l. Set up or used a continuous integration system to automate the running of tests and continuously deployed their code to their IaaS or PaaS provider

BE utilized GitHub, Circle CI with integrated suite of testing tools including Frisby.js, and Amazon's Elastic Beanstalk to facilitate a process by which code is developed, checked in tested, integrated, tested again by Circle CI and upon successfully completing testing is deployed to a Docker container. We modeled the systems and process for continuous integration on other projects we completed as well as the work BE Developers (Brandt Heisey) is doing with 18F on the MIDAS project.

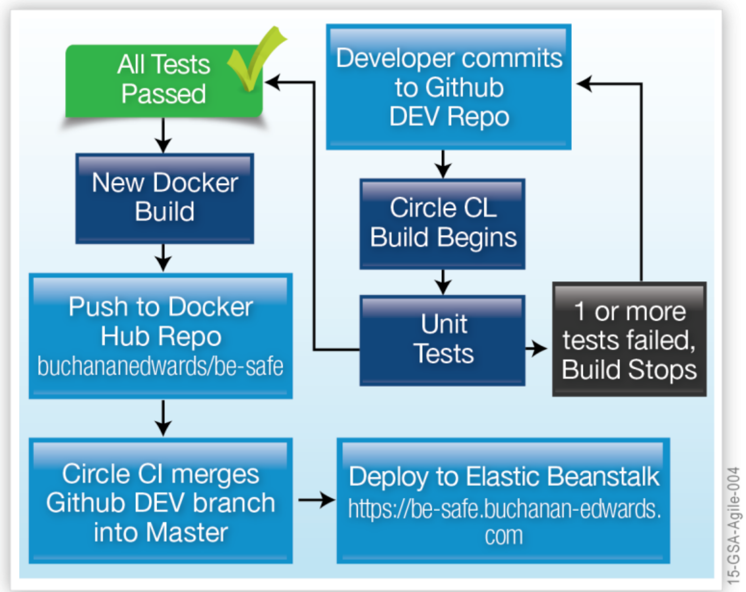

All Tests Passed
Developer commits to Github DEV Repo
New Docker Build
Circle CL Build Begins
Push to Docker Hub Repo buchananedwards/be-safe
Unit Tests
1 or more tests failed, Build Stops
Circle CI merges Github DEV branch into Master
Deploy to Elastic Beanstalk https://be-safe.buchanan-edwards.com
15-GSA-Agile-004

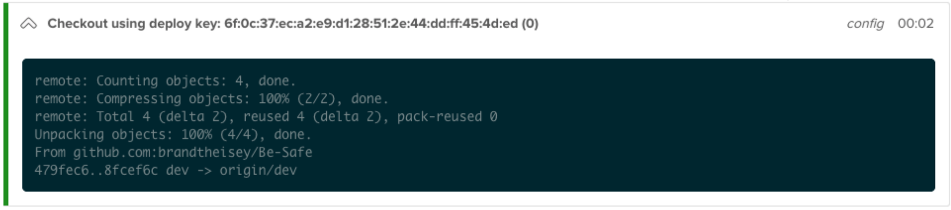
Figure 1. Continuous Integration Architecture

BE conducted no less than a daily release to AWS for our Sprint demonstrations and retrospectives. At times BE used its continuous integration system to release more frequently as collaboration and testing called for it.

On our Department of State ECA contract we currently use Visual Studio Online (VSO) and Git for our distributed version control system. To take advantage of VSO's ability to handle continuous integration, we configured it on every check-in of code to build the software and automatically run our unit and coded-user interface tests. Doing so alerts us of a broken build immediately rather than allowing the error to linger. This has made the team very efficient in terms of building, validating, and deploying software

Running Circle

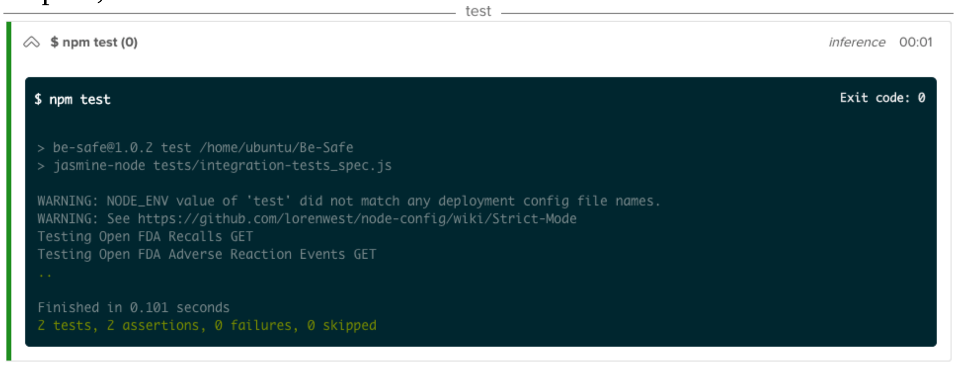
1. A Developer commits a new version of code to the GitHub repository branch DEV.
2. Circle CI detects this commit and runs tests as specified in the circle.yml file.



Checkout using deploy key: 6f:0c:37:ec:a2:e9:d1:28:51:2e:44:dd:ff:45:4d:ed (0) *config* 00:02

```
remote: Counting objects: 4, done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 4 (delta 2), reused 4 (delta 2), pack-reused 0
Unpacking objects: 100% (4/4), done.
From github.com:brandtheisey/Be-Safe
479fec6..8fcef6c dev -> origin/dev
```

3. If the tests pass, a new Docker container build is initiated.



test

$ npm test (0) *inference* 00:01

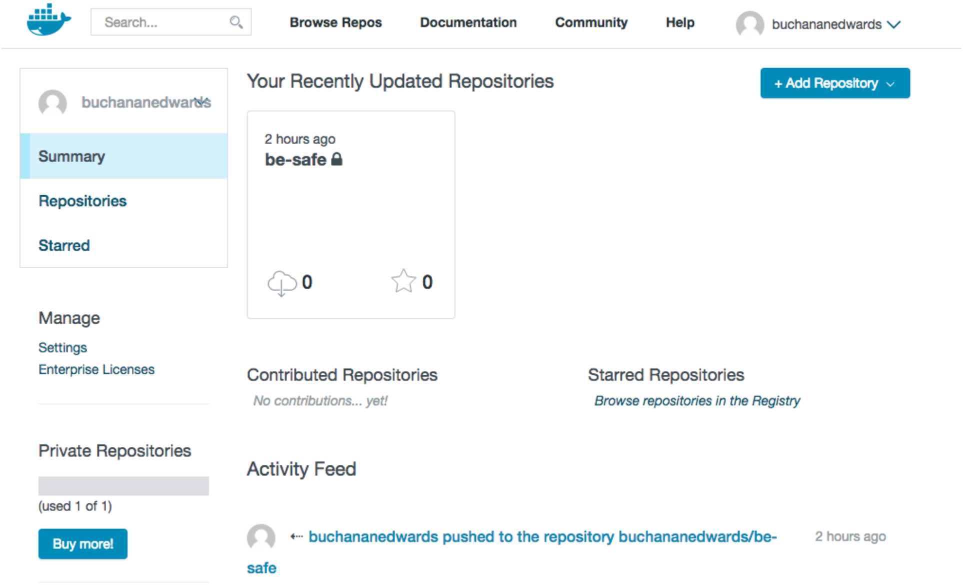
```
$ npm test                                                              Exit code: 0


> be-safe@1.0.2 test /home/ubuntu/Be-Safe
> jasmine-node tests/integration-tests_spec.js

WARNING: NODE_ENV value of 'test' did not match any deployment config file names.
WARNING: See https://github.com/lorenwest/node-config/wiki/Strict-Mode
Testing Open FDA Recalls GET
Testing Open FDA Adverse Reaction Events GET
..

Finished in 0.101 seconds
2 tests, 2 assertions, 0 failures, 0 skipped
```

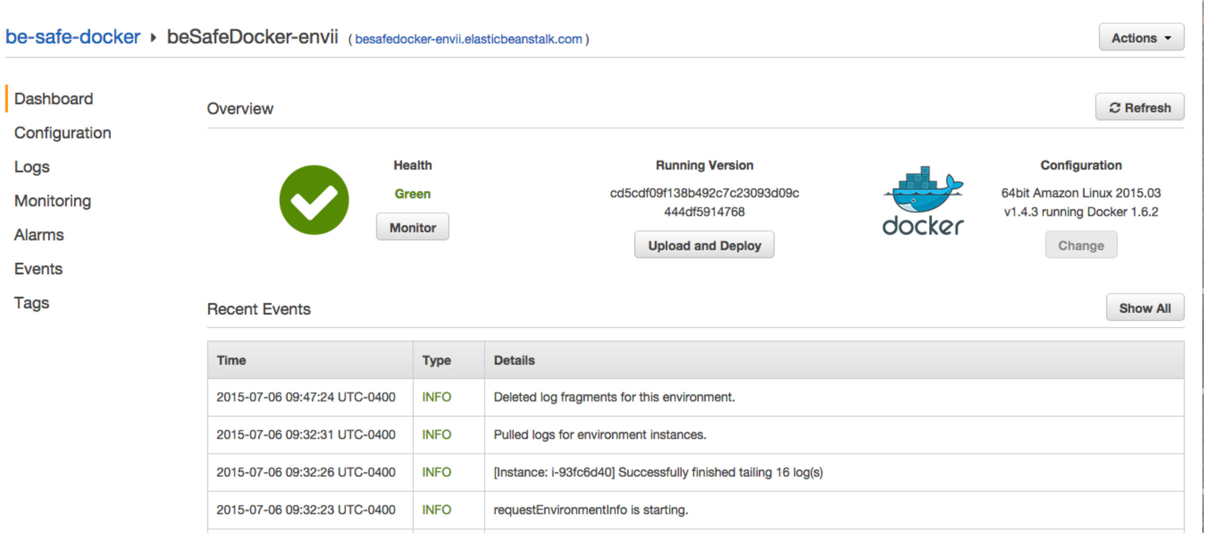
4. When the Docker build is done, it is pushed to the Docker Hub repository.



buchananedwards pushed to the repository buchananedwards/be-safe 2 hours ago

5. After the new Docker image is pushed to Docker Hub, Circle CI merges the GitHub branch DEV with Master.

6. The just-created container is deployed to Elastic Beanstalk, where the new container and application code become available at https://be-safe.buchanan-edwards.com



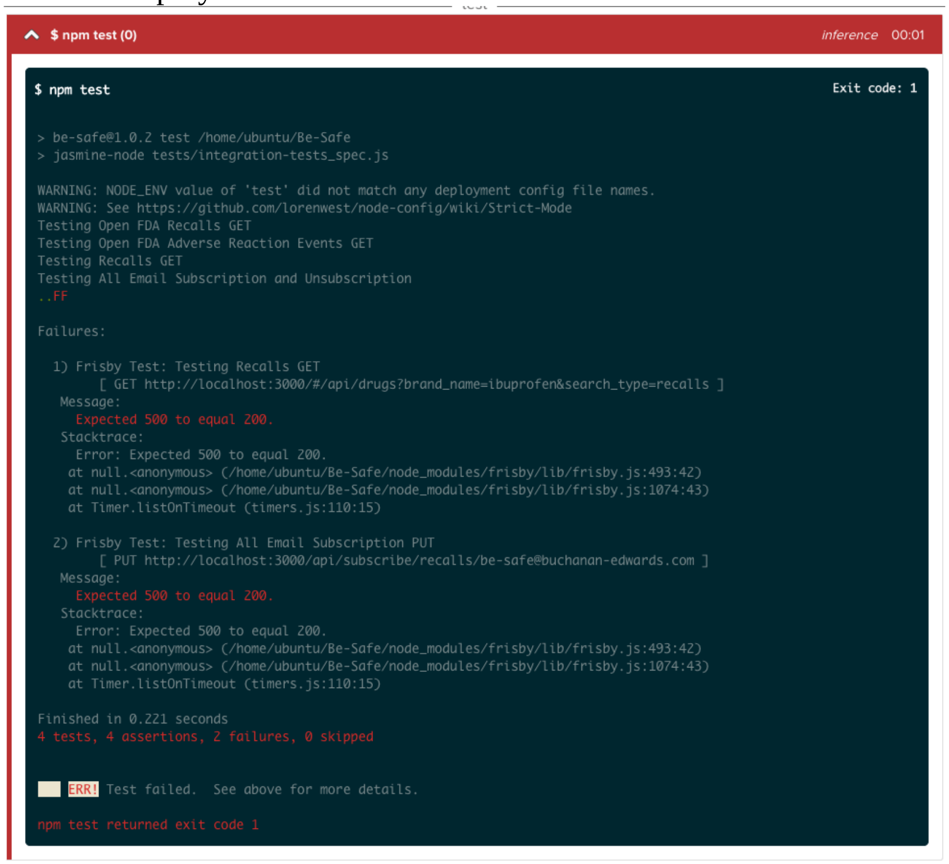
Health
Green

Running Version
cd5cdf09f138b492c7c23093d09c444df5914768

Configuration
64bit Amazon Linux 2015.03 v1.4.3 running Docker 1.6.2

Time	Type	Details
2015-07-06 09:47:24 UTC-0400	INFO	Deleted log fragments for this environment.
2015-07-06 09:32:31 UTC-0400	INFO	Pulled logs for environment instances.
2015-07-06 09:32:26 UTC-0400	INFO	[Instance: i-93fc6d40] Successfully finished tailing 16 log(s)
2015-07-06 09:32:23 UTC-0400	INFO	requestEnvironmentInfo is starting.

7. If a test fails, the build will stop -- new containers will be deployed and Elastic Beanstalk will remain at the last deployed version before the most recent commit.



```
$ npm test                                                          Exit code: 1


> be-safe@1.0.2 test /home/ubuntu/Be-Safe
> jasmine-node tests/integration-tests_spec.js

WARNING: NODE_ENV value of 'test' did not match any deployment config file names.
WARNING: See https://github.com/lorenwest/node-config/wiki/Strict-Mode
Testing Open FDA Recalls GET
Testing Open FDA Adverse Reaction Events GET
Testing Recalls GET
Testing All Email Subscription and Unsubscription
..FF

Failures:

  1) Frisby Test: Testing Recalls GET
        [ GET http://localhost:3000/#/api/drugs?brand_name=ibuprofen&search_type=recalls ]
   Message:
     Expected 500 to equal 200.
   Stacktrace:
     Error: Expected 500 to equal 200.
    at null.<anonymous> (/home/ubuntu/Be-Safe/node_modules/frisby/lib/frisby.js:493:42)
    at null.<anonymous> (/home/ubuntu/Be-Safe/node_modules/frisby/lib/frisby.js:1074:43)
    at Timer.listOnTimeout (timers.js:110:15)

  2) Frisby Test: Testing All Email Subscription PUT
        [ PUT http://localhost:3000/api/subscribe/recalls/be-safe@buchanan-edwards.com ]
   Message:
     Expected 500 to equal 200.
   Stacktrace:
     Error: Expected 500 to equal 200.
    at null.<anonymous> (/home/ubuntu/Be-Safe/node_modules/frisby/lib/frisby.js:493:42)
    at null.<anonymous> (/home/ubuntu/Be-Safe/node_modules/frisby/lib/frisby.js:1074:43)
    at Timer.listOnTimeout (timers.js:110:15)

Finished in 0.221 seconds
4 tests, 4 assertions, 2 failures, 0 skipped


    ERR! Test failed.  See above for more details.

npm test returned exit code 1
```