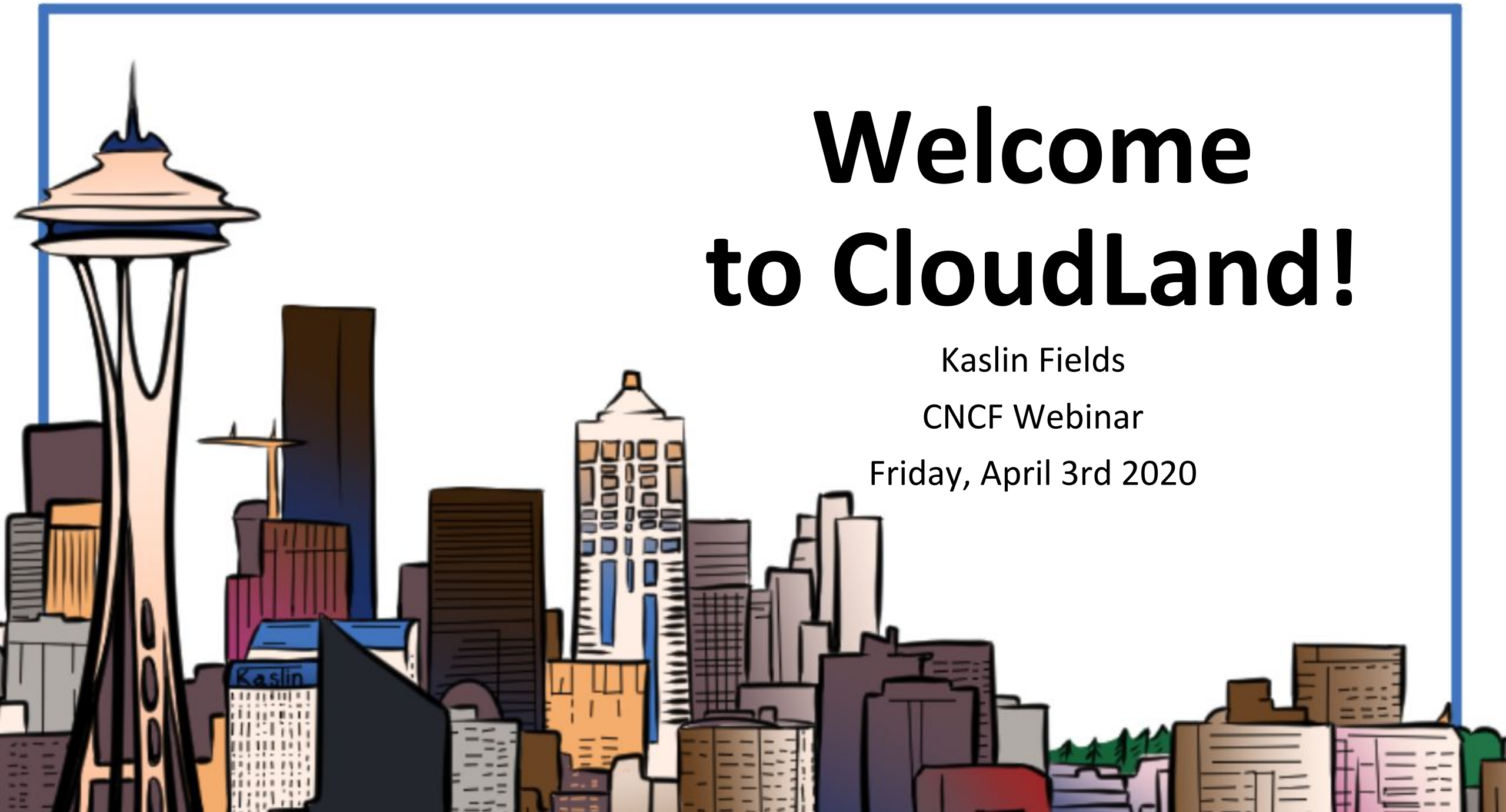


Welcome to CloudLand!

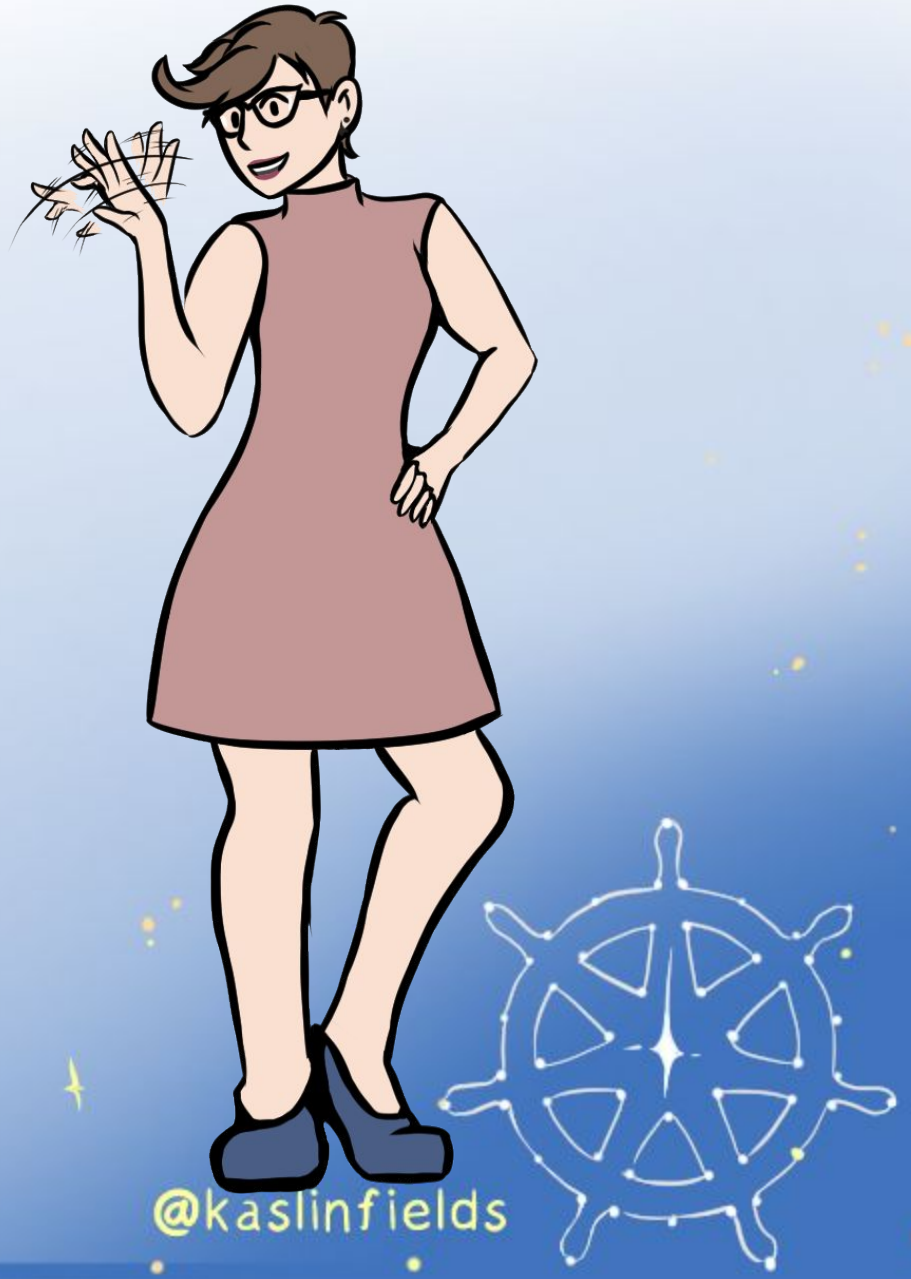
Kaslin Fields

CNCF Webinar

Friday, April 3rd 2020

Kaslin Fields

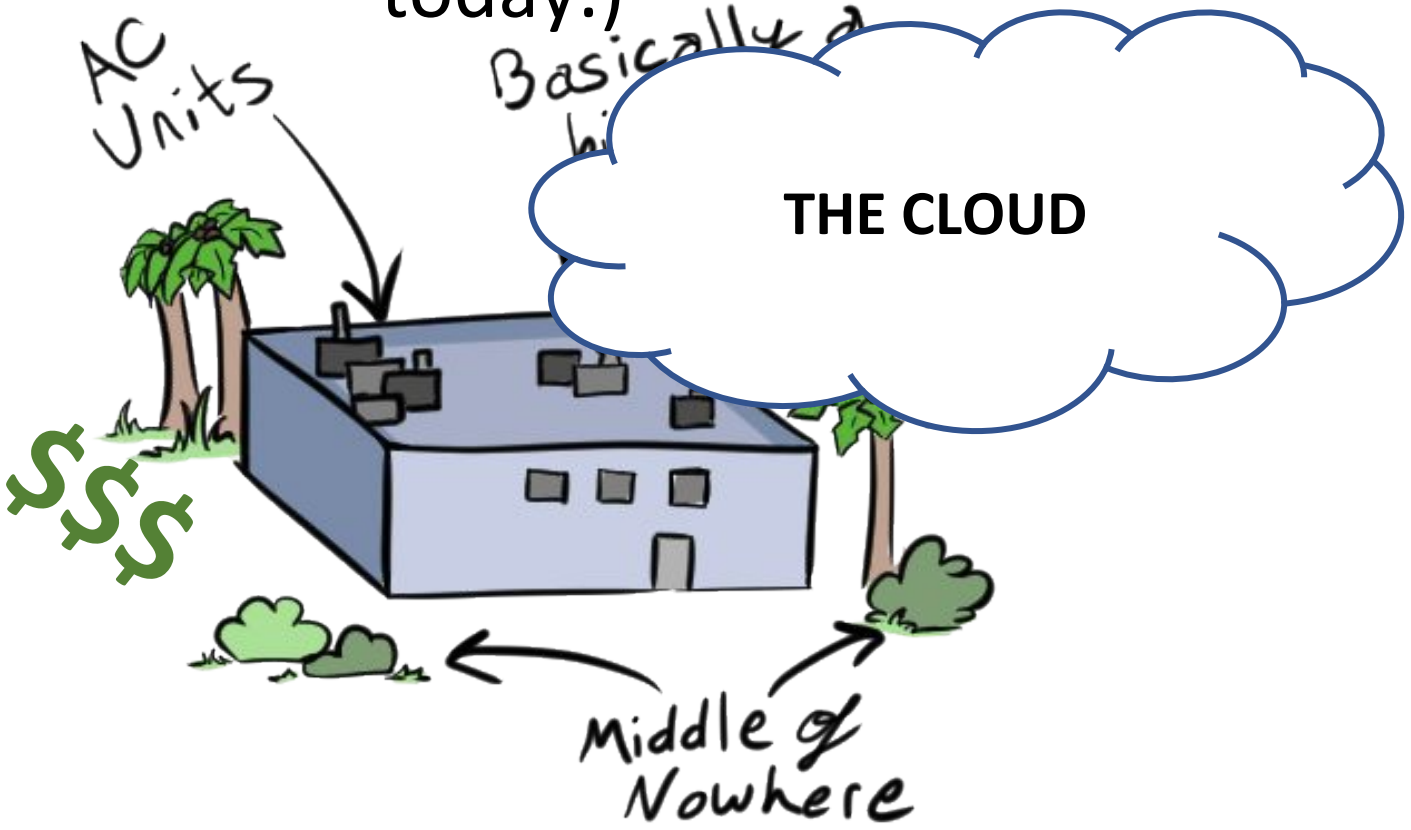
- Developer Advocate at Google
- CNCF Ambassador
- Cloud Native, DevOps, Kubernetes
- Tech Comic Creator (https://kaslin.rocks)



Tell me about Cloud Native!

Once Upon a time…

(OK, so it was today.)



Toilet Paper Co
CEO

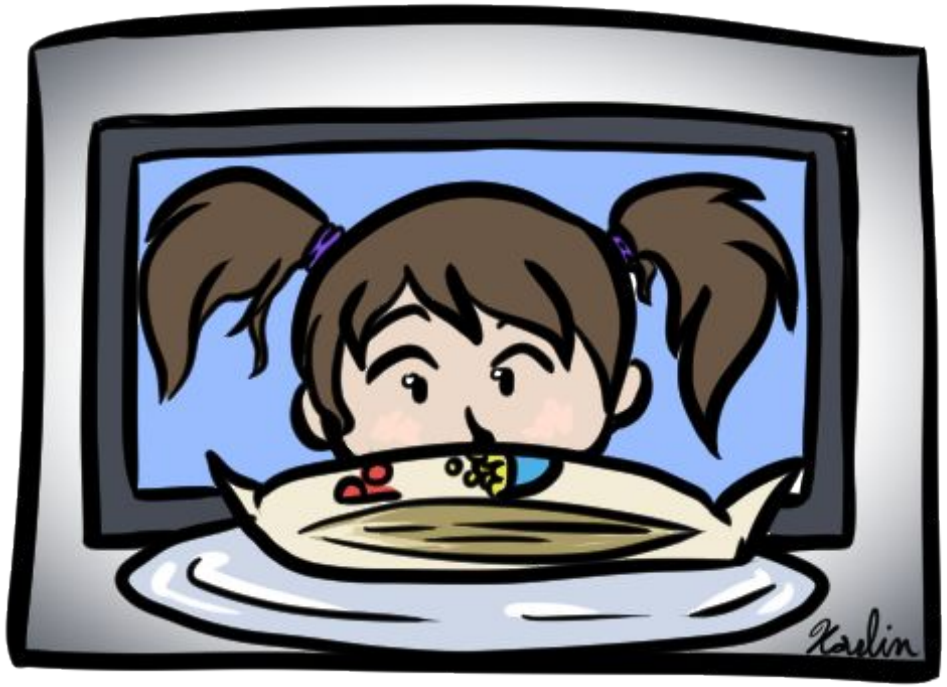
@kaslinfields

- **“Lift and Shift”**
  - Moving applications/systems as-is to the cloud

VS

- **Cloud Native**
  - Using the unique capabilities of the cloud to your advantage
  - This may mean re-architecting systems, and likely means designing new systems differently

In-House vs Cloud Native



VS

@kaslinfields

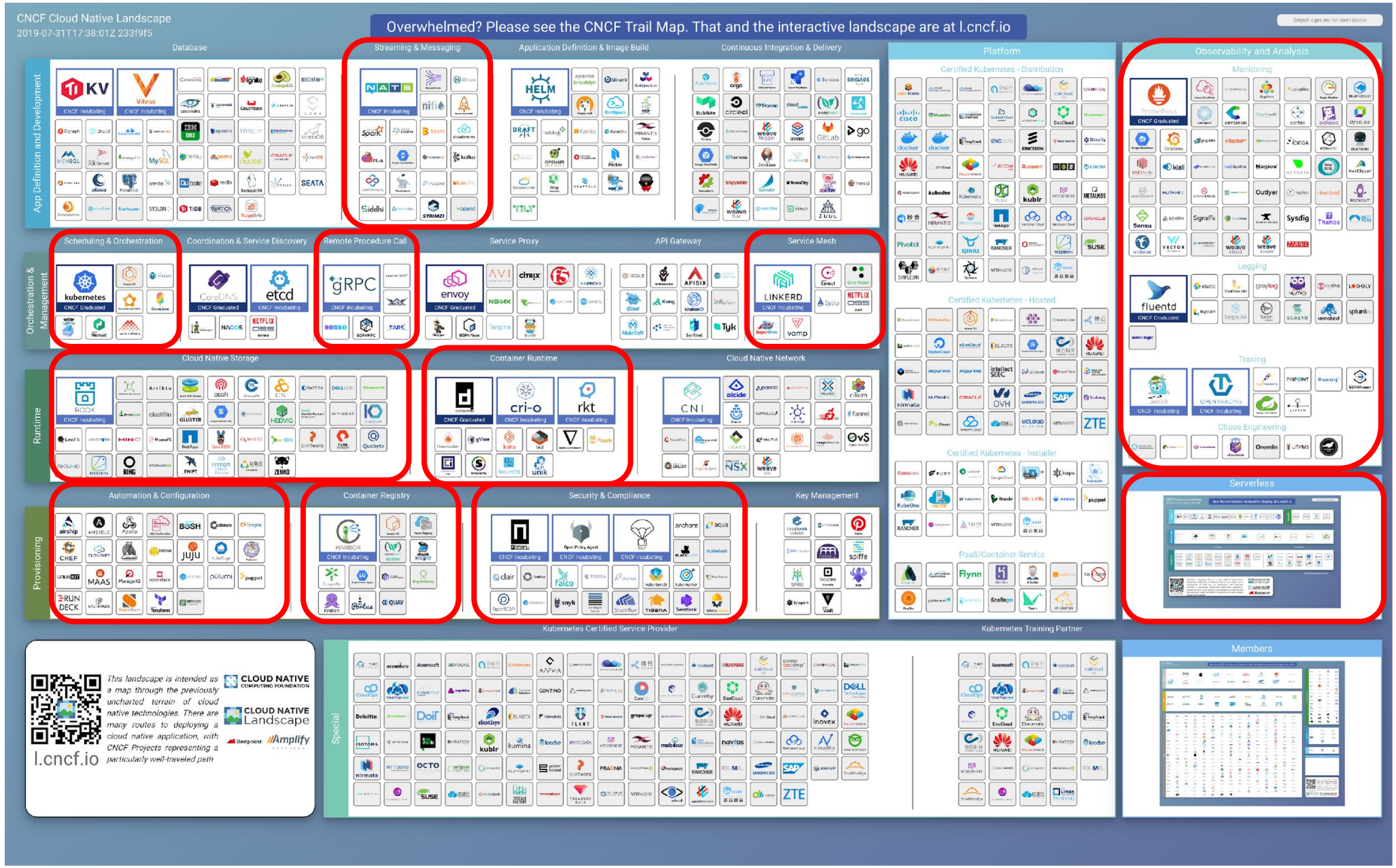
Exercise 1

- Install something!
  - Nginx works great, maybe along with a simple “Hello World” web app
- Think about
  - What steps do I have to go through to do this? If I had to do it 500 times, how would I do that?

Cloud Native Computing Foundation (CNCF)

- Independent non-profit
- Mission: Promote the growth and adoption of Cloud Native Technologies
- Support and promote many “cloud native” open source projects
- Maintain a “Cloud Native Landscape” to help companies understand the breadth of Cloud Native software

@kaslinfields


CNCF Cloud Native Landscape
2019-07-31T17:38:01Z 233f9f5
Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at l.cncf.io
Greyed logos are not open source
App Definition and Development
Database
Streaming & Messaging
Application Definition & Image Build
Continuous Integration & Delivery
Orchestration & Management
Scheduling & Orchestration
Coordination & Service Discovery
Remote Procedure Call
Service Proxy
API Gateway
Service Mesh
Runtime
Cloud Native Storage
Container Runtime
Cloud Native Network
Provisioning
Automation & Configuration
Container Registry
Security & Compliance
Key Management
Platform
Certified Kubernetes - Distribution
Certified Kubernetes - Hosted
Certified Kubernetes - Installer
PaaS/Container Service
Observability and Analysis
Monitoring
Logging
Tracing
Chaos Engineering
Serverless
This landscape is intended as a map through the previously uncharted terrain of cloud native technologies. There are many routes to deploying a cloud native application, with CNCF Projects representing a particularly well-traveled path
l.cncf.io
CLOUD NATIVE COMPUTING FOUNDATION
CLOUD NATIVE Landscape
Redpoint
Amplify
Special
Kubernetes Certified Service Provider
Kubernetes Training Partner
Members

Kelsey Hightower @kelseyhightower · 14h

Don't forget an IDE with a powerful YAML editor.
marketplace.visualstudio.com/items?itemName...

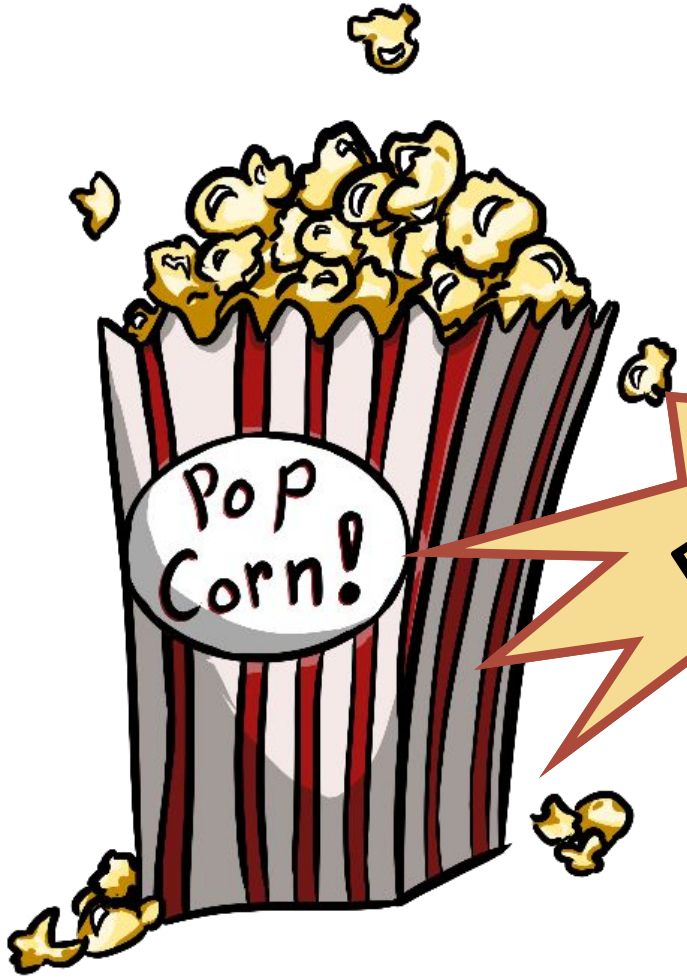
> **Kelsey Hightower** @kelseyhightower · 14h
>
> So you want to roll your own application platform. All you need is:
>
> Linux
> Docker
> Kubernetes
> Istio
> Prometheus
> Fluentd
> Grafana
> Jaeger
> Harbor
> Open Policy Agent
> Vault
> Spinnaker and Jenkins
>
> Oh, almost forgot, you're also going to need servers, people, and glue.
> Bring lots of glue.

14 14 153

kaslinfields

What are the most exciting and unique things about going to an amusement park or festival?

Amusement Park / Festival Food



Delicious!

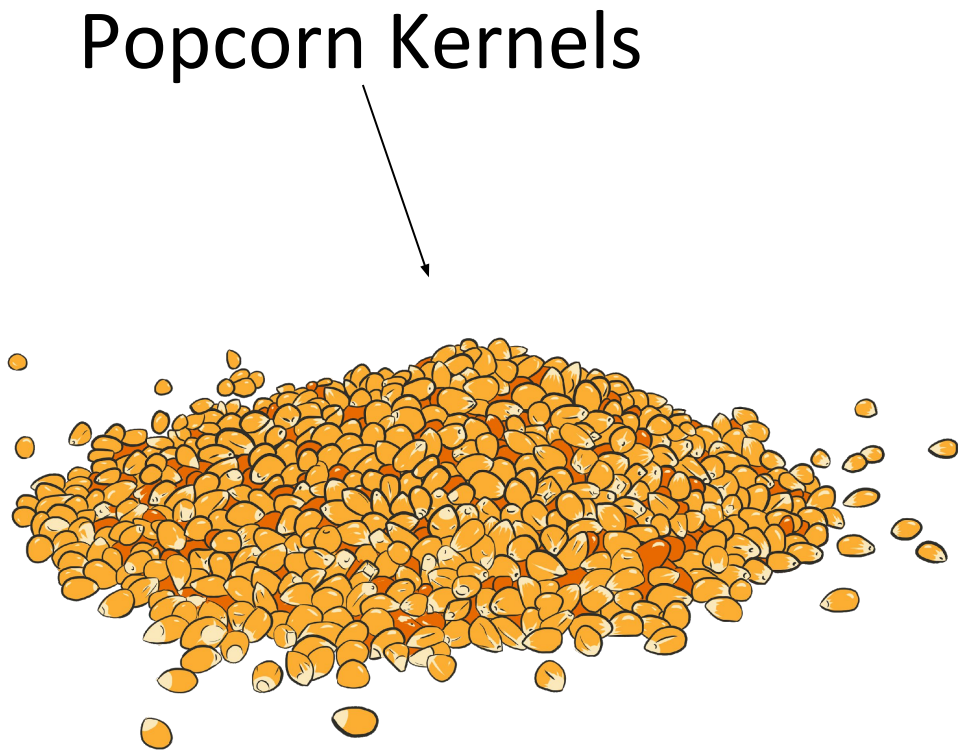
Exciting!

@kaslinfields

Containers

Benefits of Popcorn

- Efficient Storage
- Portable
- Stores small, but feeds a crowd
- Repeatable
- Quick and easy



Benefits of Containers

- Efficient Storage
- Portable
- Store once, can be spun up en masse
- Repeatable
- Quick startup time

@kaslinfields

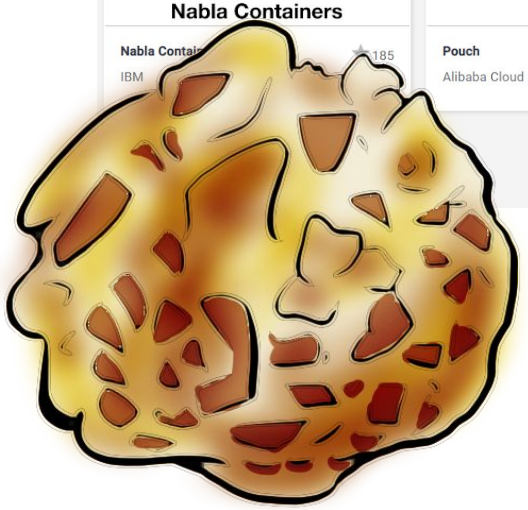
Container Runtimes

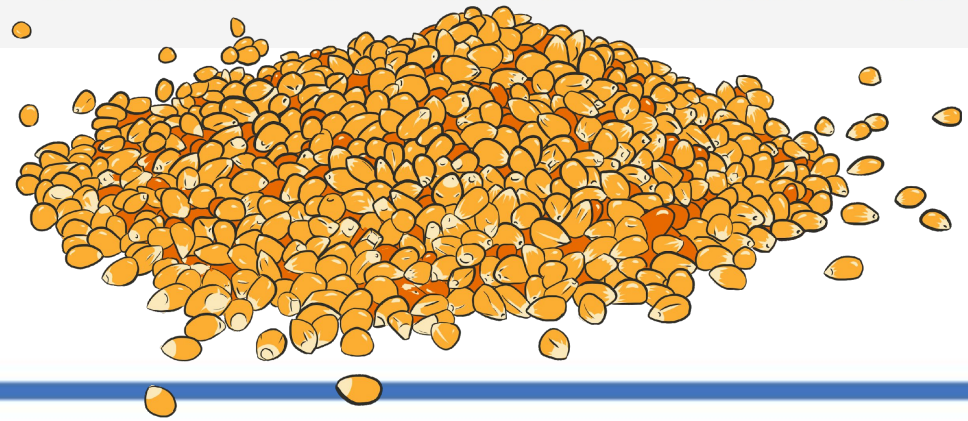
Speed, Security, Weight

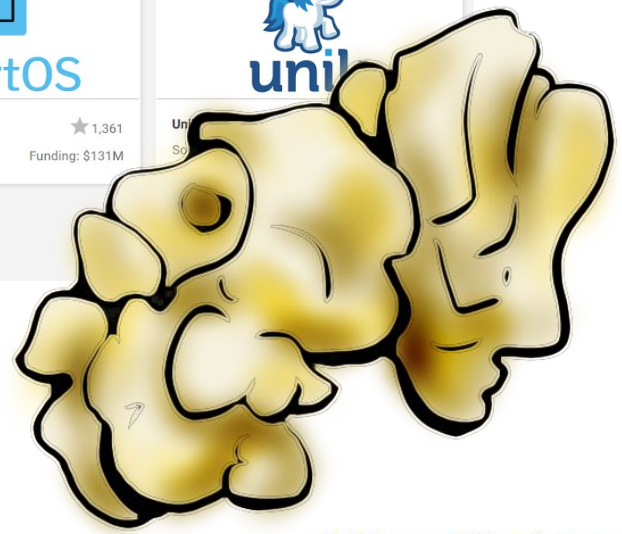
Runtime - Container Runtime (12)

containerd Cloud Native Computing Foundation (CNCF) ★ 5,165	CRI-O Cloud Native Computing Foundation (CNCF) ★ 2,282	Firecracker Amazon Web Services ★ 10,593 MCap: $1.02T	gVisor Google ★ 9,513 MCap: $996.9B	Kata Containers OpenStack ★ 1,769	lxd Canonical ★ 2,497 Funding: $12.8M
Nabla Containers Nabla Contai… ★ 185 IBM	Pouch Pouch Alibaba Cloud ★ 4,131 MCap: $579.08B	OPEN CONTAINER INITIATIVE runc runc Open Container Initiative (OCI) ★ 6,640	Singularity Singularity Sylabs ★ 1,510	SmartOS SmartOS Joyent ★ 1,361 Funding: $131M	uni… Un… So…

Crunchbase data is used under license from Crunchbase to CNCF. For more information, please see the license info.







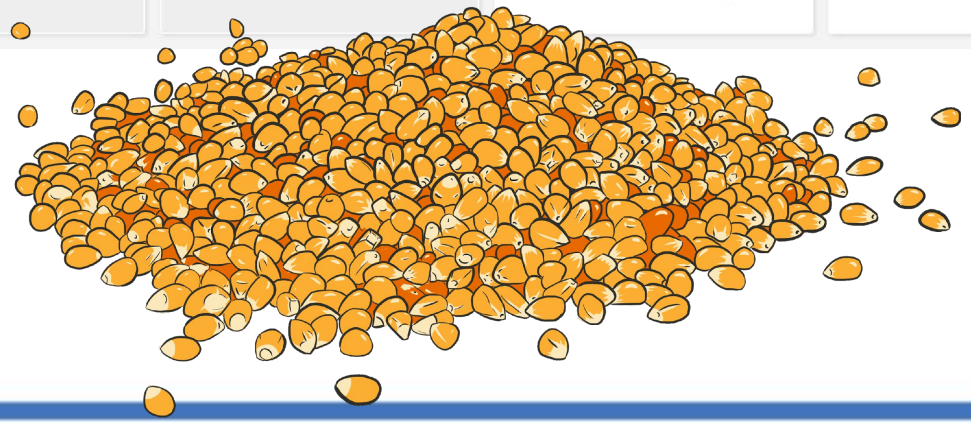
@kaslinfields

Container Registries

Storage and Retrieval

Provisioning - Container Registry (12)

Amazon ECR	Azure Registry	codefresh REGISTRY	docker REGISTRY	Dragonfly	Google Container Registry
Amazon Elastic Container Registry (ECR) Amazon Web Services MCap: $983.59B	Azure Registry Microsoft MCap: $1.36T	Codefresh Registry Codefresh Funding: $15M	Docker Registry Docker ★5,198 Funding: $307.86M	Dragonfly Cloud Native Computing Foundation (CNCF) ★4,604	Google Container Registry Google MCap: $951.62B
HARBOR	IBM Cloud Container Registry	JFrog Artifactory	Kraken	Portus	QUAY
Harbor Cloud Native Computing Foundation (CNCF) ★10,995	IBM Cloud Container Registry IBM MCap: $119.24B	JFrog Artifactory JFrog Funding: $226.5M	Kraken Uber ★3,234 MCap: $59.52B	Portus SUSE ★2,581 Funding: $3.84M	Quay Red Hat ★1,472 MCap: $119.24B



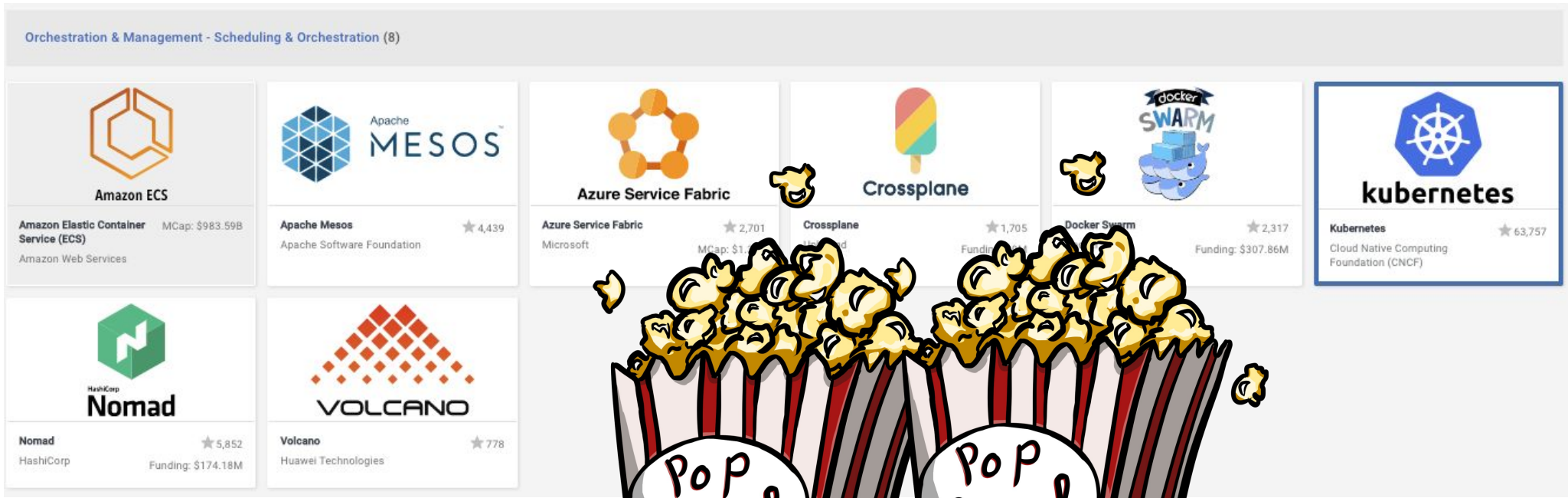
@kaslinfields

Exercise 2

- Try to install that same thing, but using containers!
  - Nginx is a common example, available easily via dockerhub!
- Think about
  - What steps do I have to go through to do this? If I had to do it 500 times, how would I do that?
  - It should be a lot easier to do 500 times!

Container Orchestration

Operating at Scale



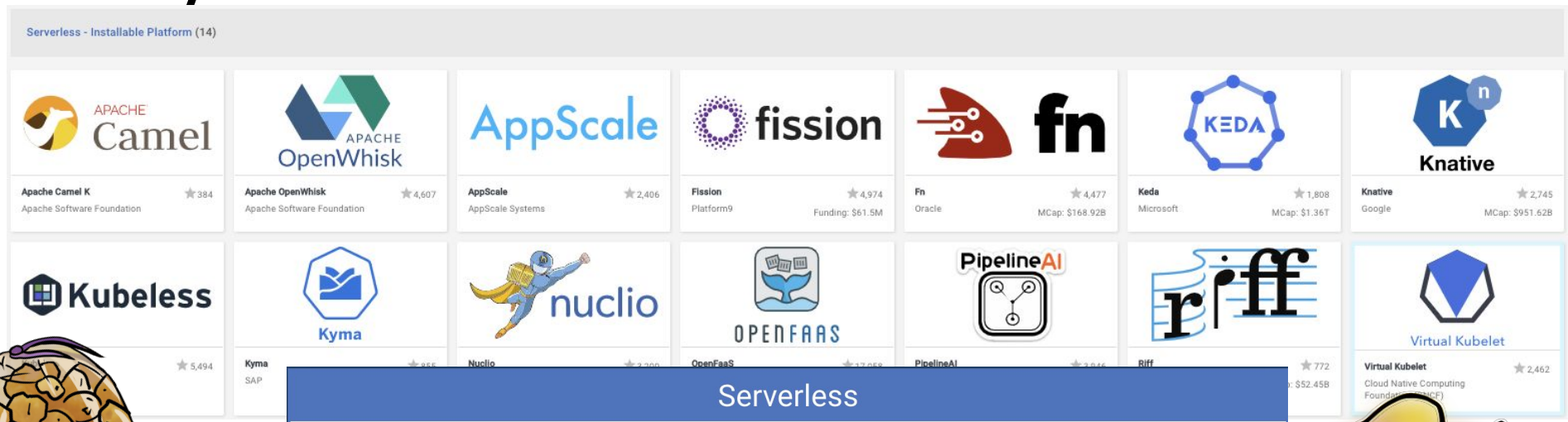
@kaslinfields

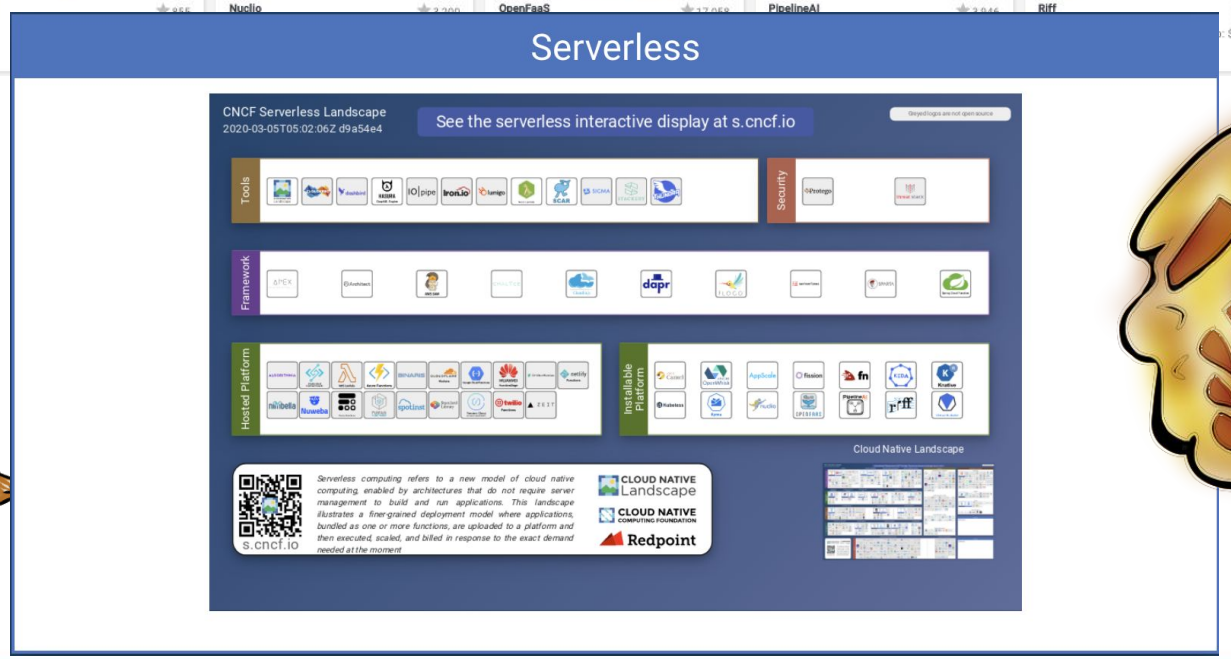
Exercise 3

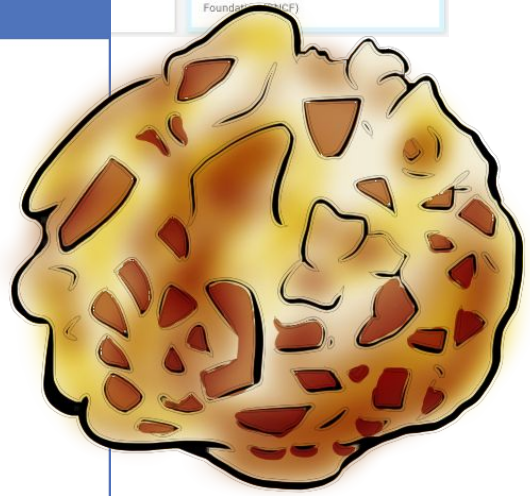
- Put that container image in dockerhub and try deploying it to a K8s Cluster!
  - Beginner (cloud)
    - Use a free trial [like GKE's free trial] to use a managed k8s cluster on a cloud provider
  - Beginner (local)
    - Use minikube on your local machine
  - Intermediate/Challenging
    - Go through Kubernetes The Hard Way
- Think about
  - If I had to run 500 of this container, how would Kubernetes help me do that?

Serverless / Functions as a Service

Focus on Code



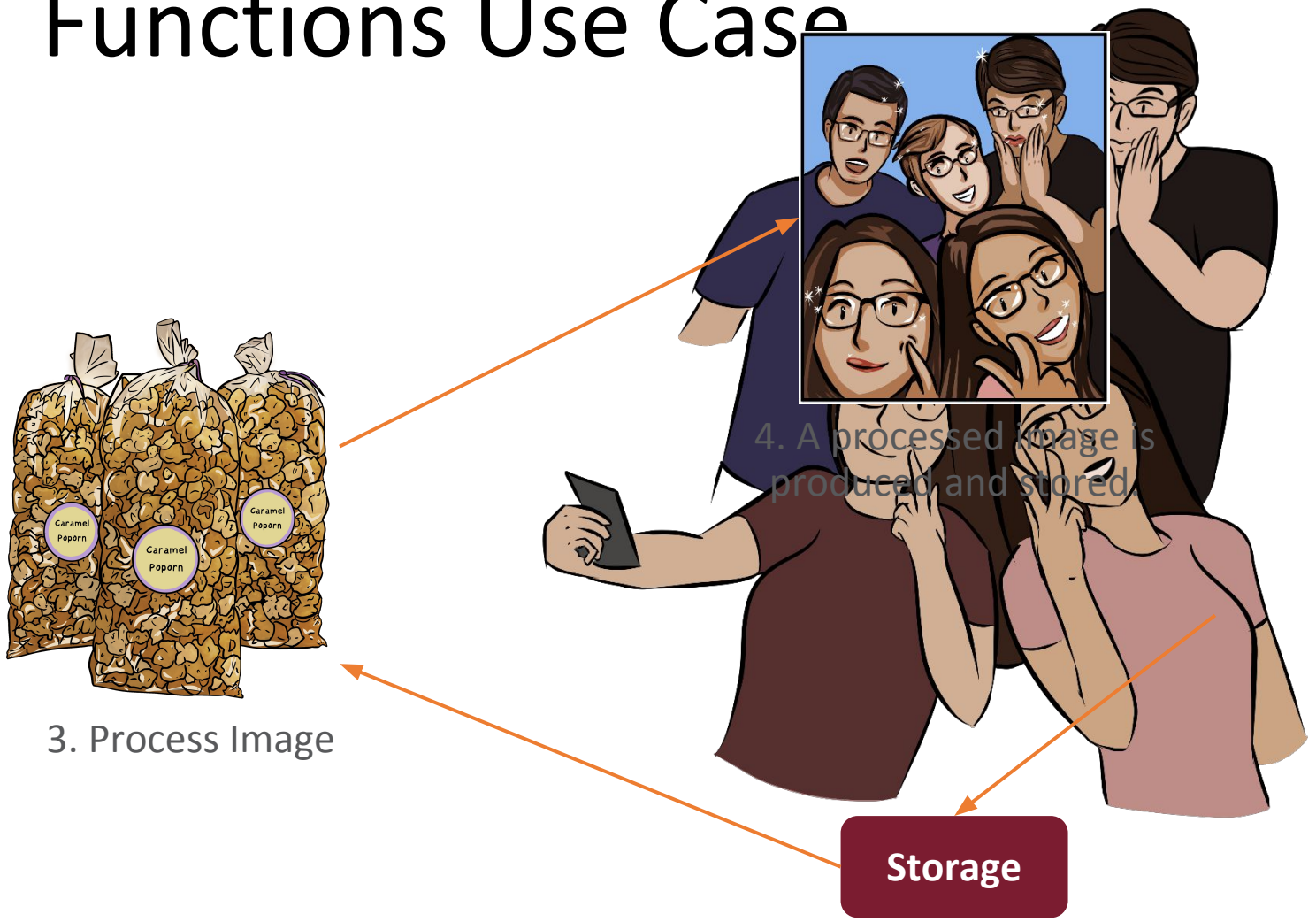




@kaslinfields

Functions Use Case

Focus on Code



3. Process Image

1. Upload an image

2. The image being inserted to object storage triggers an *event*

@kaslinfields

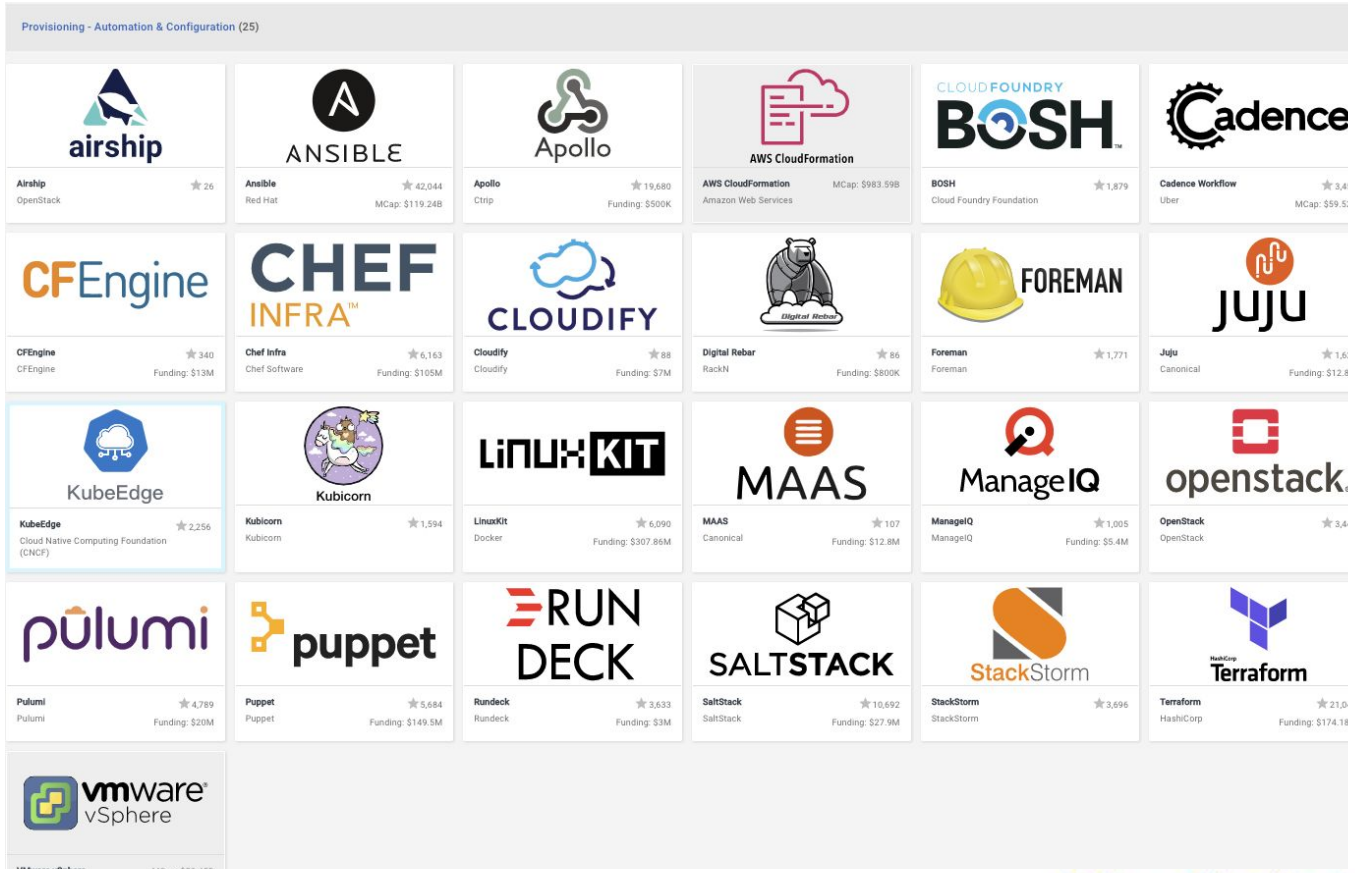
Exercise 4

- Run that app/container via a functions as a service platform!
  - Use a cloud provider's free trial to do this
- Think about
  - What is the format like? Can I run the container? Can I run some application from code?
  - What would the cost be to run 500 of these once a month for 45min?

Infrastructure as Code

"GitOps"

DevOps - Manage your "Ops" like you manage your "Dev"



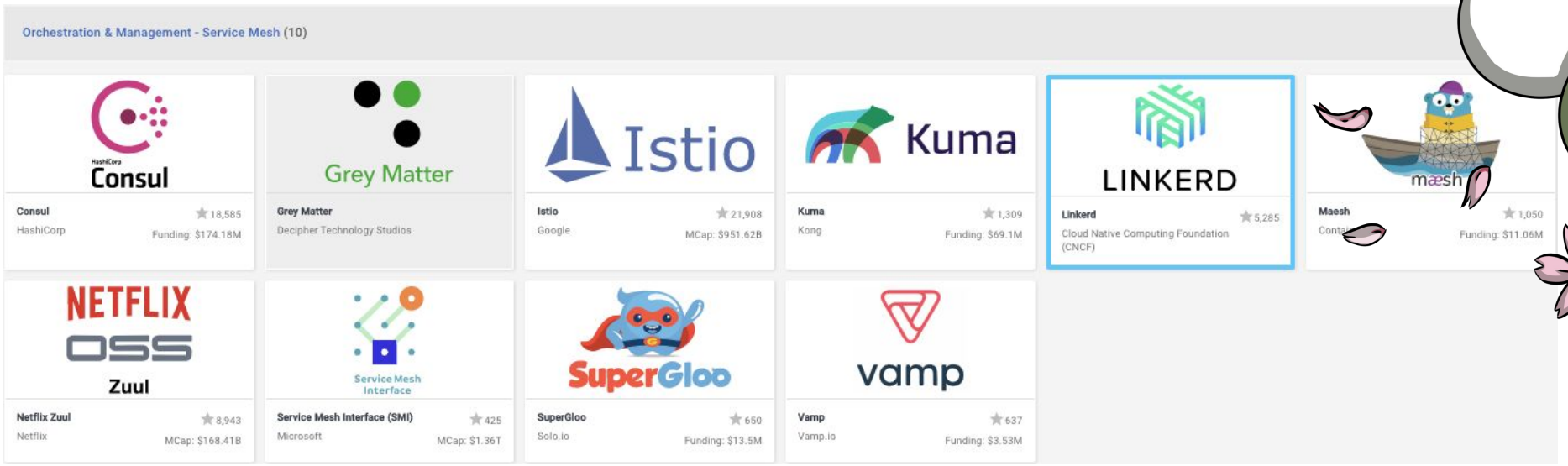
@kaslinfields

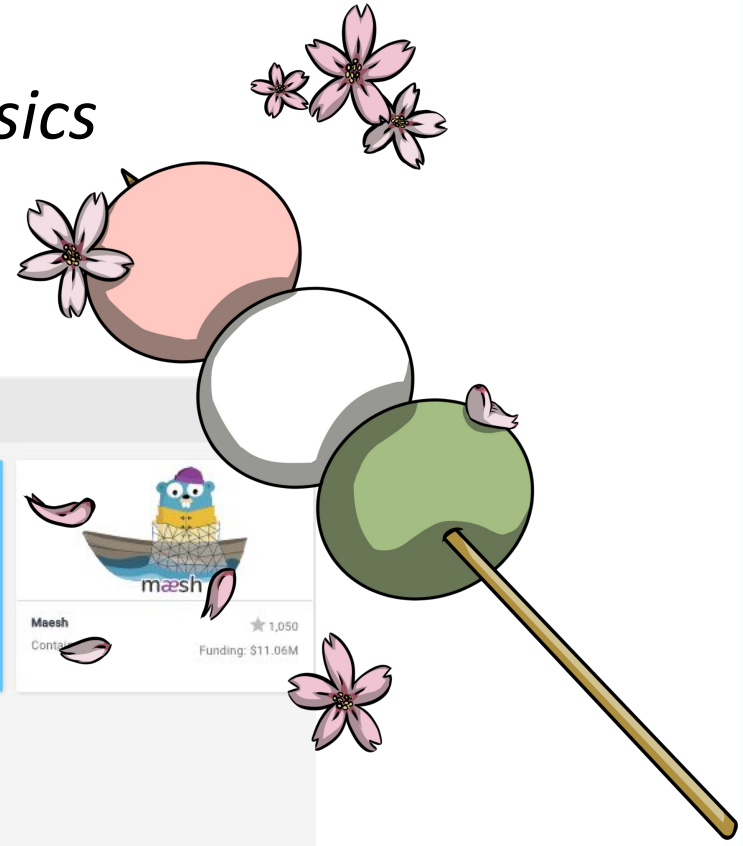
Exercise 5

- Deploy your app via Terraform
  - There may be a terraform template already on github (ie. Nginx again)
- Think about
  - What tools does this service mesh give me?
  - What do I need to do to use those tools?

Service Mesh

Beyond Basics





Day 2 Kubernetes Boogaloo

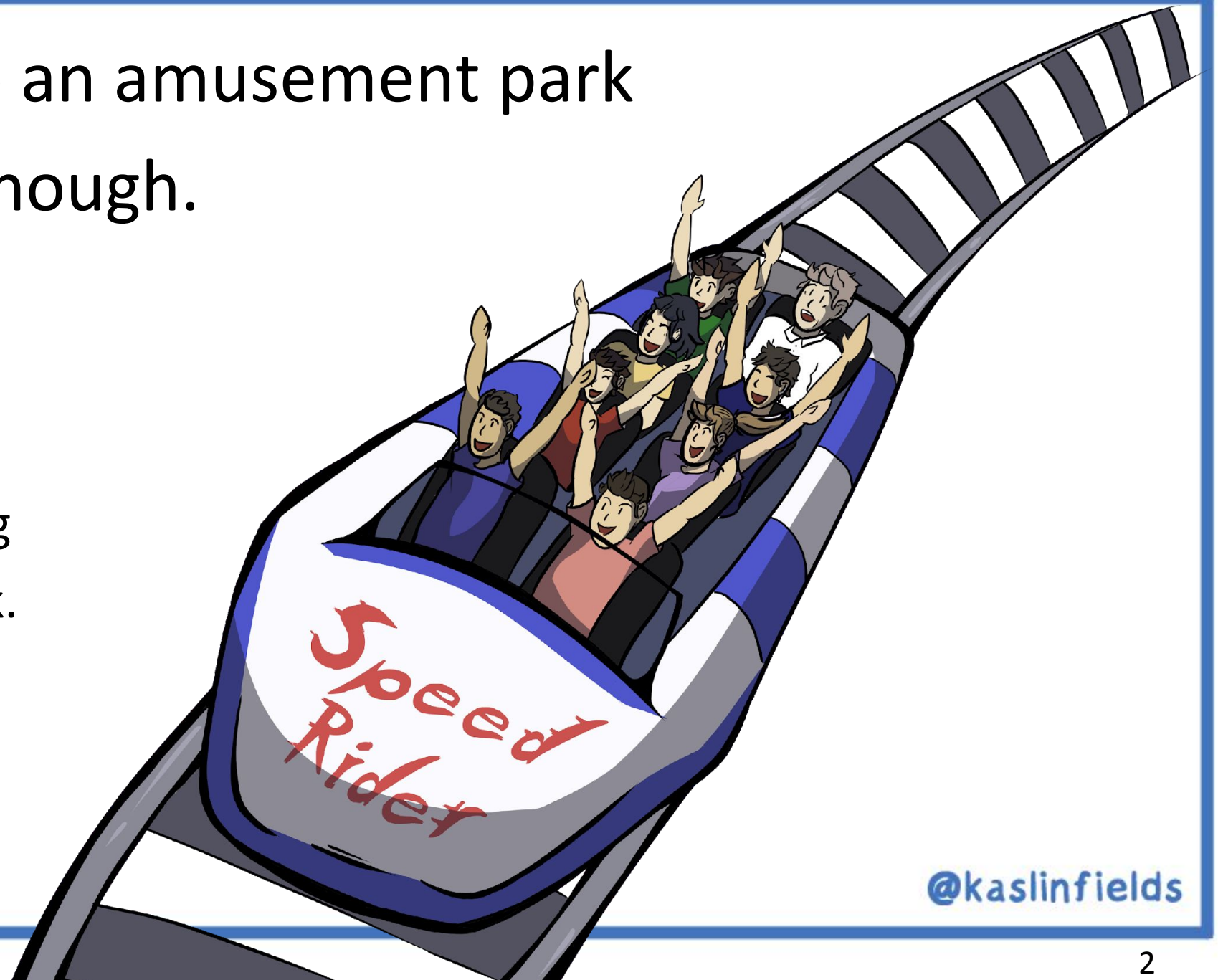
@kaslinfields

Exercise 6

- Install a service mesh on your Kubernetes cluster from Exercise 3
  - Use a cloud provider's free trial to do this
- Think about
  - What benefits does having my infrastructure defined as code give me
  - Imagine the situation where you have to deploy this 500 times, AND it's constantly changing

There’s more to an amusement park than just food though.

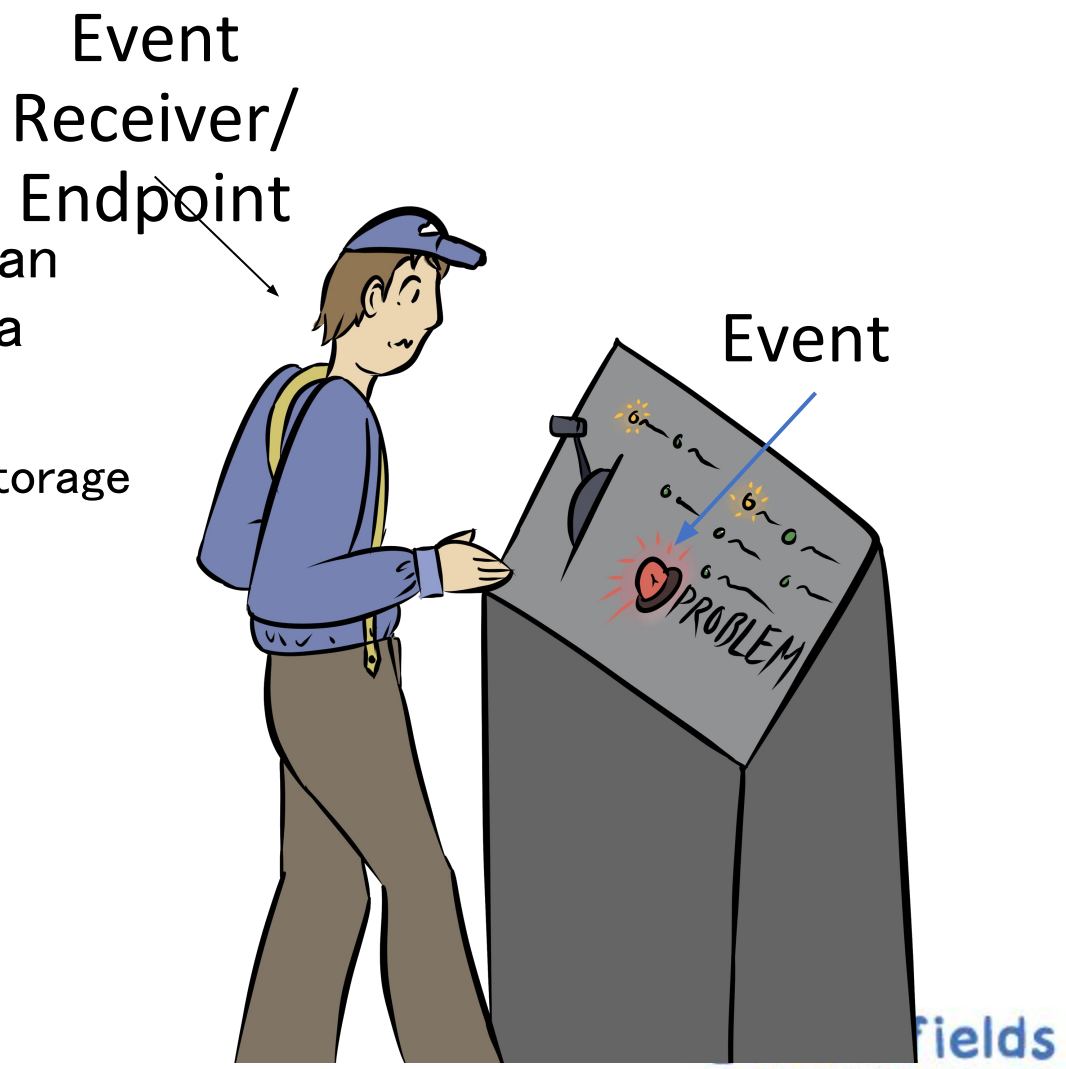
Let’s talk about some other things that go into running an amusement park.



@kaslinfields

Cloud Events

- Something Happened!
  - Create a trigger which will send a message (an event) to the endpoint of your choice when a certain action occurs
    - For example, a new object is inserted into object storage
- Standardized
  - Events are based on a standardized format owned by the Cloud Native Computing Foundation (CNCF)



Functions + Event Use Case

4. A processed image is produced and stored.

1. Upload an image

f(n)

3. Process Image

Storage

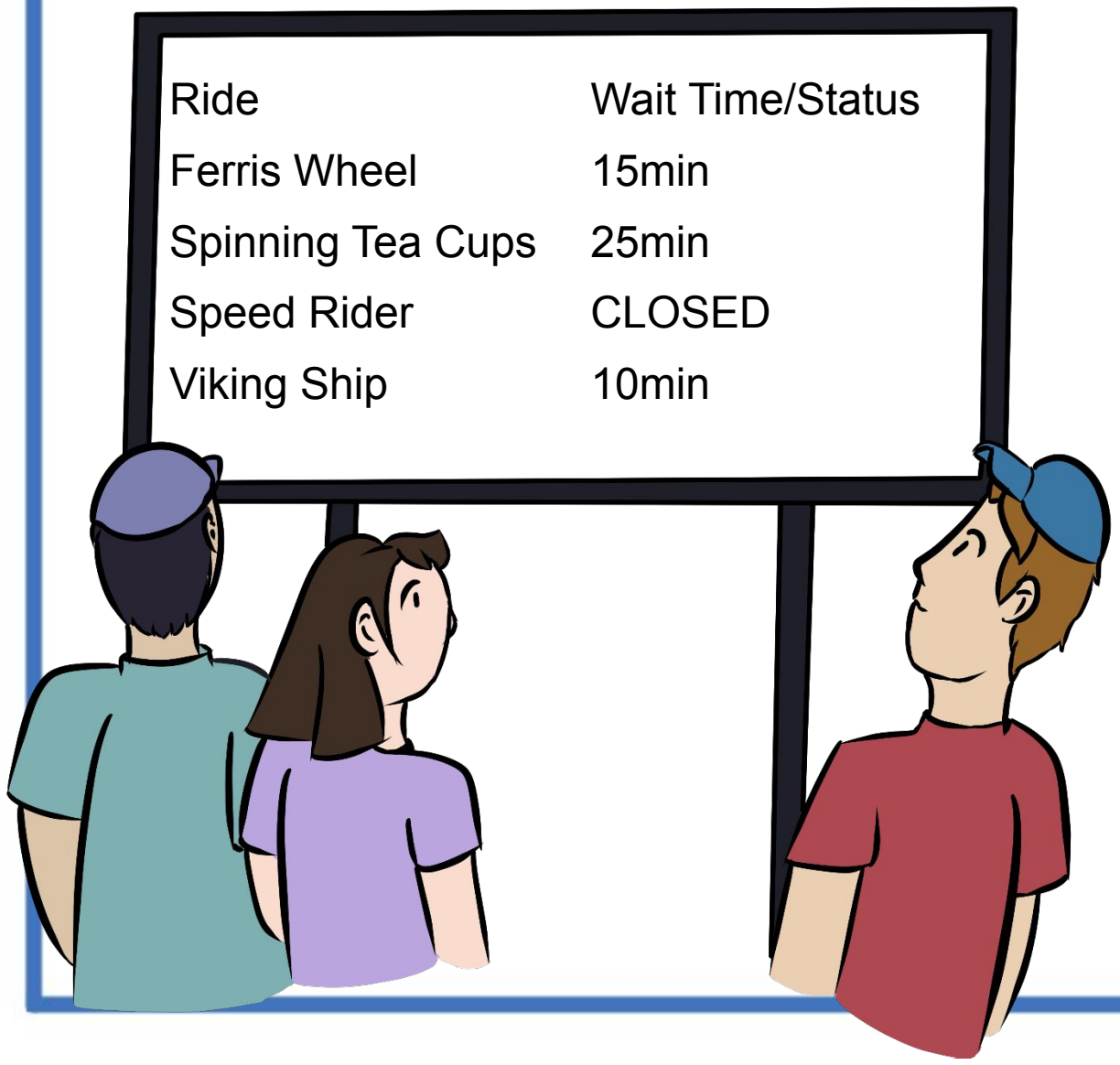
This trigger is an *event*!

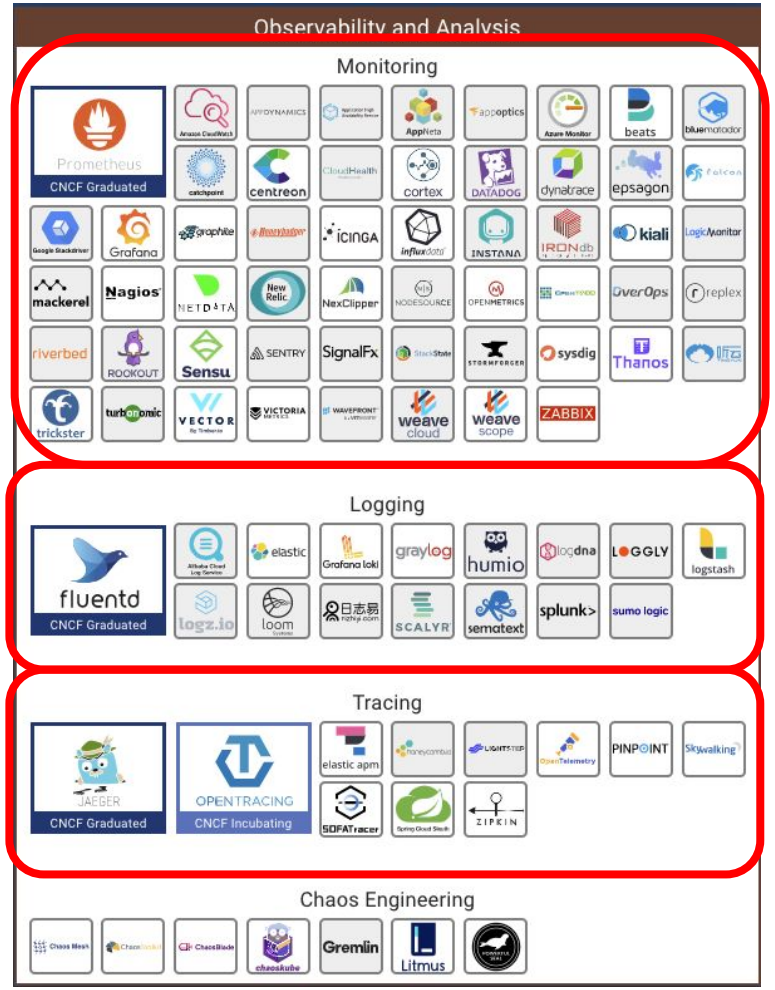
2. The image being inserted to object storage triggers an *event*

@kaslinfields

Observability

Know Your System, Know Your Business

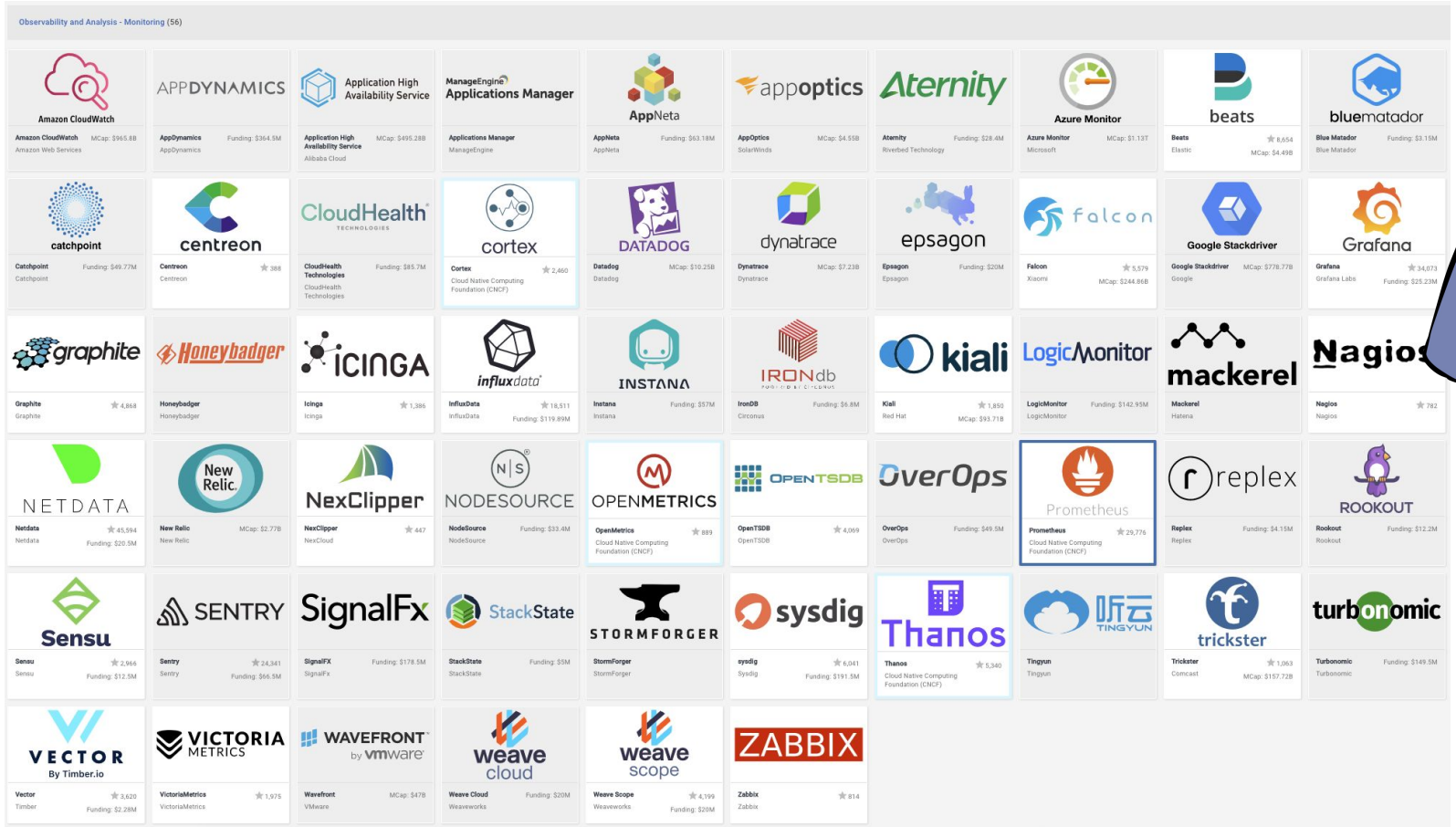


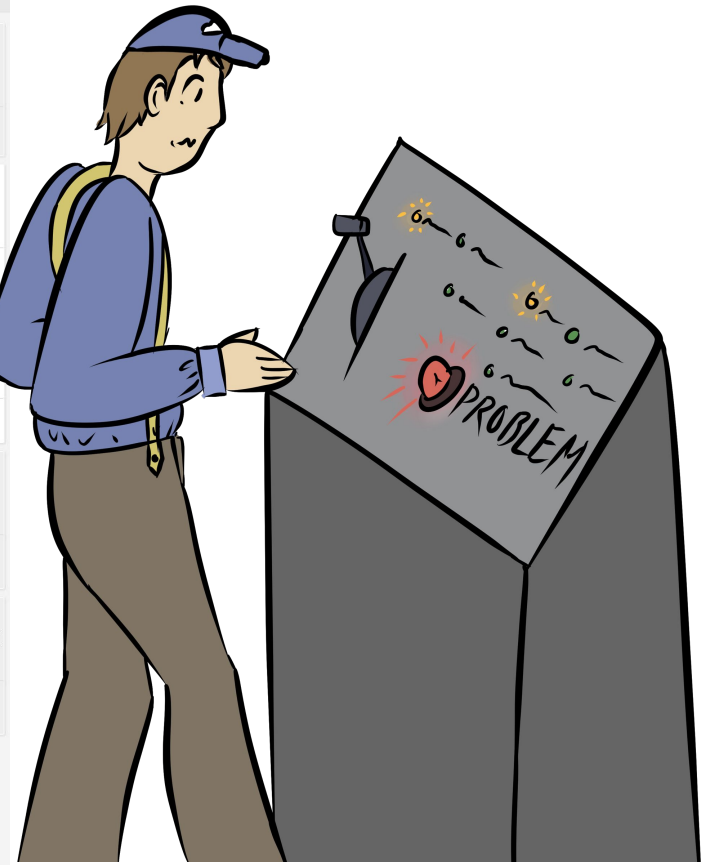


@kaslinfields

Observability - Monitoring

Know what's happening, when it happens

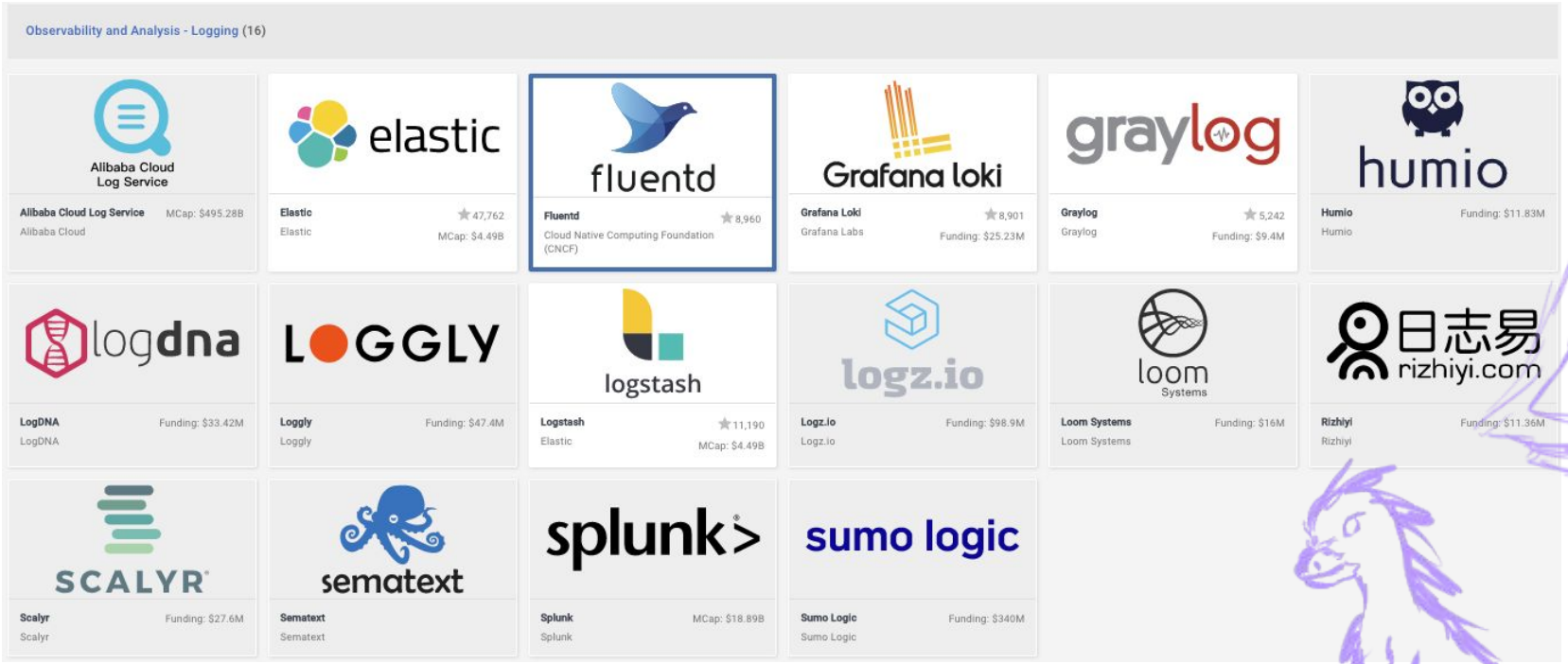




@kaslinfields

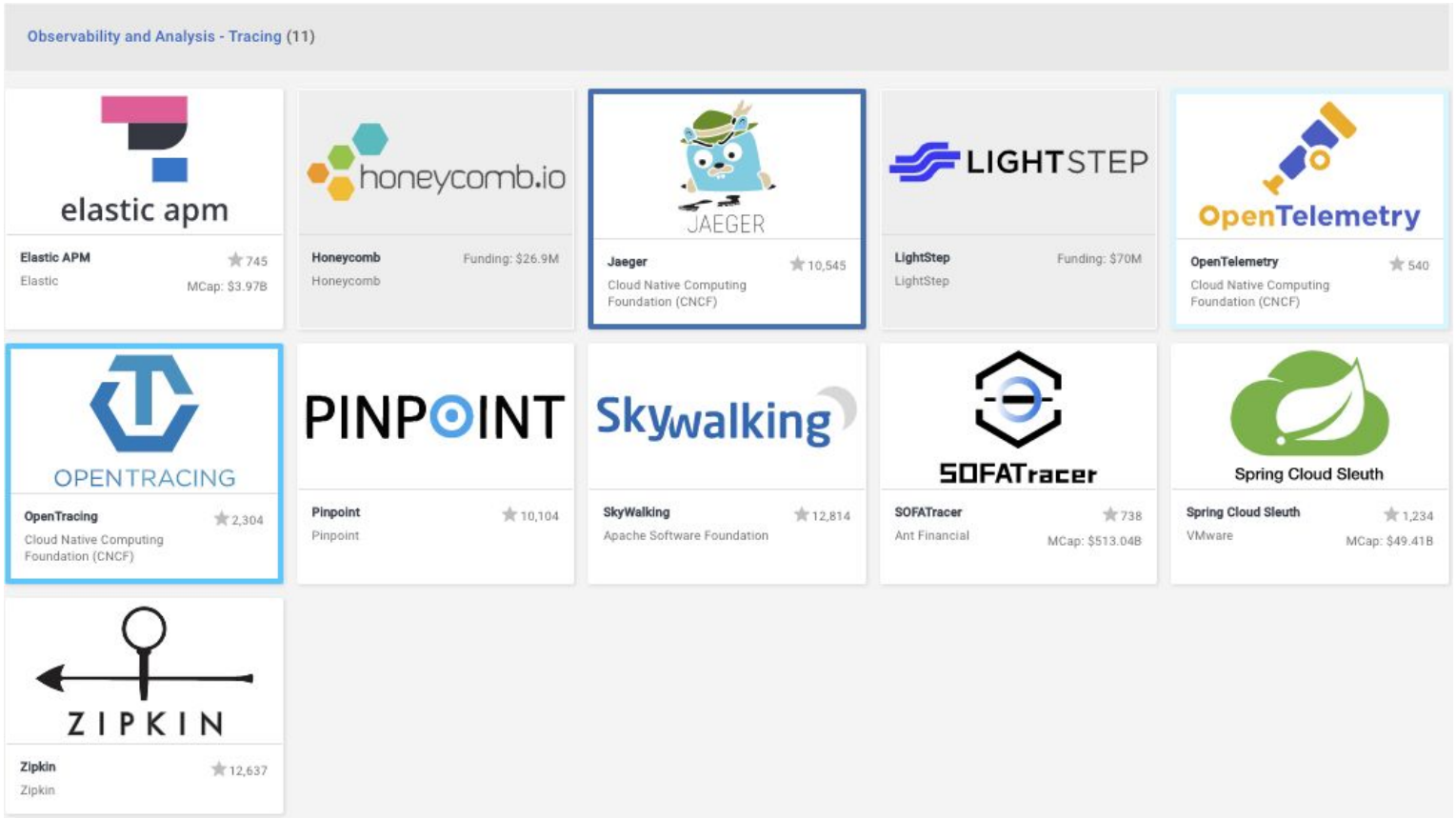
Observability - Logging

Know what happened before



Observability - Tracing

Follow where the trail leads



@kaslinfields

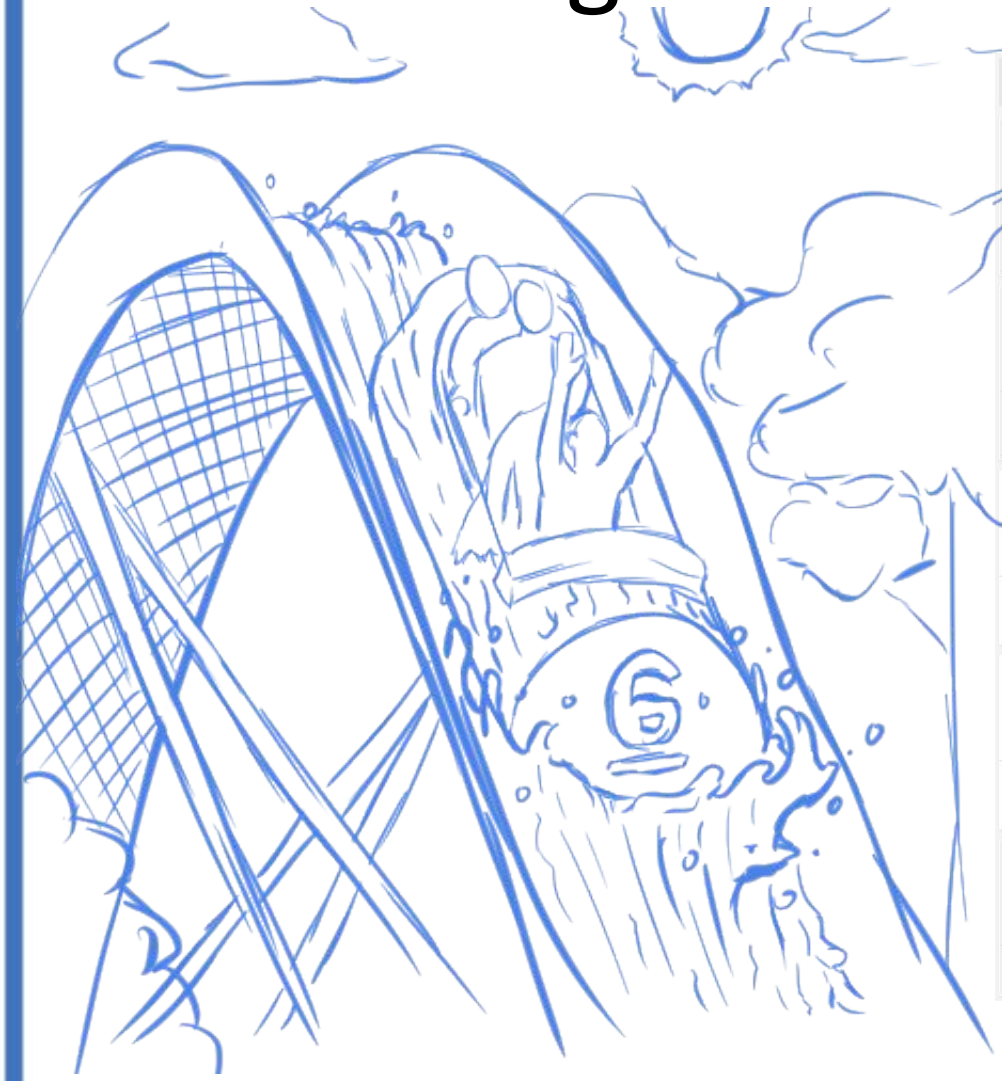
Security & Compliance

If you want people to do things right,
make it hard for them to do wrong.

@kaslinfields

Streaming & Messaging

Consume Data at Scale



App Definition and Development - Streaming & Messaging (25)

Amazon Kinesis Amazon Kinesis MCap: $983.59B Amazon Web Services	Apache HERON Apache Heron ★3,443 Apache Software Foundation	APACHE nifi Apache NiFi ★1,916 Apache Software Foundation	Apache RocketMQ Apache RocketMQ ★10,329 Apache Software Foundation	APACHE Spark Apache Spark ★25,287 Apache Software Foundation	APACHE STORM Apache Storm ★6,003 Apache Software Foundation
Azure Event Hubs Azure Event Hubs MCap: $1.36T Microsoft	beam Beam ★3,765 Apache Software Foundation	cloudevents CloudEvents ★1,661 Cloud Native Computing Foundation (CNCF)	deepstream deepstream ★6,598 deepstreamHub Funding: $1M	Flink Flink ★12,221 Apache Software Foundation	Google Cloud Dataflow Google Cloud Dataflow MCap: $951.62B Google
hazelcast JET Hazelcast Jet ★414 Hazelcast Funding: $63.58M	kafka Kafka ★15,043 Apache Software Foundation	KubeMQ KubeMQ KubeMQ	Lightbend Lightbend Funding: $52.14M Lightbend	NATS NATS ★7,342 Cloud Native Computing Foundation (CNCF)	OpenMessaging OpenMessaging ★647 Linux Foundation
Pachyderm Pachyderm ★4,275 Pachyderm Funding: $12.12M	PULSAR Pulsar ★5,167 Apache Software Foundation	RabbitMQ RabbitMQ ★6,858 Rabbit Technologies	Siddhi Siddhi ★986 WSO2 Funding: $40.5M	StreamSets StreamSets ★927 StreamSets Funding: $67.5M	STRIMZI Strimzi ★1,182 Cloud Native Computing Foundation (CNCF)
talend Talend Data Streams MCap: $1.07B Talend					

@kaslinfields

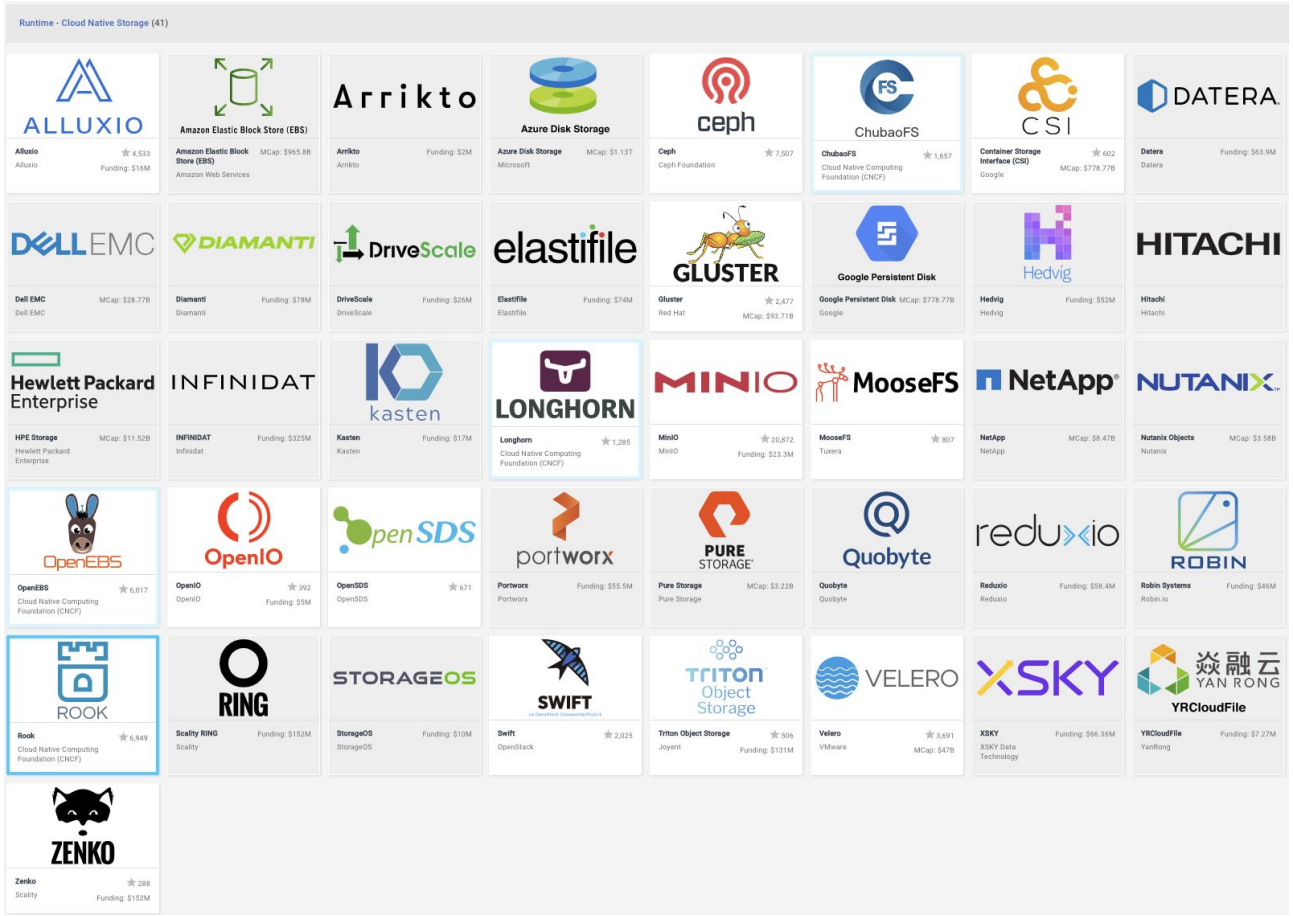
Remote Procedure Call

Orchestration & Management - Remote Procedure Call (6)

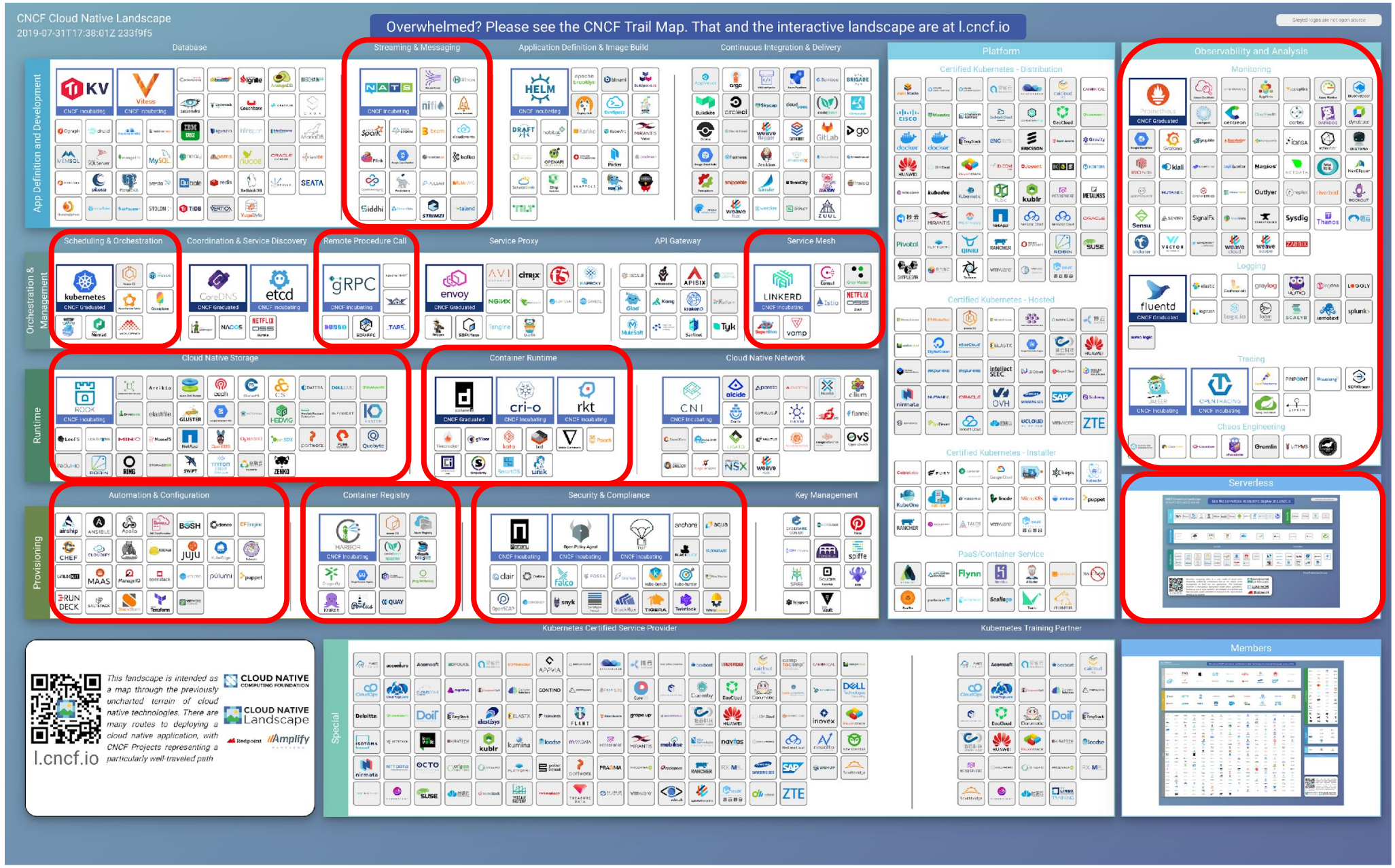
Apache Thrift	Avro	Dubbo	gRPC	SOFARPC	TARS
Apache Thrift ★7,246	Avro ★1,497	Dubbo ★31,222	gRPC ★25,066	SOFARPC ★3,029	TARS
Apache Software Foundation	Apache Software Foundation	Apache Software Foundation	Cloud Native Computing Foundation (CNCF)	Ant Financial MCap: $572.74B	Linux Foundation

Distributed Systems, Distributed Communication

Cloud Native Storage *If the system is distributed, where is the data?*



@kaslinfields


CNCF Cloud Native Landscape
2019-07-31T17:38:01Z 233f9f5
Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at l.cncf.io
Greyed logos are not open source
App Definition and Development
Database
Streaming & Messaging
Application Definition & Image Build
Continuous Integration & Delivery
Orchestration & Management
Scheduling & Orchestration
Coordination & Service Discovery
Remote Procedure Call
Service Proxy
API Gateway
Service Mesh
Runtime
Cloud Native Storage
Container Runtime
Cloud Native Network
Provisioning
Automation & Configuration
Container Registry
Security & Compliance
Key Management
Platform
Certified Kubernetes - Distribution
Certified Kubernetes - Hosted
Certified Kubernetes - Installer
PaaS/Container Service
Observability and Analysis
Monitoring
Logging
Tracing
Chaos Engineering
Serverless
This landscape is intended as a map through the previously uncharted terrain of cloud native technologies. There are many routes to deploying a cloud native application, with CNCF Projects representing a particularly well-traveled path
l.cncf.io
CLOUD NATIVE COMPUTING FOUNDATION
CLOUD NATIVE Landscape
Redpoint
Amplify
Special
Kubernetes Certified Service Provider
Kubernetes Training Partner
Members

Thanks for Visiting Cloud Land!

@kaslinfields