Make seamless development on cloud with kubernetes

By Praparn Luengphoonlap
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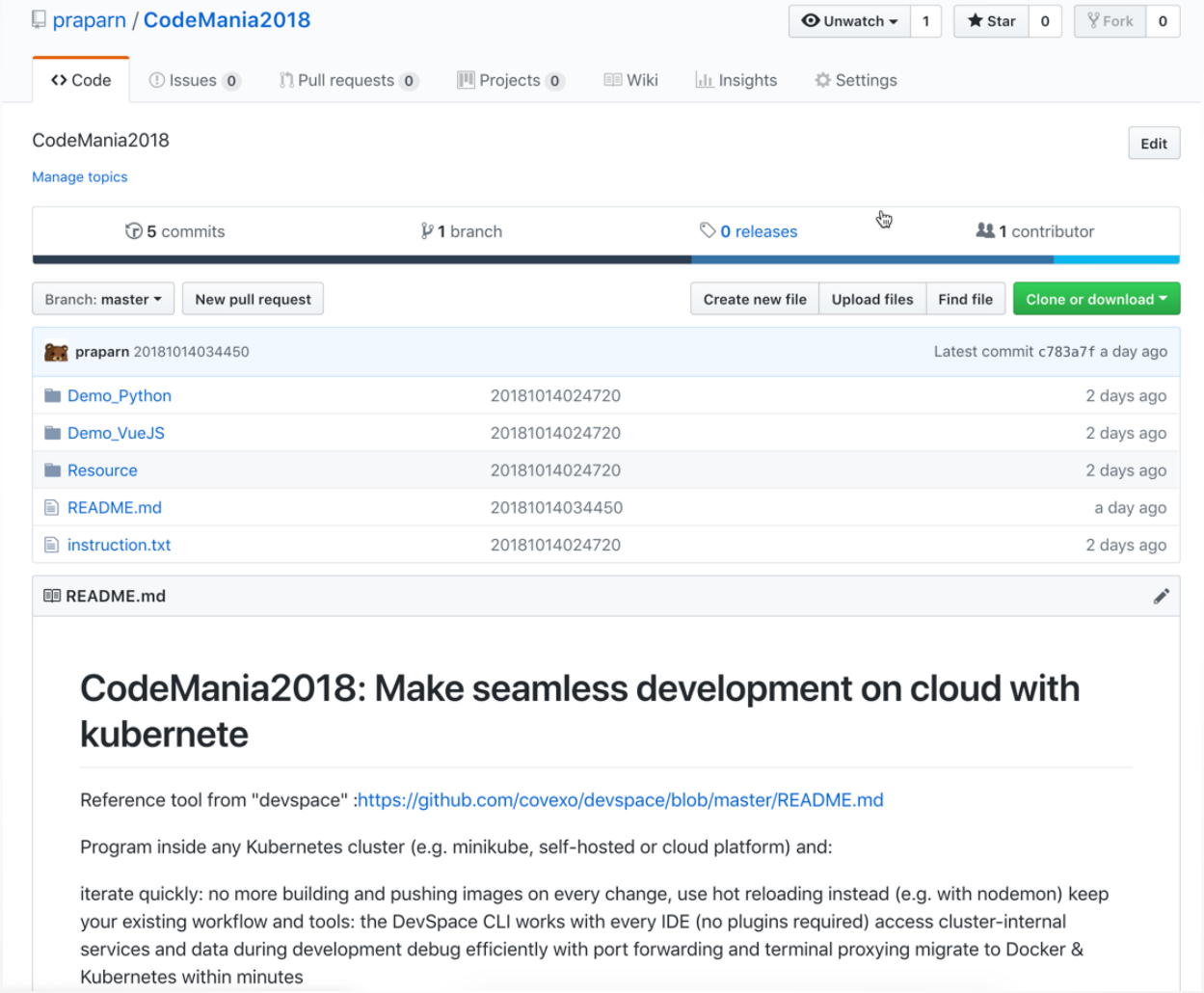
Agenda

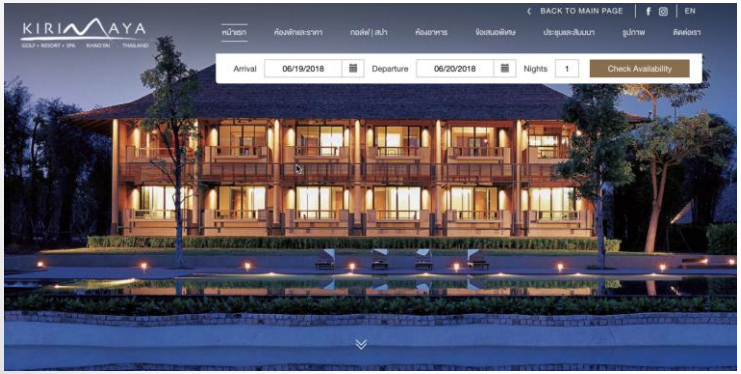
- Container's trend on real-world 2018
- How development environment going today?
- Kubernetes for all…
- Make devspace seamless with "DevSpace"
- Demo Case: Vuejs3.0 (CLI) with K8S (Front-End)
- Demo Case: Python realtime with K8S (Back-End)
- Q&A

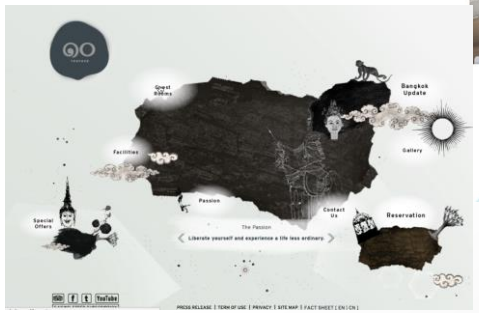
Resource

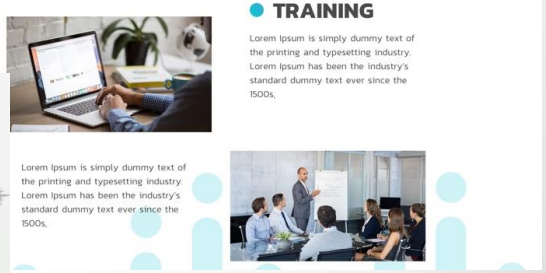
- https://github.com/praparn/CodeMania2018



Who are we ? (Opcellent)







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Container's trend on real-world 2018

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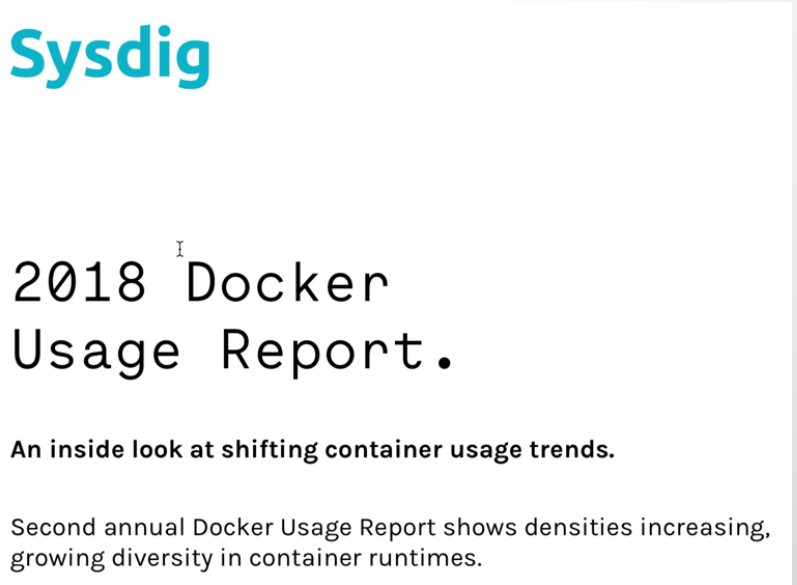
Container's trend on real-world 2018

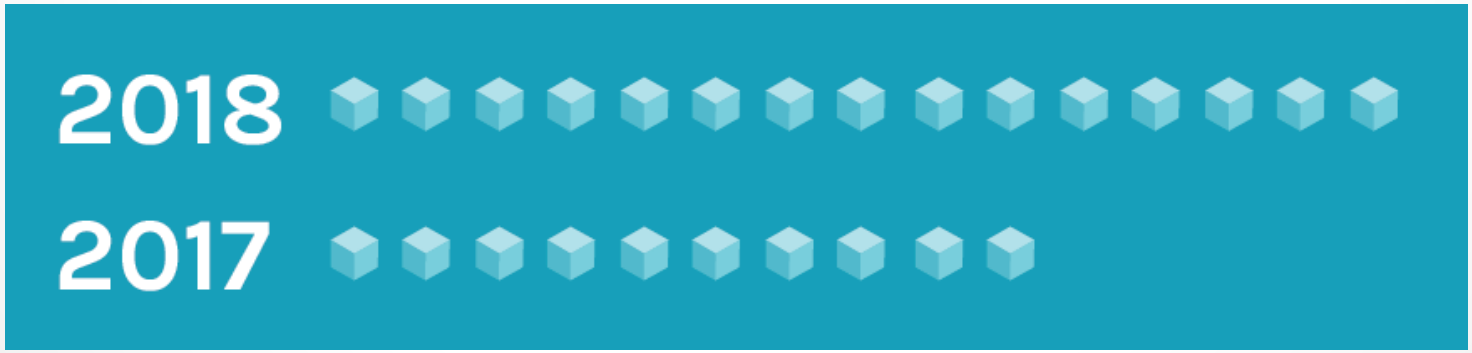
- Reference from "2018 Docker Usage Report" of sysdig
- Sampling from 90,000 container over company of mid-market to large enterprise
- Scope on
  - North America
  - Latin America
  - EMEA (Europe, Middle East and Africa)
  - Asia Pacific
- https://sysdig.com/blog/2018-docker-usage-report/



Container's trend on real-world 2018

- Most application component on container

- Median container density per host rises 50% (Per year)



Container's trend on real-world 2018

- Max container housing per single host is 154 containers !!! (2017: 95) (Docker Native)

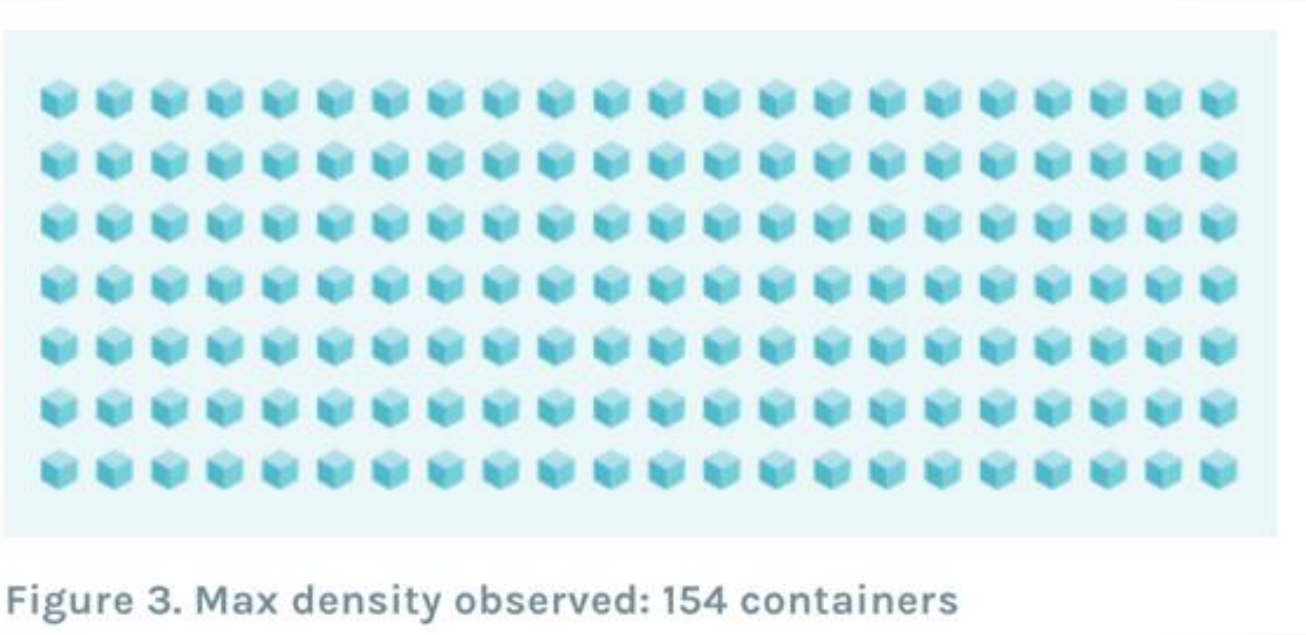
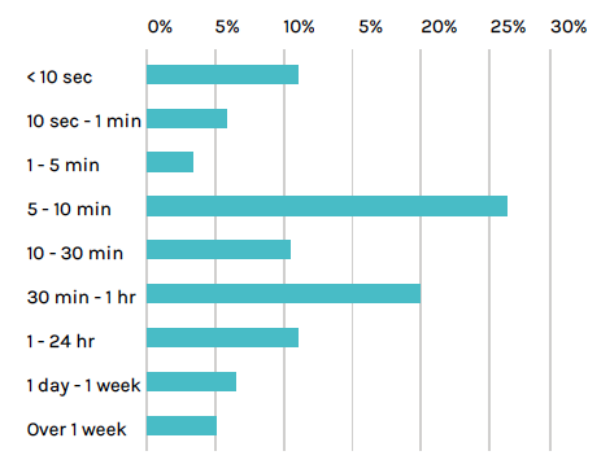


Figure 3. Max density observed: 154 containers

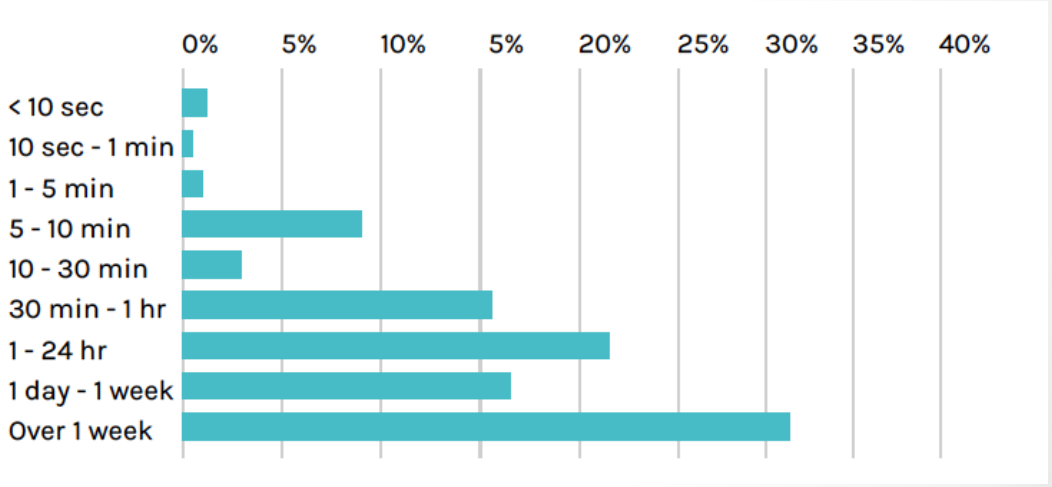
Container's trend on real-world 2018

- Lifespan of containers and service (95% less than a week)

- (Container Run Time)



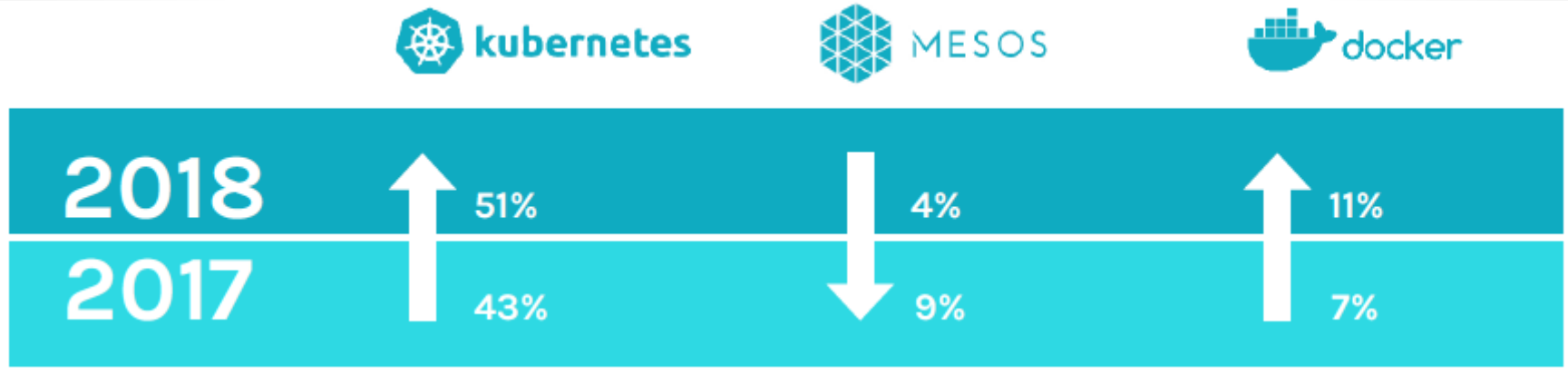
(Image Live Time)



Container's trend on real-world 2018

- Container runtime used (Almost also docker)

- Orchestrator trend (Kubernetes king of orchestrator)



Container's trend on real-world 2018

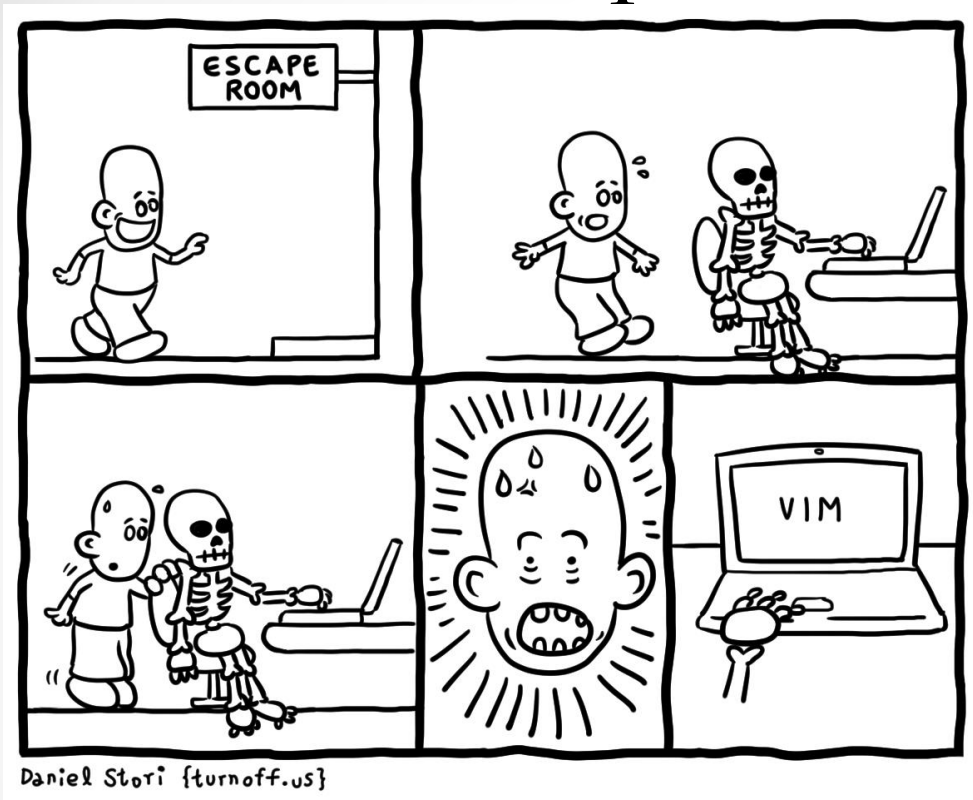
- Conclusion
  - More company migrate their culture to "DevOps" and deploy their application from monolith to microservice with container technology (50% from 2017)
  - Application development life cycle come more faster
    - monthly ➔ week
    - Week ➔ less than week (70% is on this point)
  - Docker will best for container runtime and native single host
  - Kubernetes still "king of orchestrator" when running container farm

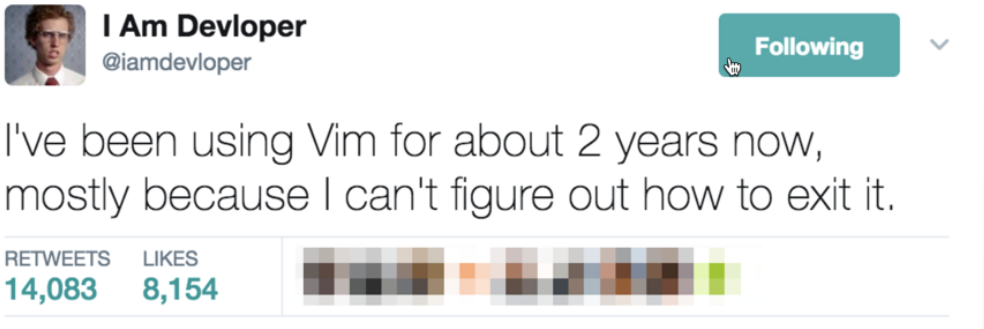
How development environment going today

How development env. going today

- Normally we are happy to develop on our machine with our favorite IDE (Atom, Notepad++, VSCode, NetBeans, Android Studio etc) and debug on our machine
- Many and many debug / develop until finish module
- But…
  - Some environment are available on
    - Development Server
    - Cloud Server
  - How to synchronize code/configure ?
  - No IDE tool…Oh ! We have Vim
  - …

How development env. going today





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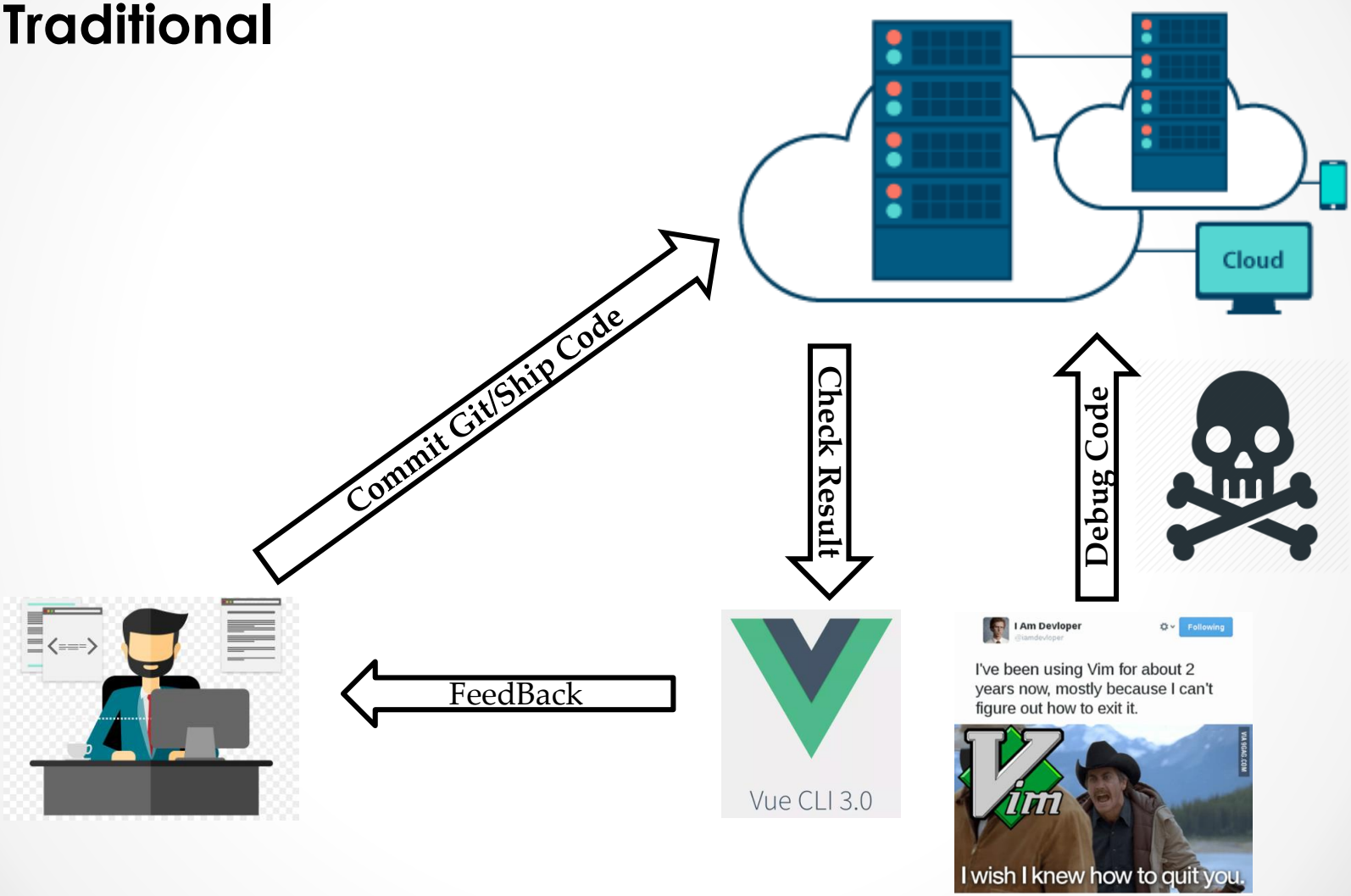
How development env. going today

- **Traditional**



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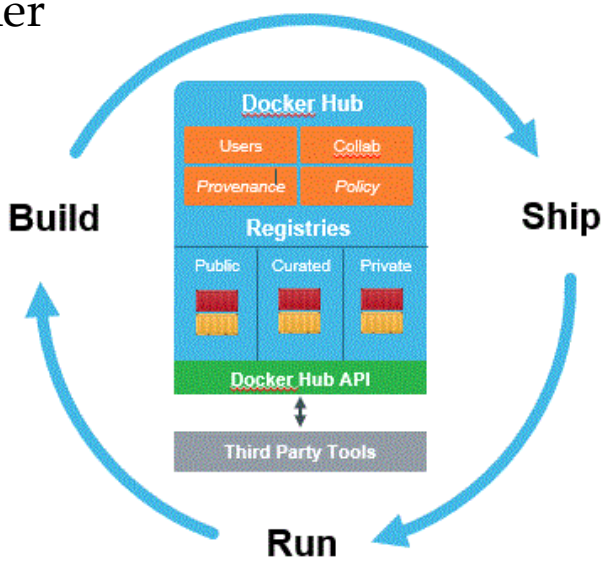
How development env. going today

- **Docker Solution (Native)**
- Build – Ship – Run
- But also need to build



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Kubernetes for All

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Kubernetes for All

- Docker native is good for container runtime…
- But…Kubernetes is better orchestrator for cluster system
- Kubernetes will short name with “K8S”
- Docker is easier for developer to deploy application just “docker container run ….” all of it will appear like magic ^^
- But this not easy like that on “K8S” T_T
  - Kubernetes will operate via “YAML” for almost of it. So we need to create YAML file also (And change it everytime we had been change code !!!)
  - Kubernetes will separate workload and service from each other. So YAML file also need to separate ???

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Kubernetes for All

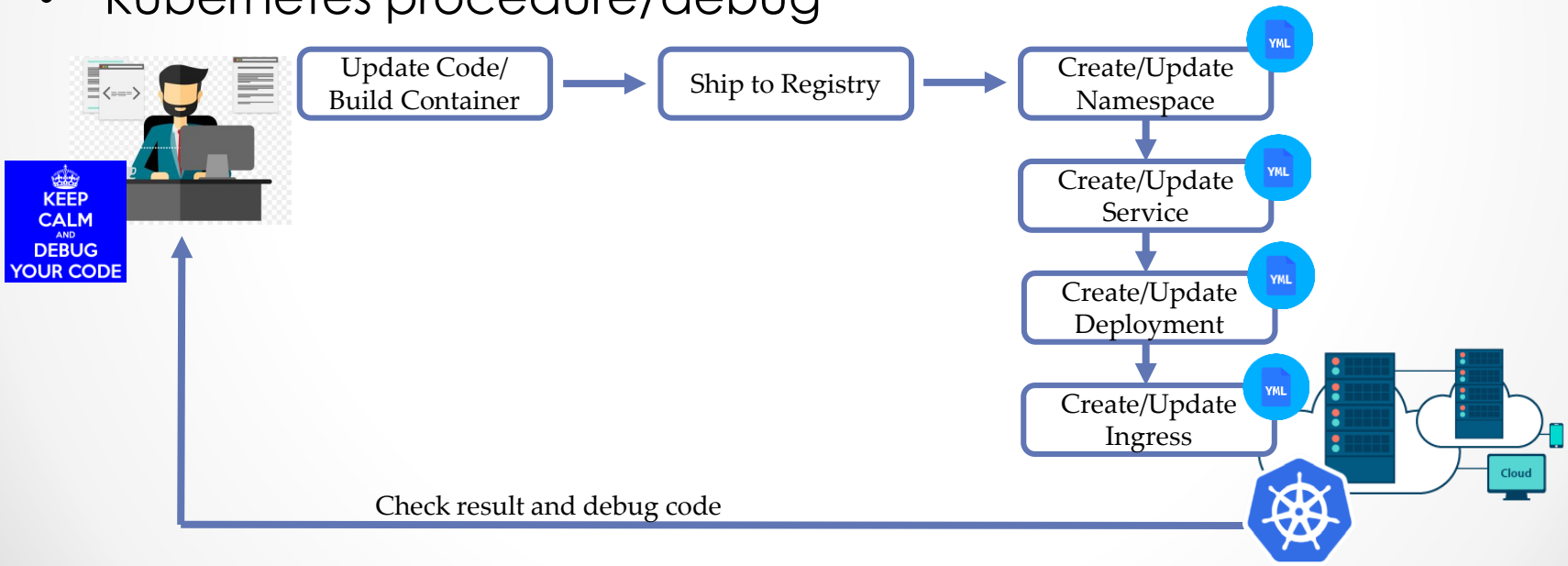
Topic	K8S	Docker/Swarm
Architecture	Open-system (Base on cluster manager "Borg" for support complex workload)	**Swarm**: Proprietary of Docker product, "Easy to use", "Extend capability of Docker in cluster"
Operation command	Almost operate by "YMAL" file (Declarative Command)	Almost operate by "command" (Imperative Command)
Unit of Work	Pods (Pods >= Container)	Container
How to Identify Work	"Label operation"	**Docker**: By container name **Swarm**: By service/stack name
Level of workload management	Service Level: (Simple) Replication Level: (Auto healing) Deployment Level: (Auto healing + Roll Update)	**Docker**: N/A **Swarm**: Service Level (Snag with service/stack)
Auto scaling	HPA (Horizontal Pods Scaling) base on CPU	No
Health check	Liveness & Readiness (Multi option to check application health)	Service health only

K8S Storage Built-In

Kubernetes for All

- Docker procedure/debug

- Kubernetes procedure/debug



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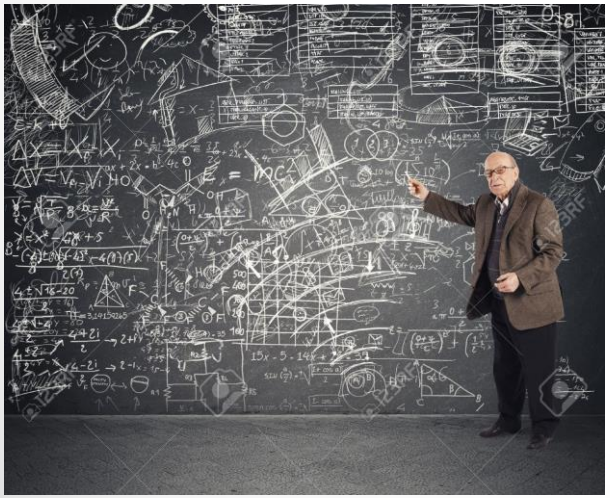
Kubernetes for All

- But…We just want to debug our code and make surly it can survive without any error ^^
- We just need
  - Some simple …
  - Some sync code often as need…
  - Some automatic operate easy
  - …
- We have a lot of problem to solve TT…



Make devspace seamless with “DevSpace”

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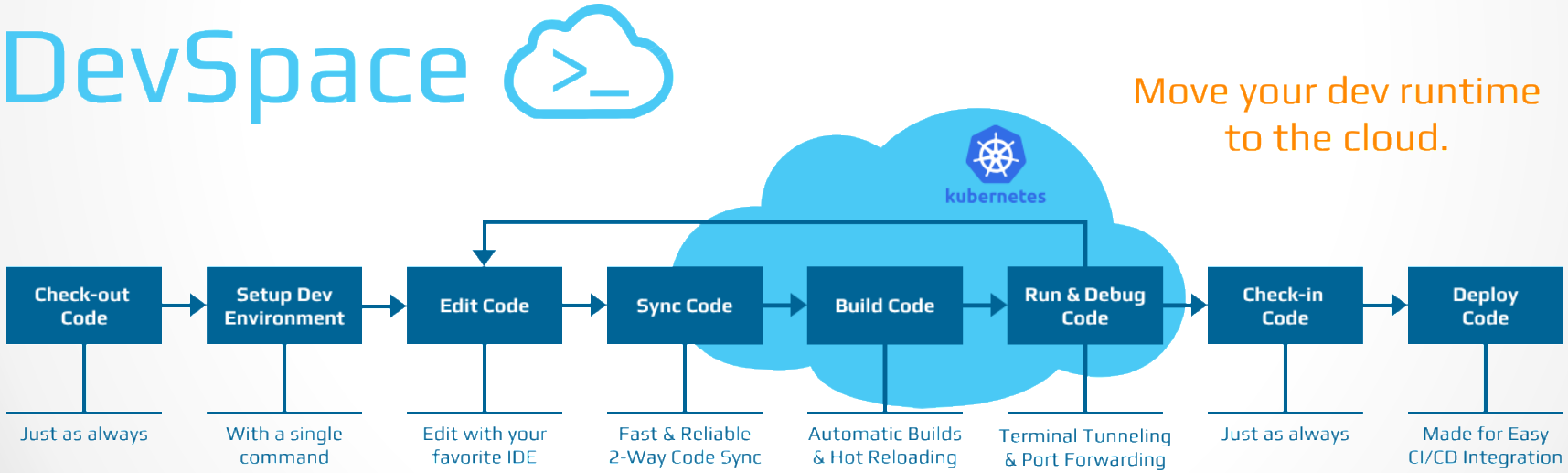
Make seamless dev with devspace

- Let's make development seamless with "DevSpace"
  - DevSpace will provide tools for make development better in Kubernetes
  - Code was develop on your machine but sync with K8S !!!



Ref: https://github.com/covexo/devspace/blob/master/README.md

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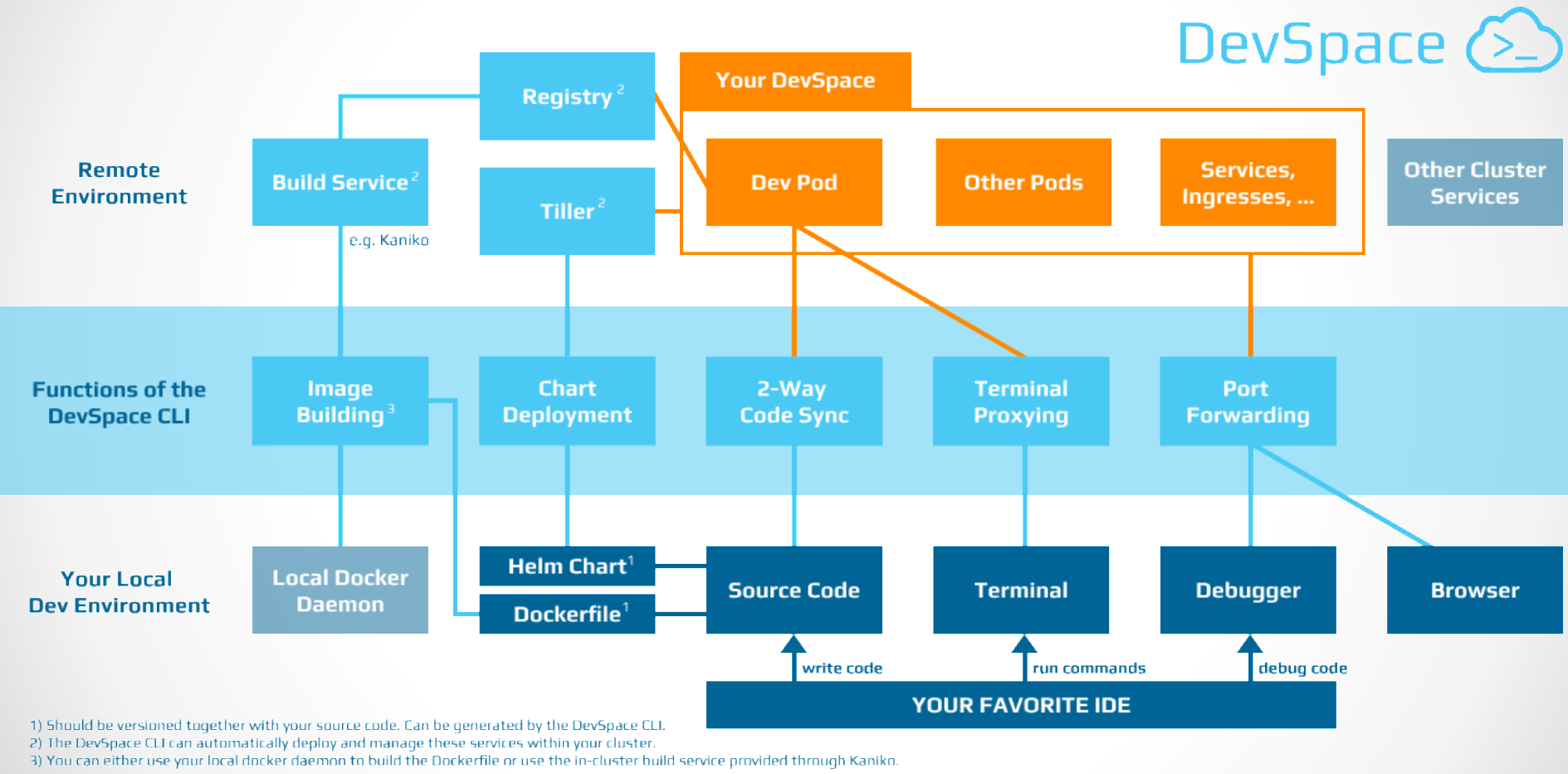
Make seamless dev with devspace

- Feature
  - **Iterate quickly:** no more building and pushing images on every change, use hot reloading instead
  - **Keep your existing workflow and tools**: the DevSpace CLI works with every IDE
  - **Access cluster-internal**: access services and data during development debug efficiently with port forwarding and terminal proxying
  - **Migrate:** Docker ➔ Kubernetes within minutes
- Support Platform
  - Mac OS X
  - Linux
  - Windows

Make seamless dev with devspace

- Architecture



1) Should be versioned together with your source code. Can be generated by the DevSpace CLI.
2) The DevSpace CLI can automatically deploy and manage these services within your cluster.
3) You can either use your local docker daemon to build the Dockerfile or use the in-cluster build service provided through Kaniko.

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Make seamless dev with devspace

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  - **Migrate:** Docker ➔ Kubernetes within minutes

- Support Platform for developer's machine
  - Mac OS X
  - Linux
  - Windows

Make seamless dev with devspace

- Support Platform for kubernetes's farm
  - Minikube
  - Docker for Mac/Docker for Windows (Enable K8S)
  - Kubernetes on Server (Cloud/On-Prem)

- Single command for crate all environment
  - devspace up/down: build environment/start-stop
  - devspace and connect to environment
  - devspace enter: jump to environment as need
  - devspace reset: clear entire project environment
  - devspace add/remove (package/sync/port)
  - devspace status
  - etc

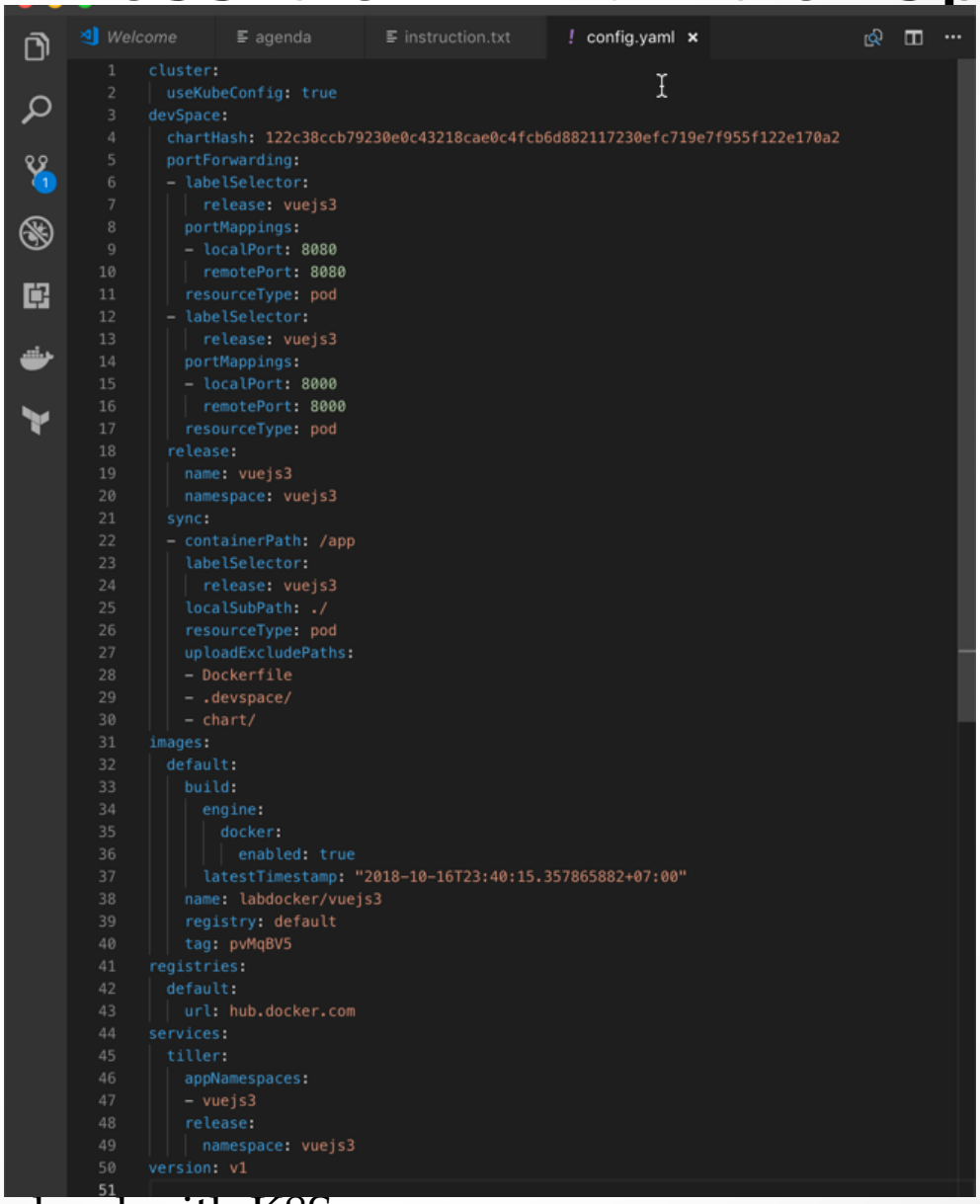
Make seamless dev with devspace

- Folder structure

```
YOUR_PROJECT_PATH/
|
|-- Dockerfile
|
|-- chart/
|   |-- Chart.yaml
|   |-- values.yaml
|   |-- templates/
|       |-- deployment.yaml
|       |-- service.yaml
|       |-- ingress.yaml
|
|-- .devspace/
|   |-- .gitignore
|   |-- cluster.yaml
|   |-- config.yaml
```

Make seamless dev with devspace

- config.yaml



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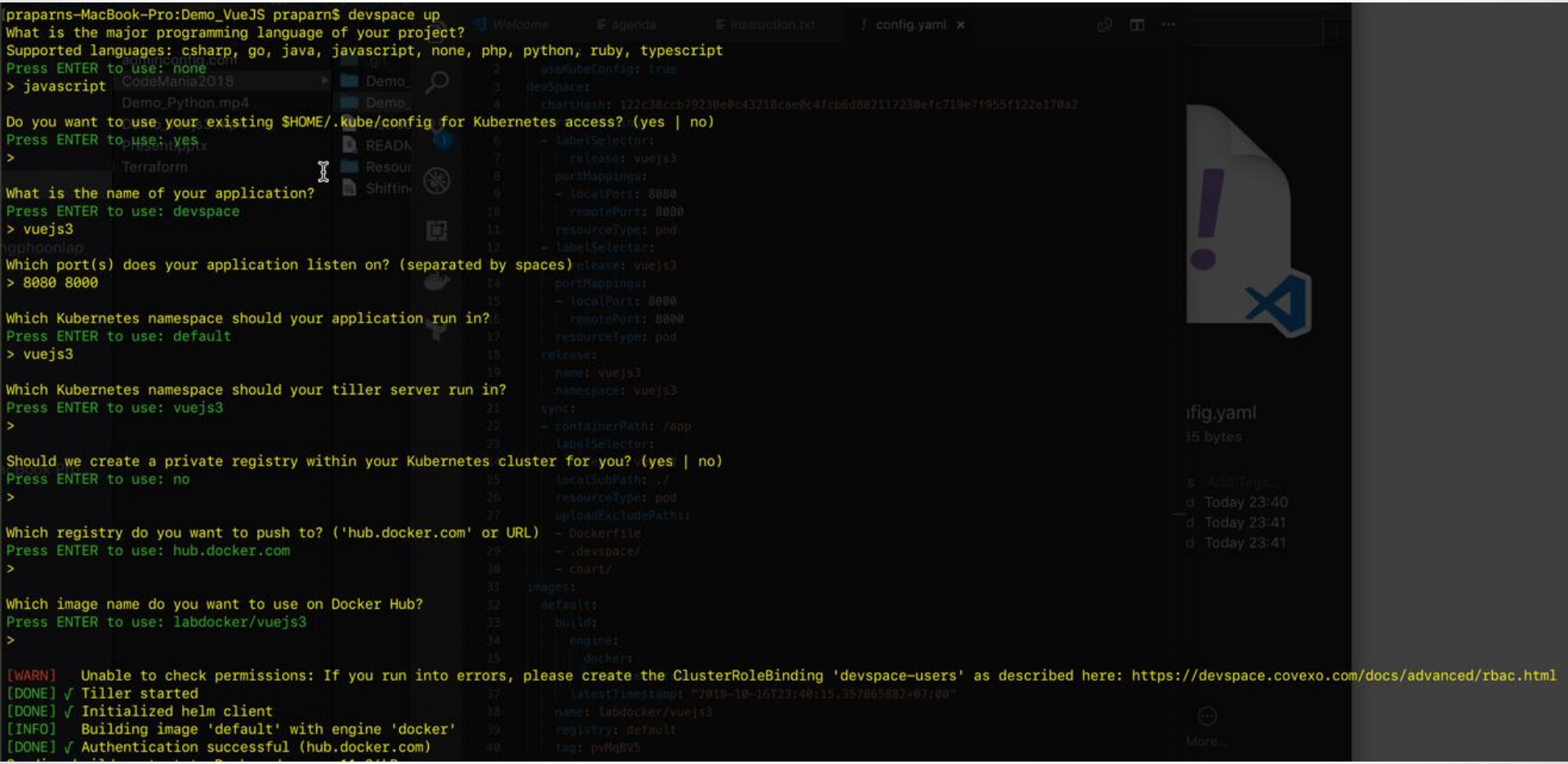
Make seamless dev with devspace

- Example



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Demo Case:

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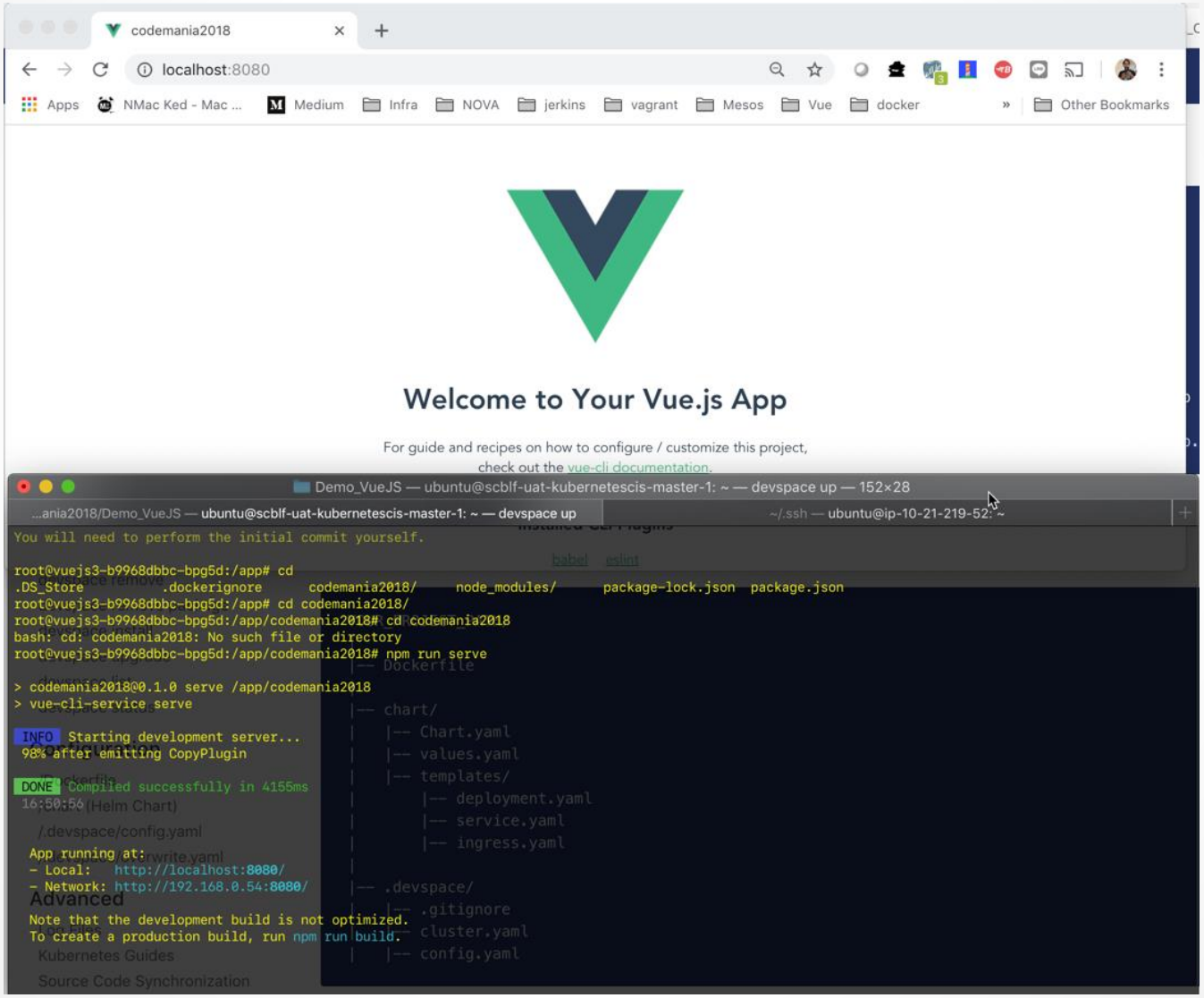
Demo Case: Vuejs3.0 (CLI)



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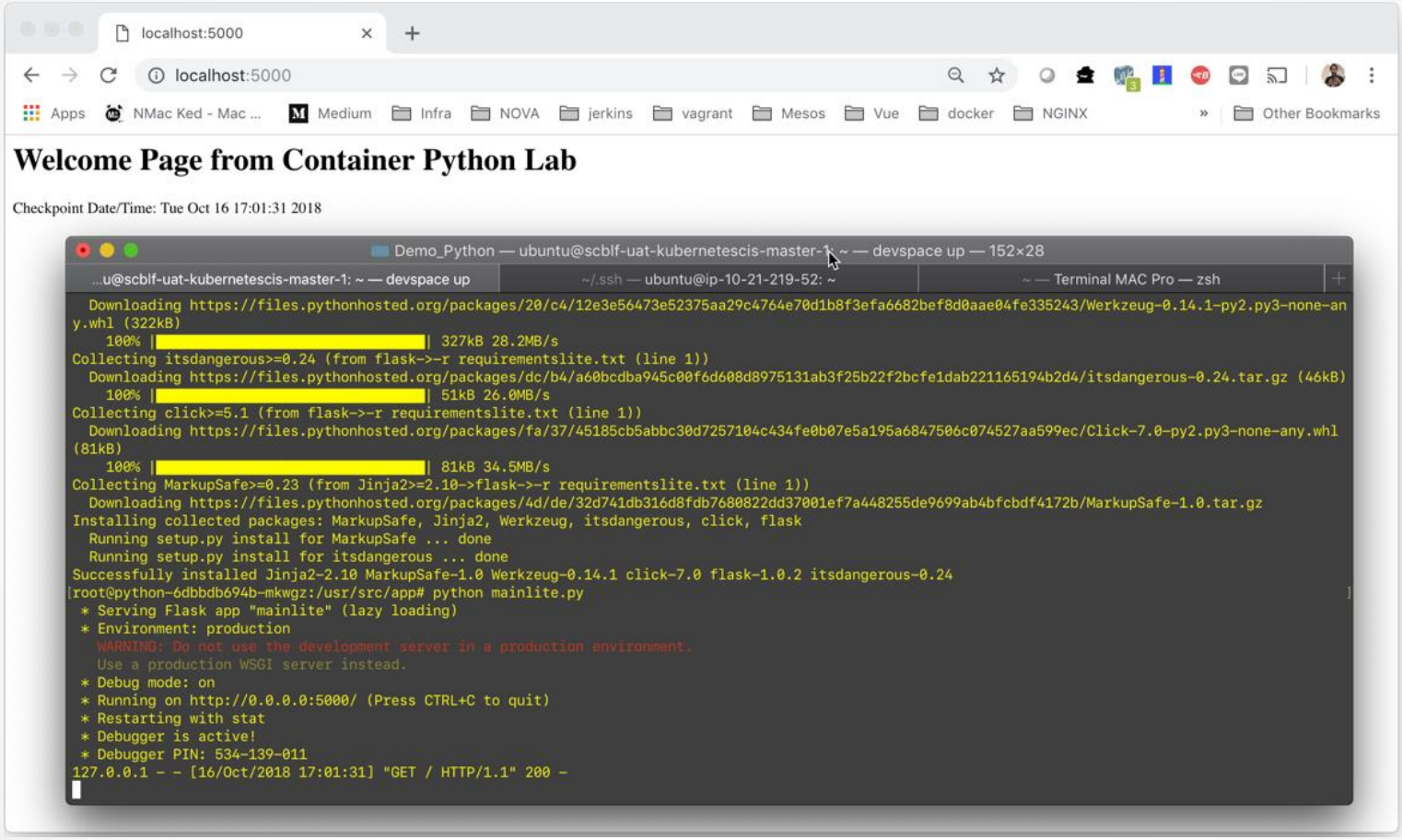
Demo Case: Python with K8S



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