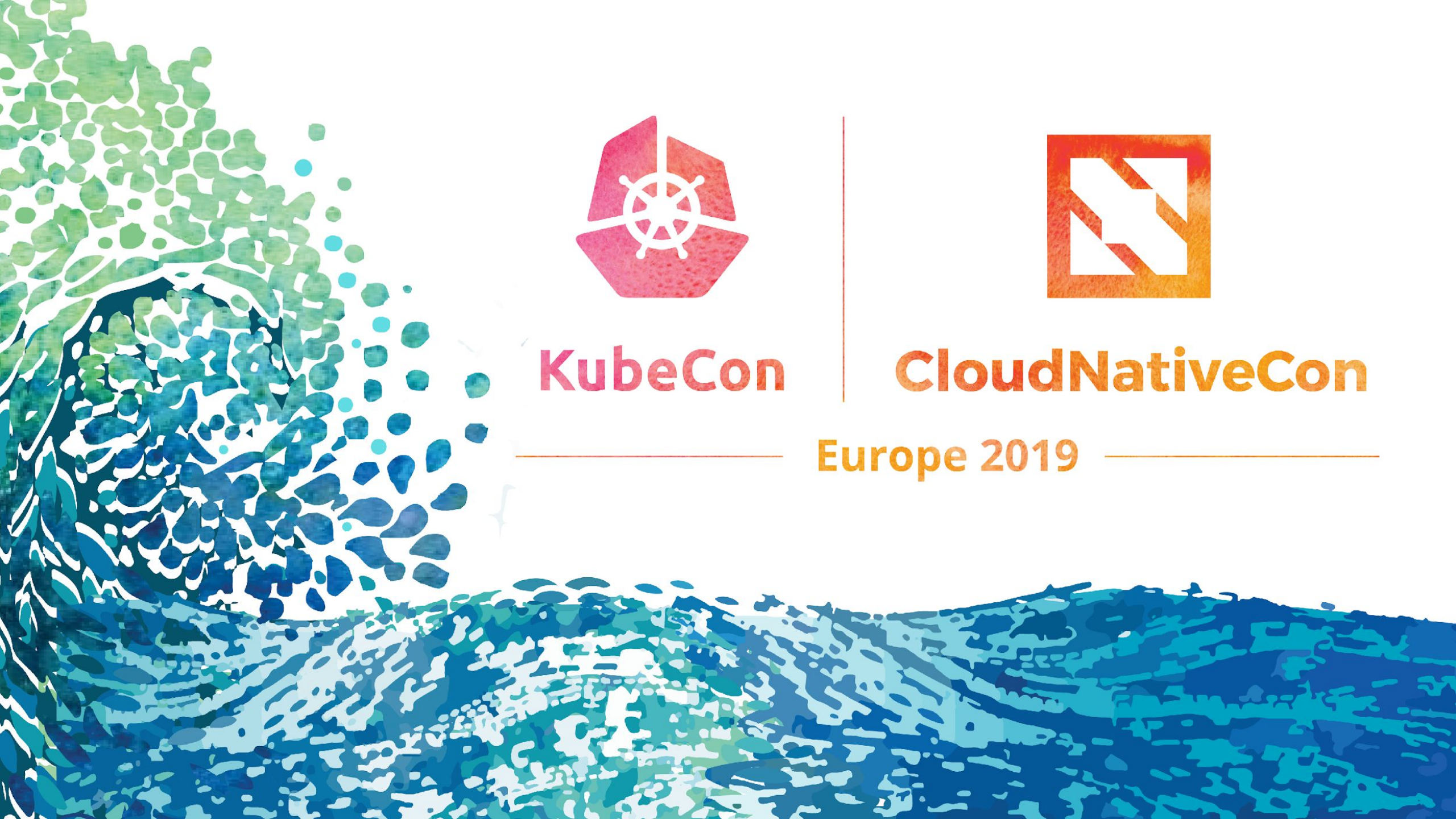
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BRIGADE

Event-driven scripting for Kubernetes

@matei_radu

Who am I?

Radu M (@matei_radu, https://radu.sh)

- piano enthusiast
- open source maintainer for Brigade, CNAB
- software engineer @Microsoft (Deis Labs 💛)

What is an OS?

An **operating system** is the program that, after being initially loaded into the computer, manages all the other programs.

Kubernetes as a “cloud OS”

An operating system manages **processes on a machine**.

Kubernetes manages **containers on a cluster**.

Operating System Shell Scripting

Flow control that wraps the execution of **processes**, but is not opinionated about what the **process** do, or how they run.

Operating System Shell Scripting


```
#!/bin/bash

for i in $( ls -1 ); do
   if [[ -d $i ]]; then
      echo "$i is a directory"
   fi
done
```

Cluster Shell Scripting?

Flow control that wraps the execution of **containers**, but is not opinionated about what the **containers** do, or how they run.

Cluster Shell Scripting


```
for i in $( run_some_container ); do
  if $( run_some_other_container ); then
    $( run_yet_another_container )
  fi
done
```

BRIGADE

What is Brigade?

- CNCF Sandbox Project

What is Brigade?

- framework for event-driven scripting on Kubernetes
- extremely lightweight, Kubernetes native
- chain together containers to create workflows

Cluster Shell Scripting


```
for i in $( run_some_container ); do
  if $( run_some_other_container ); then
    $( run_yet_another_container )
  fi
done
```

Cluster Shell Scripting

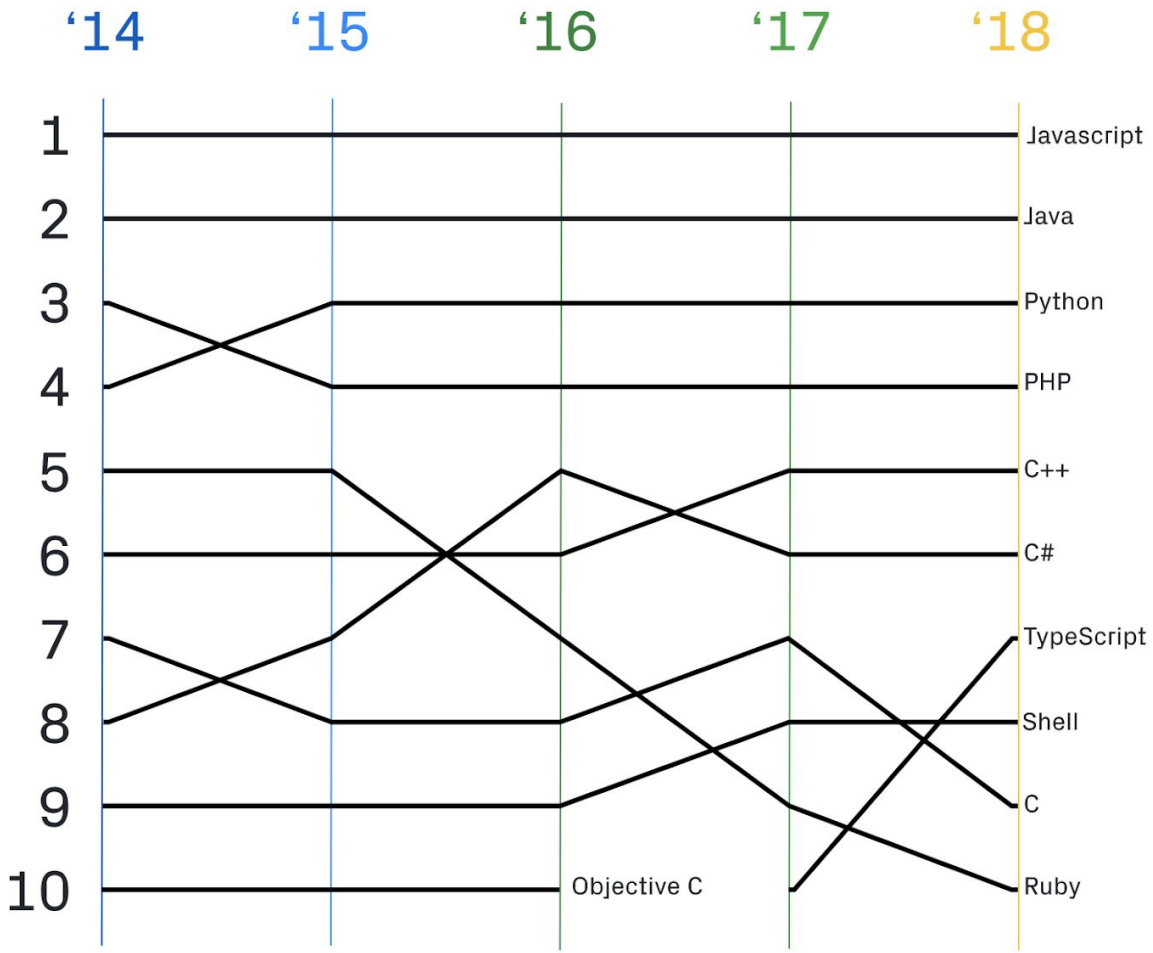
- what programming language?
- how to share data between containers?
- when should we execute scripts?

Choose a language, don't write one

Top languages over time

You're coding on GitHub in hundreds of programming languages, but JavaScript still has the most contributors in public and private repositories, organizations of all sizes, and every region of the world.

This year, TypeScript shot up to #7 among top languages used on the platform overall, after making its way in the top 10 for the first time last year. TypeScript is now in the top 10 most used languages across all regions GitHub contributors come from—and across private, public, and open source repositories. *

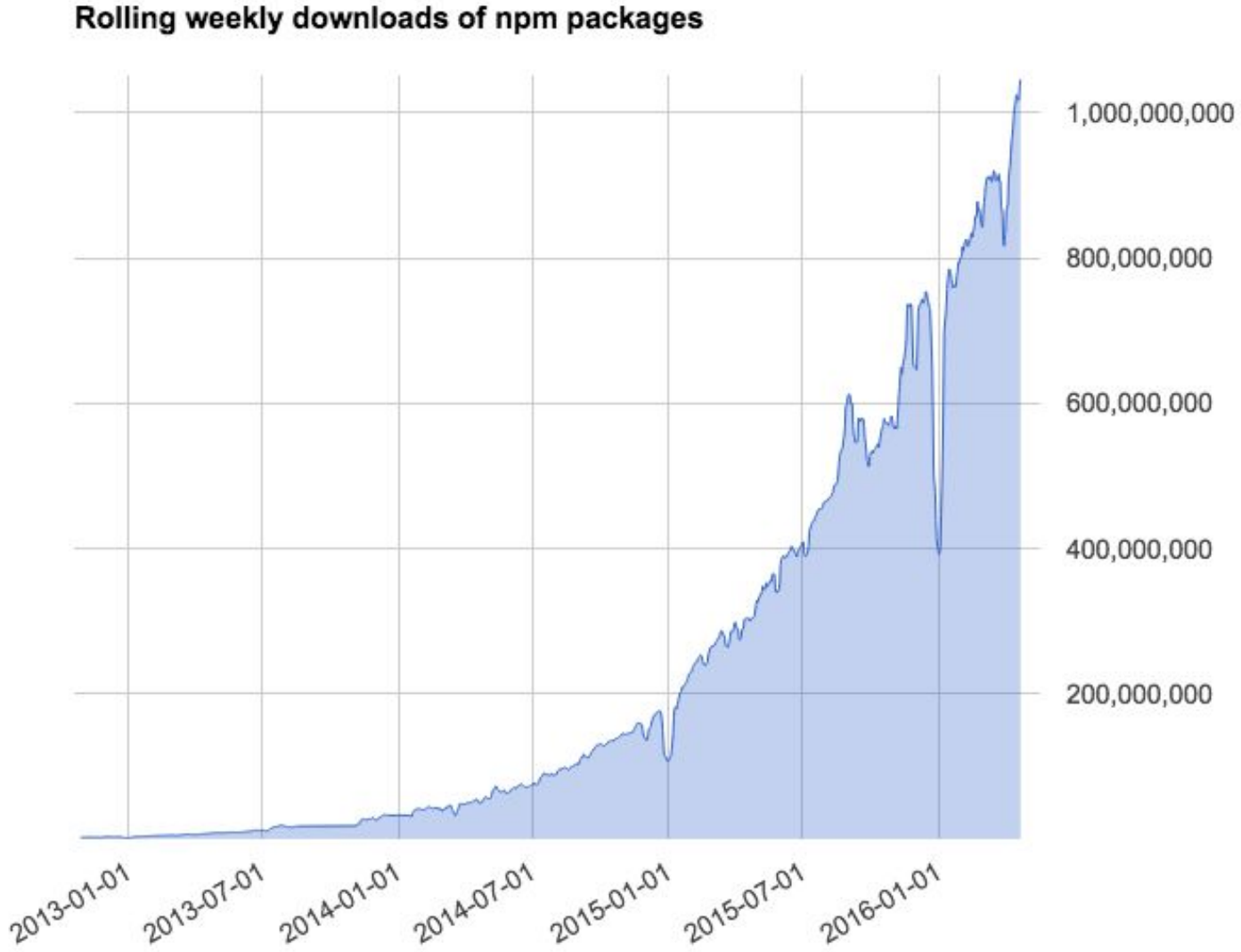


[State of the Octoverse, 2018]

But why JavaScript?

- most popular programming language
- rich ecosystem of tools
- extremely flexible

1Billion weekly NPM package pulls



blog.npmjs.org

How to share data between containers?

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- pass information *TO* the containers (commands, environment variables, files)

- get information *FROM* the container (STDOUT, exit codes, files)

How to share data between containers?

- JavaScript native

- preserve the existing paradigms for passing data to and from containers

It's just JavaScript...

```
var program = new Job("one", "alpine:3.5")
program.tasks = [ "echo hello", "echo goodbye"]
program.env = { "KEY": "value" }

program.run()
```

When do we execute scripts?

- reacting to triggers / events

- event handlers become the entry points for Brigade scripts

Where do events come from?

- HTTP webhooks (internal, 3rd party)
- Git events, container registry events
- Kubernetes events
- any event source can be configured for Brigade -- gateways

Reacting to events with Brigade


```
const { events, Job } = require("brigadier")

events.on("someEvent", ( eventData ) => {
  var program = Job("one", "alpine:3.5")
  program.tasks = [ "echo hello", "echo goodbye"]
  program.env = { "KEY": "value" }
  program.run()
})
```

Use Cases

- foundation for opinionated CI/CD workflows
- application security scannings
- aggregating + analyzing data from multiple systems to build reports
- spinning up preview environments for every pull request or on demand

Demo

Getting started with Brigade

Getting started with Brigade

```
$ helm repo add brigade
https://brigadecore.github.io/charts

$ helm install brigade/brigade --name brigade

$ brig check
```

Community + Integrations

- built-in support for CloudEvents (CNCF)
- integration with GitHub Checks API
- integrations with Prometheus and Virtual Kubelet (CNCF)
- support for arbitrary event data with a generic gateway

Ecosystem

Related Projects

- Kashti - a dashboard for your Brigade pipelines.
- Brigadeterm - a simple terminal ui for brigade pipelining system.
- Brigade exporter - a Prometheus exporter to gather metrics from Brigade.
- Gateways
  - BitBucket events: Gateway Support for BitBucket repositories
  - GitLab events: Gateway Support for GitLab repositories
  - Kubernetes events: Gateway that listens to Kubernetes event stream
  - Event Grid gateway: Gateway for Azure Event Grid events
  - Cron Gateway: Schedule events to run at a particular time
  - Trello and Generic Webhooks: Experimental gateway for Trello and for generic webhooks
  - Draft Pack for Building Custom Gateways: Build your own gateway in 5 minutes
  - Azure DevOps / VSTS gateway: Gateway for Azure DevOps / VSTS events

Brigade ❤️ Developers

atei_radu

Getting Started - docs.brigade.sh

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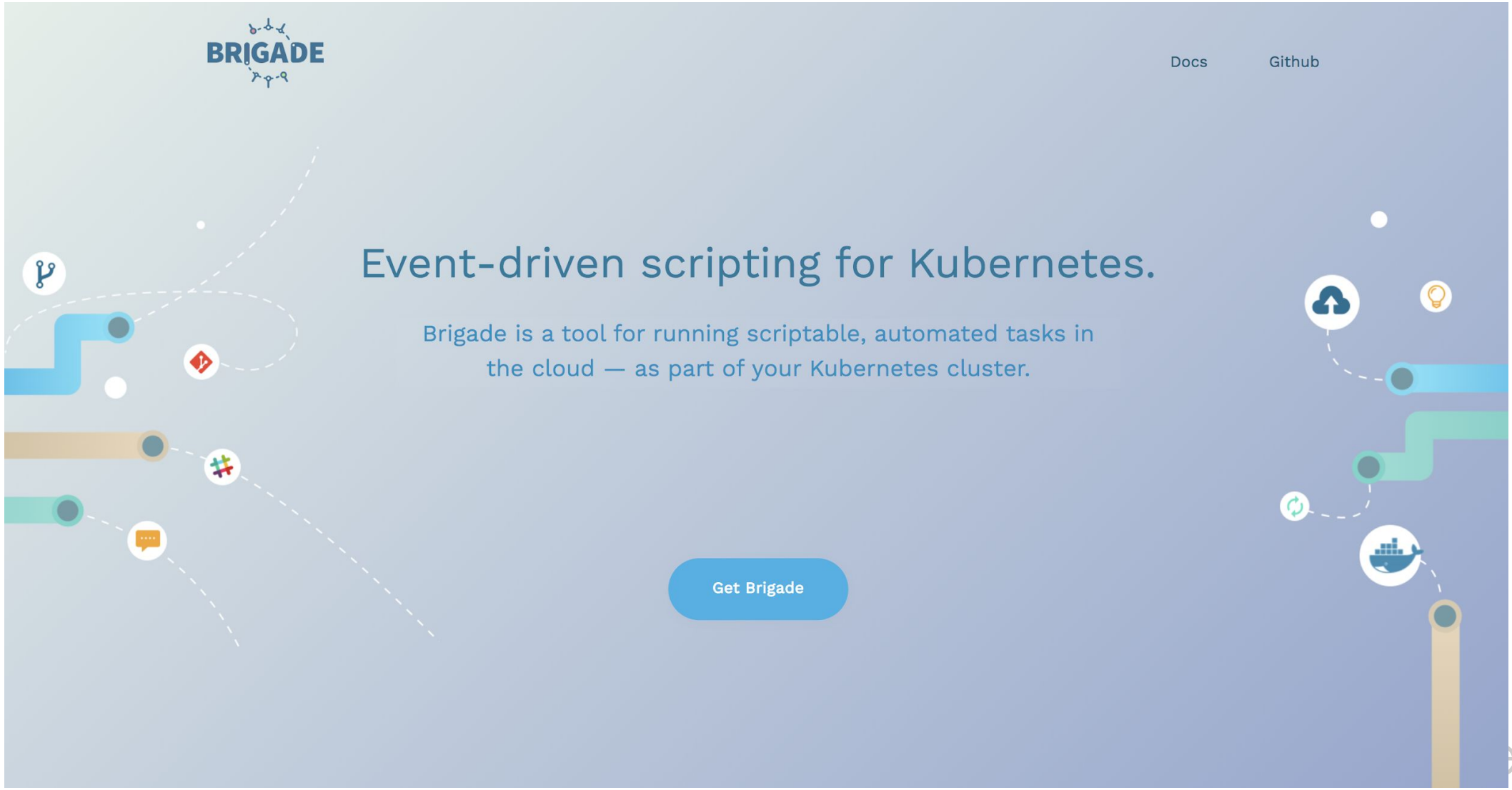

ei_radu

Contribute - #good-first-issue

brigadecore / brigade ✓

Unwatch ▾ | Unstar 1,608 | Fork

Code | Issues 99 | Pull requests 10 | Projects 1 | Wiki | Releases 24 | More ▾ | Settings

Event-based Scripting for Kubernetes. brigade.sh

Edit

cncf | kubernetes | Manage topics

1,322 commits | 3 branches | 24 releases | 1 environment | 69 contributors | MIT

Branch: master ▾ | Create new file | Upload files | Find File | Clone or download ▾

vdice Merge pull request #915 from vdice/fix/log-level ... Latest commit c9bb882 6 hours ago

.github	chore(*): updates per org change to brigadecore	2 months ago
brig	make worker command configurable globally with a controller flag (#906)	12 days ago
brigade-api	chore(*): updates per org change to brigadecore	2 months ago
brigade-controller	allow default worker command to also be set via env var (#910)	5 days ago
brigade-cr-gateway	chore(*): update image org to brigadecore	2 months ago
brigade-generic-gateway	chore(*): update image org to brigadecore	2 months ago
brigade-vacuum	chore(*): updates per org change to brigadecore	2 months ago
brigade-worker	fix(brigade-worker): uppercase BRIGADE_LOG_LEVEL val for deriving cor...	a day ago
docs	Merge branch 'master' into docs-analytics	12 days ago
git-sidecar	chore(*): update image org to brigadecore	2 months ago
pkg	make worker command configurable globally with a controller flag (#906)	12 days ago
scripts	chore(*): update image org to brigadecore	2 months ago

Get involved!

- #brigade in the Kubernetes Slack
- bi-weekly community meeting, Tuesdays, 6pm CET
- github.com/brigadecore/brigade

Brigade: Deep Dive

- advanced scripting guide
- E ıge)
- Thursday May 23, 2019 14:50 - 15:25
- Hall 8.1 G2
- Maintainer Track
- **Skill Level** Intermediate (Mid-level experience)
- What's next for Brigade?

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Questions & Answers
@matei_radu

TL;DR

- Brigade is a cluster scripting environment that allows you to chain multiple containers and create workflows and pipelines
- lightweight, and works on **any Kubernetes cluster**
- write scripts in basic JavaScript
- Brigade is a Kubernetes application - you can manage and monitor it the same way as any other application
- Brigade is a CNCF Sandbox Project, stable at v1.0.0

FAQ - Declarative?

- Brigade is a cluster scripting environment - so a real programming language is required
- But… it is easy to create pipelines with Brigade
- we are actively investigating adding support for declarative pipelines (YAML, **HCL**), and there are already multiple declarative implementations for Brigade (community-driven)

FAQ - Windows and Kubernetes?

[WIP] Experimental Windows containers support #838

Draft **radu-matei** wants to merge 1 commit into `brigadecore:master` from `radu-matei:windows-entrypoint`

Conversation 0 | Commits 1 | Checks 2 | Files changed 1

radu-matei on 8 Mar — Member

What this PR does / why we need it:
This PR adds very early experimental Windows Server containers support.
It has been tested with a Virtual Kubelet node backed by Azure Container Instances, so the following are current known limitations:

- job and build caches are not supported (limitation of volumes in ACI)
- the Git sidecar is not supported (limitation of volumes in ACI)
- the entrypoint is passed directly to the command arguments, not constructed as a script (limitation of volumes in ACI)

FAQ - Brigade on ARM clusters

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[WIP] Add ARM64 support #803

Open **Alxandr** wants to merge 11 commits into `brigadecore:master` from `Alxandr:master`

Conversation 45 Commits 11 Checks 0 Files changed 10

Alxandr on 8 Feb — First-time contributor

What this PR does / why we need it: It adds ARM64 support to brigade, allowing it to run on ARM (and hybrid ARM64/AMD64) clusters.

If applicable:

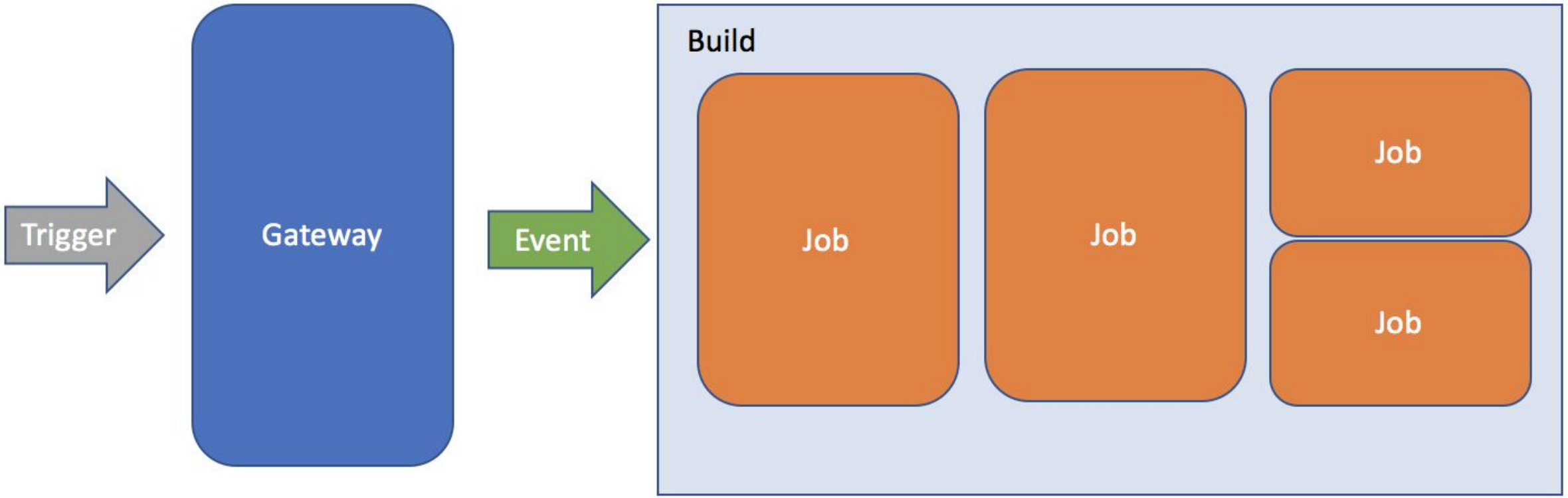
- [ ] this PR contains documentation
- [ ] this PR contains unit tests
- [ ] this PR has been tested for backwards compatibility

No code changes have been performed, so it should not need unit tests, nor break backwards compatibility. It might warrant an update to docs just to say it supports ARM though?

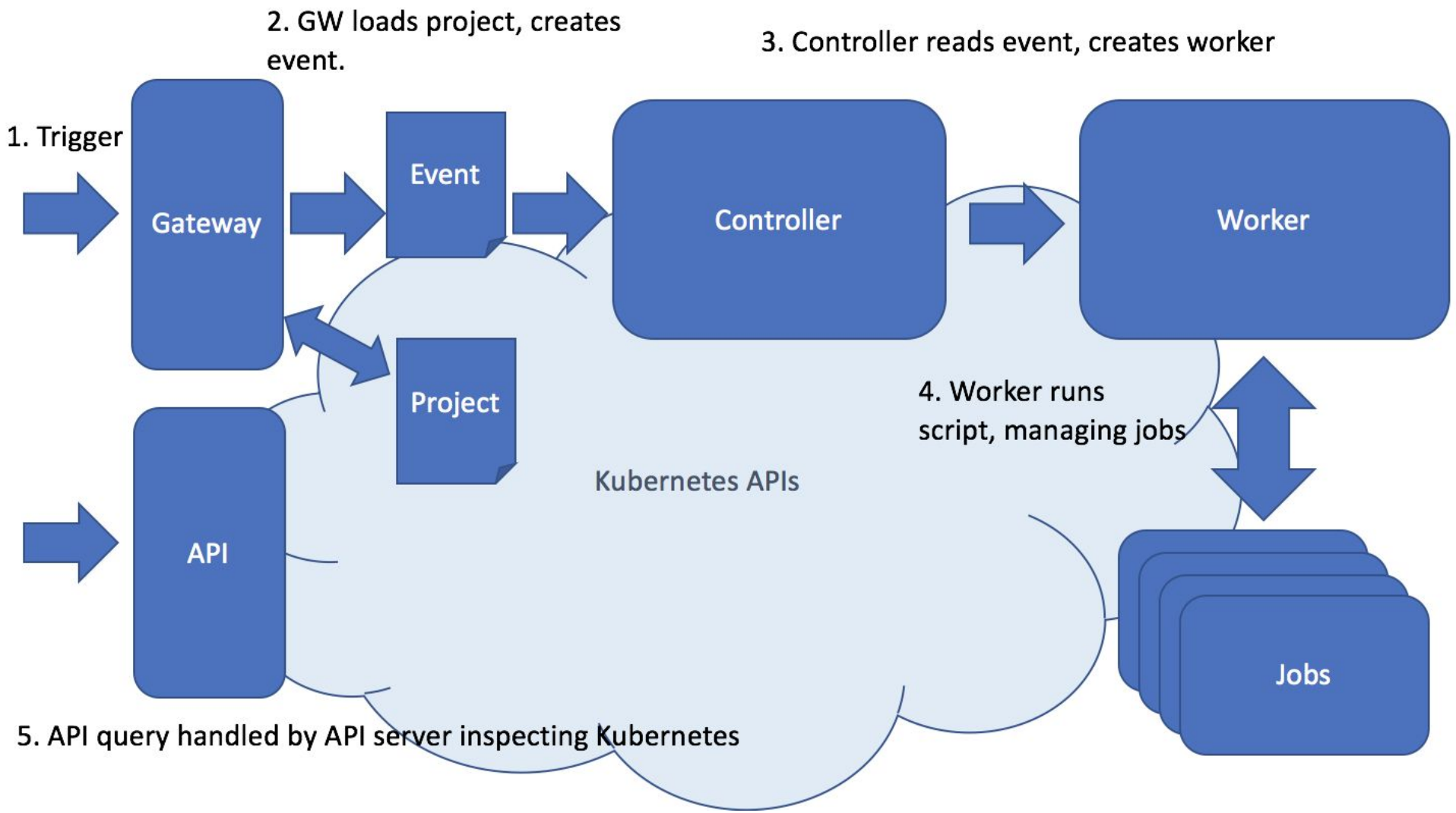
Resolves #773

@matei_radu

How does Brigade work?



How does Brigade work?



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