For the IsaC I will just use the CloudFormation template from the previous assignment.

It’s quite simple with three EC2 instances running a nodejs image containing some basic tests

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To test this pipeline for yourself you have to make your own image builder template with these components, build and update the ImageId to your own AMIs. Its code should look like this:

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I created the image in the aws console, as it can take a solid bit of time, and make the GitHub actions time out. It should be mostly static too, so rebuilding the image every deployment would be a waste of time.

CloudFormation code

{

"AWSTemplateFormatVersion": "2010-09-09",

"Metadata": {

"AWS::CloudFormation::Designer": {

"ae95d48d-a3ac-47a3-aea1-506d4e3e8365": {

"size": {

"width": 60,

"height": 60

},

"position": {

"x": 480,

"y": 370

},

"z": 0,

"embeds": []

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"c6ee5b9a-f394-4f46-8f2c-626a44b86bce": {

"size": {

"width": 60,

"height": 60

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"position": {

"x": 570,

"y": 370

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"z": 0,

"embeds": []

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"df433d24-5ad6-4a94-b88a-f79e6f9696fa": {

"size": {

"width": 60,

"height": 60

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"position": {

"x": 660,

"y": 370

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"z": 0,

"embeds": []

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"ea1d2848-7bc8-408c-823a-c298d732224f": {

"size": {

"width": 60,

"height": 60

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"position": {

"x": 400,

"y": 370

},

"z": 0

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}

},

"Resources": {

"EC2I3C31M": {

"Type": "AWS::EC2::Instance",

"Properties": {

"ImageId": "ami-0f44d9081083b94f7",

"InstanceType": "t2.micro"

},

"Metadata": {

"AWS::CloudFormation::Designer": {

"id": "ae95d48d-a3ac-47a3-aea1-506d4e3e8365"

}

}

},

"EC2IW00S": {

"Type": "AWS::EC2::Instance",

"Properties": {

"ImageId": "ami-0f44d9081083b94f7",

"InstanceType": "t2.micro"

},

"Metadata": {

"AWS::CloudFormation::Designer": {

"id": "c6ee5b9a-f394-4f46-8f2c-626a44b86bce"

}

}

},

"EC2I3UWUI": {

"Type": "AWS::EC2::Instance",

"Properties": {

"ImageId": "ami-0f44d9081083b94f7",

"InstanceType": "t2.micro"

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"Metadata": {

"AWS::CloudFormation::Designer": {

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}

},

"EC2I57G": {

"Type": "AWS::EC2::Instance",

"Properties": {

"ImageId": "ami-0f44d9081083b94f7",

"InstanceType": "t2.micro"

}, "Metadata": {

"AWS::CloudFormation::Designer": {

"id": "ea1d2848-7bc8-408c-823a-c298d732224f"

}

}

}

}

}

GitHub Actions

Test environment deployment:

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Staging environment deployment:

Text

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Production environment deployment:

Text

Description automatically generated

These actions deploy to their respective environments. Test deploy just deploys the code in an environment and runs the different tests. If, and only if, the test deploy deployment succeeds the staging environment is deployed. Here’s where I would do integration tests, having a “network” of all the services staging environments. However, as I only have the one this environment doesn’t do all that much except that it runs the latest code pushed that doesn’t immediately break. An example of its use could be if the service is supposed to run a simple website, you could go into the staging environment and see if everything looks right.

Lastly is the production deployment. This only happens when someone manually runs the workflow

Pipeline Runs

First I’ll show a successful run of the pipeline

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Test deployment:

Text

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Here we see that the workflow completed without any errors, which means that the template can be built and run, as well as the test components of our succeeded, if not it would have failed.

This step is triggered by a push on the master branch

Staging deployment:

Graphical user interface, text

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Again we know at this point that the template is valid and works as intended, so this should also succeed, straight forward. Remember, this happens automatically, depending on the status of the test deployment. It is at this point you would do manual and integration-testing.

Prod deployment

Graphical user interface, text

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On to production deployment. This stage only happens if you manually run the deployment to production, which should be after both a successful test deployment as well as some testing in the staging environment, depending on your situation.

This has been an example of how how a successful pipeline run would work

Next up, a failed run.

Graphical user interface, text, application

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To fail a run, in this example, I will just re-deploy the exact same code I did the last time. Thanks to CloudFormations own testing, a stack update is changed if the new template lacks any changes

Test deployment:

Text

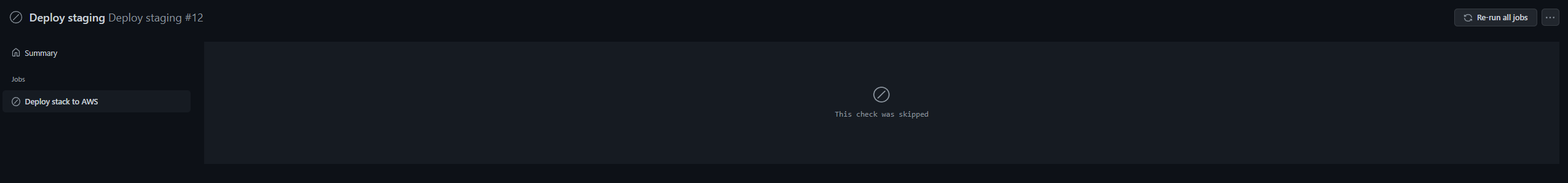
Description automatically generated

As you can see in the error from the deployment:

“**Error:** Failed to create Change Set: The submitted information didn't contain changes. Submit different information to create a change set.”

The deployment failed due to CloudFormation failing to create a change set, as we just pushed the same code as last time.

Staging deployment:



Since our test deployment failed, we skipped the staging deployment, so our last working staging deployment works as before.

This example of a failed deployment works for any other failure, such as if the test components of the machine image fails, CloudFormation will detect it and propagate the error and fail itself