



First Ever CI/CD Debugger

Codefresh

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 **codefresh**



Agenda

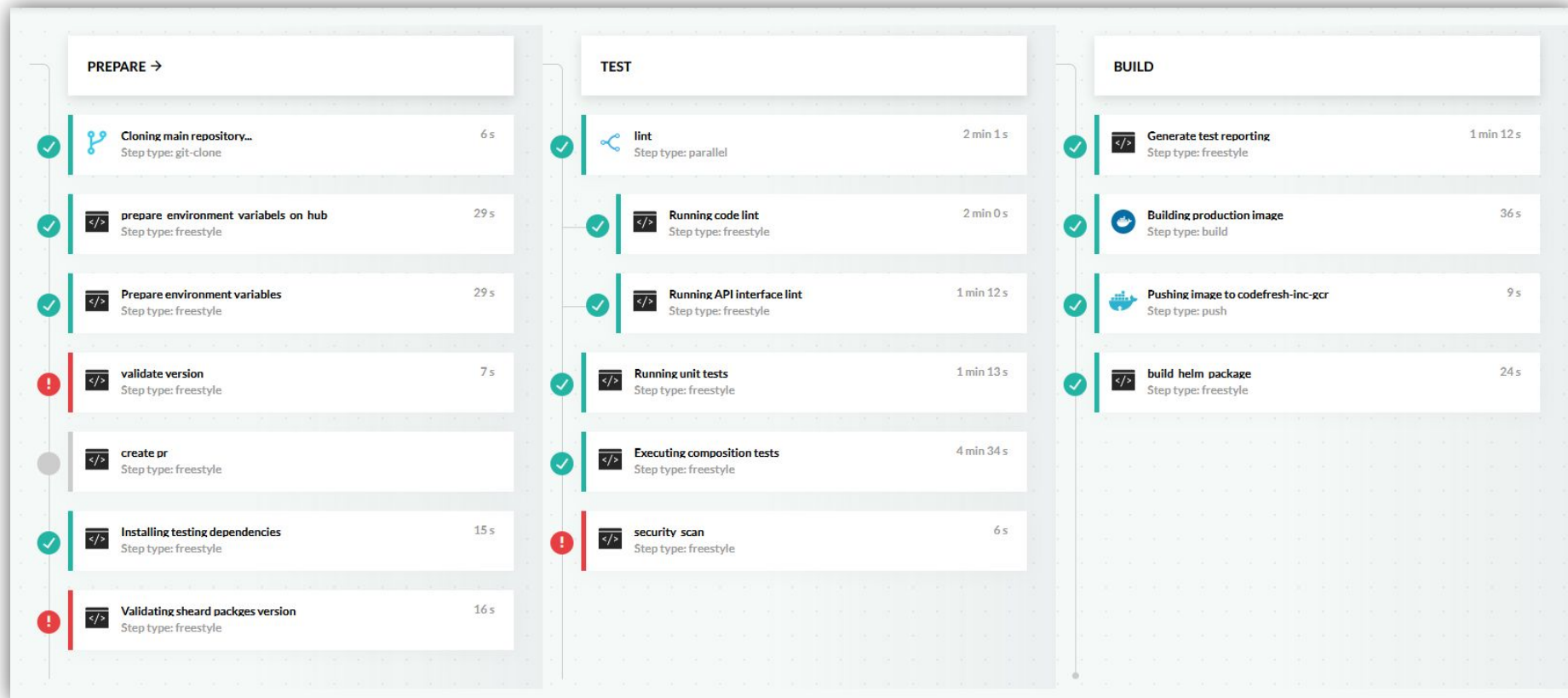
1. How debugging works in pipelines
2. Moving in/out of containers
3. Dynamic tool installation
4. Debugging and security
5. Debugging demos

About Codefresh

- Docker based CI/CD solution
- Each build step is a Docker image
- Native support for Docker, Helm, Kubernetes deployments
- Includes built-in Docker registry and Helm repository
- 20,000+ users

The screenshot displays the Codefresh web interface for a completed pipeline. The left sidebar contains navigation menus for BUILD (PIPELINES, Builds), MONITORING (Kubernetes, Helm Releases, Docker Swarm), RESOURCES (Images, Repositories, Helm Charts), and CONFIGURATION (Account Settings, User Settings). The main panel shows the pipeline details for 'Pipeline Name' (Release a new update to prod. Must be updated as needed...), which is in a 'COMPLETED' state. It lists 12 steps, a start time of 1/8/2018 22:22, a duration of 10m, and a trigger of 'COMMIT on' by 'Man's Gitlab - codefresh-io/ secrets by' and 'Man Arbel'. The pipeline is visualized as a sequence of three stages: 'Initialization' (2.43s), 'BUILD' (2.43s), and 'UNIT' (2.43s). Each stage contains a 'GIT CLONE' step with the description 'Cloning main repository'. A 'Restart from Step' button is visible over the first 'BUILD' stage. The bottom of the interface includes a link to 'Select pipeline step to view details'.

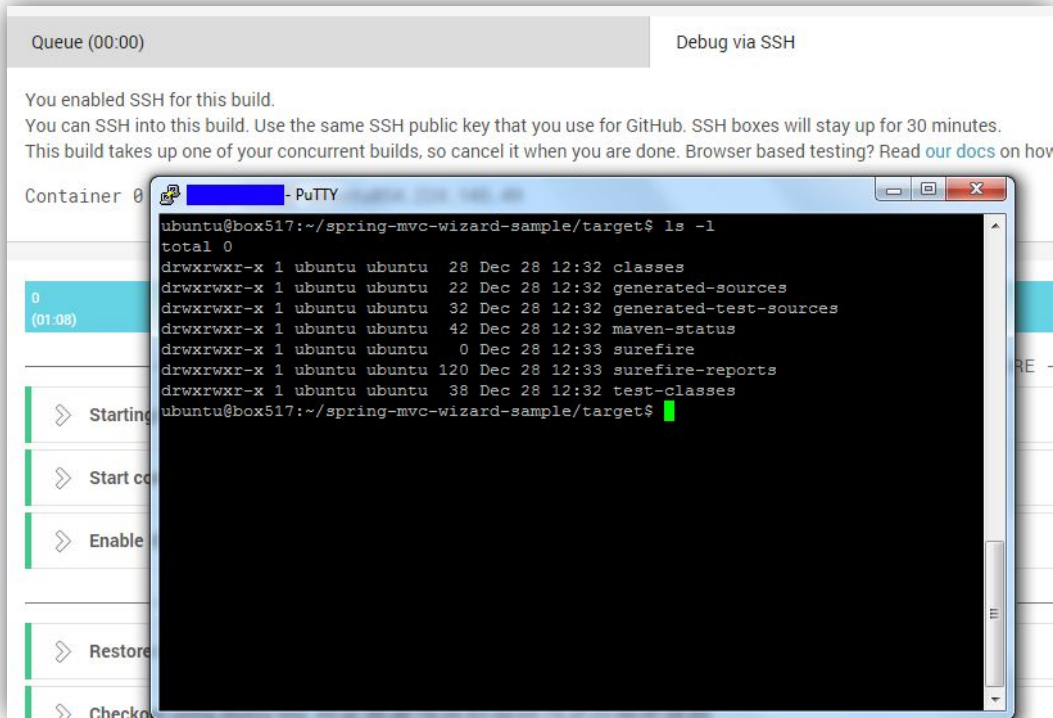
Pipelines break. It happens!



Other CI solutions

SSH is not very helpful

- Only works for legacy VM based pipelines
- Can only verify tools installed
- Lack of running context
- There is no state (e.g. environment variables)



CREATE

**DevOps = bringing developers
and operators together**

Debugging Code

The familiar experience

Place breaking points on code

```
91 // UnmarshalYAML is a custom unmarshaler that wraps strings in arrays
92 func (a *StringArray) UnmarshalYAML(unmarshal func(interface{}) error) error {
93     var strings []string
94     if err := unmarshal(&strings); err != nil {
95         var str string
96         if err := unmarshal(&str); err != nil {
97             return err
98         }
99         *a = []string{str}
100     } else {
101         *a = strings
102     }
103     return nil
104 }
105
106 // FlagArray is a wrapper for an array of strings
107 type FlagArray []string
108
109 // UnmarshalYAML is a custom unmarshaler that wraps strings in arrays
110 func (a *FlagArray) UnmarshalYAML(unmarshal func(interface{}) error) error {
111     var flags []string
112     if err := unmarshal(&flags); err != nil {
113         var flagstr string
114         if err := unmarshal(&flagstr); err != nil {
115             return err
```

View calls/ variables, resume/step forward

VARIABLES

- Local
 - Return value: undefined
 - this: global
 - next: function next(err) { ... }
 - productId: 1
 - req: IncomingMessage {readableSt...
 - res: ServerResponse {domain: null...
- Closure
- Global

WATCH

- productId: 1

CALL STACK PAUSED ON STEP

(anonymous function)	.../routes/ind...
handle	layer.js 95:5
next	route.js 137:13
dispatch	route.js 112:3
handle	layer.js 95:5
(anonymous function)	.../router/ind...
process_params	.../router/index.js
next	.../router/index.js 275:10
handle	.../router/index.js 174:3
router	.../router/index.js 47:12
handle	layer.js 95:5
trim_prefix	.../router/index.js

BREAKPOINTS

- ☐ All Exceptions
- ☐ Uncaught Exceptions
- ☒ index.js routes 10
- ☒ index.js routes 12

```
1  var express = require('express');
2  var router = express.Router();
3
4  var fs = require('fs');
5
6  var Cart = require('../models/cart'); Cart = function Cart(cart) { ... }
7  var products = JSON.parse(fs.readFileSync('./data/products.json', 'utf8
8
9  router.get('/', function (req, res, next) { req = IncomingMessage { rea
10     var productId = products[0].id; products = Array(4) [Obj
11
12     res.render('index', res = ServerResponse {domain: null, _events: Obj
13     {
14       title: 'NodeJS Shopping Cart',
15       products: products products = Array(4) [Object, Object, Object, ...]
16     }
17   });
18 });
19
20 router.get('/add/:id', function(req, res, next) {
21
22   var productId = req.params.id;
23   var cart = new Cart(req.session.cart ? req.session.cart : {});
24   var product = products.filter(function(item) {
25     return item.id == productId;
26   });
27   cart.add(product[0], productId);
28   req.session.cart = cart;
29   res.redirect('/');
30   inline();
31 });
32
33 router.get('/cart', function(req, res, next) {
```

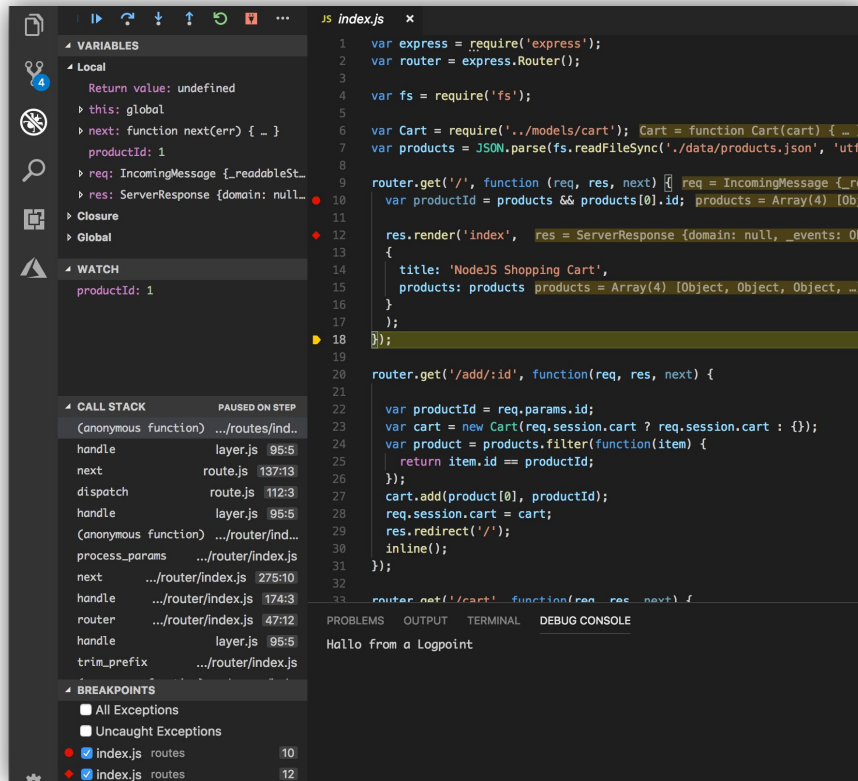
PROBLEMS OUTPUT TERMINAL **DEBUG CONSOLE**

Hallo from a Logpoint

Live debugging

Quick isolation of errors

- View exact running state
- Pause/resume any line
- No printf's and printouts needed anymore



CREATE

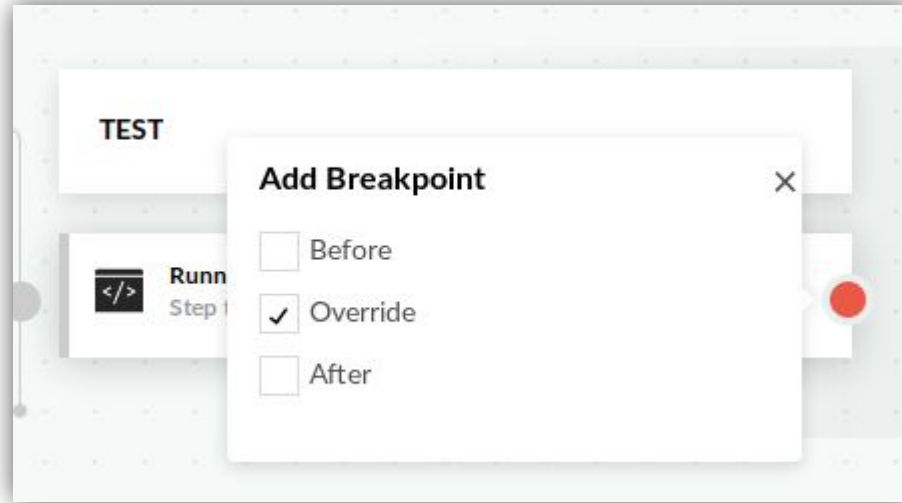
Developers

**We love IDEs
and live
debugging**

Operators

**We want live
debugging as
well!**

CI/CD Live Debugging



CI/CD live debugging

The screenshot displays a CI/CD pipeline interface with three main stages: **PREPARE**, **BUILD**, and **TEST**.

- PREPARE** (15 s): Includes the step "Cloning main repository..." (Step type: git-clone) with a duration of 5 s.
- BUILD** (0 s): Includes the step "Building Docker Image" (Step type: build), which is currently selected for debugging.
- TEST**: Includes the step "Running Unit tests" (Step type: freestyle).

The **Building Docker Image** step is expanded, showing the **DEBUG CONSOLE** with the following content:

```
-----
Debug Status: "before"
-----

bash-4.4# ls
cf_export          python-flask-sample-app  setup_debugger.sh
env_vars_to_export sensitive

bash-4.4# pwd
/codefresh/volume

bash-4.4# ls -l python-flask-sample-app/
.dockerrignore Dockerfile    codefresh.yml  setup.py
.git/          MANIFEST.in  minitwit/     tests/
.gitignore     README.MD    setup.cfg

bash-4.4# ls -l python-flask-sample-app/
```

At the bottom of the interface, there are tabs for **Output**, **YAML**, **State**, and **Debugger**. The **Debugger** tab is active, showing a chat icon in the bottom right corner.

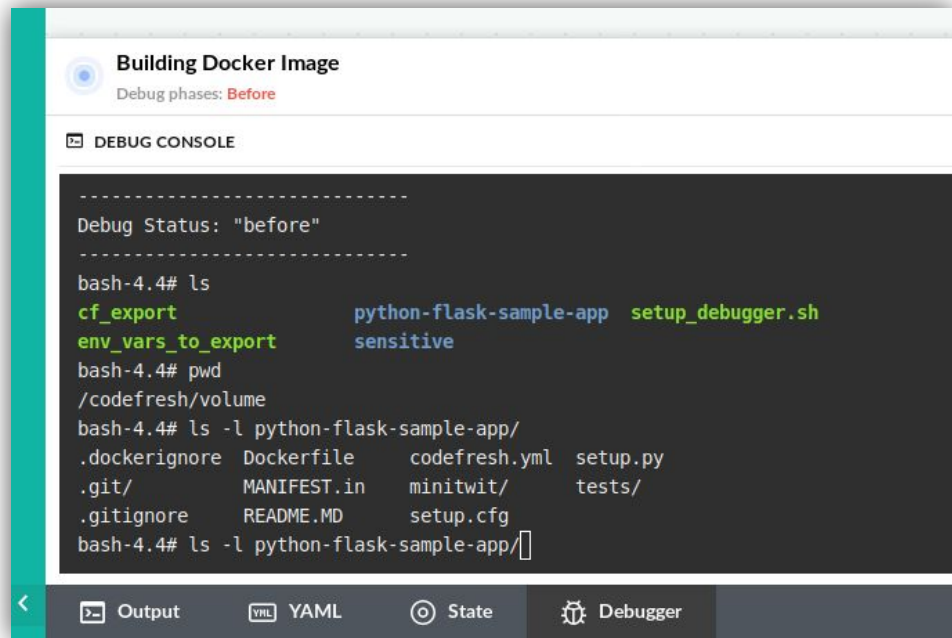
Demo: Simple Debugging

Demo: Container Tooling

Move in/out of containers

Install any tool

- Use Curl, nano, go, node
- Example: `apk add curl`
- All existing tools in your image



The screenshot shows a web-based interface for building a Docker image. At the top, it says 'Building Docker Image' with a sub-label 'Debug phases: Before'. Below this is a 'DEBUG CONSOLE' tab. The console displays a terminal session with the following commands and output:

```
-----  
Debug Status: "before"  
-----  
bash-4.4# ls  
cf_export          python-flask-sample-app  setup_debugger.sh  
env_vars_to_export sensitive  
bash-4.4# pwd  
/codefresh/volume  
bash-4.4# ls -l python-flask-sample-app/  
.dockerignore  Dockerfile      codefresh.yml  setup.py  
.git/           MANIFEST.in     minitwit/      tests/  
.gitignore      README.MD       setup.cfg  
bash-4.4# ls -l python-flask-sample-app/[]
```

At the bottom of the interface, there is a navigation bar with icons and labels for 'Output', 'YAML', 'State', and 'Debugger'.

Demo: Dynamic Tools

Install tools on demand

Demo: Services

Access running services

What about Security?

Codefresh access controls

Control

- Pipelines
- Clusters
- From other repo

Permissions BACK TO APPLICATION

TEAM CAN Delete, Read, Update CLUSTERS THAT HAVE staging TAGS

sales TEAM CAN Read CLUSTERS THAT HAVE platform TAGS

Select Team ... TEAM CAN Any CLUSTERS THAT HAVE Any TAGS

ADD RULE

PIPELINES

sales TEAM CAN Approve, Read, Run, Update PIPELINES THAT HAVE all tags TAGS

Select Team ... TEAM CAN

ADD RULE

☒ Approve
☒ Read
☒ Run
☒ Update
☐ Create
☐ Debug
☐ Delete

APPLY

Pro debugging plan

- Breakpoints on any step
- Debug window
- Pause/Resume
- Standard commands (cd, ls, printenv etc)

Enterprise debugging plan

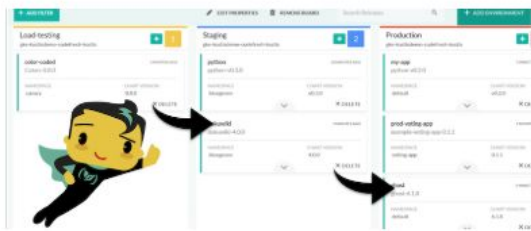
- Includes Pro plan
- Add extra tools dynamically (e.g. curl, wget, redis-cli)
- Shell auto-completion
- Restrict debug access

Summary

- World's first CI/CD debugger
- Place breakpoints on pipeline steps
- Stop/Resume pipeline
- Inspect files/variables/services
- Install tools on demand
- Lock-down debugging controls



About Kostis Kapelonis

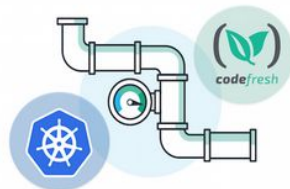


Helm Tutorial | February 7, 2019

Using a Kanban board to
manage and promote Helm
Releases



Kostis Kapelonis

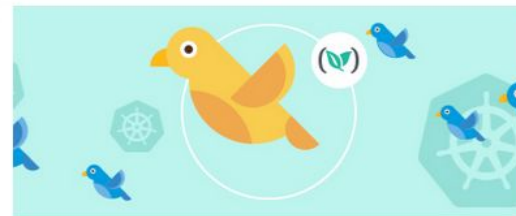


Continuous Integration | September 11,
2018

Programmatic Creation of
Codefresh Pipelines – Part1



Kostis Kapelonis

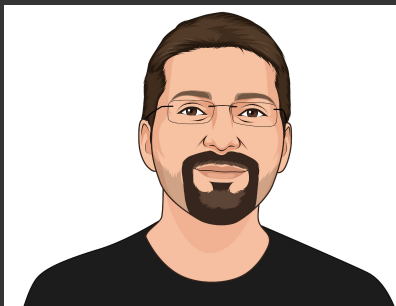


Continuous Deployment/Delivery | August
30, 2018

Fully automated canary
deployments in Kubernetes



Kostis Kapelonis



Questions?

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