

COMP1531

Projects - Continuous Integration

Lecture 3.2

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In This Lecture

- **Why?** 🤔
 - To scale multi-user software projects, we need automated ways to integrate and test code
- **What?** 📄
 - Continuous Integration
 - Pipelines
 - Runners



Continuous Integration

Continuous Integration: Practice of automating the integration of code changes from multiple contributors into a single software project.

Or in more concrete terms: Helping make merges into master more **frequent and stable**.



Continuous Integration

Typically continuous integration consists of a series of operations that are executed on any commit that is pushed to the repository, for example:

- Building (not applicable in JS)
- Testing
- More (in next lectures).

i.e. To oversimplify, continuous integration allows us to:

1. Automatically run `npm run test` (and more) on every commit.
2. Get a visual "OK"/"Not OK" summary of this on gitlab, including more details.



Setting It Up

Every git website has it's own way of handling continuous integration. With gitlab, it's the addition of a `.gitlab-ci.yml` file within the root of your git repository. An example that just does testing would be:

```
1 image: comp1531/basic:latest
2
3 cache:
4   paths:
5     - node_modules
6
7 stages:
8   - checks
9
10 sanity:
11   stage: checks
12   script:
13     - echo 'Hello!'
```

`gitlab-ci_basic.yml`

Let's try and add this to a repo.



Setting It Up

1 Commit 3 Branches 0 Tags 102 KB Files 133 KB Storage

Forked from COMP1531 / 21T3 / STAFF / repos / Lab 08 / lab08_cod

master lab08_cod / + History Find file Web IDE ↓ Clone

Ready to go COMP1531 Bot authored 1 year ago fdd1114e

Upload File README CI/CD configuration Add LICENSE Add CHANGELOG

Add CONTRIBUTING Add Kubernetes cluster Configure Integrations

Name	Last commit	Last update
.gitignore	Ready to go	1 month ago
.gitlab-ci.yml	Ready to go	1 month ago
README.md	Ready to go	1 month ago
cod.py	Ready to go	1 month ago
cod_test.py	Ready to go	1 month ago

See the tick? This tick indicates that some process was run from the last commit. It uses `.gitlab-ci.yml` to figure out what to run. You can click the tick.



Setting It Up

passed Job **pytest** triggered 1 month ago by Rani Jiang

🔒 This job is archived. Only the complete pipeline can be retried.

📄 ⬆️ ⬇️

```
1 Running with gitlab-runner 13.8.0 (775dd39d)
2   on COMP1531 Primary Runner tBsSVHYJ
3 Preparing the "docker" executor 00:03
4 Using Docker executor with image comp1531/basic:20T3
5 ...
6 Using locally found image version due to "if-not-present" pull policy
7 Using docker image sha256:b9bde8920c13862905ac628e8eda7d1fa59a4760287992cad96899d1de965954 for comp1531/basic:20T3 with digest comp1531/basic@sha256:bf744bea3285c3238463fbc90f0b97e3bd3ba905b9a83b6d1486aa96b558c02d ...
8 Preparing environment 00:01
9 Running on runner-tbssvhyj-project-221082-concurrent-0 via cashewbread...
11 Getting source from Git repository 00:03
12 Fetching changes with git depth set to 50...
13 Reinitialized existing Git repository in /builds/COMP1531/22T1/STAFF/repos/lab08/lab08_cod/.git/
14 Checking out fdd1114e as master...
15 Removing .pytest_cache/
16 Removing __pycache__/
17 Skipping Git submodules setup
19 Executing "step_script" stage of the job script 00:04
20 $ pytest
```

Duration: 13 seconds
Finished: 1 month ago
Timeout: 15m (from runner) ?
Runner: #49 (tBsSVHYJ) COMP1531 Primary Runner

Commit [fdd1114e](#) 📄
Ready to go

🟢 **Pipeline #922720** for master 📄

checks ▾

→ 🟢 **pytest**

This is what we call the pipeline - a summary of what was run.



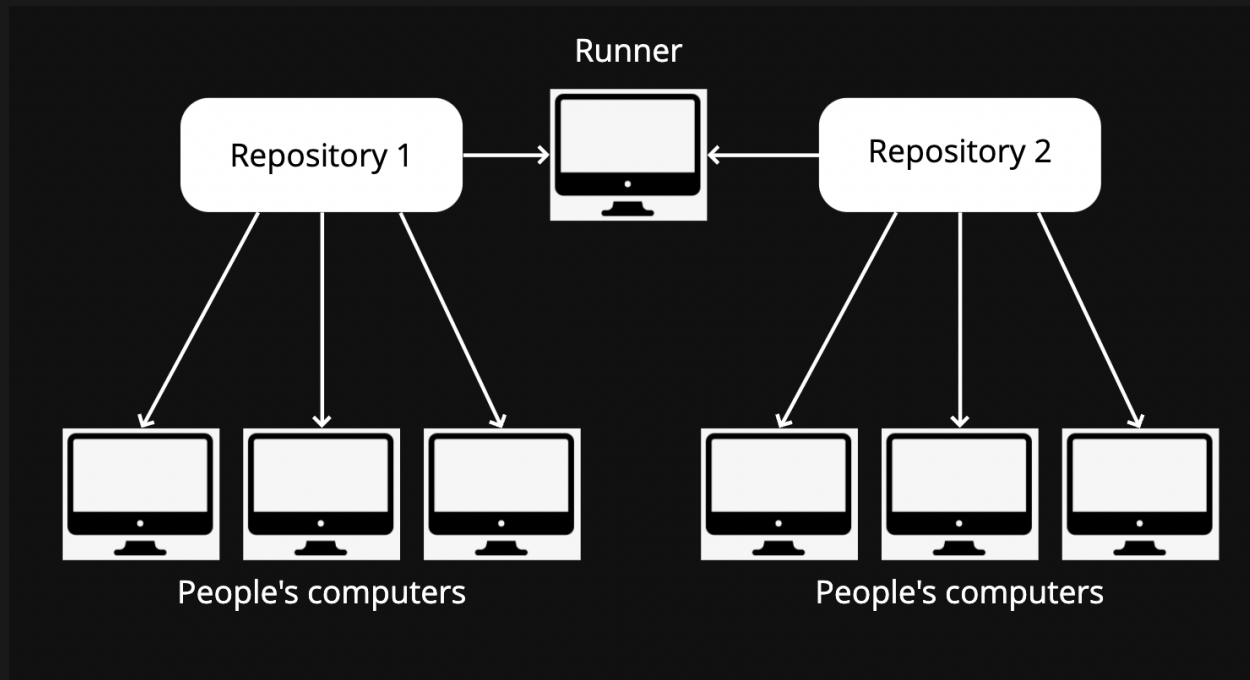
How It Works

When a commit is pushed, all of the code in that commit is taken by another computer (or "runner") and has the `.gitlab-ci.yml` instructions run on it.



How It Works

Architecture





How It Works

A runner really is just another computer whose sole job it is to run these "pipelines".

For more commercial products **github** and **bitbucket**, they have an array of runners that are used for people with git repositories. These tend to have free usage limits and then they start charging.

For **gitlab**, runners are not build in, but we've setup a runner for you. This runner runs on any `.gitlab-ci.yml` configuration that is pushed within the COMP1531 repos on gitlab.

Configuring

Now let's add **jest** to the pipeline!

```
1 image: comp1531/basic:latest
2
3 cache:
4   paths:
5     - node_modules
6
7 stages:
8   - checks
9
10 testing:
11   stage: checks
12   script:
13     - npm run test
```

gitlab-ci_test.yml

Configuring

Normally you would have an extra step here for `npm install`!

```
1 testing:
2   stage: checks
3   script:
4     - npm install
5     - npm run test
```



Continuous Integration

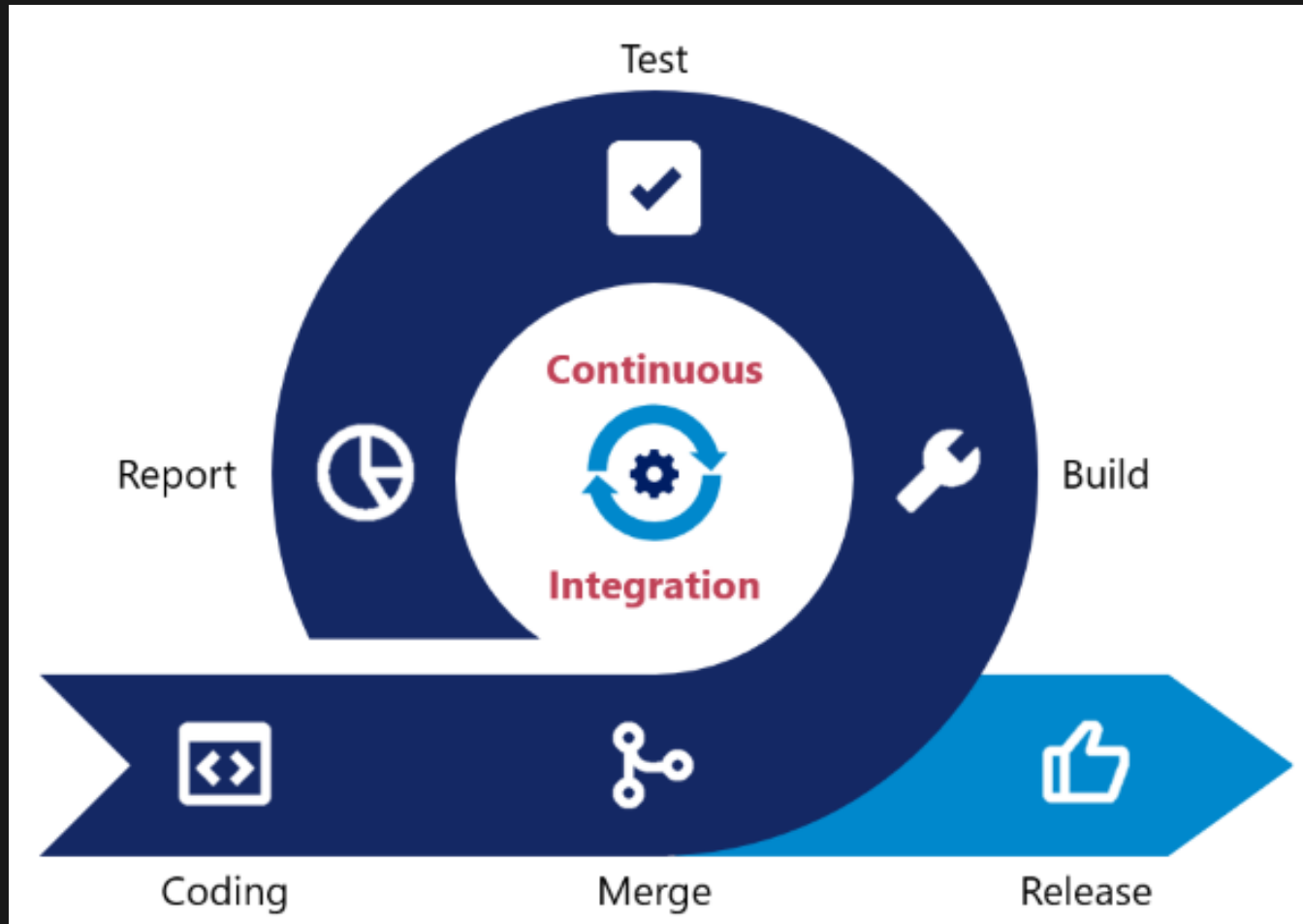
In summary, continuous integration assists us in making frequent code changes,
because we can:

1. Write tests
2. Write implementation
3. Push to gitlab + add merge request
4. Make sure we have the green tick
5. Merge in

Confidence!



Continuous Integration





Continuous Integration

An important rule to follow is that your **master** branch should ALWAYS be green. No code should be merged into it unless you're getting the green tick.



Further Reading

You should definitely read the following:

- [Gitlab Continuous Integration](#)
- [Atlassian Continuous Integration](#)

Feedback



Or go to the [form here](#).

