Cloud Architecture for CI/CD

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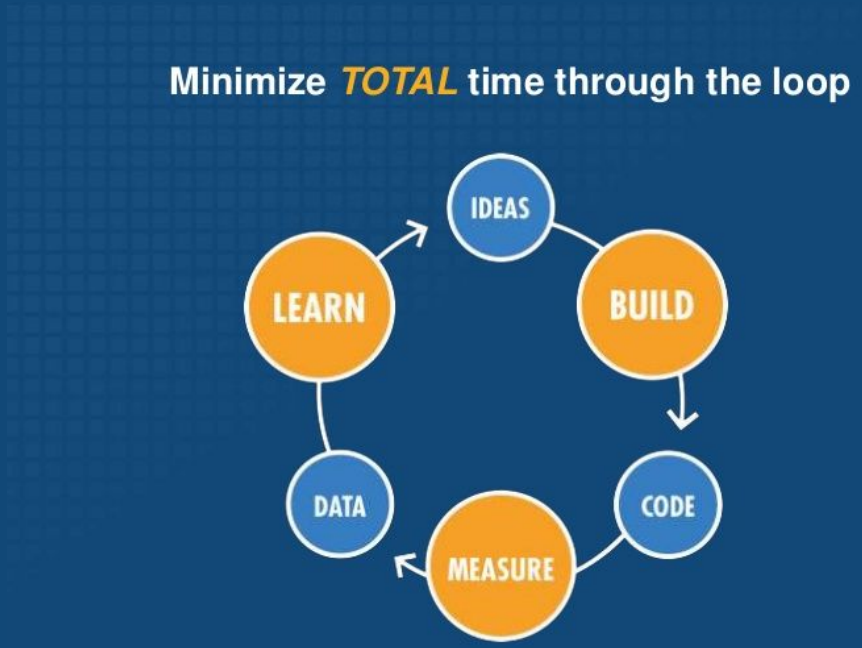
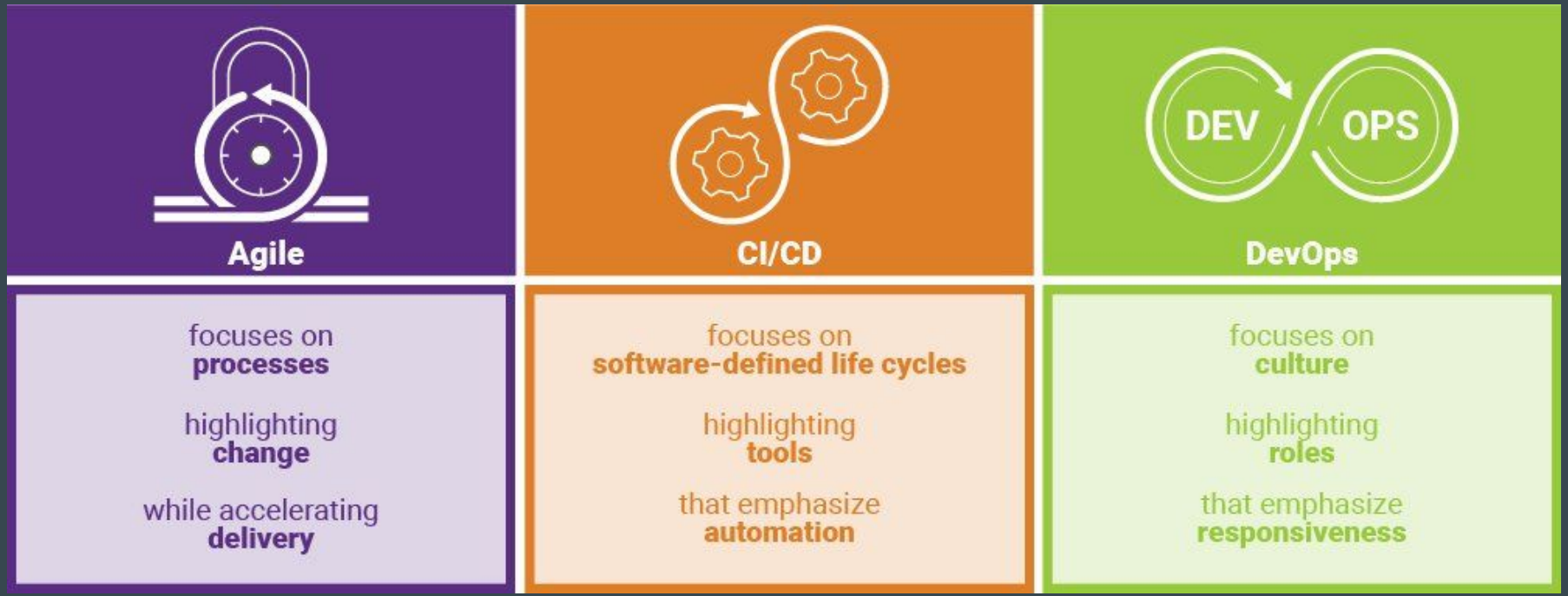
Lean Startup

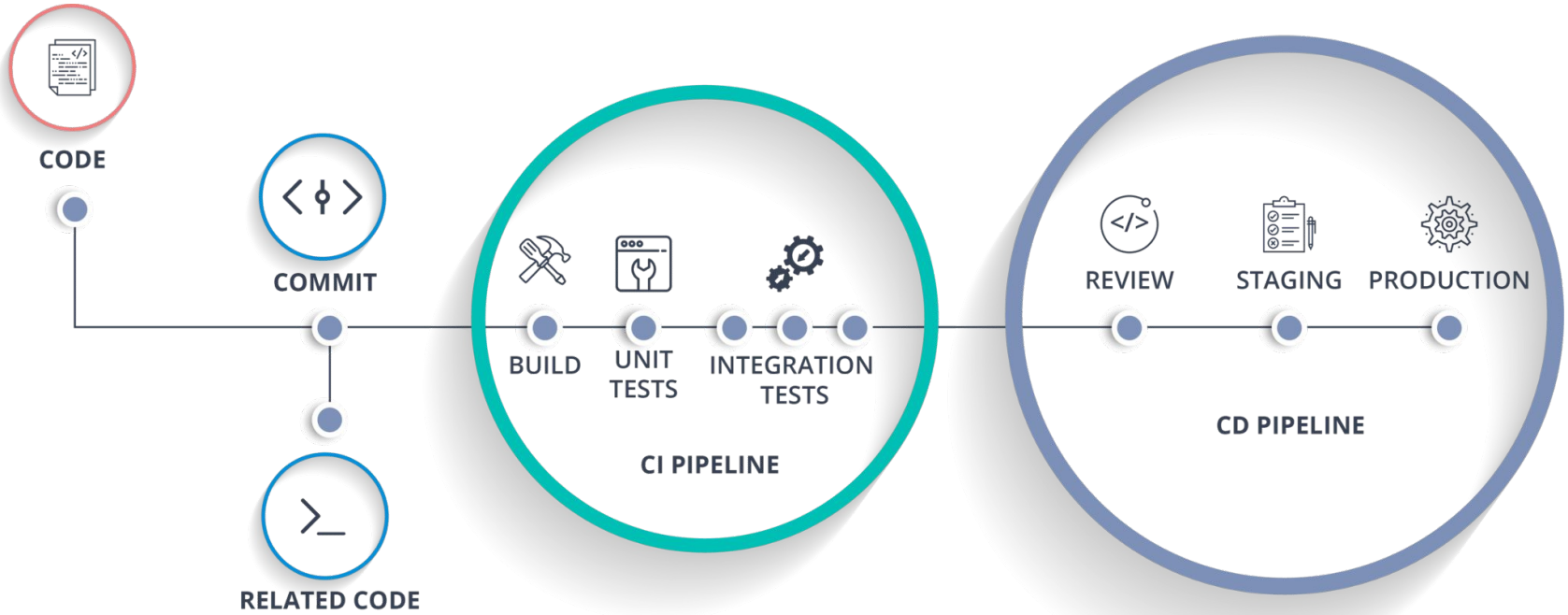


Review
Plan
Quality
Design
Agile
Software
Development
Test
Meet
Evaluate
Develop

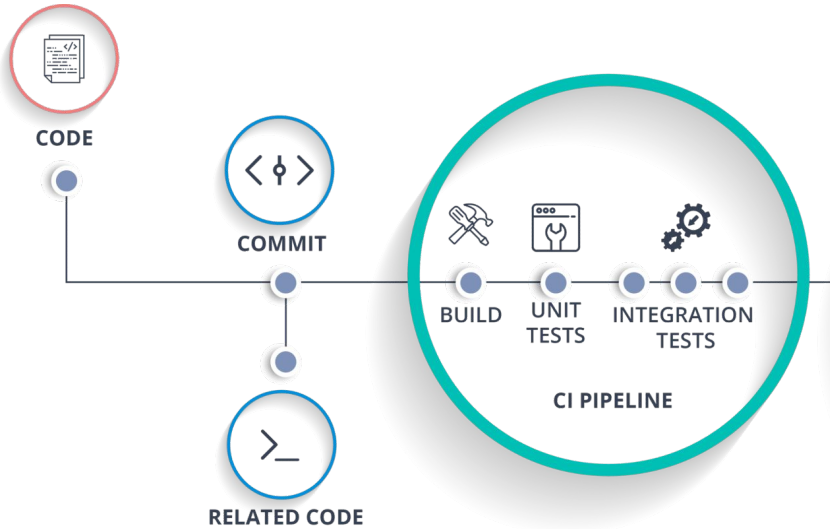
What and why CI/CD?



Overview of CI/CD Pipelines



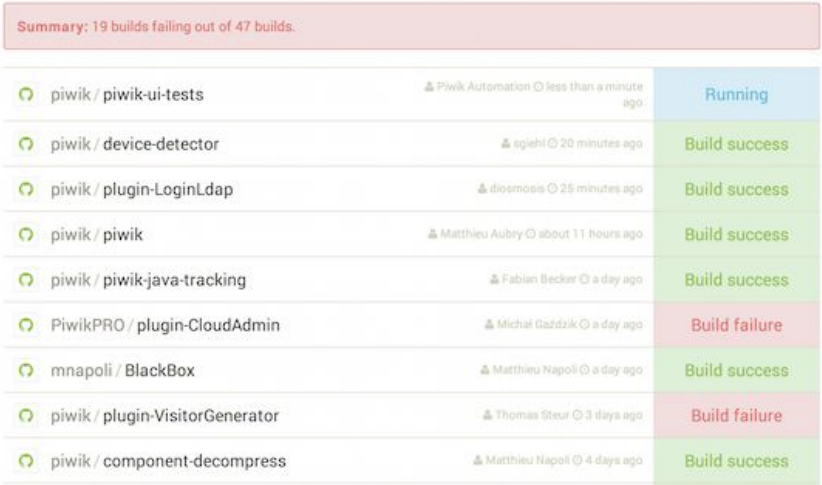
Continuous Integration



- Integrate **frequently**
- Verified by an **automated** build
- Followed by **automated** tests

CI: Automate Build

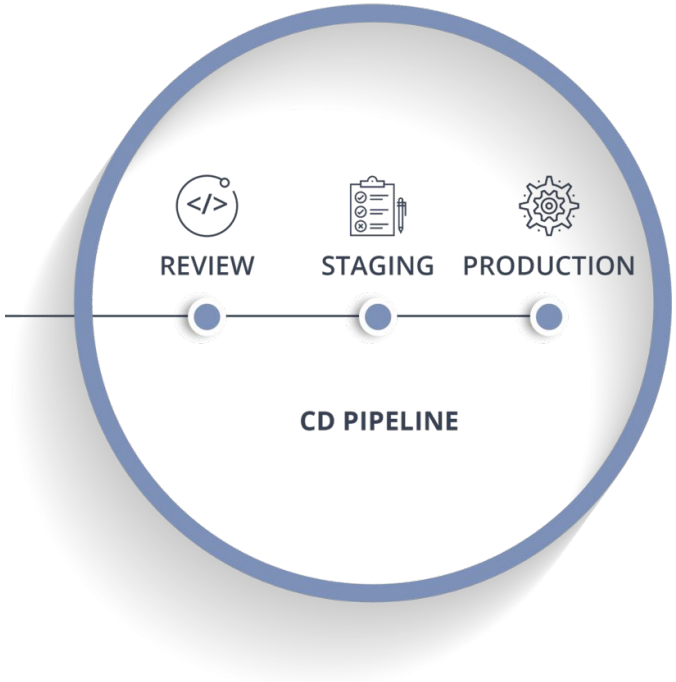
- Build is a **repetitive** task
- **Automation** can be done through pre-prepared script
- May include things like **automatic** database migration, **automatic** flushing cache, etc
- Failures will be notified to developers



CI: Automated tests

- Scripts to test software
- “Manual testing only considers the functionality of one aspect of a system at one point in time.”
- Several examples:
  - Unit tests: code-level check
  - API tests: test between services
  - Functional tests: user scenario tests
  - Etc...
- Results will be notified to developers

CD



- **Review** built file
- Ideally, deploy it first to "**staging**" environment
  - Staging = clone of production environment
- People can test out staging environment for things that cannot be tested during automatic tests
- After staging tests, app deployed to production

Continuous Delivery vs Continuous Deployment

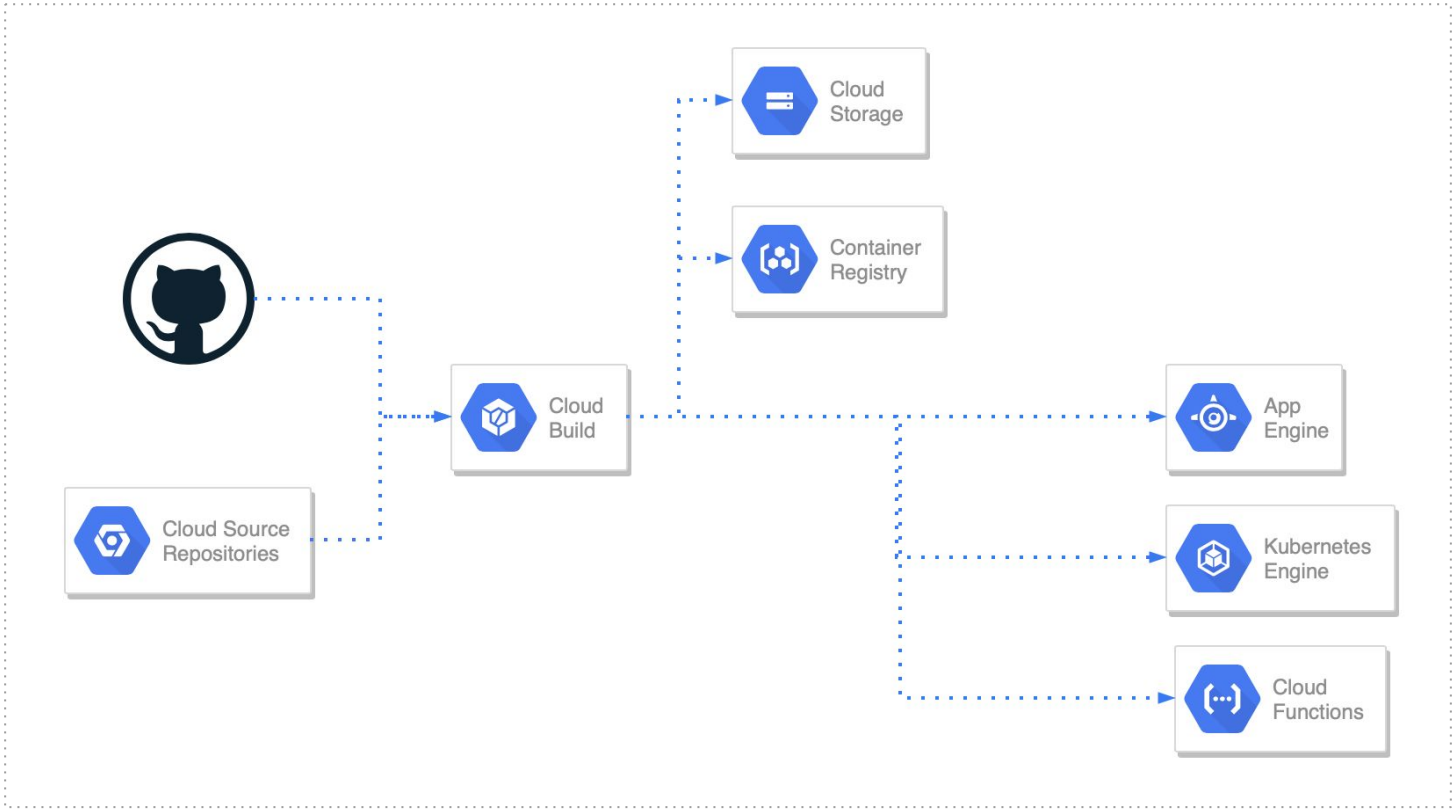
Continuous Delivery

- Code in main branch ready to deploy
- **Require** human interaction to deploy
- Suitable for project that require non-technical aspects to release features

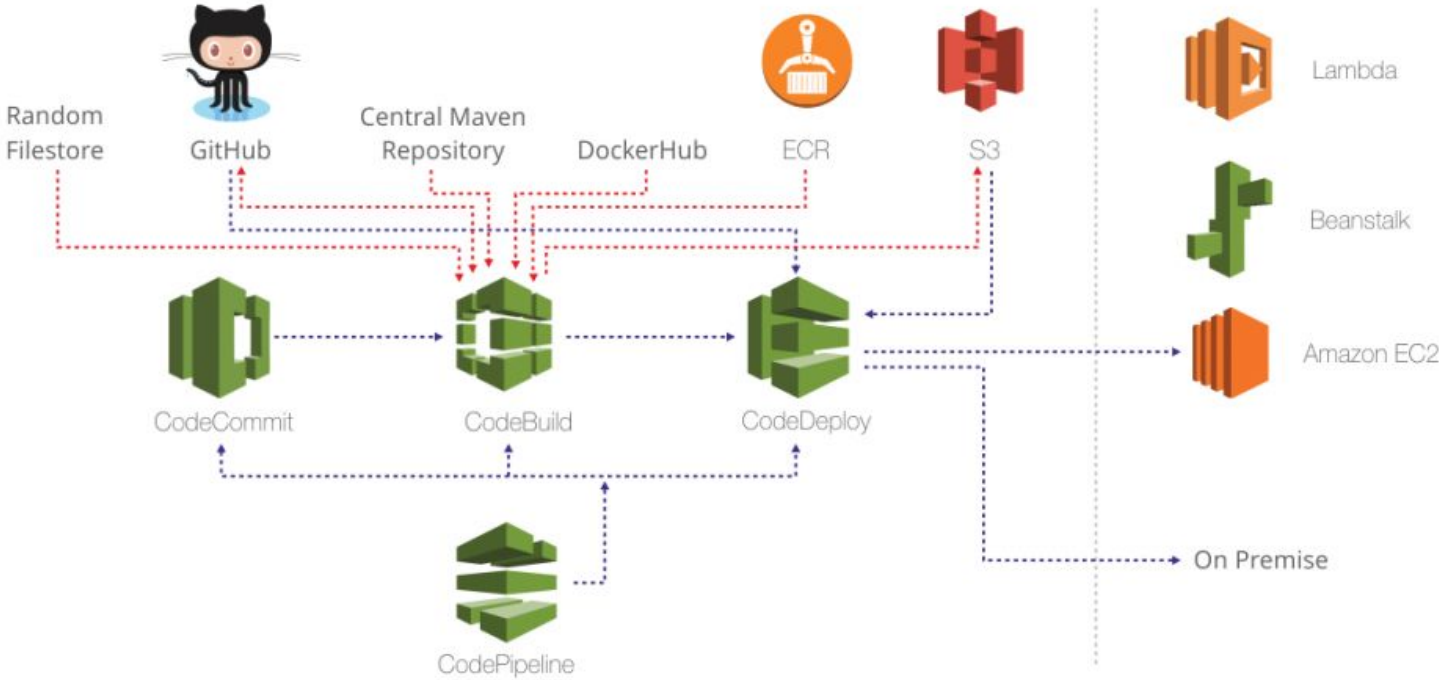
Continuous Deployment

- Code in main branch ready to deploy
- **Automatically** deployed
- Suitable for project that end-users can receive new features as soon as it's ready

Google Cloud Platform



Amazon Web Service



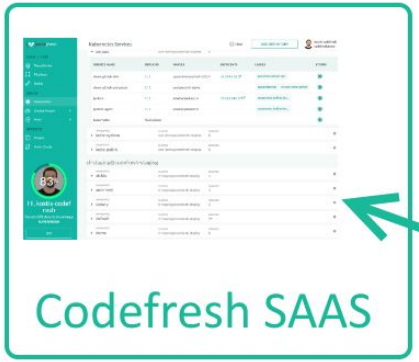
Others - On Top of AWS/GCP

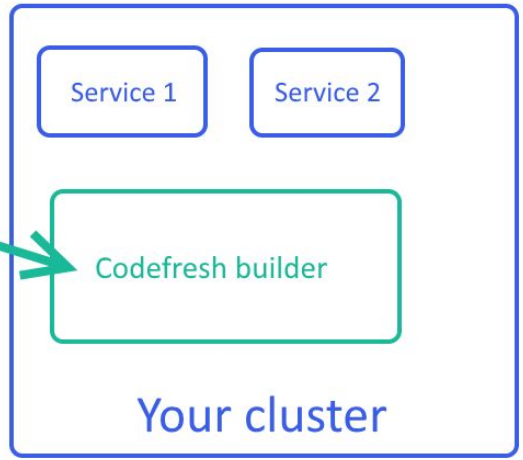
circleci

codefresh

kubernetes

Google Cloud





Demo on GCP - Setup

- ➔ GCP Account, Project, and GCP Client/SDK
- ➔ Cloud Build, Cloud Storage, App Engine + GitHub
- ➔ Creating a simple API Service
- ➔ *GO* : main.go & main_test.go + app.yaml

```go
// main.go
package main

import (
    "fmt"
    "net/http"
)

func homeHandler() func(w http.ResponseWriter, r *http.Request) {
    return func(w http.ResponseWriter, r *http.Request) {
        fmt.Fprintf(w, "Hello World! ")
    }
}

func main() {
    http.HandleFunc("/", homeHandler())
    http.ListenAndServe(":8080", nil)
}
```

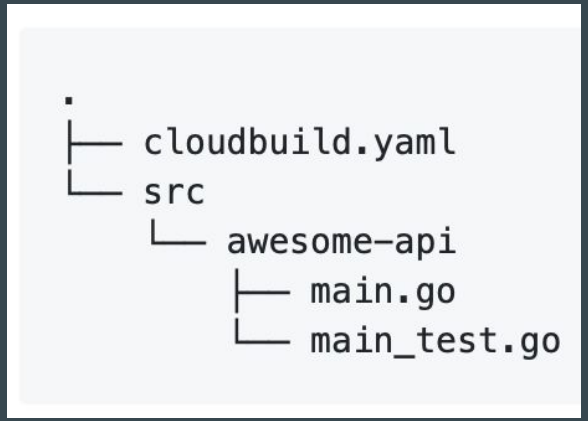
```go
// main_test.go
package main

import (
    "net/http"
    "net/http/httptest"
    "testing"
)

func TestMain(t *testing.T) {
    http.HandleFunc("/", homeHandler())
    req, _ := http.NewRequest("GET", "", nil)
    w := httptest.NewRecorder()
    hf := http.HandlerFunc(homeHandler())
    hf.ServeHTTP(w, req)
    if w.Code != http.StatusOK {
        t.Errorf("Home page didn't return %v", http.StatusOK)
    }
}
```

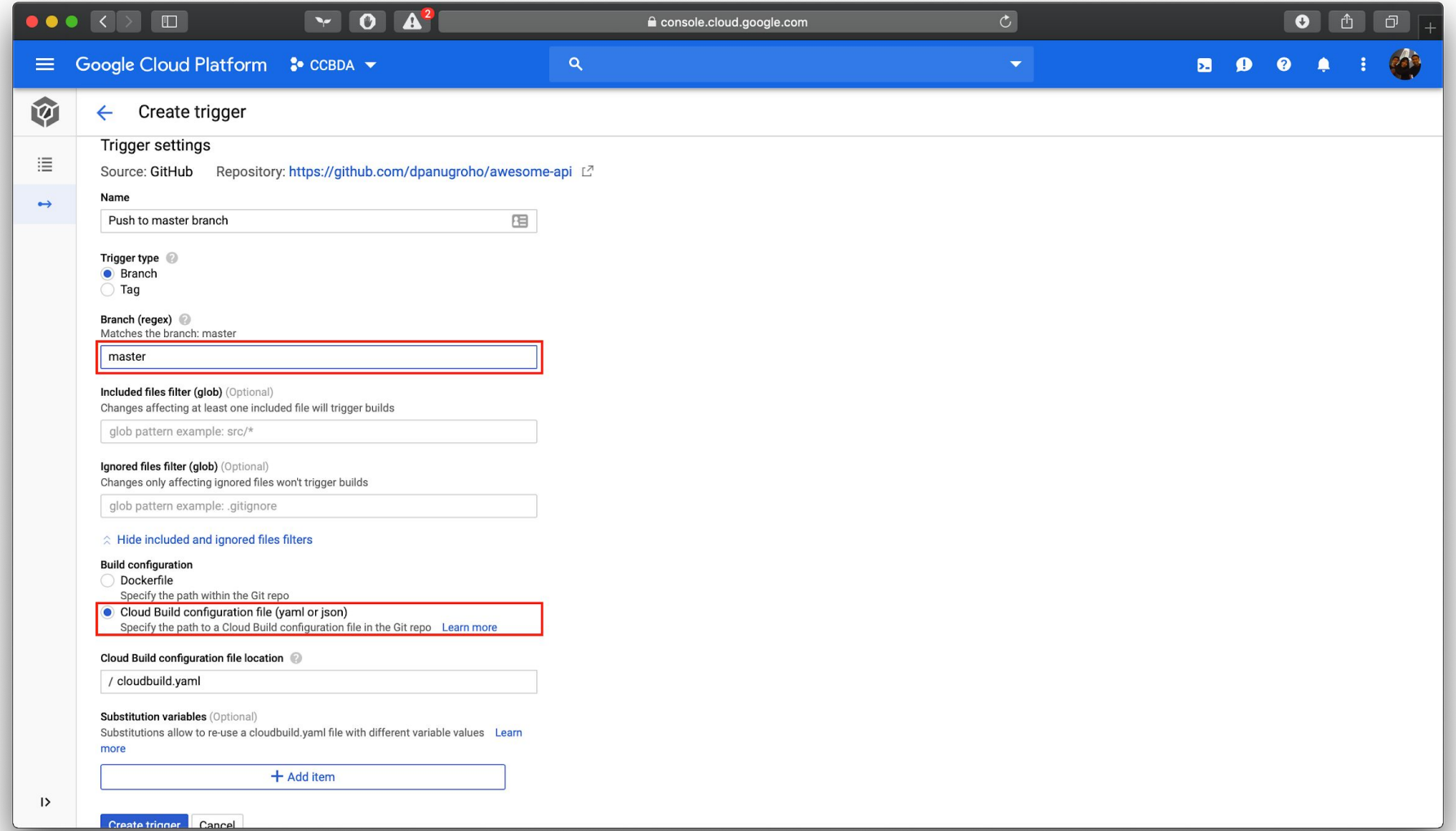
```yaml
# app.yaml
runtime: go112
```

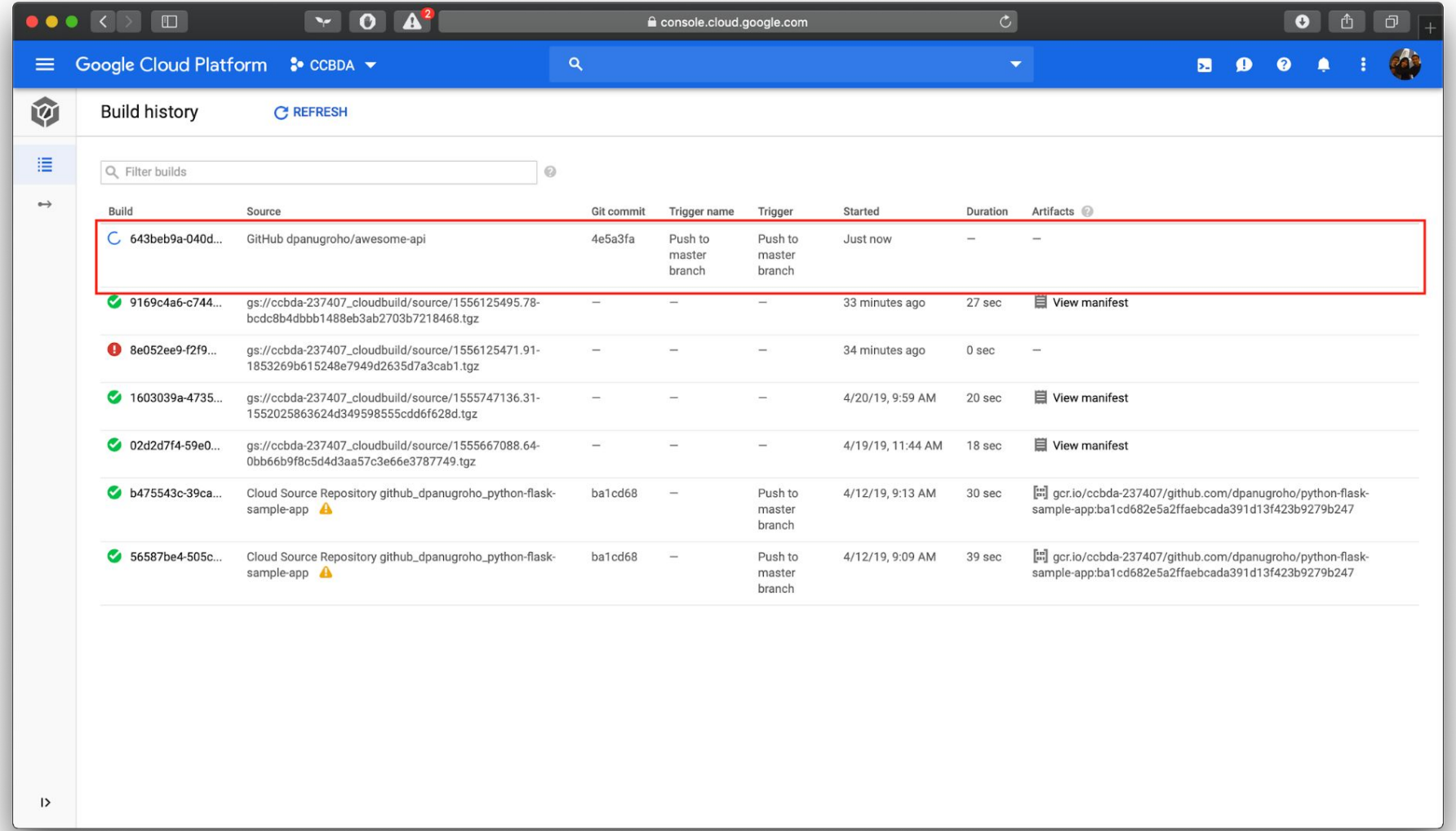
Demo - Cloudbuild.yaml

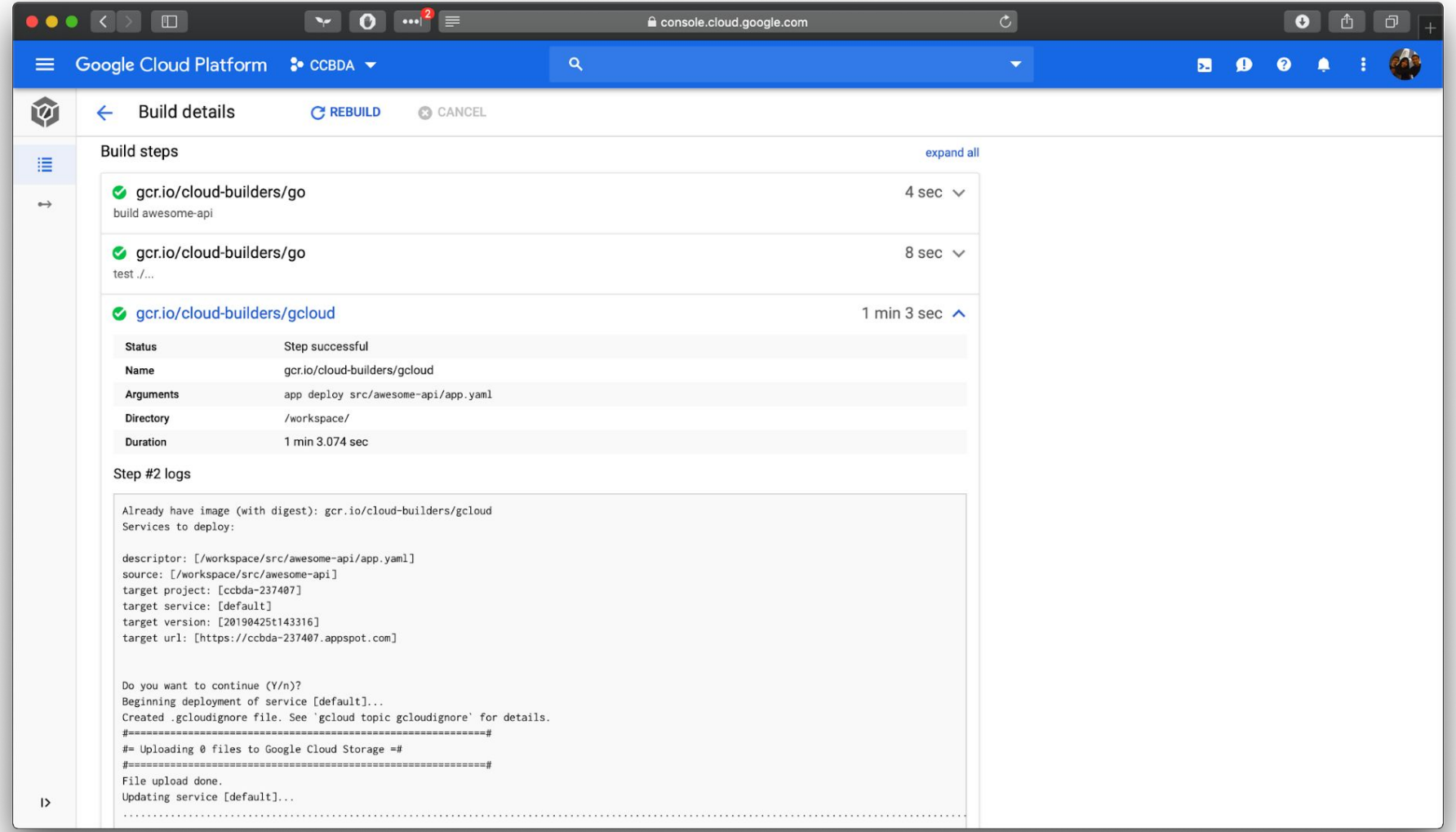
```
steps:

    - name: 'gcr.io/cloud-builders/go'  args: ['build', 'awesome-api']

    - name: "gcr.io/cloud-builders/go"  args: ['test','./...']

    - name: 'gcr.io/cloud-builders/gcloud'  args: ['app',
    'deploy','src/awesome-api/app.yaml']  timeout: '600s'

artifacts:

    objects:

        location: 'gs://awesome-api-bin'

        paths: ['awesome-api']
```

Demo on GCP - Structure




console.cloud.google.com
Google Cloud Platform
CCBDA
Create trigger
Trigger settings
Source: GitHub
Repository: https://github.com/dpanugroho/awesome-api
Name
Push to master branch
Trigger type
Branch
Tag
Branch (regex)
Matches the branch: master
master
Included files filter (glob) (Optional)
Changes affecting at least one included file will trigger builds
glob pattern example: src/*
Ignored files filter (glob) (Optional)
Changes only affecting ignored files won't trigger builds
glob pattern example: .gitignore
Hide included and ignored files filters
Build configuration
Dockerfile
Specify the path within the Git repo
Cloud Build configuration file (yaml or json)
Specify the path to a Cloud Build configuration file in the Git repo
Learn more
Cloud Build configuration file location
/ cloudbuild.yaml
Substitution variables (Optional)
Substitutions allow to re-use a cloudbuild.yaml file with different variable values
Learn more
Add item
Create trigger
Cancel


console.cloud.google.com
Google Cloud Platform
CCBDA
Build history
REFRESH
Filter builds
Build
Source
Git commit
Trigger name
Trigger
Started
Duration
Artifacts
643beb9a-040d...
GitHub dpanugroho/awesome-api
4e5a3fa
Push to master branch
Push to master branch
Just now
–
–
9169c4a6-c744...
gs://ccbda-237407_cloudbuild/source/1556125495.78-bcdc8b4dbbb1488eb3ab2703b7218468.tgz
33 minutes ago
27 sec
View manifest
8e052ee9-f2f9...
gs://ccbda-237407_cloudbuild/source/1556125471.91-1853269b615248e7949d2635d7a3cab1.tgz
34 minutes ago
0 sec
1603039a-4735...
gs://ccbda-237407_cloudbuild/source/1555747136.31-1552025863624d349598555cdd6f628d.tgz
4/20/19, 9:59 AM
20 sec
View manifest
02d2d7f4-59e0...
gs://ccbda-237407_cloudbuild/source/1555667088.64-0bb66b9f8c5d4d3aa57c3e66e3787749.tgz
4/19/19, 11:44 AM
18 sec
View manifest
b475543c-39ca...
Cloud Source Repository github_dpanugroho_python-flask-sample-app
ba1cd68
Push to master branch
4/12/19, 9:13 AM
30 sec
gcr.io/ccbda-237407/github.com/dpanugroho/python-flask-sample-app:ba1cd682e5a2ffaebcada391d13f423b9279b247
56587be4-505c...
Cloud Source Repository github_dpanugroho_python-flask-sample-app
ba1cd68
Push to master branch
4/12/19, 9:09 AM
39 sec
gcr.io/ccbda-237407/github.com/dpanugroho/python-flask-sample-app:ba1cd682e5a2ffaebcada391d13f423b9279b247


console.cloud.google.com
Google Cloud Platform
CCBDA
Build details
REBUILD
CANCEL
Build steps
expand all
gcr.io/cloud-builders/go
build awesome-api
4 sec
gcr.io/cloud-builders/go
test ./...
8 sec
gcr.io/cloud-builders/gcloud
1 min 3 sec
Status
Step successful
Name
gcr.io/cloud-builders/gcloud
Arguments
app deploy src/awesome-api/app.yaml
Directory
/workspace/
Duration
1 min 3.074 sec
Step #2 logs
Already have image (with digest): gcr.io/cloud-builders/gcloud
Services to deploy:
descriptor: [/workspace/src/awesome-api/app.yaml]
source: [/workspace/src/awesome-api]
target project: [ccbda-237407]
target service: [default]
target version: [20190425t143316]
target url: [https://ccbda-237407.appspot.com]
Do you want to continue (Y/n)?
Beginning deployment of service [default]...
Created .gcloudignore file. See `gcloud topic gcloudignore` for details.
#===#
#= Uploading 0 files to Google Cloud Storage =#
#===#
File upload done.
Updating service [default]...

Summary

- ➔ CI/CD enables agile development & lean
- ➔ Cloud Service Ease CI/CD Process