เปิด cmd แล้วรันคำสั่งดังนี้

```
docker run --name some-nginx -p 9080:80 -d nginx
```

> link สำหรับหา image https://hub.docker.com

เปิด browser เข้า url ดังนี้ `http://localhost:9080`

สร้าง file index.html

- สร้าง folder ชื่อ html
- สร้าง file index.html แล้วใส่ code ดังนี้

```
<h1>Hello World</h1>
```

- เปิด cmd อีก tab แล้ว run คำสั่งดังนี้

```
docker run --name my-nginx -p 9081:80 -d -v <your project path>:/usr/share/nginx/html nginx
```

เปิด browser เข้า url ดังนี้ `http://localhost:9081`

Docker Command

Login

```
docker login
docker login -u <user_name>
docker login -u <user_name> -p <password>
```

Logout

```
docker logout
```

List all image

```
docker images
docker image ls
```

Docker Command #2

Search image

```
docker search <image name>
```

Pull image

```
docker pull <image name>
```

Create container from image

```
docker create <options> <image name> --name -v -p
docker create --name ubuntu14 -v /user/sommaik:/home ubuntu:14.04
```

Docker Command #3

Start Container

```
docker start <container_id> or <container_name>
```

Stop Container

```
docker stop <container_id> or <container_name>
```

Stop all container

```
docker stop $(docker ps -a -q)
```

List all container

```
docker ps <options>
```

Docker Command #4

Pause Container

```
docker pause <container_id> or <container_name>
```

Unpause Container

```
docker unpause <container_id> or <container_name>
```

Exec Container

```
docker exec -it <container_id> bash
```

Inspect Container

```
docker inspect <container_id>
```

Docker Command #5

Logs container

```
docker logs <options>
```

Commit Container

```
docker commit <container_id> <new_image_name>
docker commit 2x5t aloha
```

Push Image

```
docker push <account>/<image name>
```

Tag

```
docker tag ubuntu ubuntu-x
```

Docker Command #6

Export container

```
docker export <container_id> > <to_path>
```

Import container

```
docker import – <from_path>
```

Save Image

```
docker save <image name> > <to path>
docker save <image name>:<tag> > <to path>
```

Load Image

```
docker load < <from path>
```

Docker Command #7

Remove container

```
docker rm <container_id>
```

Remove all stop container

```
docker rm $(docker ps -a -q)
```

Remove Image

```
docker rmi <image_id>
```

Docker Network

List all network

```
docker network ls
```

Create new network

```
docker network create <network_name> default bridge
docker network create --subnet 10.0.0.1/24 <network_name>
docker network create my-net (create images networks)
```

Inspect network

```
docker network inspect <network_name>  or <container_id>
```

Use network

```
docker run --network <network_name> <image_name>
docker run -it --name <container_name> --net--alias alias2 --network <network_name> <image_name>
```

Docker run command parameter

Parameter	Description
-d	Run in the background
--name	Create name to container is running
-p	Port mapping (local_port:container_port)
-h	Container host name
-e	Environment
-v	Map volume paths
-i	Keep STDIN open even if not attached
-t	Allocate a pseudo-TTY
--network	Use network

How to create Dockerfile for

BUILD CUSTOM DOCKER IMAGE

Dockerfile

FROM

```
FROM <image>[:<tag>]
FROM ubuntu:14.04
```

RUN

```
RUN <command>
RUN echo “Hello World”
```

EXPOSE

```
EXPOSE <port>
EXPOSE 8080
```

COPY

```
COPY <local_path> <container_path>
COPY ./tomcat/context.xml /usr/local/tomcat/conf
```

Dockerfile #2

ENV

```
ENV <key> <value>
```

CMD

```
CMD command param1 param2
```

WORKDIR

```
WORKDIR /path/to/workdir
```

VOLUME

```
VOLUME /path
```

Dockerfile #3

Build

```
docker build <option> <path> -t <tagname> .
```

Example

```
docker build -t first .
```

Works shop การสร้าง docker image

- สร้าง file ชื่อ Dockerfile

```
FROM nginx:alpine
COPY ./html /usr/share/nginx/html
```

- run คำสั่งเพื่อ build image

```
docker build -t my-first-image .
```

- ตรวจสอบผลการ build

```
docker image ls my-first-image
```

Container orchestration with

DOCKER COMPOSE

Docker compose

file name

```
docker-compose.yaml
```

Example

```yaml
services:
  hello:
    image: nginx:alpine
    ports:
      - 9085:80
```

docker compose cli

Start docker compose

```
docker compose up -d –build
```

Start docker compose with create new

```
docker compose up -d --force-recreate
```

List all container

```
docker compose ps
```

Stop all container

```
docker compose stop
```

docker compose cli #2

Delete all container

```
docker compose rm
```

Stop and delete all container

```
docker compose down
```

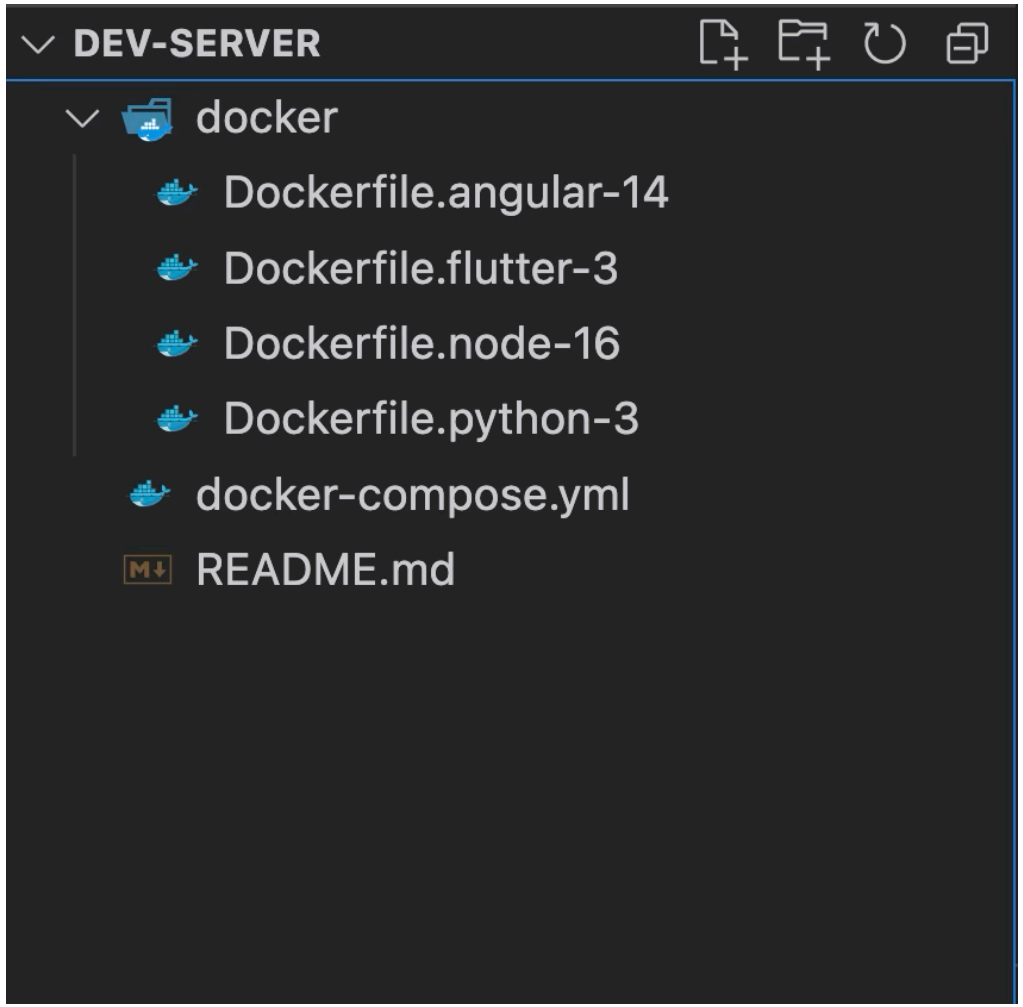
List all compose

```
docker compose list
```

How to

REMOTE DEVELOPMENT

Step 1 Create docker folder and file



Step 2 Create Docker.node-18 file

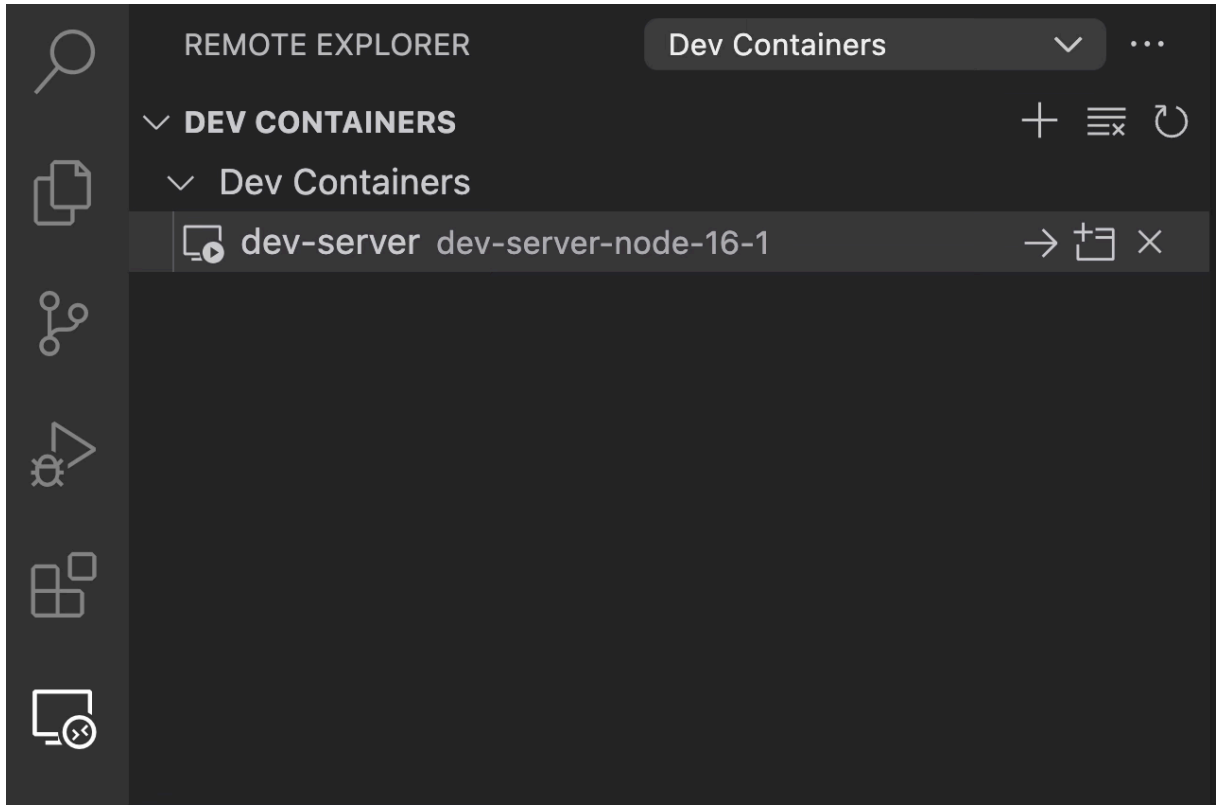
```
FROM node:18-alpine
RUN apk add git
```

Step 3 Create docker-compose.yml

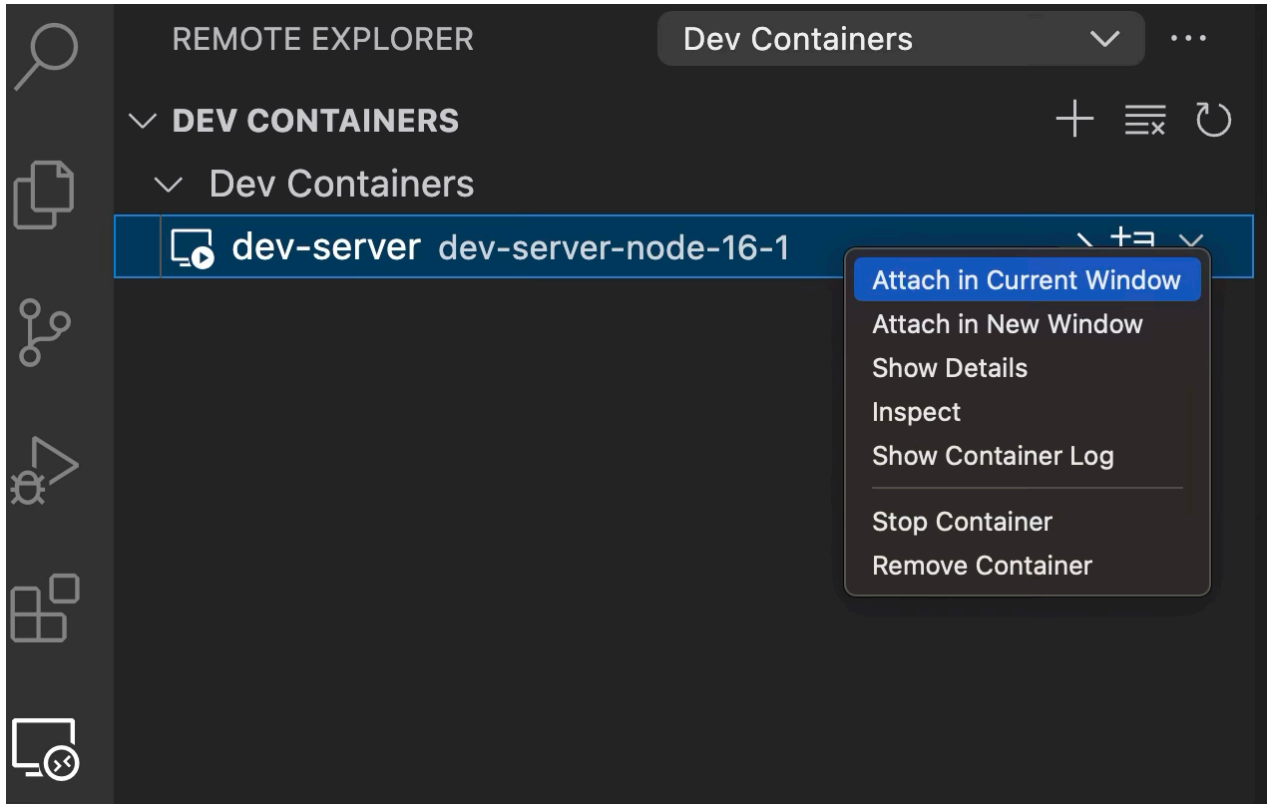
```
volumes:
  dev_data:
services:
  node-18:
    build:
      context: .
      dockerfile: docker/Dockerfile.node-18
    restart: on-failure
    command: ["sleep", "infinity"]
    volumes:
      - dev_data:/home/dev/source
```

Step 4 Connect to container

```
docker compose up -d node-18
```

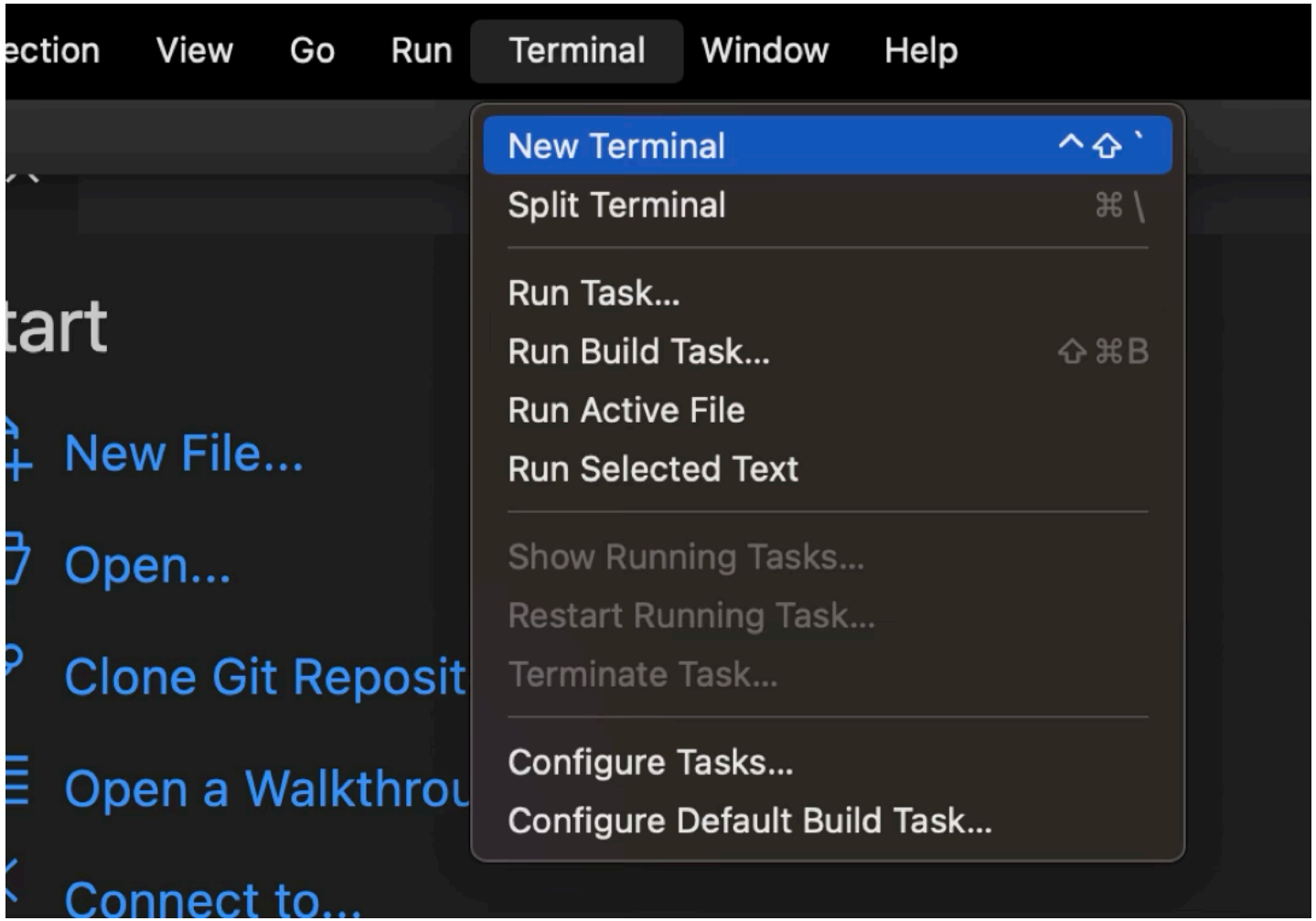


Step 5 Attach in current window

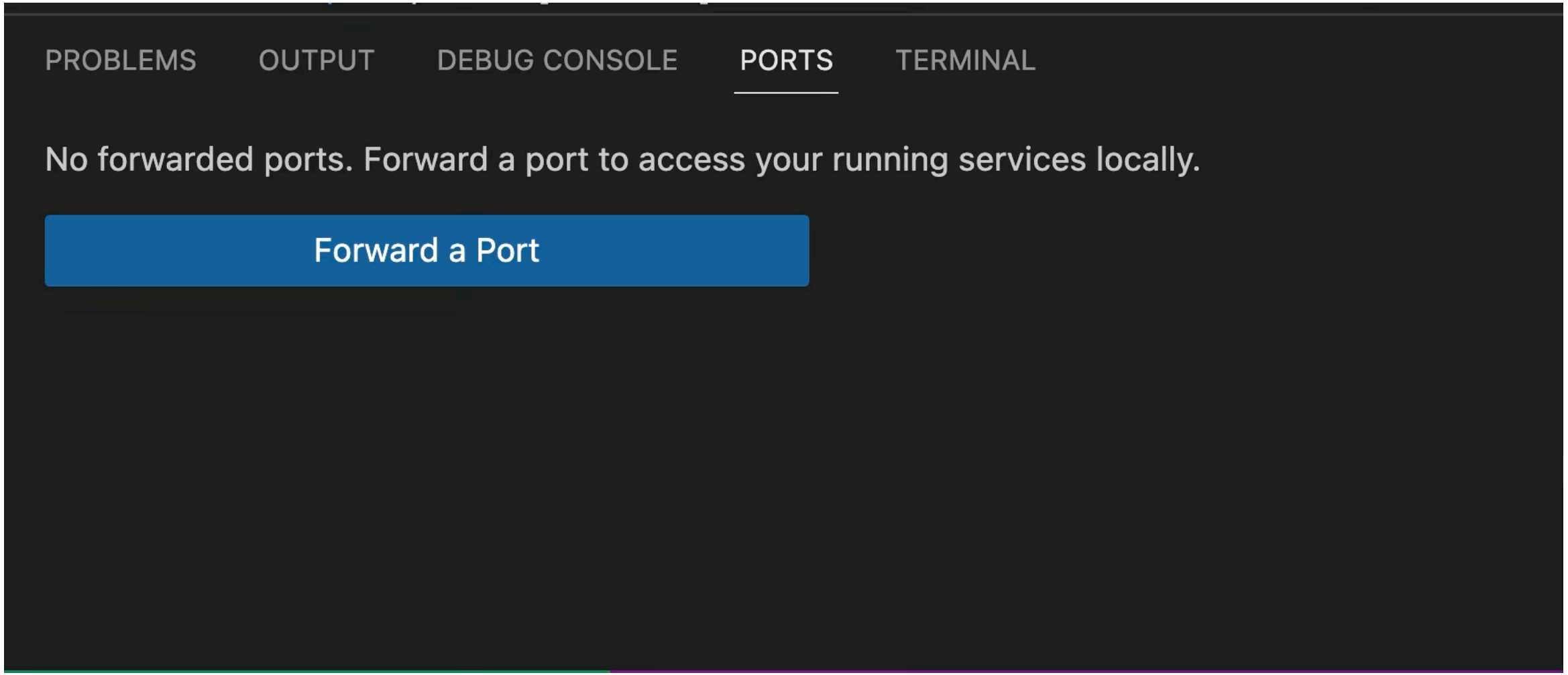


Step 6 Connect to container success

Step 7 Open terminal



Step 8 Tunnel



How to debug

CUSTOM DOCKER IMAGE

Step to debug

- run คำสั่งเพื่อหาชื่อ container ที่ต้องการจะ debug

```
docker ps -a
```

- run คำสั่งเพื่อเข้าไปทำงานภายใน container

```
docker exec -it <container-name bash
```

หมายเหตุ เปลี่ยน `<container-name>` เป็นชื่อ container ที่ต้องการเข้าไป debug

- หลังจากนั้นเราจะสามารถใช้คำสั่งของ container นั้น ๆ ได้
- ในกรณีที่ใช้งานเสร็จแล้วให้ออกโดยใช้คำสั่ง `exit`

How to push custom docker image to

DOCKER REGISTRY

Step

- login เข้าไปที่ registry server

```
docker login <registry-server>
```

- ตั้งชื่อ image ให้ตรงกับ container registry pattern ดังนี้ `registry-server` / `owner` / `project-name` : `tag`
- ในกรณีชื่อไม่ตรงตาม pattern ให้ใช้คำสั่งนี้ในการสร้างให้ชื่อตรงกัน

```
docker tag <old-name> <new-name>
```

- ใช้คำสั่งนี้ในการนำ image ขึ้นไปเก็บบน registry

```
docker push <image-name>:<tag>
```

หมายเหตุ ต้องเปลี่ยน `<image-name>` เป็นชื่อ image ตัวที่เราต้องการนำขึ้นไป ส่วน `<tag>` ถ้าไม่ระบุจะระบบจะค่า default เป็น `latest`

Introduction to containerization

WHAT IS CONTAINERIZATION

What is containerization

- Each container that you run is repeatable; the standardization from having dependencies included means that you get the same behavior wherever you run it.
- Containers decouple applications from underlying host infrastructure. This makes deployment easier in different cloud or OS environments.
- Each node in a Kubernetes cluster runs the containers that form the Pods assigned to that node. Containers in a Pod are co-located and co-scheduled to run on the same node

Introduction to containerization

WHAT IS KUBERNETES

What is Kubernetes

- Kubernetes is an open-source system that automates container deployment tasks. It was originally developed at Google but is now maintained as part of the Cloud Native Computing Foundation (CNCF).
- Kubernetes has risen to prominence because it solves many of the challenges around using containers in production. It makes it easy to launch limitless container replicas, distribute them across multiple physical hosts, and set up networking so users can reach your service.
- Most developers begin their container journey with Docker. While this is a comprehensive tool, it's relatively low-level and relies on CLI commands that interact with one container at a time. Kubernetes provides much higher-level abstractions for defining applications and their infrastructure using declarative schemas you can collaborate on.

Introduction to containerization

KUBERNETES FEATURES

Kubernetes features

Kubernetes has a comprehensive feature set that includes a full spectrum of capabilities for running containers and associated infrastructure:

- **Automated rollouts, scaling, and rollbacks** – Kubernetes automatically creates the specified number of replicas, distributes them onto suitable hardware, and takes action to reschedule your containers if a node goes down. You can instantly scale the number of replicas on-demand or in response to changing conditions such as CPU usage.
- **Service discovery, load balancing, and network ingress** – Kubernetes provides a complete networking solution that covers internal service discovery and public container exposure.
- **Stateless and stateful applications** – While Kubernetes initially focused on stateless containers, it's now also got built-in objects to represent stateful apps too. You can run any kind of application in Kubernetes

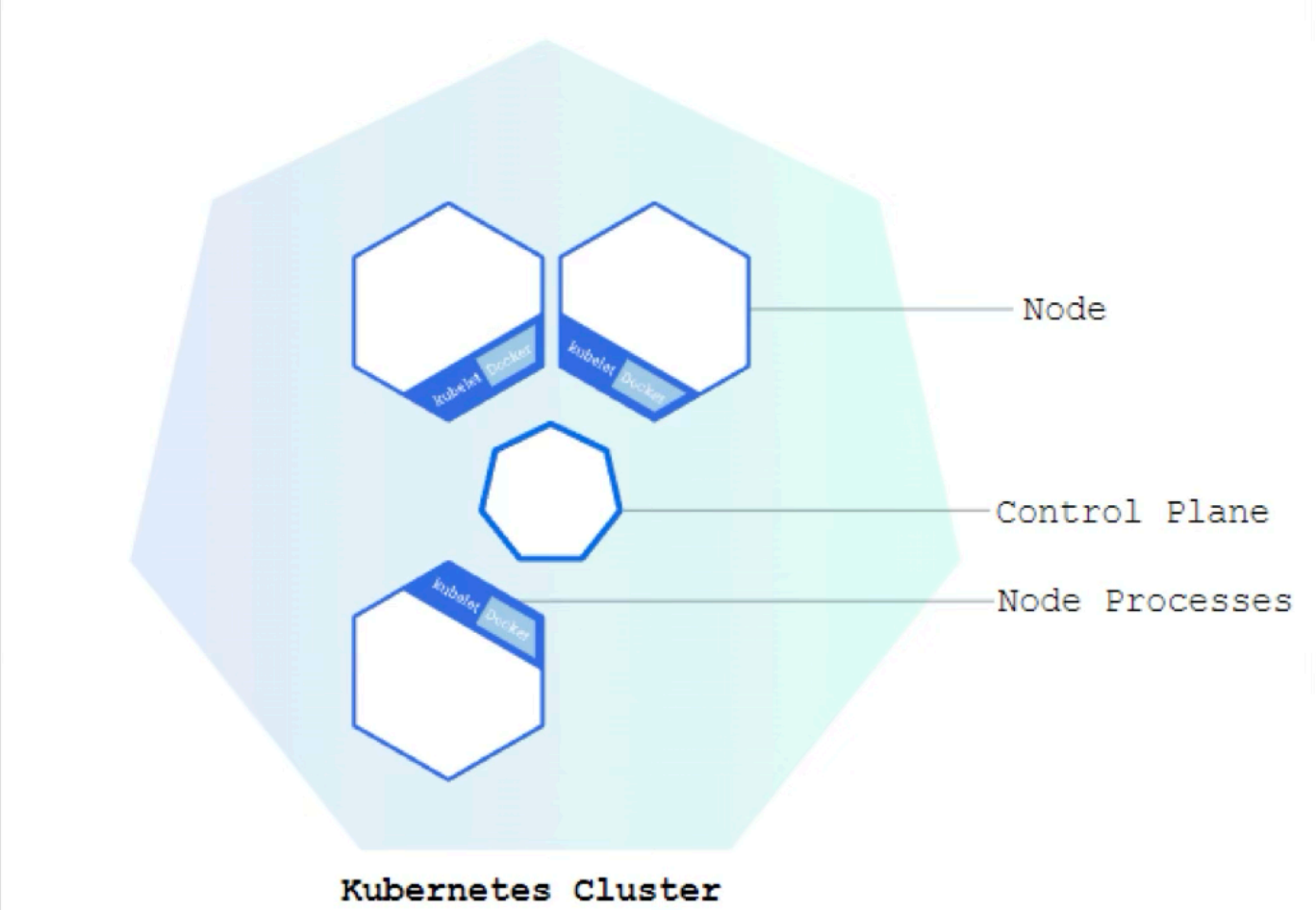
Kubernetes features #2

- **Storage management** – Persistent storage is abstracted by a consistent interface that works across providers, whether in the cloud, on a network share, or on a local filesystem.
- **Declarative state** – Kubernetes uses object manifests in YAML files to define the state you want to create in your cluster. Applying a manifest instructs Kubernetes to automatically transition the cluster to the target state. You don't have to manually script the changes you want to see.
- **Works across environments** – Kubernetes can be used in the cloud, at the edge, or on your developer workstation. Many different distributions are available to match different use cases. Major cloud providers like AWS and Google Cloud offer managed Kubernetes services, while single-node distributions such as Minikube and K3s are great for local use.
- **Highly extensible** – Kubernetes packs in a lot of functionality, but you can add even more using extensions. You can create custom object types, controllers, and operators to support your own workloads.

Introduction to containerization

ARCHITECTURE OF KUBERNETES CLUSTER

Architecture of Kubernetes cluster



Introduction to

KUBERNETES 101

Nodes

- Nodes represent the physical machines that form your Kubernetes cluster. They run the containers you create. Kubernetes tracks the status of your nodes and exposes each one as an object. You used Kubectl to retrieve a list of nodes in the example above.
- While your fresh cluster has only one node, Kubernetes advertises support for up to 5,000 nodes. It's theoretically possible to scale even further.

Pods

- Pods are the fundamental compute unit in Kubernetes. A Pod is analogous to a container but with some key differences. Pods can contain multiple containers, each of which share a context. The entire Pod will always be scheduled onto the same node. The containers within a Pod are tightly coupled so you should create a new Pod for each distinct part of your application, such as its API and database.
- In simple situations, Pods will usually map one-to-one with the containers your application runs. In more advanced cases, Pods can be enhanced with init containers and ephemeral containers to customize startup behavior and provide detailed debugging.

Deployments

- Deployments wrap ReplicaSets with support for declarative updates and rollbacks. They’re a higher level of abstraction that’s easier to control.
- A Deployment object lets you specify the desired state of a set of Pods. This includes the number of replicas to run. Modifying the Deployment will automatically detect the required changes and scale the ReplicaSet as required. You can pause the rollout or revert to an earlier revision, features that aren’t available with plain ReplicaSets.

Jobs

- A Kubernetes Job is an object that creates a set of Pods and waits for them to terminate. It will retry any failed Pods until a specified number have exited successfully. The Job's then marked as complete.
- Jobs provide a mechanism for running ad-hoc tasks inside your cluster. Kubernetes also provides CronJobs that wrap Jobs with cron-like scheduling support. These let you automatically run a job on a regular cadence to accommodate batch activities, backups, and any other scheduled tasks your application requires.

Services

- Services are used to expose Pods to the network. They allow defined access to Pods either within your cluster or externally.
- Ingresses are closely related objects. These are used to set up HTTP routes to services via a load balancer. Ingresses also support HTTPS traffic secured by TLS certificates.

Read more Kubernetes Ingress with NGINX Ingress Controller Example

Labels

- Labels are key/value pairs that are attached to objects, such as pods.
- Labels are intended to be used to specify identifying attributes of objects that are meaningful and relevant to users, but do not directly imply semantics to the core system.
- Labels can be used to organize and to select subsets of objects.
- Labels can be attached to objects at creation time and subsequently added and modified at any time.
- Each object can have a set of key/value labels defined.
- Each Key must be unique for a given object.

Selectors

- Label selector, the client/user can identify a set of objects.
  The label selector is the core grouping primitive in Kubernetes.

example

```
kubectl get pods -l environment=production,tier=frontend
```

Namespaces

- Namespaces isolate different groups of resources. They avoid name collisions by scoping the visibility of your resources.
- Creating two objects with the same name is forbidden within the same namespace. If you're in the default namespace, you can't create two Pods that are both called database, for example. Namespaces resolve this by providing logical separation of resources. Two namespaces called app-1 and app-2 could each contain a Pod called database without causing a conflict.
- Namespaces are flexible and can be used in many different ways. It's a good idea to create a namespace for each workload in your cluster. You can also use namespaces to divide resources between users and teams by applying role-based access control.

Kubelet

- Kubelet is a worker process that runs on each of your nodes. It maintains communication with the Kubernetes control plane to receive its instructions.
- Kubelet is responsible for pulling container images and starting containers in response to scheduling requests.

Kube-proxy

- Proxy is another component found on individual nodes. It configures the host's networking system so traffic can reach the services in your cluster.

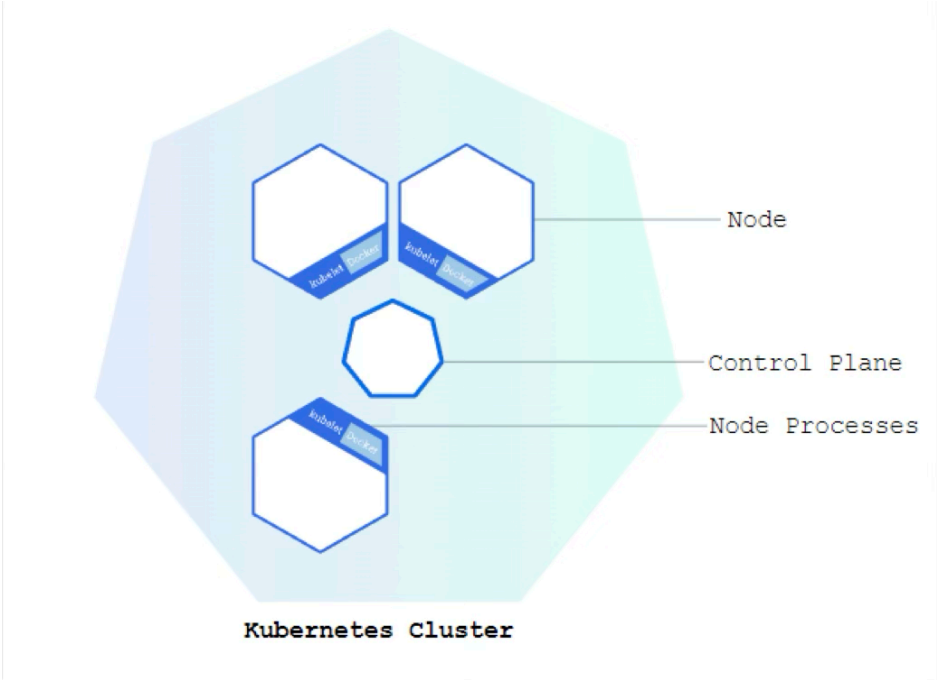
How to run

THE HELLO WORLD APPLICATION

Using Minikube to Create a Cluster

A Kubernetes cluster consists of two types of resources:

- The Control Plane coordinates the cluster
- Nodes are the workers that run applications



Create a minikube cluster

- Start minikube

```
minikube start
```

```
C:\Windows\System32>minikube start
* minikube v1.28.0 on Microsoft Windows 11 Home Single Language 10.0.22621 Build 22621
* Using the docker driver based on existing profile
* Starting control plane node minikube in cluster minikube
* Pulling base image ...
* Updating the running docker "minikube" container ...
* Preparing Kubernetes v1.25.3 on Docker 20.10.20 ...
* Verifying Kubernetes components...
  - Using image gcr.io/k8s-minikube/storage-provisioner:v5
* Enabled addons: storage-provisioner, default-storageclass
* Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
```

Deployment step

- Create deployment

```
kubectl create deployment hello-node --image=nginx
kubectl get deployment
```

- Create loadbalancer server

```
minikube tunnel
```

- Create service

```
kubectl expose deployment hello-node --type=LoadBalancer --port=8080 --target-port=80
kubectl get svc
```

- Tunnel

```
kubectl port-forward service/hello-node 8080:8080 --address=0.0.0.0
```

Scaling the Hello World application

```
kubectl scale --replicas=2 deployment hello-node
kubectl get deployment
kubectl get pod
```

advance topic in

KUBERNETES

kubectl command list

```
kubectl api-resources
kubectl apply -f ./test.yaml
kubectl create deployment nginx --image=nginx
kubectl expose deployment nginx --type=LoadBalancer --port=80
kubectl get services
kubectl get pods
kubectl get deployments
kubectl get nodes
kubectl set image deployment/frontend www=image:v2
kubectl expose rc nginx --port=80 --target-port=8000
kubectl autoscale deployment foo --min=2 --max=10
kubectl get hpa
kubectl scale --replicas=3 -f ./test.yaml
kubectl delete pod,service baz foo
```

Deployment

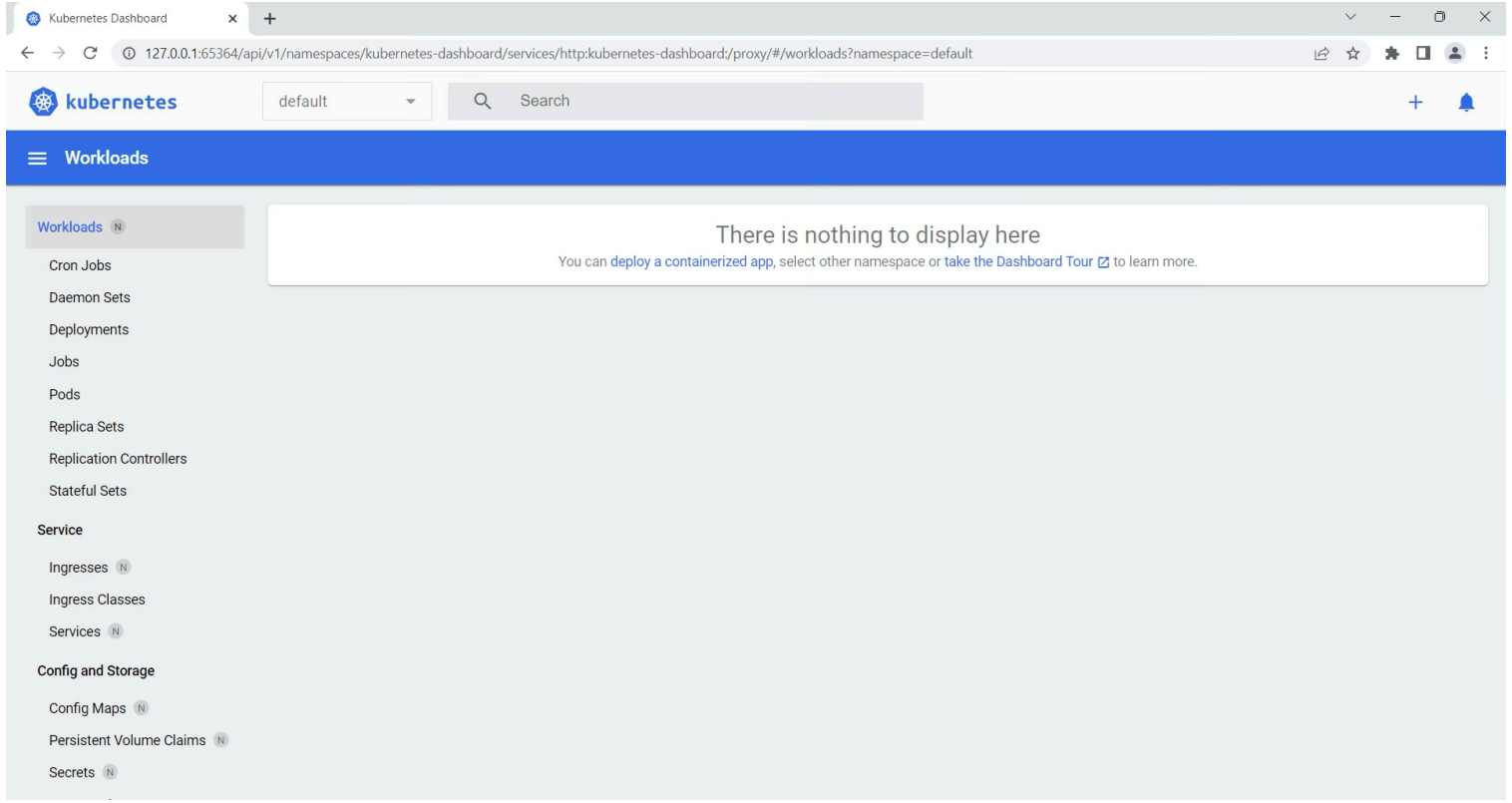
```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: hello-world
spec:
  replicas: 1
  selector:
    matchLabels:
      app: hello-world
  template:
    metadata:
      labels:
        app: hello-world
    spec:
      containers:
        - name: hello-world-server
          image: nginx:alpine
          ports:
            - containerPort: 80
```

Service

```yaml
apiVersion: v1
kind: Service
metadata:
  name: helloworld
  labels:
    app: hello-world
spec:
  selector:
    app: hello-world
  ports:
    - name: http
      protocol: TCP
      port: 8080
      targetPort: 80
  type: ClusterIP
```

Kubernetes dashboard

```
minikube addons enable metrics-server
minikube dashboard
```



ConfigMap

```yaml
apiVersion: v1
kind: ConfigMap
metadata:
  name: mysql-config
data:
  root-password: "1234"
  database-name: "simple_db"
  user: "usr"
  password: "usr"
```

Deployment with ConfigMap

```
env:
  - name: MYSQL_ROOT_PASSWORD
    valueFrom:
      configMapKeyRef:
        name: mysql-config
        key: root-password
```

Application Secret

- Create new secret from file

```
kubectl create secret generic regcred
--from-file=.dockerconfigjson=<path/to/.docker/config.json>
--type=kubernetes.io/dockerconfigjson
```

- Create new secret from parameter

```
kubectl create secret docker-registry regcred
--docker-server=<your-registry-server>
--docker-username=<your-name>
--docker-password=<your-pword>
--docker-email=<your-email>
```

- Get all secret

```
kubectl get secret
```

Dealing with application secret

```yaml
spec:
  containers:
    - name: hello-world-server
      image: nginx:alpine
      ports:
        - containerPort: 80
      resources:
        requests:
          memory: "10Mi"
          cpu: "50m"
        limits:
          memory: "128Mi"
          cpu: "500m"
  imagePullSecrets:
    - name: regcred
```

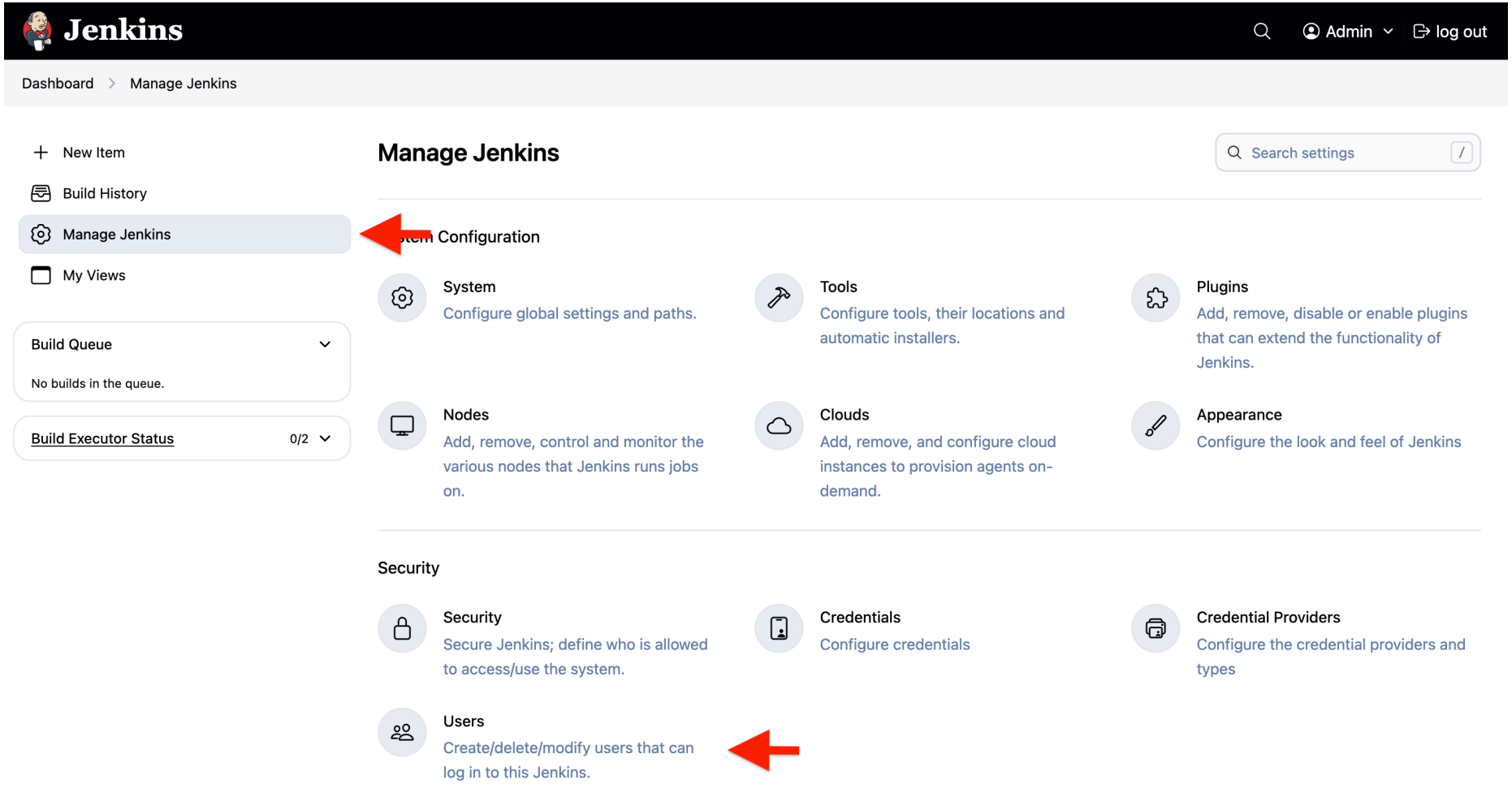
หมายเหตุ cpu 1000m = 1 core

Workshop #1

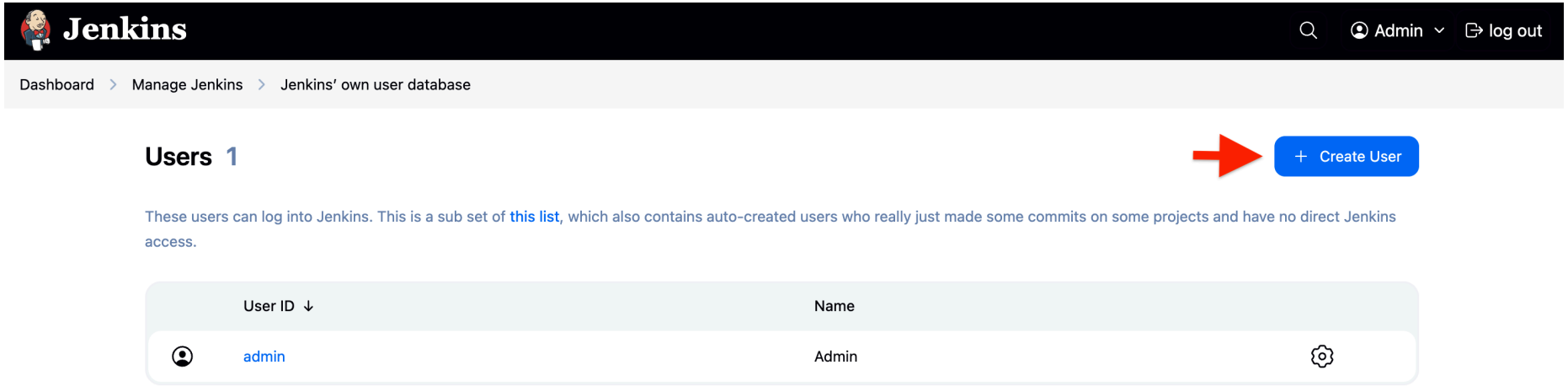
การสร้าง Jenkins user

login เข้า jenkins server

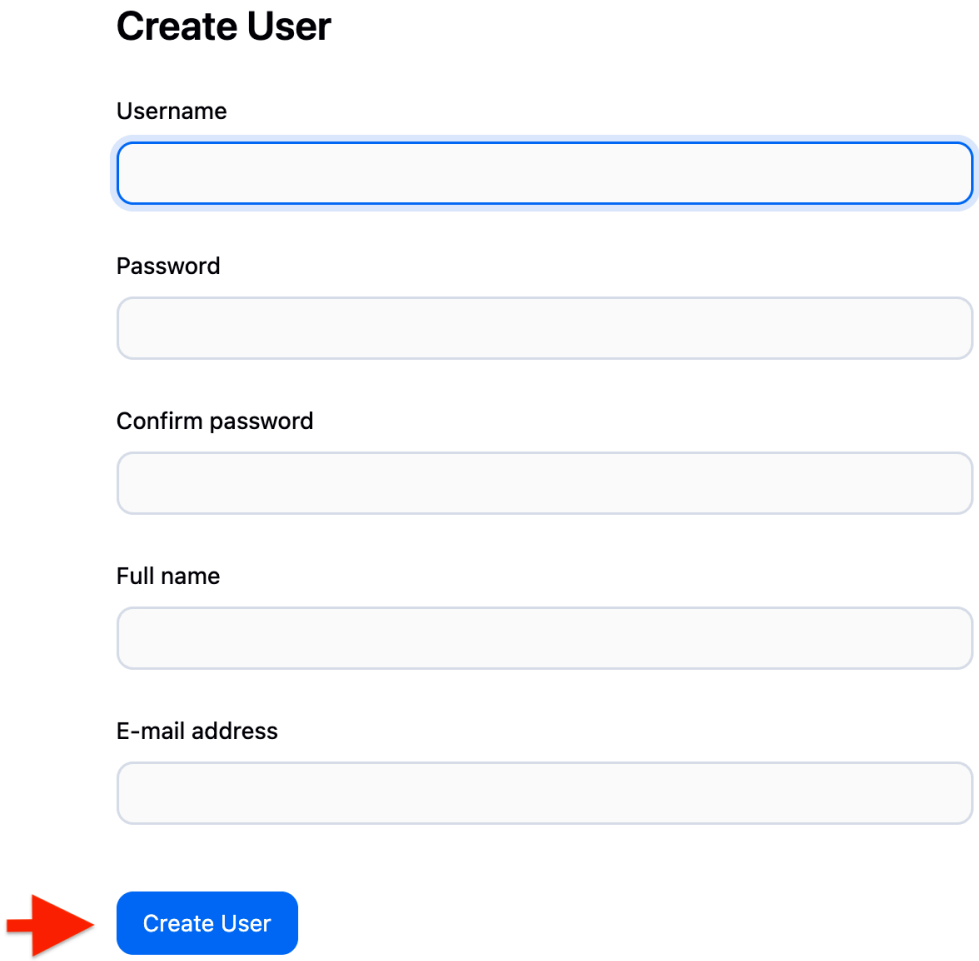
สร้าง user ใหม่ #1



สร้าง user ใหม่ #2



สร้าง user ใหม่ #3



สร้าง user ใหม่ #4

- logout ออกจากระบบ
- ทดสอบ login ใหม่ด้วย user ที่เพิ่งสร้างขึ้นมา

Workshop #2

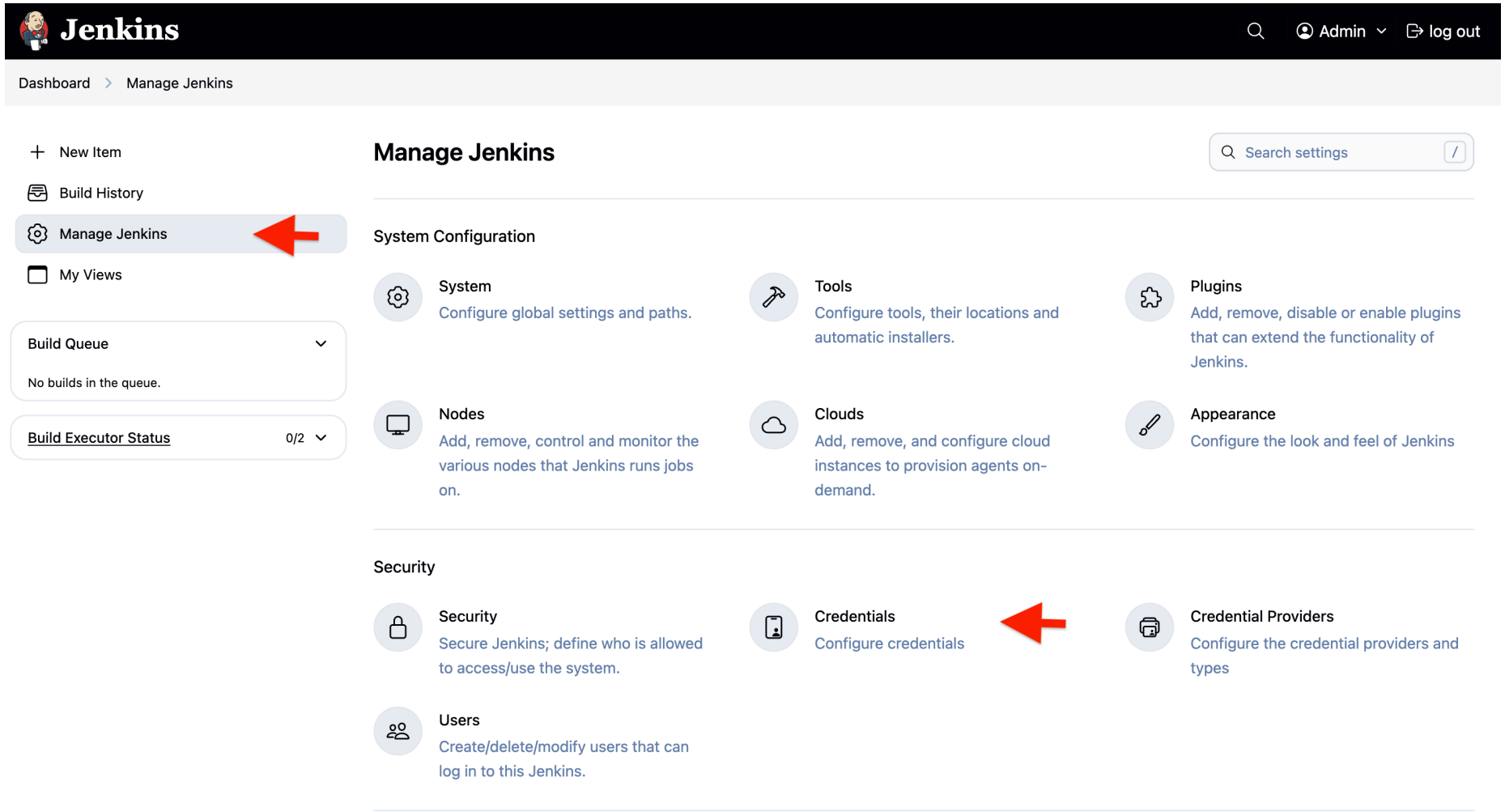
การสร้าง Jenkins credential

About Jenkins credential

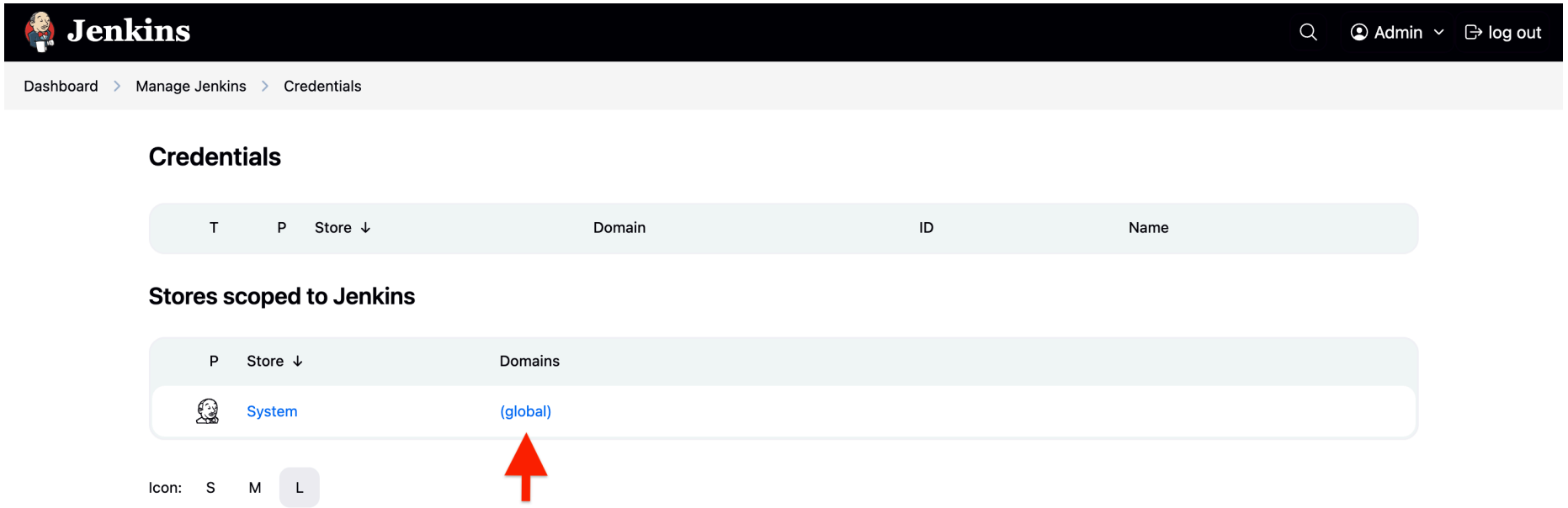
Credential เอาไว้เก็บข้อมูลที่จำเป็นต้องใช้ใน script เพื่อเชื่อมต่อกับระบบอื่น ๆ โดยแบ่งเป็น ประเภท ดังนี้

- Username with password
- GitHub App
- SSH Username with private key
- Secret file
- Secret text
- Certificate

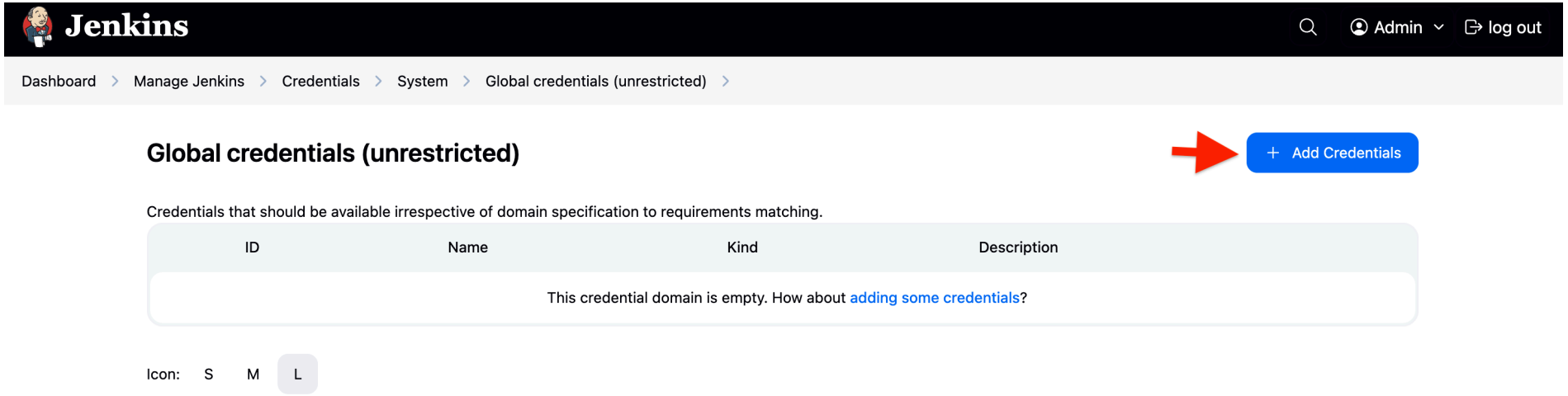
สร้าง Credential ประเภท Username with password



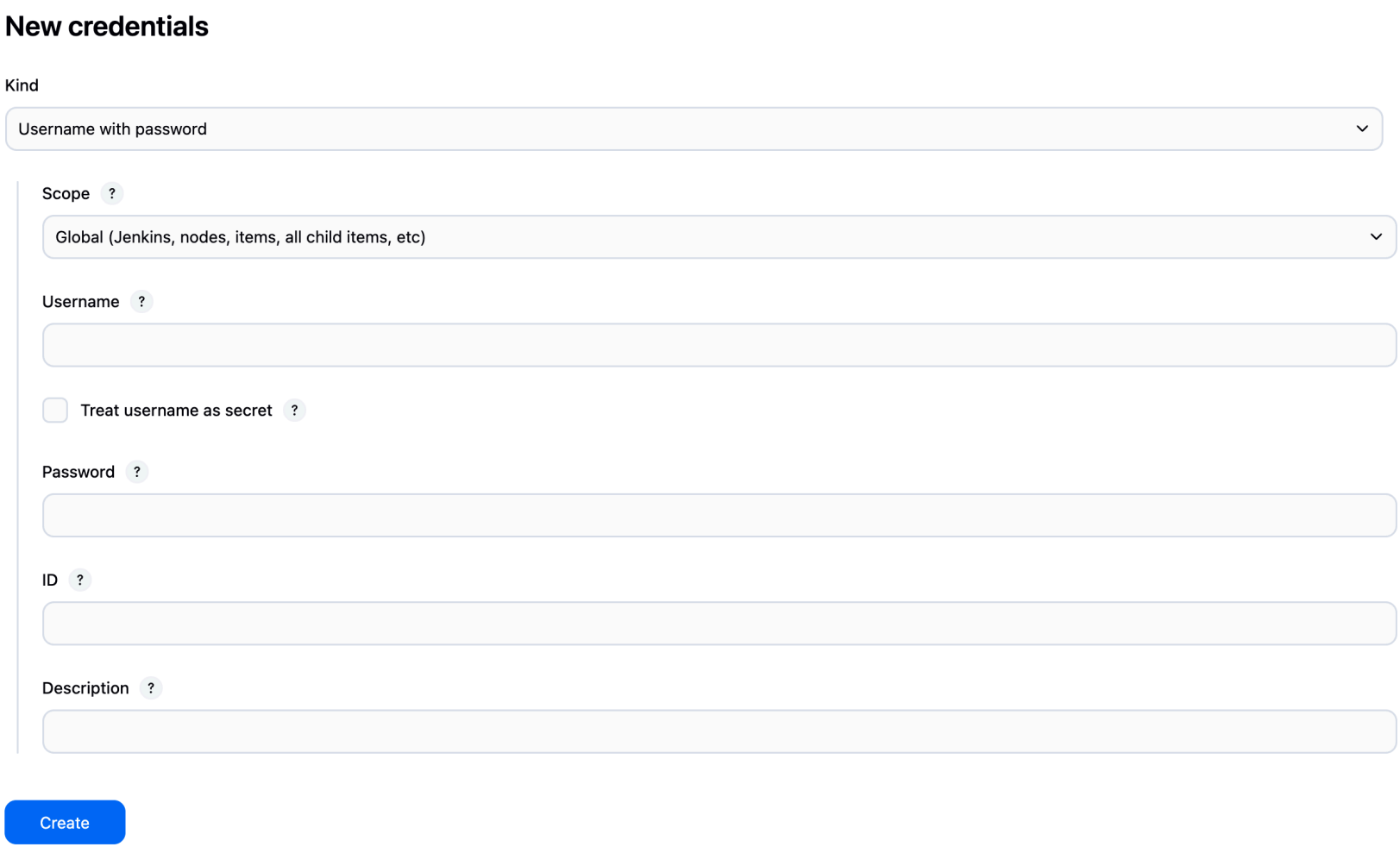
เลือก global


Jenkins
Admin
log out
Dashboard
Manage Jenkins
Credentials
Credentials
T
P
Store ↓
Domain
ID
Name
Stores scoped to Jenkins
P
Store ↓
Domains
System
(global)
Icon:
S
M
L

เลือก add credential



กรอกข้อมูลใน form



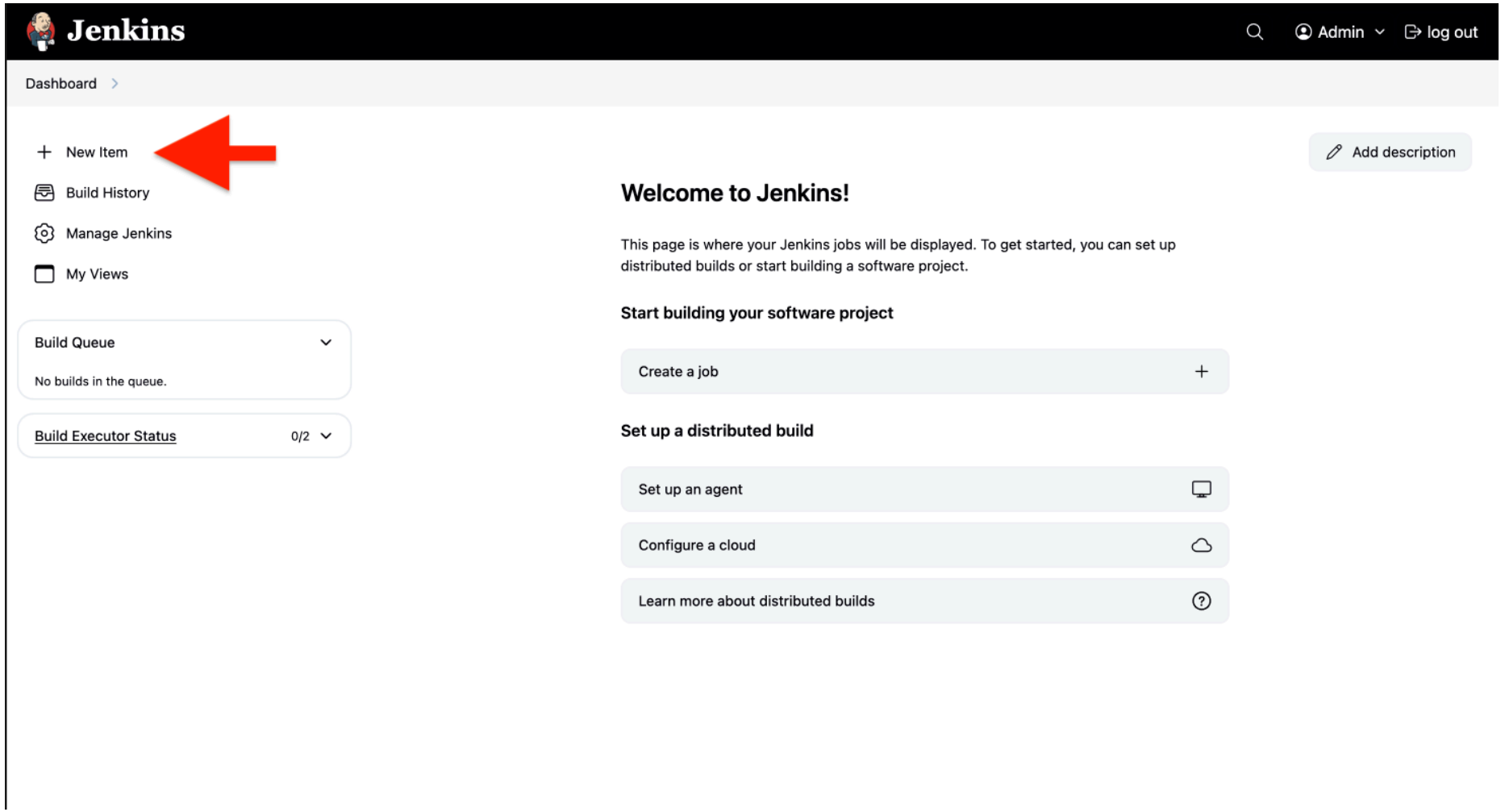
กรอกข้อมูล credentail สำหรับ gitlab

- Kind = Username with password
- Scope = Global
- Username = email ที่ใช้ login เข้า gitlab
- Password = รหัสผ่านสำหรับ gitlab
- ID = ชื่อตัวแปรสำหรับการอ้างถึงใน script Jenkinsfile
- Description = คำอธิบายรายการ

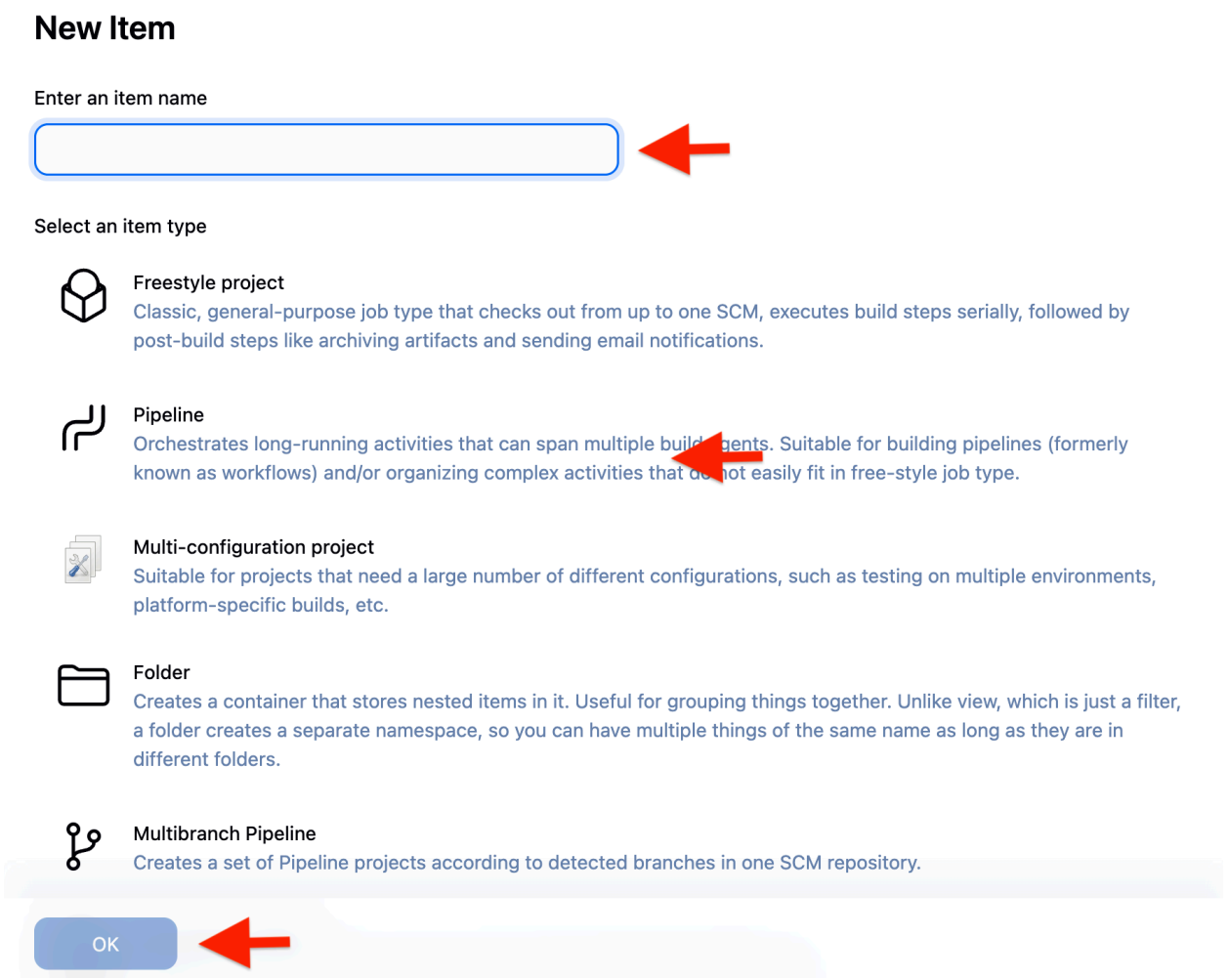
Workshop #3

การสร้าง Jenkins Job / Item

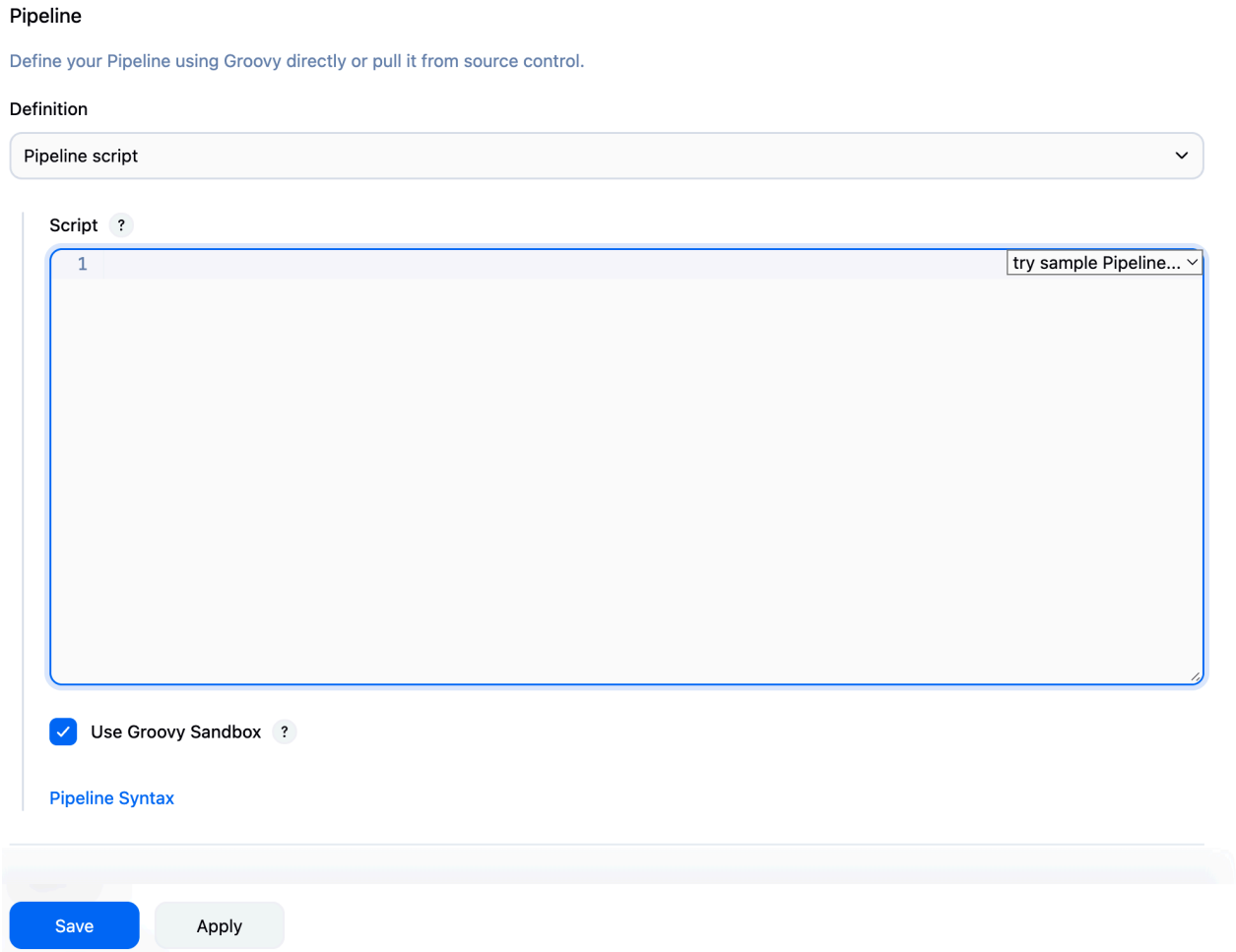
เลือก New Item



กรอกข้อมูล Item



กรอกข้อมูล Item

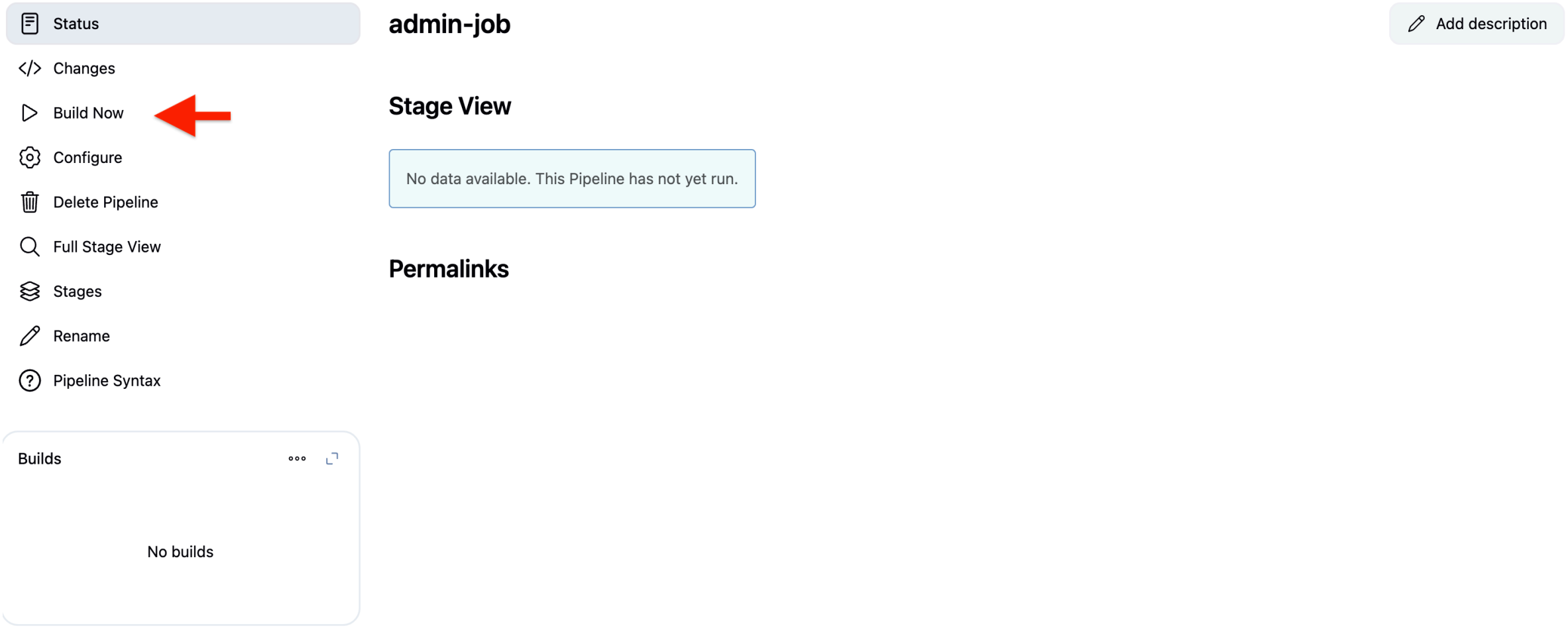


ระบุข้อมูลดังนี้

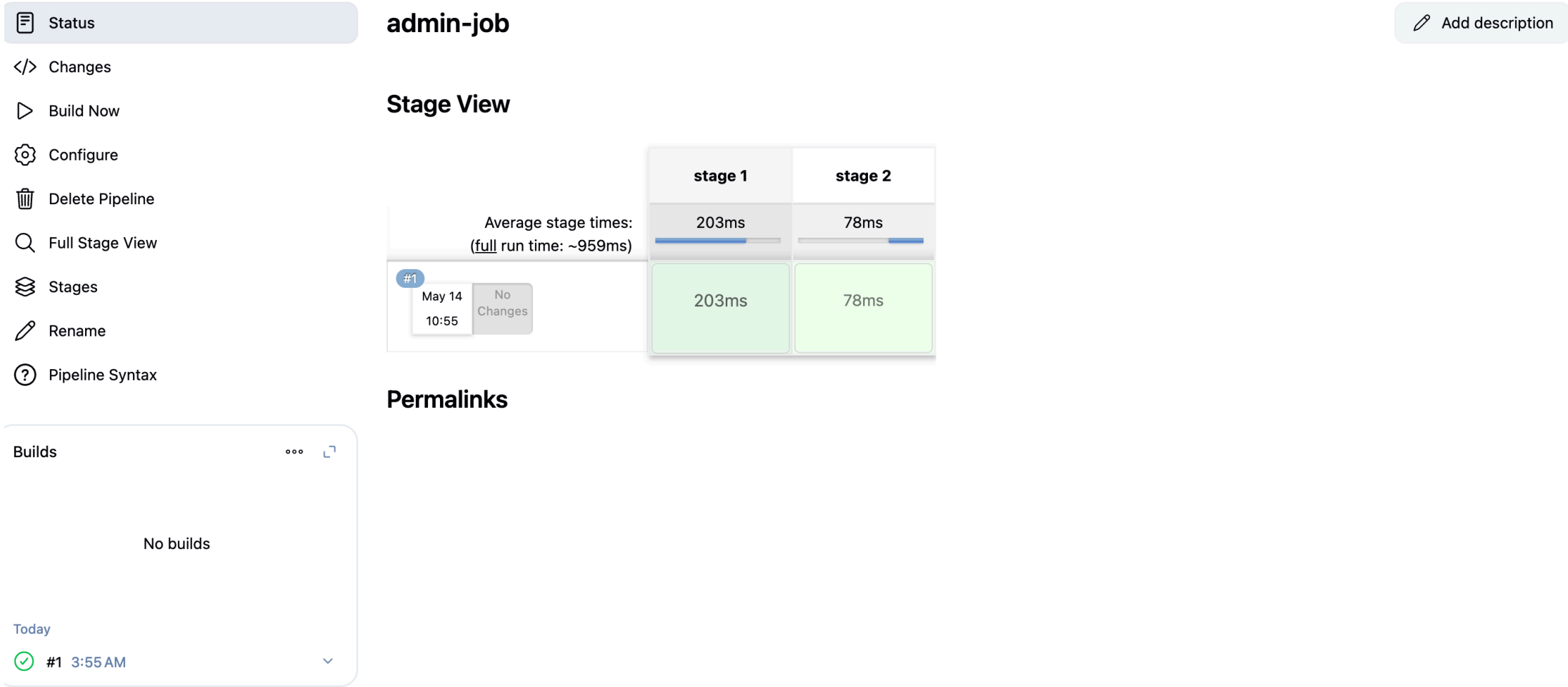
- Definition = Pipeline script
- Script

```
node: {
  stage("stage 1") {
    echo "Hello"
  }
  stage("stage 2") {
    echo "World!"
  }
}
```

ส่งให้ Job ทำงานแบบ manual



ผลการทำงานในรูปแบบ stage view



Workshop #4

Jenkins CI/CD with Gitlab

สร้าง Jenkinsfile

```
pipeline {
  agent any
  environment {
    APP_NAME = "test app name"
  }
  stages {
    stage("Stage 1") {
      steps {
        sh "echo ${APP_NAME}"
      }
    }
    stage("Stage 2") {
      steps {
        sh "echo Hello"
      }
    }
  }
}
```

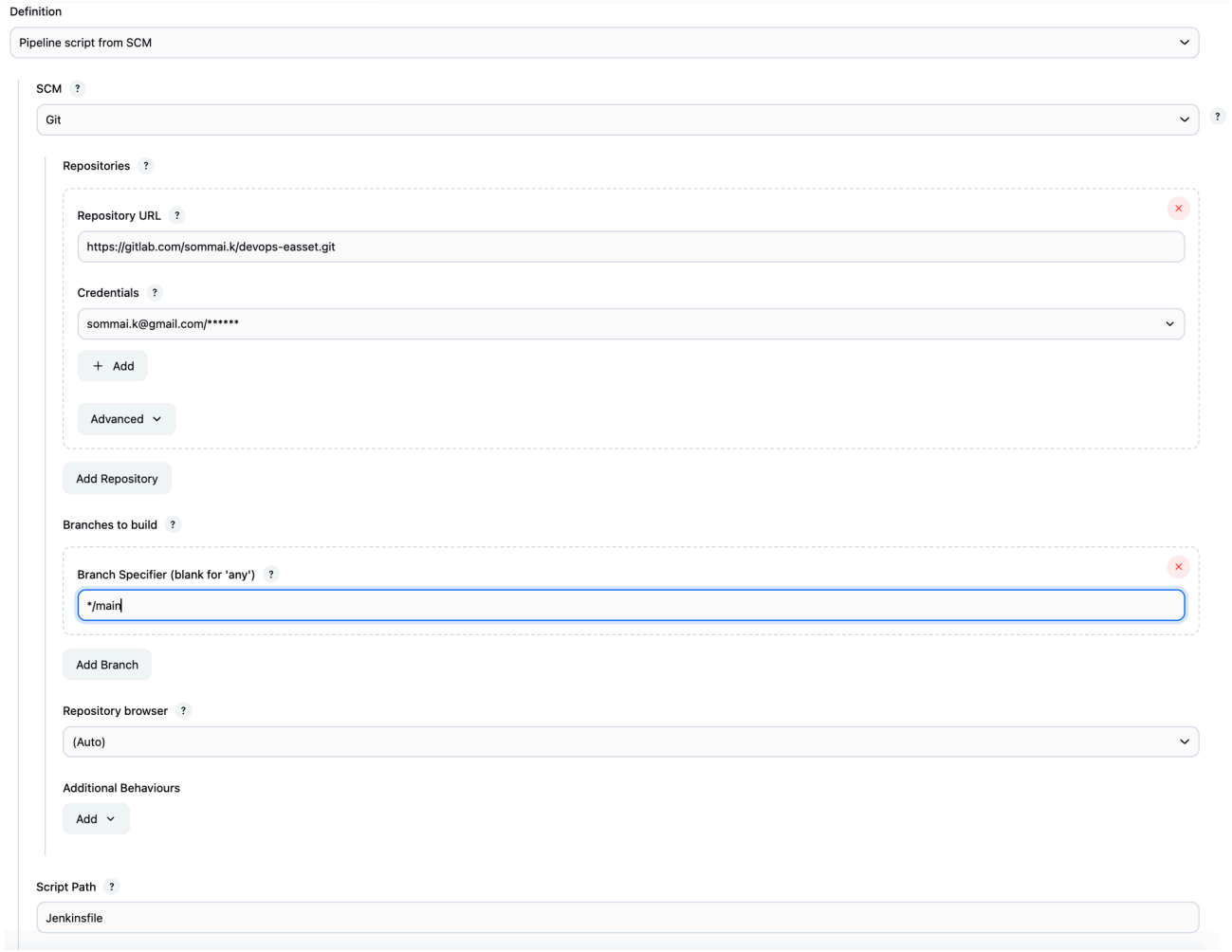
push Jenkinsfile ขึ้น gitlab

```
git add Jenkinsfile
git commit -m "add Jenkinsfile"
git push
```

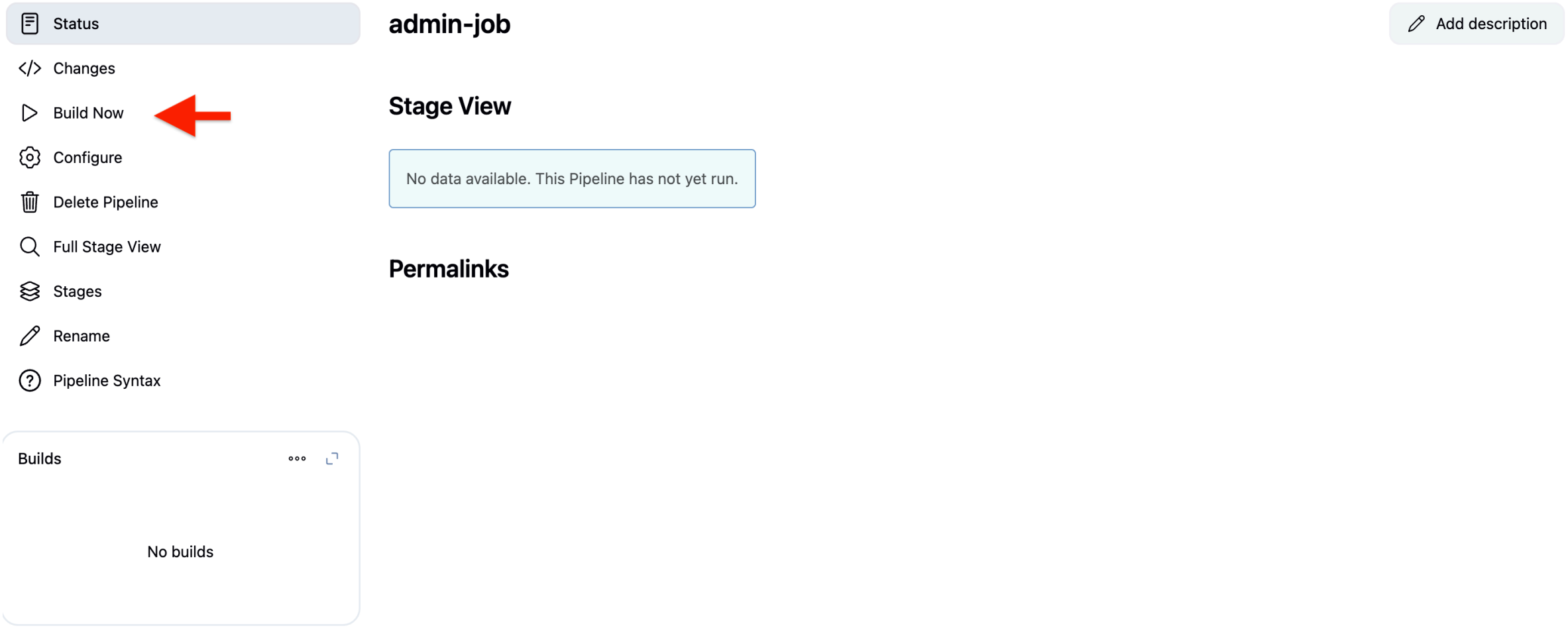
สร้าง Item / Job ใหม่ใน Jenkins

- Name = <user-name>-ci-job
- Type = Pipeline
- Definition = Pipeline script from SCM
  - SCM = Git
  - Repositories
    - Repository URL = <gitlab repository url>
    - Credentials = <Credential id ที่สร้างจากขั้นตอนก่อนหน้านี้>
  - Branch Specifier = */main
  - Script Path = Jenkinsfile

ตัวอย่าง


Definition
Pipeline script from SCM
SCM
Git
Repositories
Repository URL
https://gitlab.com/sommai.k/devops-easset.git
Credentials
sommai.k@gmail.com/******
Add
Advanced
Add Repository
Branches to build
Branch Specifier (blank for 'any')
*/main
Add Branch
Repository browser
(Auto)
Additional Behaviours
Add
Script Path
Jenkinsfile

ส่งให้ Job ทำงานแบบ manual



ผลลัพธ์จากการทำงาน

Dashboard > admin-ci-job >

- Status
- Changes
- Build Now
- Configure
- Delete Pipeline
- Full Stage View
- Stages
- Rename
- Pipeline Syntax

admin-ci-job

Stage View

	Declarative: Checkout SCM	Stage 1	Stage 2
Average stage times: (full run time: ~14s)	6s	503ms	366ms
#3 May 14 13:07 — No Changes	6s	503ms	366ms

Workshop #5

สร้าง custom image

สร้าง file ชื่อ Dockerfile ที่ root ของ Project

```
FROM nginx:alpine
COPY ./html /usr/share/nginx/html
```

Build custom image ใน local

- run คำสั่งเพื่อ build docker image

```
docker build -t <registry-server>/hello .
```

- ทดสอบผลการ build ด้วยคำสั่ง

```
docker image ls <registry-server>/hello
```

- ทดสอบนำ image ขึ้น registry ด้วยคำสั่งดังนี้

```
docker push <registry-server>/hello
```

Push Dockerfile ขึ้น gitlab

- push code ขึ้น gitlab ด้วยคำสั่งดังนี้

```
git add Dockerfile
git commit -m "Add Dockerfile"
git push
```

Workshop #6

Jenkins CI/CD with docker

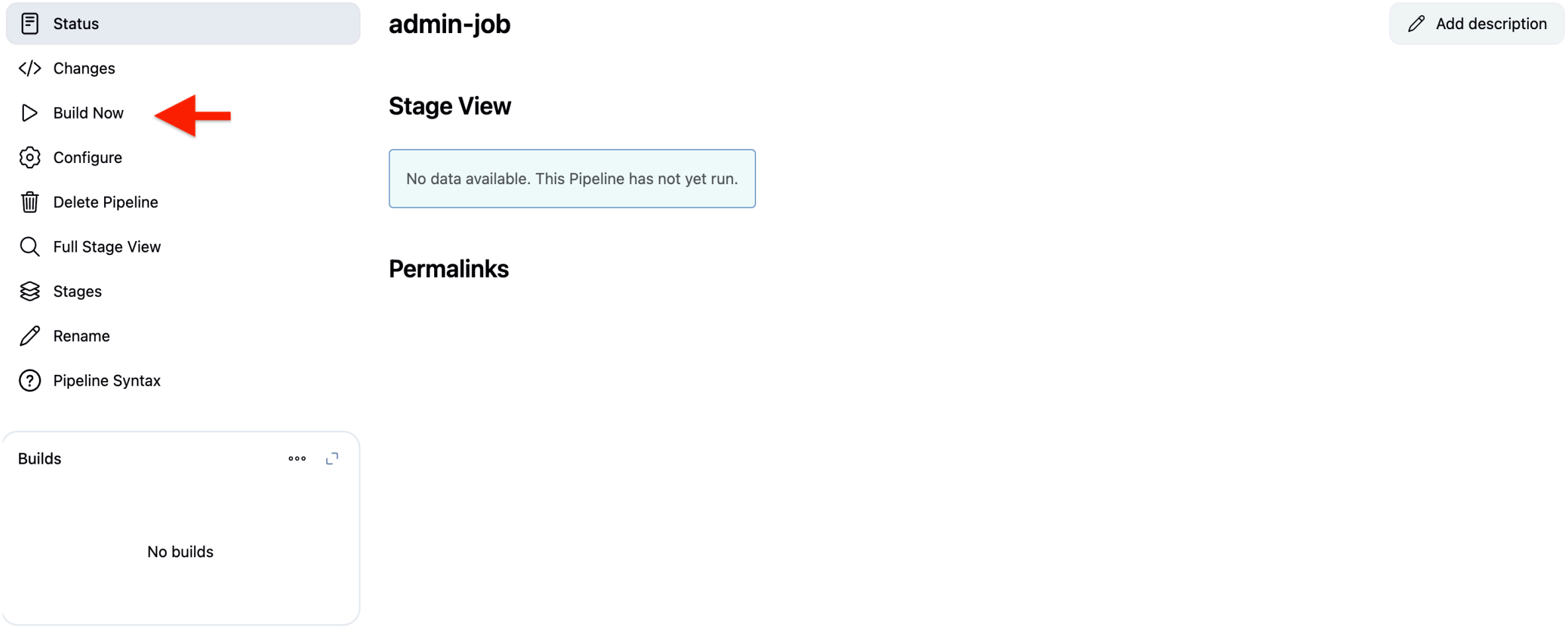
แก้ไข file Jenkinsfile

```
pipeline {
    agent { label 'build-server' }
    environment {
        APP_NAME = "test app name"
        IMAGE_NAME = "<registry-server>/hello"
    }
    stages {
        stage("Build Image") {
            steps {
                sh "echo ${APP_NAME}"
                sh "docker version"
                sh "docker build -t ${IMAGE_NAME} ."
            }
        }
    }
}
```

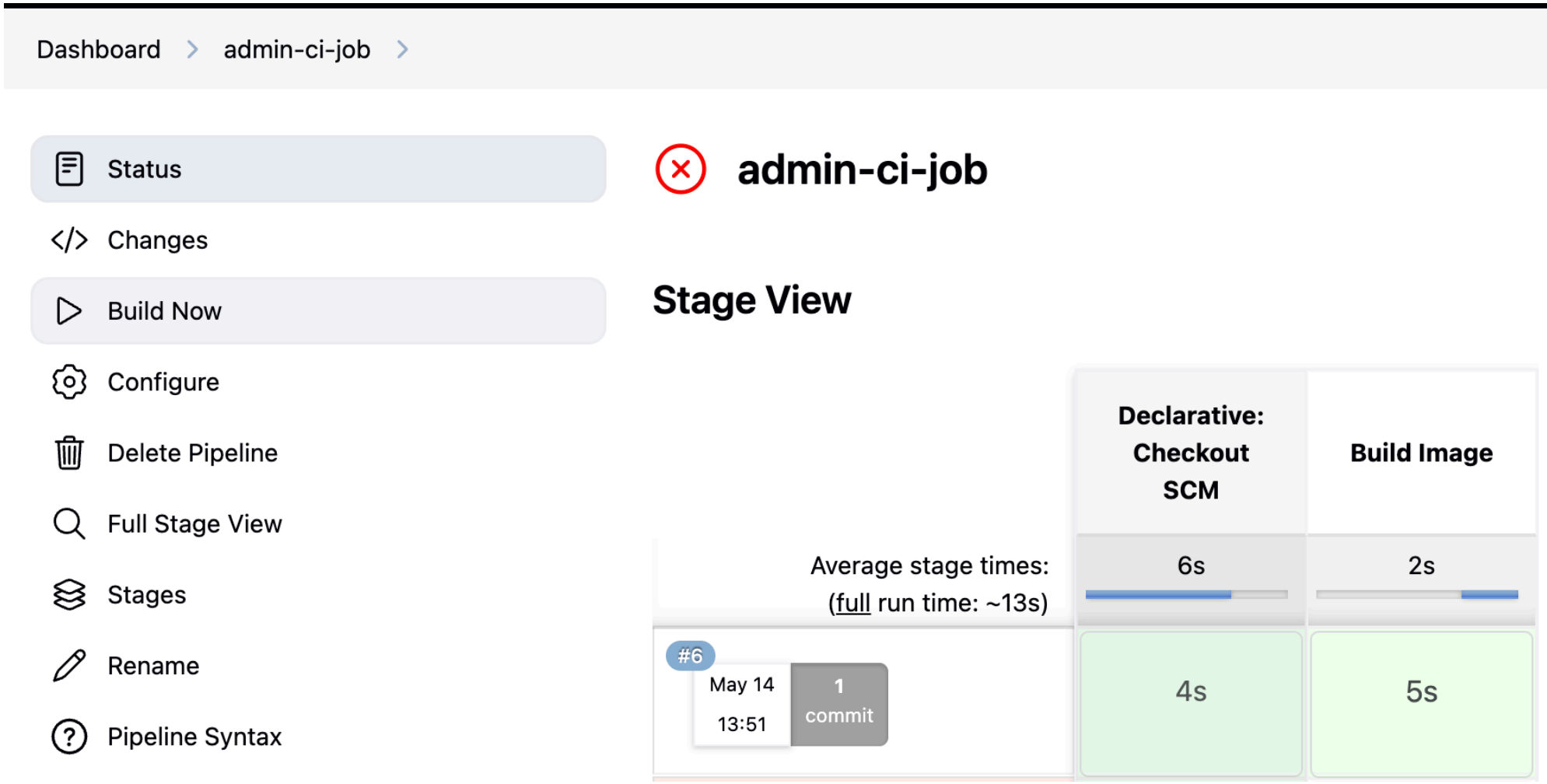
push Jenkinsfile ขึ้น gitlab

```
git add Jenkinsfile
git commit -m "add Jenkinsfile"
git push
```

ส่งให้ Job ทำงานแบบ manual



ผลลัพธ์จากการทำงาน



Workshop #7

Jenkins CI/CD with docker registry

แก้ไข file Jenkinsfile

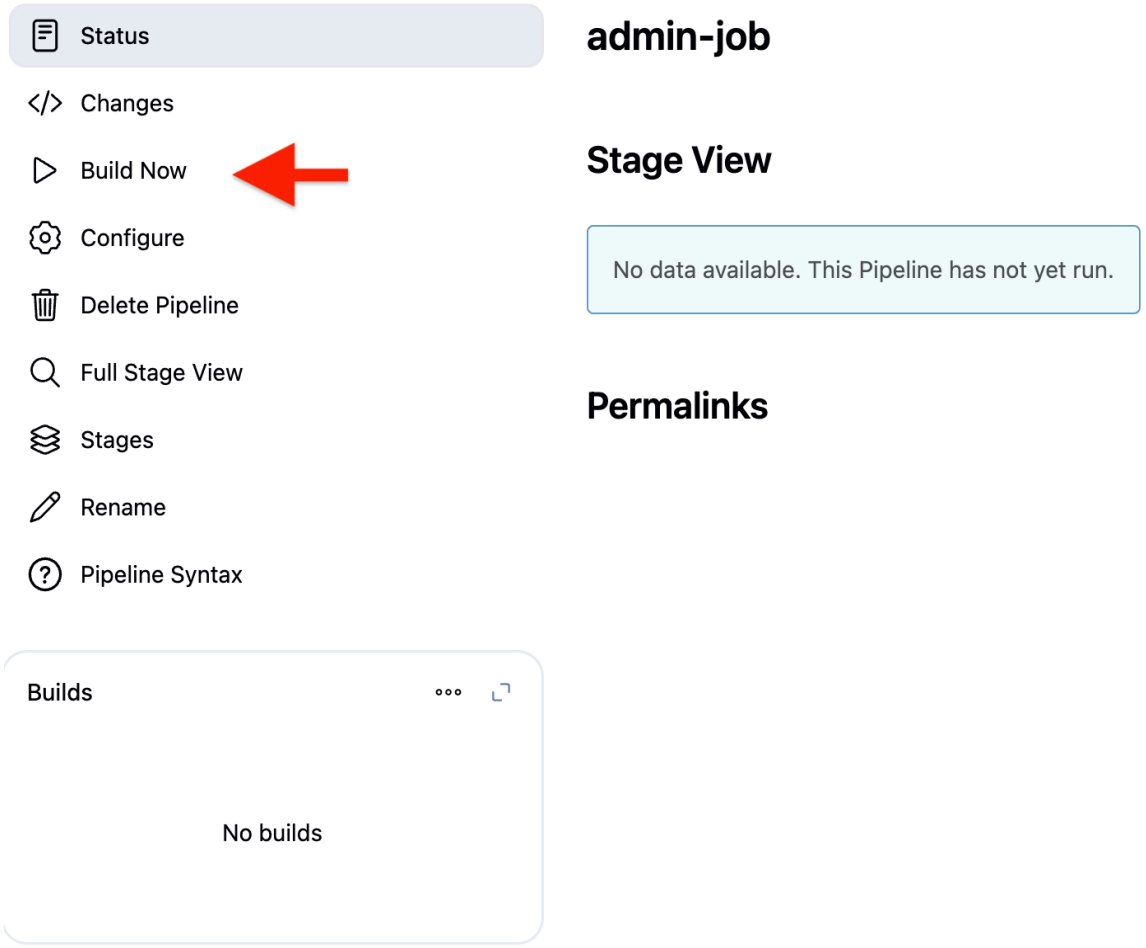
- เพิ่ม stage เข้าไปที่ file Jeninsfile ภายใต้ stages

```
stage("Delivery") {
  steps {
    withCredentials(
      [usernamePassword(
          credentialsId: '<credential-id จากขั้นตอนการสร้าง credential id>',
          passwordVariable: 'gitlabPassword',
          usernameVariable: 'gitlabUser'
      )])
    {
      sh "docker login registry.gitlab.com -u ${gitlabUser} -p ${gitlabPassword}"
      sh "docker push ${IMAGE_NAME}"
    }
  }
}
```

push Jenkinsfile ขึ้น gitlab

```
git add Jenkinsfile
git commit -m "add Jenkinsfile"
git push
```

ส่งให้ Job ทำงานแบบ manual



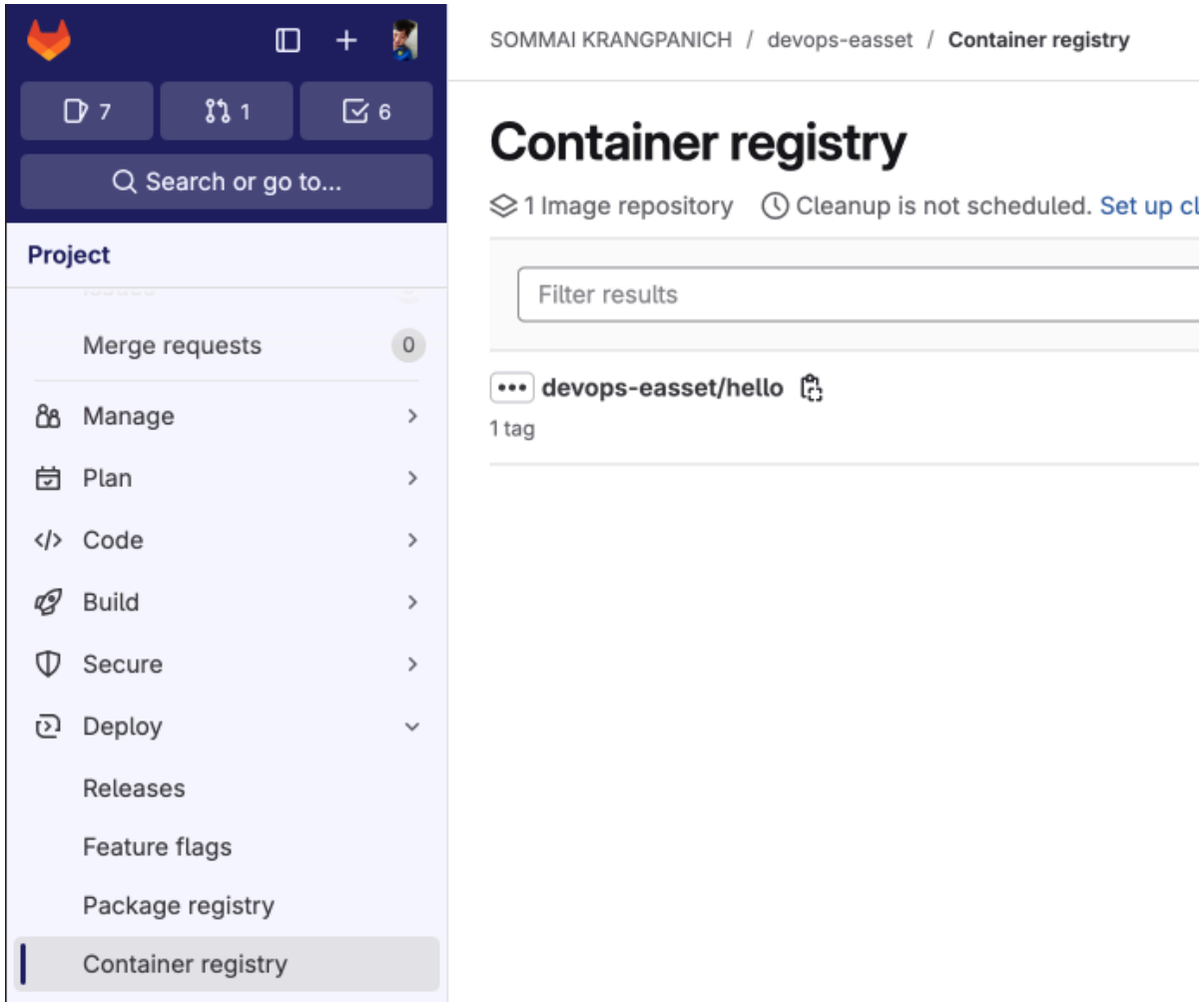
ผลลัพธ์จากการทำงาน

- Status
- Changes
- Build Now
- Configure
- Delete Pipeline
- Full Stage View
- Stages
- Rename
- Pipeline Syntax

admin-ci-job

Stage View

ตรวจสอบ docker image ใน docker-registry



Workshop #8

Revision and Cleanup

แก้ไข file Jenkinsfile

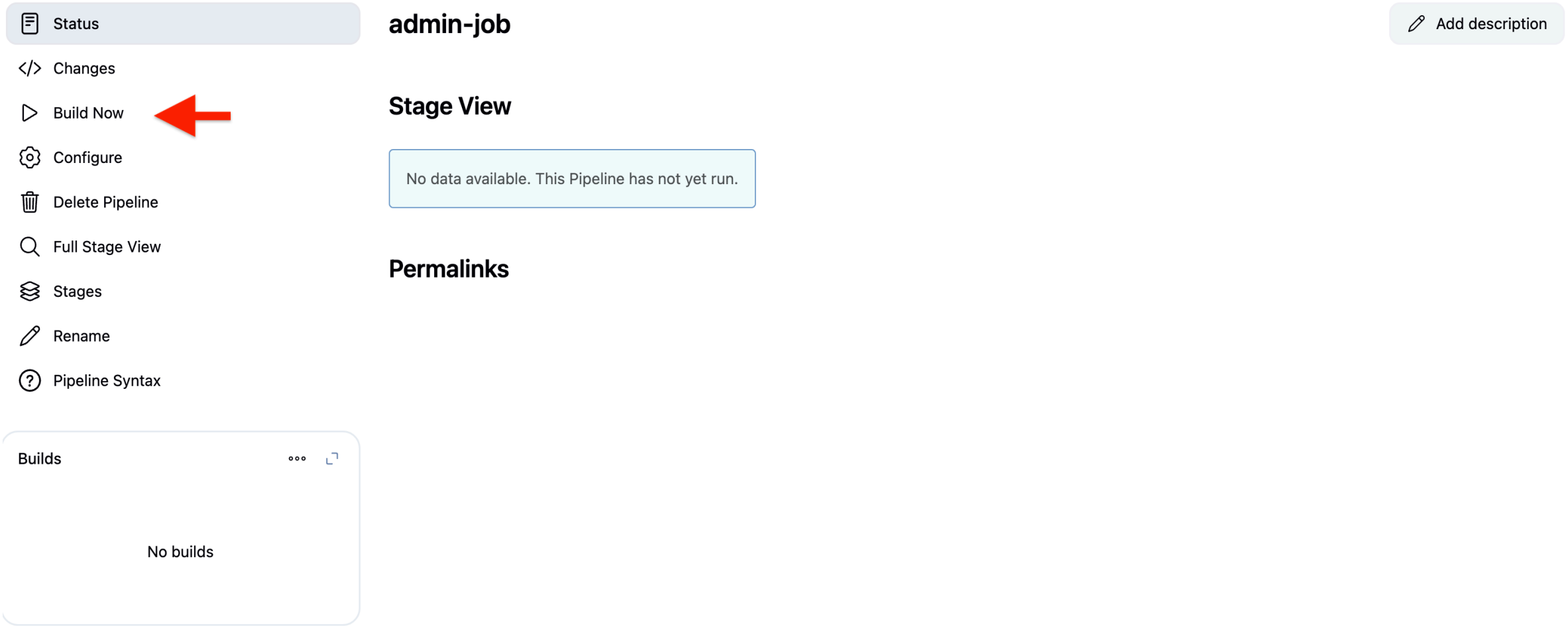
- แก้ไข steps ภายใต้ stage Delivery ดังนี้

```
{
  sh "docker login registry.gitlab.com -u ${gitlabUser} -p ${gitlabPassword}"
  sh "docker tag ${IMAGE_NAME} ${IMAGE_NAME}:1.0.${BUILD_NUMBER}"
  sh "docker push ${IMAGE_NAME}"
  sh "docker push ${IMAGE_NAME}:1.0.${BUILD_NUMBER}"
  sh "docker rmi ${IMAGE_NAME}:1.0.${BUILD_NUMBER}"
  sh "docker rmi ${IMAGE_NAME}"
}
```

push Jenkinsfile ขึ้น gitlab

```
git add Jenkinsfile
git commit -m "add Jenkinsfile"
git push
```

ส่งให้ Job ทำงานแบบ manual

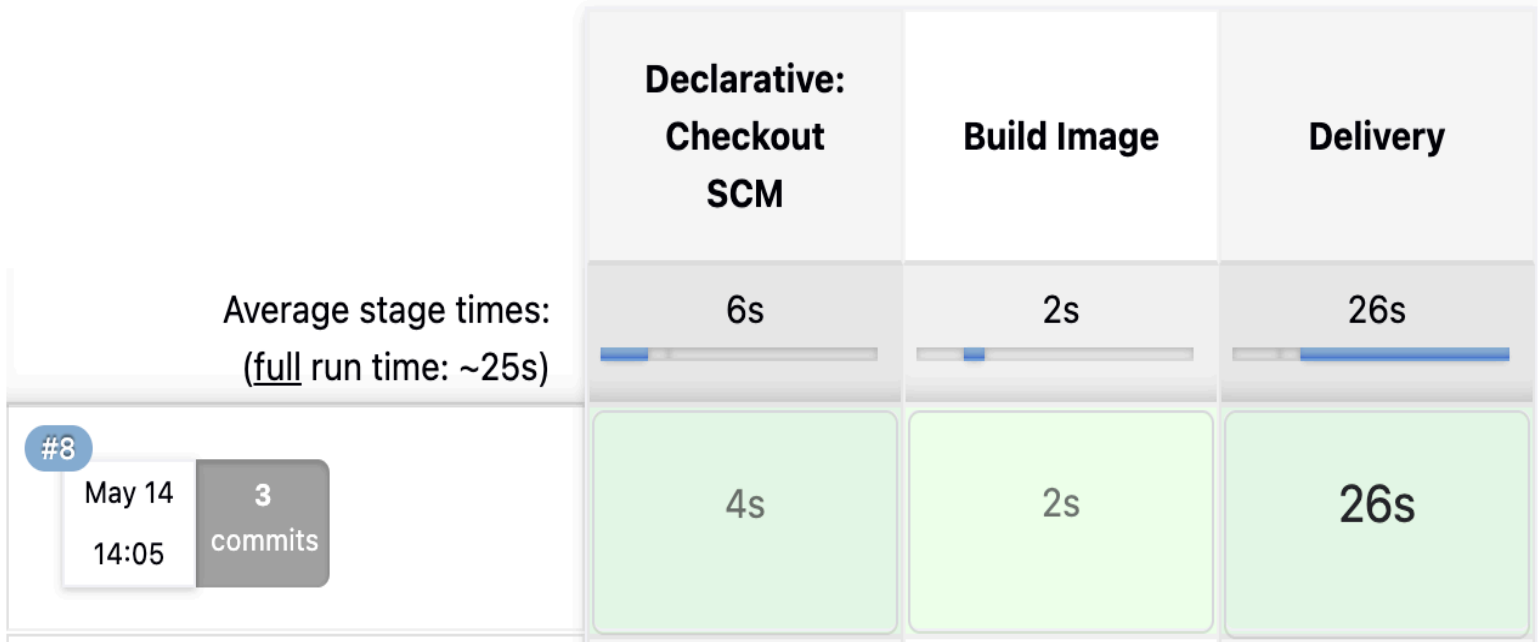


ผลลัพธ์จากการทำงาน

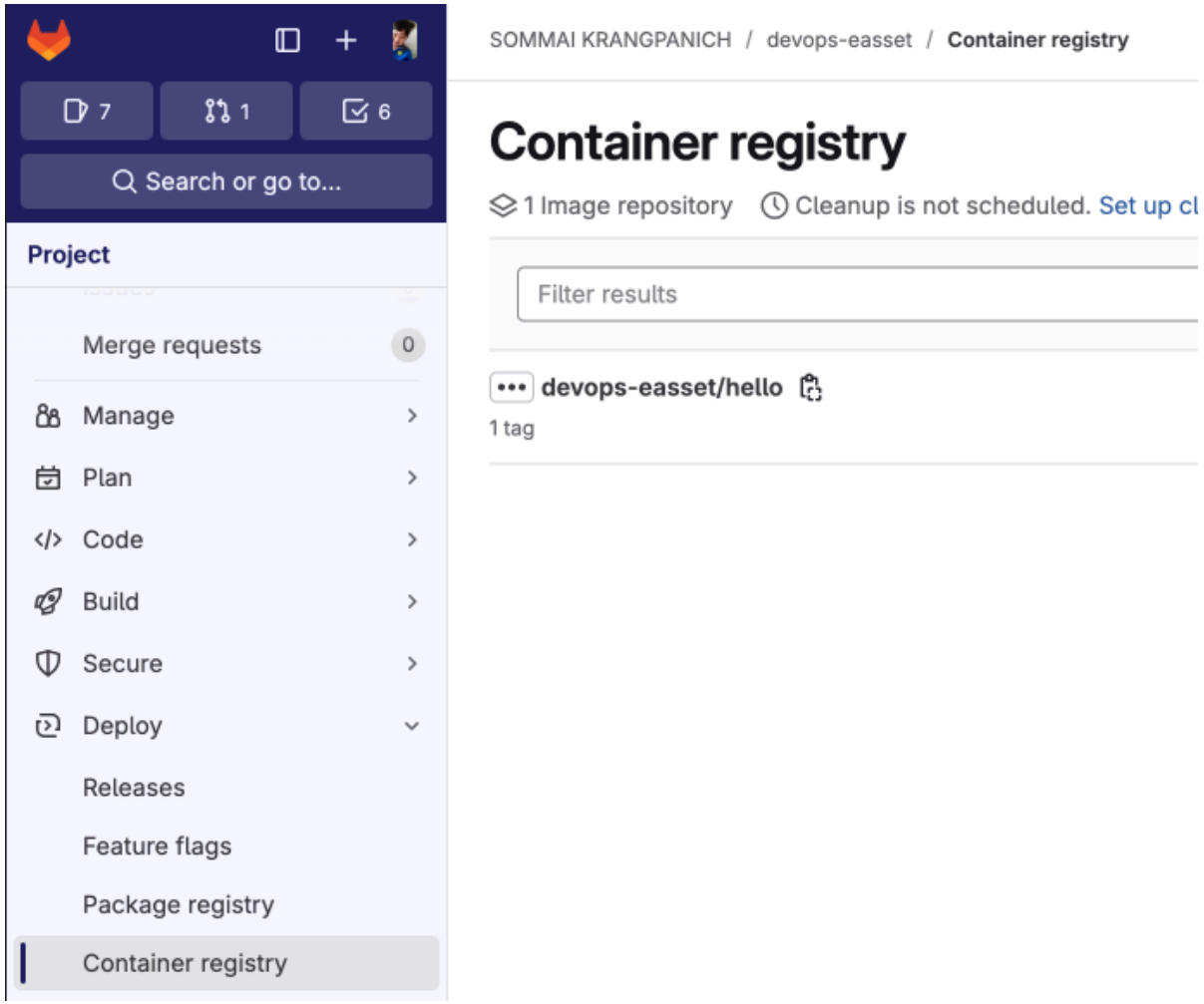
- Status
- Changes
- Build Now
- Configure
- Delete Pipeline
- Full Stage View
- Stages
- Rename
- Pipeline Syntax

admin-ci-job

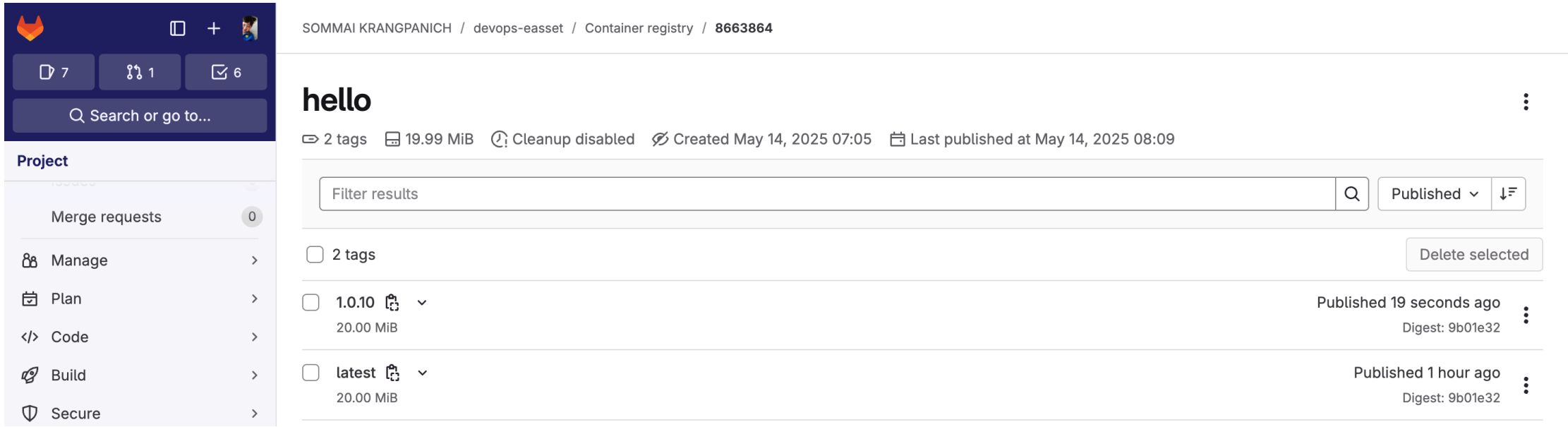
Stage View



ตรวจสอบ docker image ใน docker-registry



ตรวจสอบ docker image version ใน docker-registry



Workshop #9

Kubernetes deployment yml

create file hello-deploy.yml ภายใต้ folder k8s

- สร้าง namespace

```
apiVersion: v1
kind: Namespace
metadata:
  name: <insert-namespace-name-here>
```

สร้าง secret

- สำหรับการ pull private image
- เข้า website https://www.base64encode.org/
- ใส่ข้อมูลเพื่อเข้ารหัส

```
{
  "auths":{
    "registry.gitlab.com":{
      "username":"",
      "password":"",
      "email":""
    }
  }
}
```


BASE64
Decode and Encode
Decode
Encode
Language: English Español
Do you have to deal with Base64 format? Then this site is perfect for you! Use our super handy onlir
Encode to Base64 format
Simply enter your data then push the encode button.
{
"auths":{
"registry.gitlab.com":{
"username":"",
"password":"",
"email":""
}
}
}

แก้ไข hello-deploy.yml

- เพิ่มส่วนการสร้าง secret

```
---
apiVersion: v1
kind: Secret
metadata:
  namespace: <name-space>
  name: regcred
type: kubernetes.io/dockerconfigjson
data:
  .dockerconfigjson: >-
    <base64>
```

- `<name-space>` `<base64>` มาจากขั้นตอนด้านบน

แก้ไข hello-deploy.yml

- เพิ่มส่วนการสร้าง deployment

```
---
apiVersion: apps/v1
kind: Deployment
metadata:
  namespace: <name-space>
  name: hello
spec:
  replicas: 1
  selector:
    matchLabels:
      app: hello
  template:
    metadata:
      labels:
        app: hello
    spec:
      containers:
        - name: hello
          image: <your-image-name>
          ports:
            - containerPort: 80
      imagePullSecrets:
        - name: regcred
```

หมายเหตุ อย่าลืมแก้ `<name-space>` `<your-image-name>`

แก้ไข hello-deploy.yml

- เพิ่มส่วนการสร้าง service

```
---
apiVersion: v1
kind: Service
metadata:
  namespace: <name-space>
  name: hello
spec:
  selector:
    app: hello
  ports:
    - port: 8080
      targetPort: 80
  type: ClusterIP
```

หมายเหตุ อย่าลืมแก้ `<name-space>`

แก้ไข hello-deploy.yml

- เพิ่มส่วนการสร้าง network ingress

```
---
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  namespace: <name-space>
  name: http-ingress
  annotations:
    nginx.ingress.kubernetes.io/rewrite-target: /$2
    nginx.ingress.kubernetes.io/use-regex: "true"
spec:
  rules:
    - http:
        paths:
          - path: /<your-path>(/|$)(.*)
            pathType: ImplementationSpecific
            backend:
              service:
                name: hello
                port:
                  number: 8080
```

หมายเหตุ อย่าลืมแก้ `<name-space>` `<your-path>`

push code ขึ้น gitlab

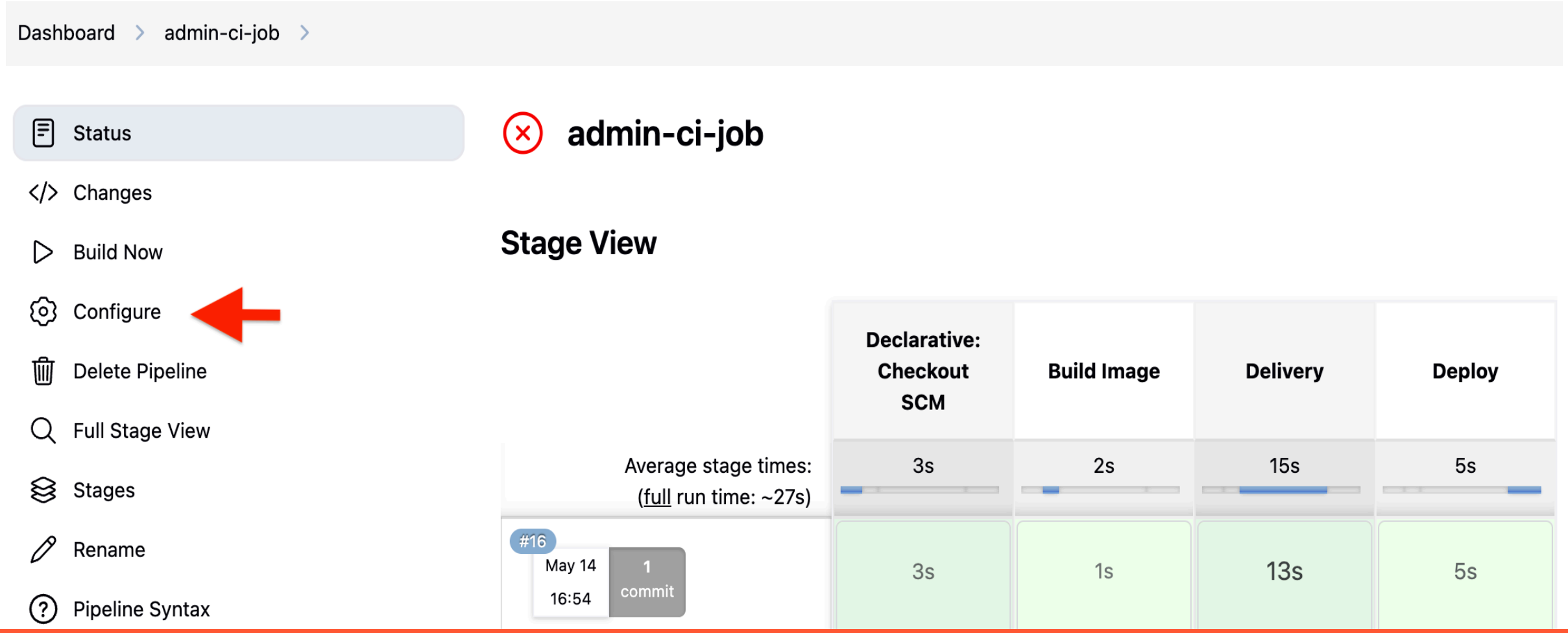
```
git add k8s/hello-deploy.yml
git commit -m "add hello deploy"
git push
```

Workshop #10

Jenkins automate CI/CD with gitlab docker and kubernetes

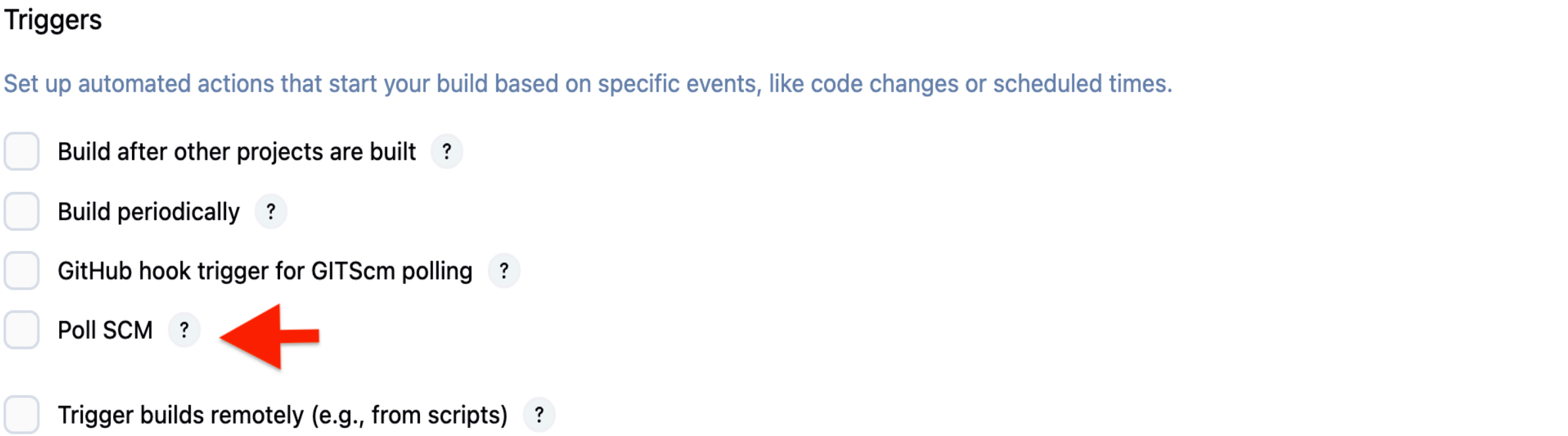
แก้ไข Job ใน Jenkins

- เลือก configure



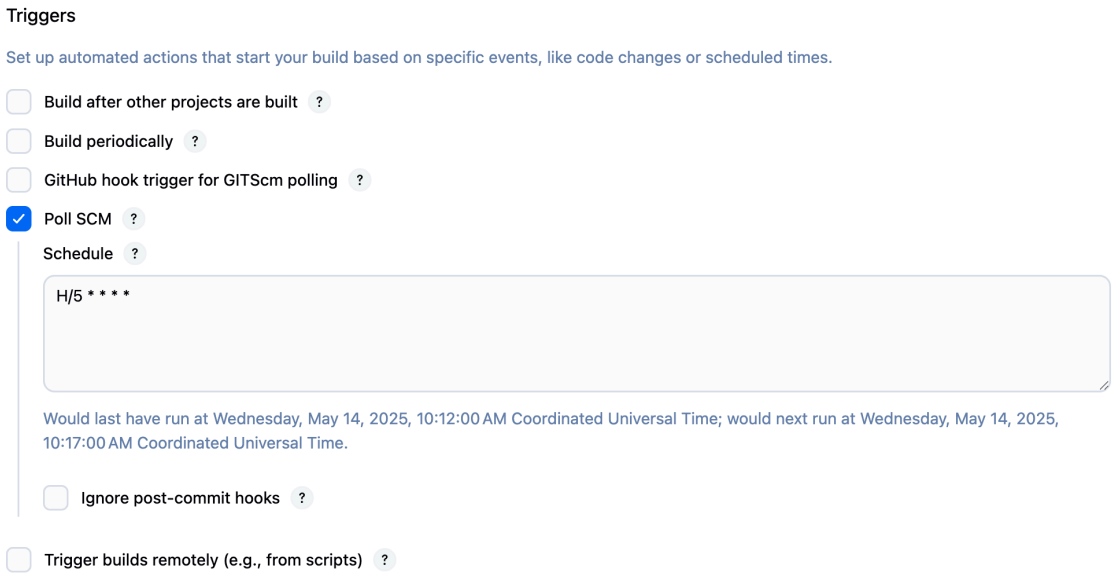
แก้ไข Job ใน Jenkins

- เลือก Poll SCM



แก้ไข Job ใน Jenkins

- ระบุข้อมูลดังนี้ `H/5 * * * *`



แก้ไข Jenkinsfile

- เพิ่ม stage Deploy ต่อจาก Delivery

```
stage("Deploy") {
  agent { label 'k8s-server' }
  steps {
      script {
        try {
          sh "kubectl set image deployment/hello -n <name space> hello=${IMAGE_NAME}:1.0.${BUILD_NUMBER}"
          sh "echo update service"
        } catch (e){
          sh "kubectl apply -f k8s/hello-deploy.yml"
          sh "echo create service"
        }
    }
  }
}
```

push code ขึ้น gitlab

```
git add Jenkinsfile
git commit -m "add deploy step"
git push
```

หลักการทำงานของ Jenkins

- หลังจากที่ push code ขึ้น gitlab แล้ว Jenkins จะทำงานดังนี้
  - ทุก ๆ 5 นาที Jenkins จะไปทำการตรวจสอบ branch ของ gitlab ว่ามี code เปลี่ยนแปลงหรือไม่
  - ถ้า code มีการเปลี่ยนแปลง Jenkins จะทำการ pull code ลงมาใน workspace
  - Jenkins จะทำการ run script ทีละ step จาก file Jenkinsfile

Any questions ?