



Welcome to CloudLand!

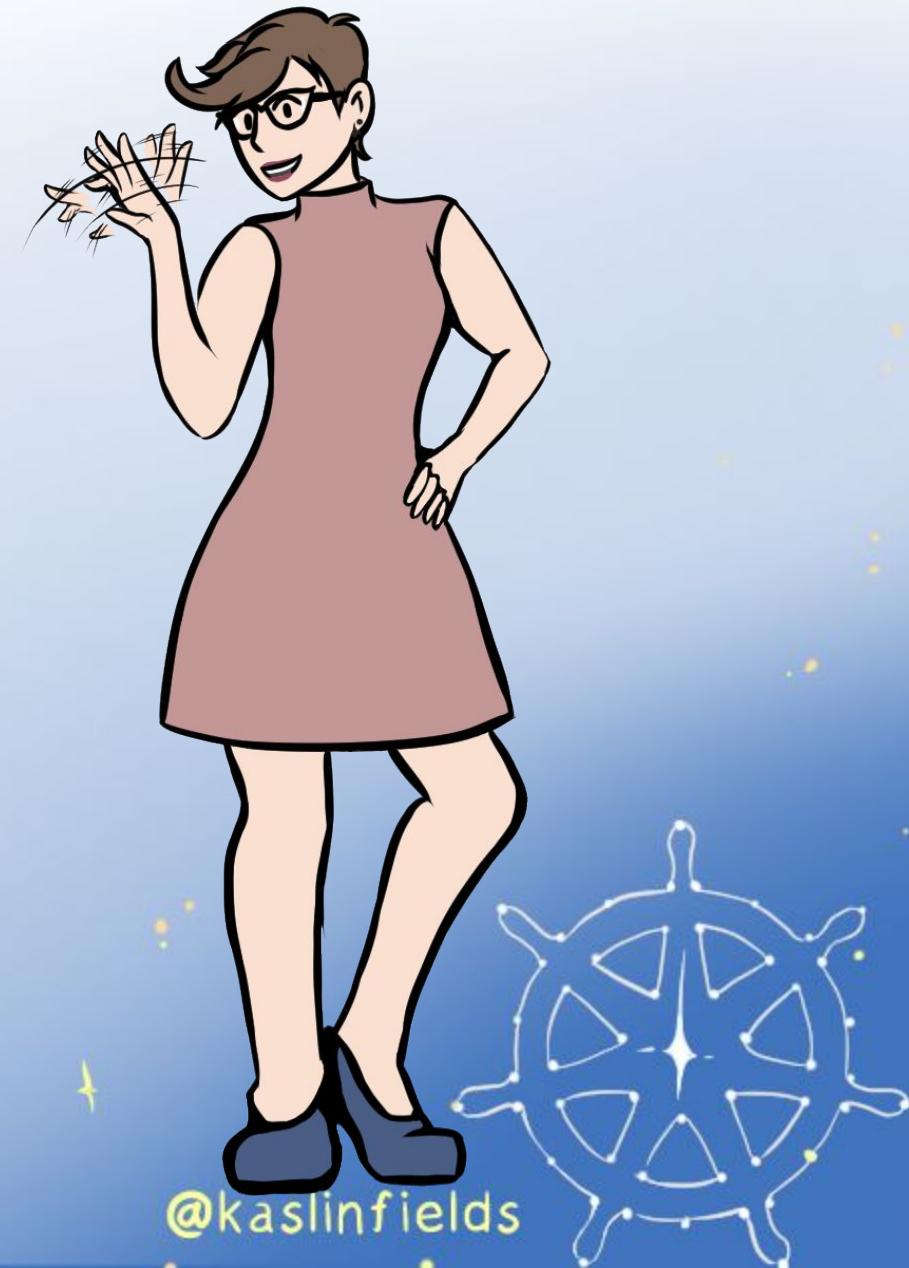
Kaslin Fields

CNCF Webinar

Friday, April 3rd 2020

Kaslin Fields

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



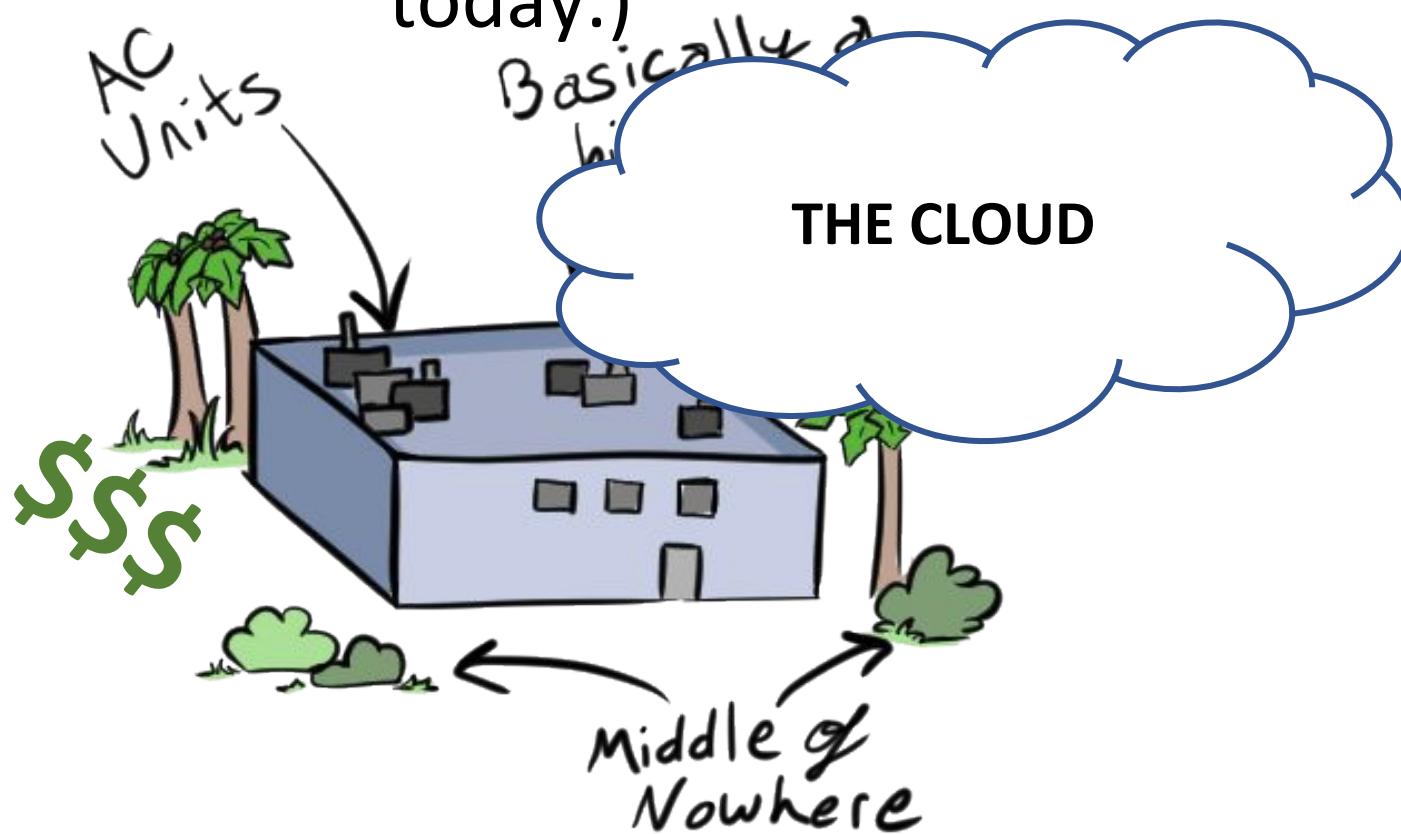
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Tell me about Cloud Native!

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Once Upon a time...

(OK, so it was
today.)



Toilet Paper Co
CEO



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- “**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



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Exercise 1

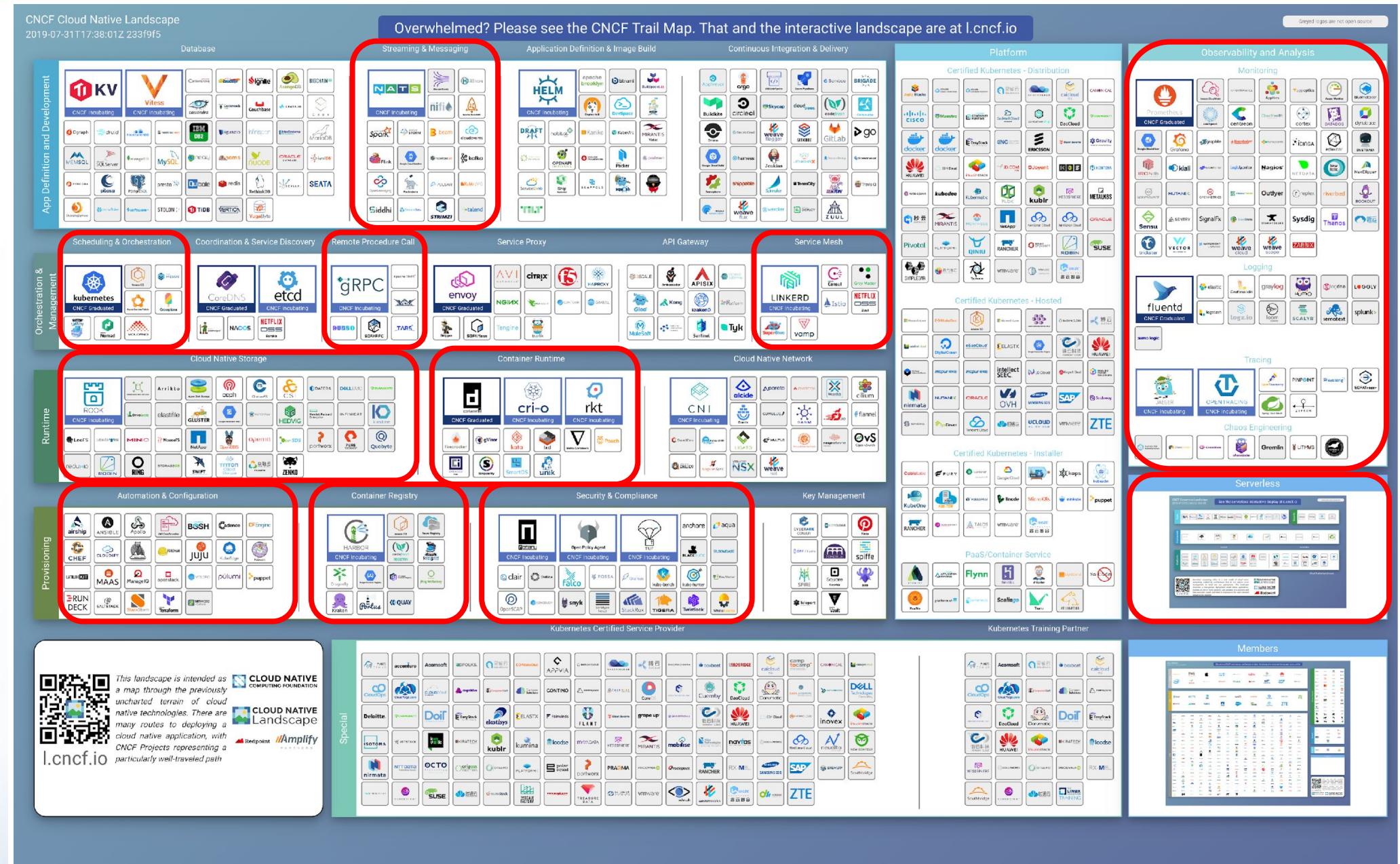
- Install something!
 - Nginx works great, maybe along with a simple “Hello World” web app
- Think about
 - What steps do I have to go through to do this? If I had to do it 500 times, how would I do that?

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

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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

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153





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

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Amusement Park / Festival Food



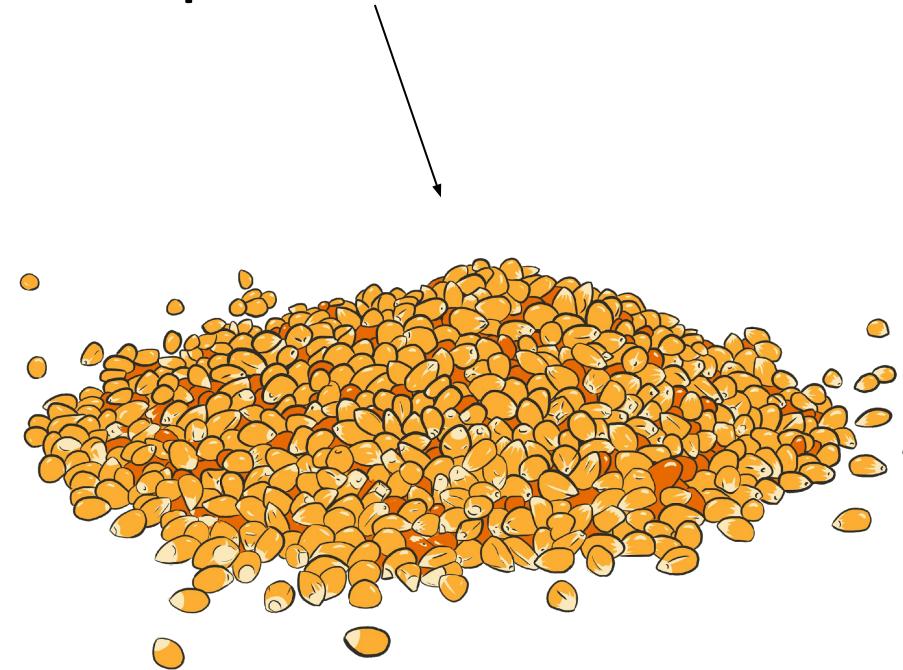
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Containers

Benefits of Popcorn

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

Popcorn Kernels



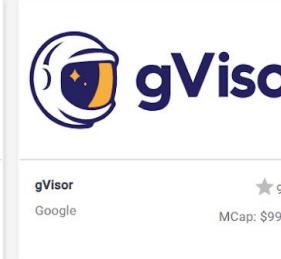
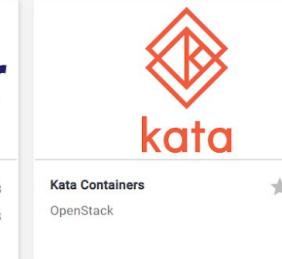
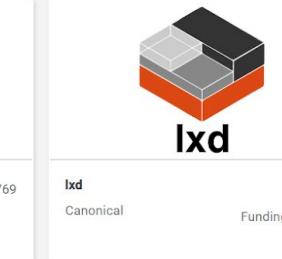
Benefits of Containers

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

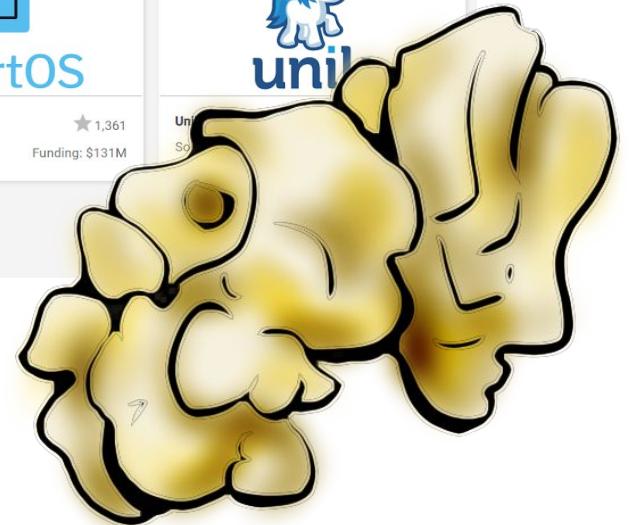
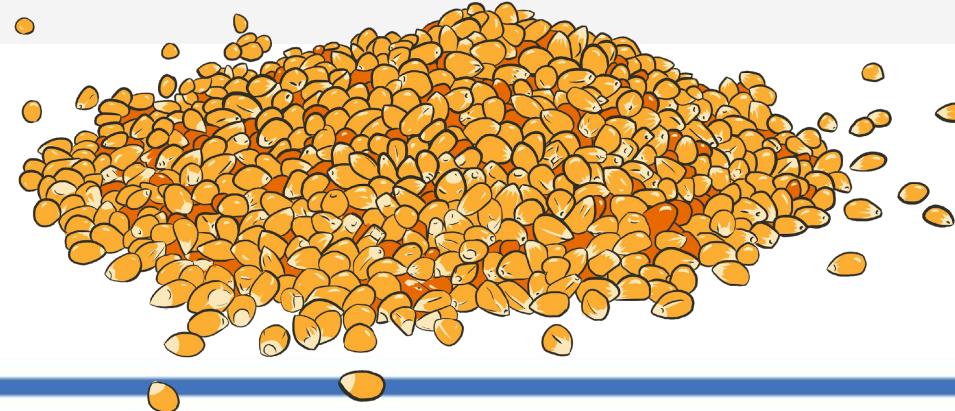
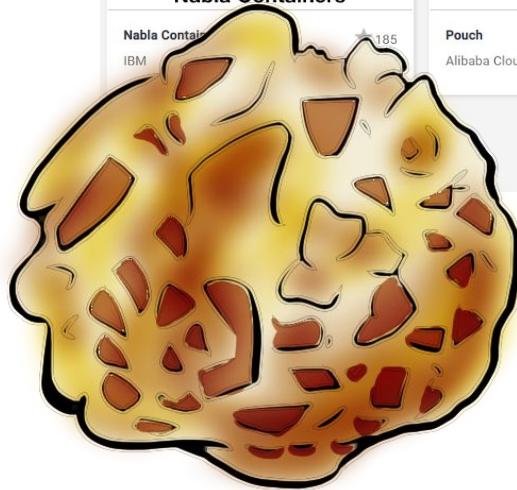
Container Runtimes

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 IBM ★ 185	 Pouch Alibaba Cloud ★ 4,131 MCap: \$579.08B	 runc Open Container Initiative (OCI) ★ 6,640	 Singularity Sylabs ★ 1,510	 SmartOS Joyent ★ 1,361 Funding: \$131M	 unilogo Södertörn University ★ 1,361 Funding: \$131M

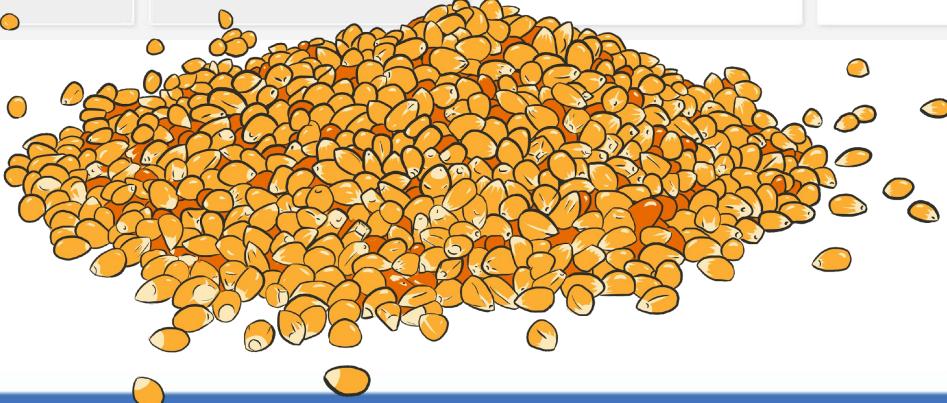
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Container Registries

Storage and Retrieval

Provisioning - Container Registry (12)					
 Amazon ECR Amazon Elastic Container Registry (ECR) Amazon Web Services	 Azure Registry Microsoft	 Codefresh Registry Codefresh	 Docker Registry Docker	 Dragonfly Cloud Native Computing Foundation (CNCF)	 Google Container Registry Google
 HARBOR Harbor Cloud Native Computing Foundation (CNCF)	 IBM Cloud Container Registry IBM	 JFrog Artifactory JFrog	 Kraken Uber	 Portus SUSE	 QUAY Red Hat
					

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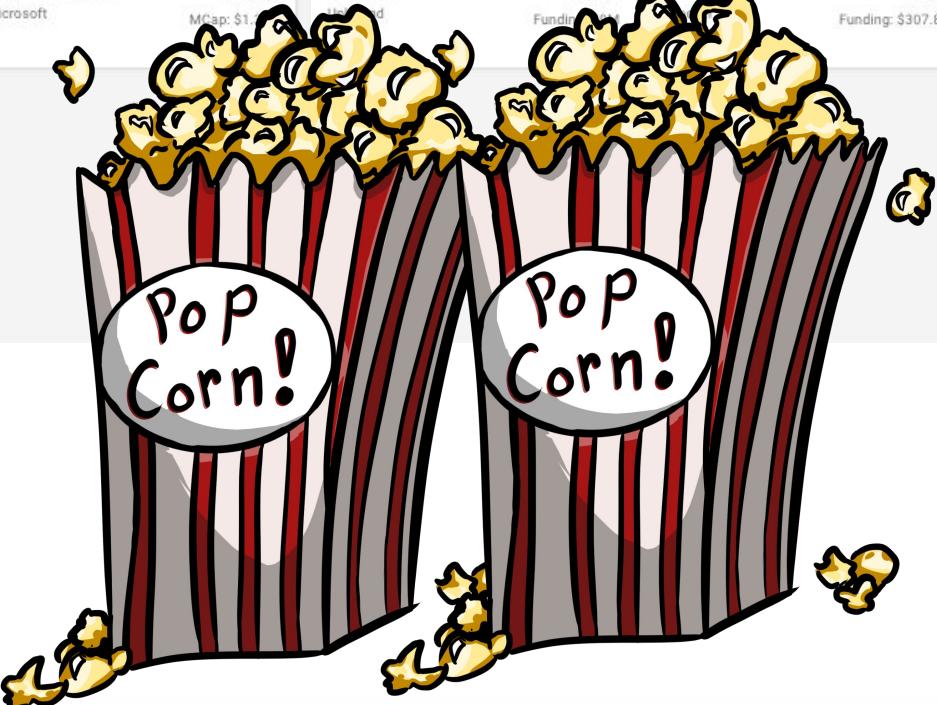
Exercise 2

- 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

Orchestration & Management - Scheduling & Orchestration (8)

 Amazon ECS Amazon Elastic Container Service (ECS) Amazon Web Services	 Apache MESOS™ Apache Mesos Apache Software Foundation ★ 4,439	 Azure Service Fabric Microsoft MCap: \$1.1B Funding: \$1.1B ★ 2,701	 Crossplane Cloud Native Computing Foundation ★ 1,705	 Docker Swarm Funding: \$307.86M ★ 2,317	 kubernetes Cloud Native Computing Foundation (CNCF) ★ 63,757
 Nomad HashiCorp Nomad	 VOLCANO Huawei Technologies ★ 778				

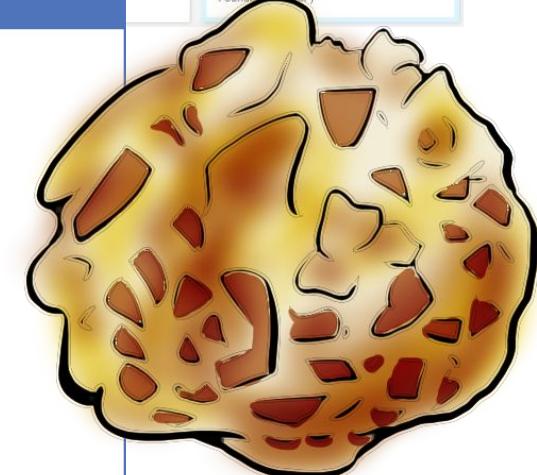
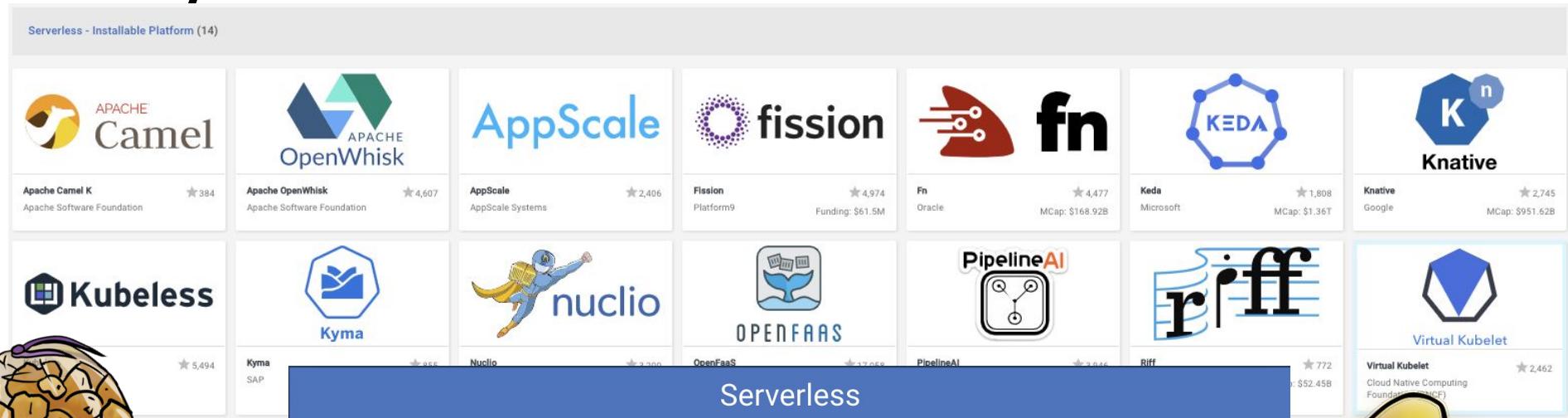
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Exercise 3

- 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

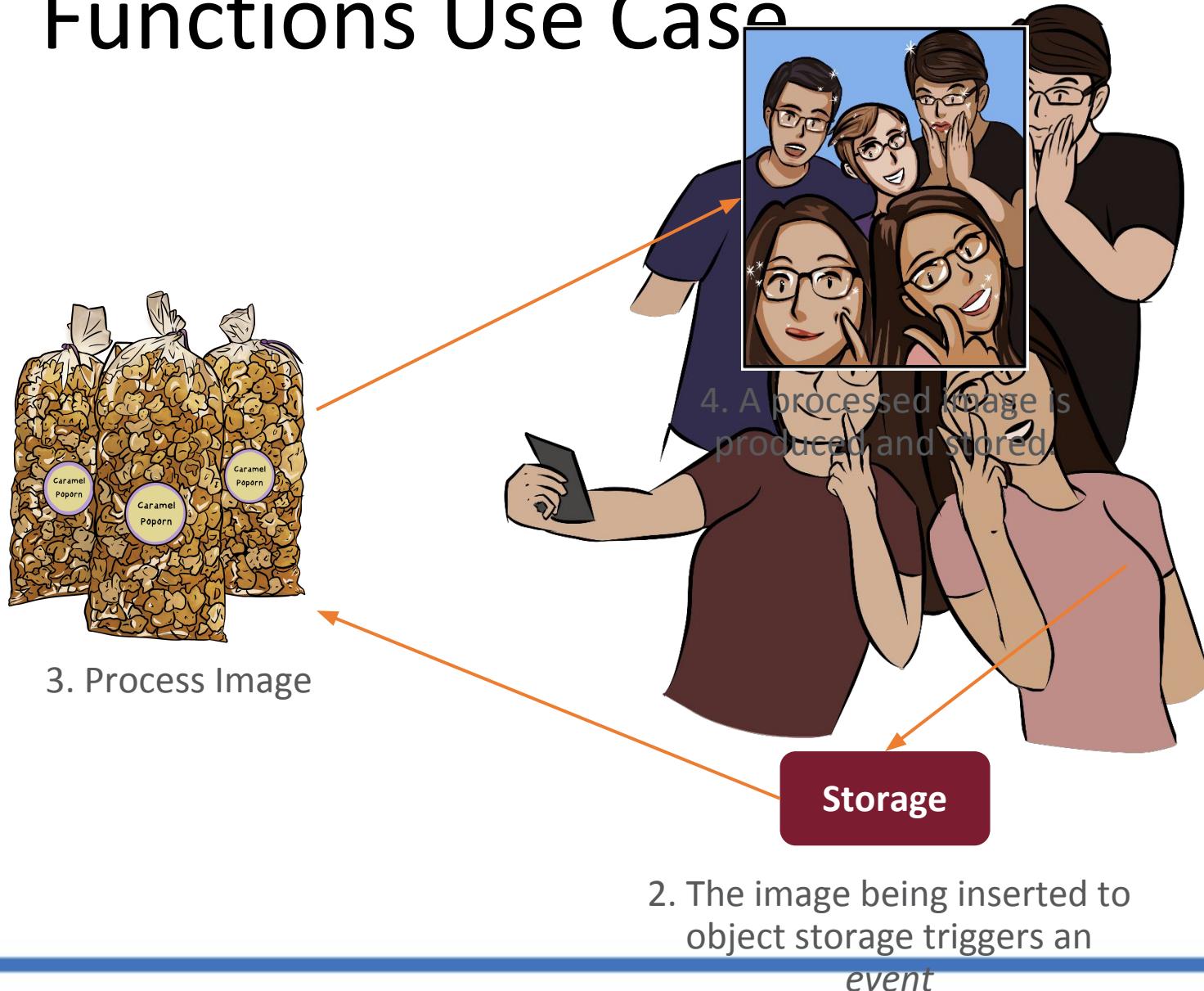
Focus on Code



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Functions Use Case

Focus on Code



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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”



Provisioning - Automation & Configuration (25)											
airship	Airship OpenStack	★ 26	ANSIBLE	Ansible Red Hat	★ 42,044 MCap: \$119.24B	Apollo	Apollo Ctrip	★ 19,680 Funding: \$500K	AWS CloudFormation	AWS CloudFormation Amazon Web Services	MCap: \$983.59B
CFEngine	CFEngine CFEngine	★ 340 Funding: \$13M	CHEF INFRA™	Chef Infra Chef Software	★ 6,163 Funding: \$105M	CLOUDIFY	Cloudify Cloudify	★ 88 Funding: \$7M	Digital Rebar	Digital Rebar RackN	★ 86 Funding: \$800K
KubeEdge	KubeEdge Cloud Native Computing Foundation (CNCF)	★ 2,256	Kubicorn	Kubicorn Kubicorn	★ 1,594	LinuxKIT	LinuxKit Docker	★ 6,090 Funding: \$307.86M	MAAS	MAAS Canonical	★ 107 Funding: \$12.8M
pulumi	pulumi Pulumi	★ 4,789 Funding: \$20M	puppet	Puppet Puppet	★ 5,684 Funding: \$149.5M	RUN DECK	Rundeck Rundeck	★ 3,633 Funding: \$3M	SALTSTACK	SaltStack SaltStack	★ 10,692 Funding: \$27.9M
vmware vSphere						StackStorm	StackStorm StackStorm	★ 3,696	Terraform	Terraform HashiCorp	★ 21,06 Funding: \$174.18

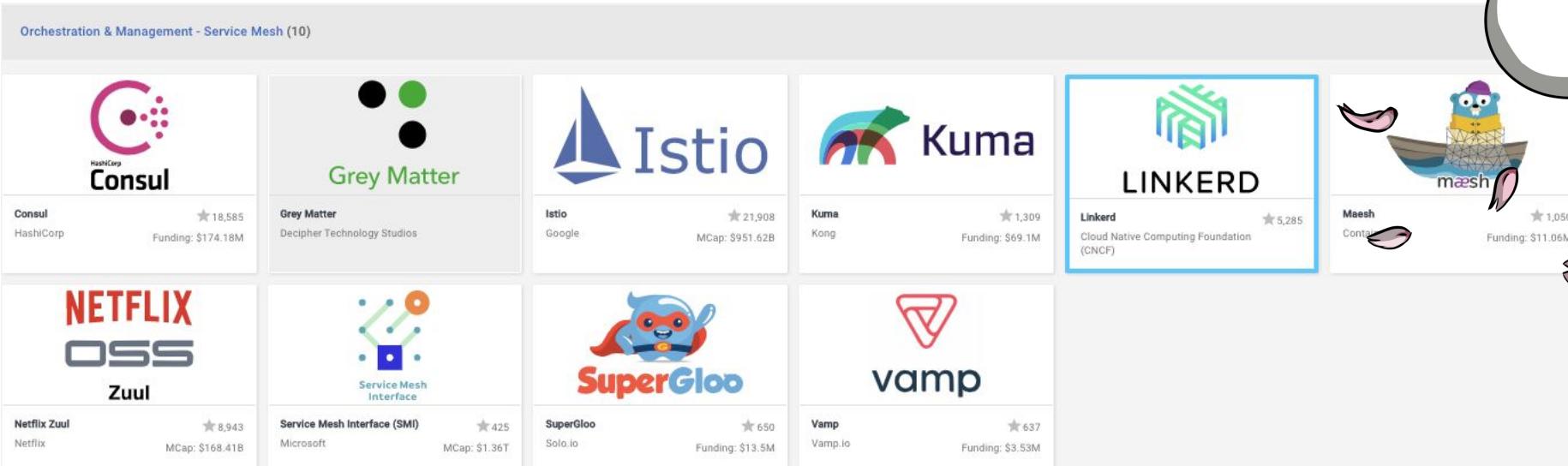
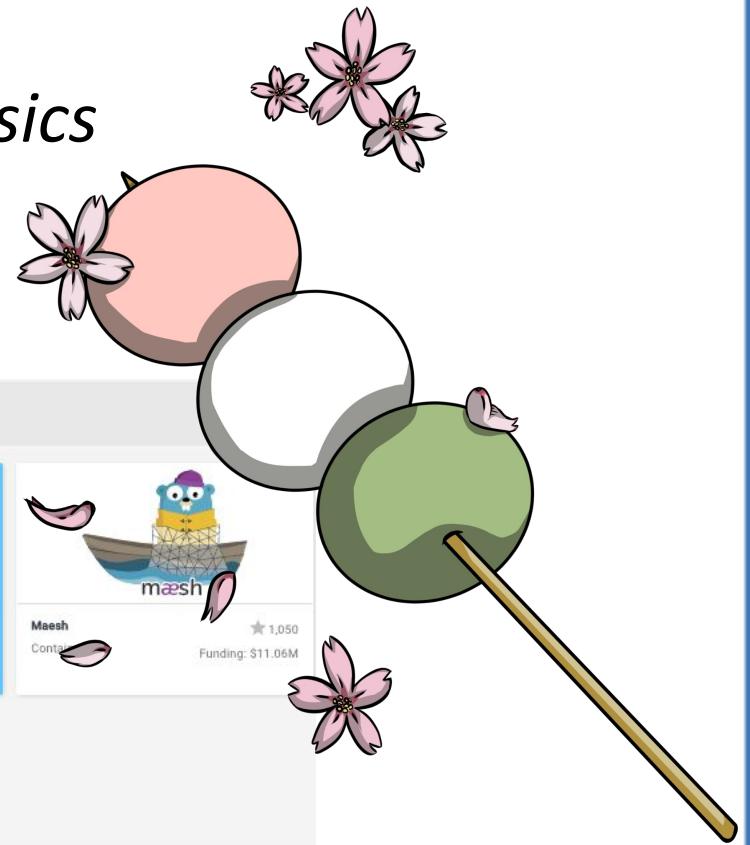
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Exercise 5

- 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

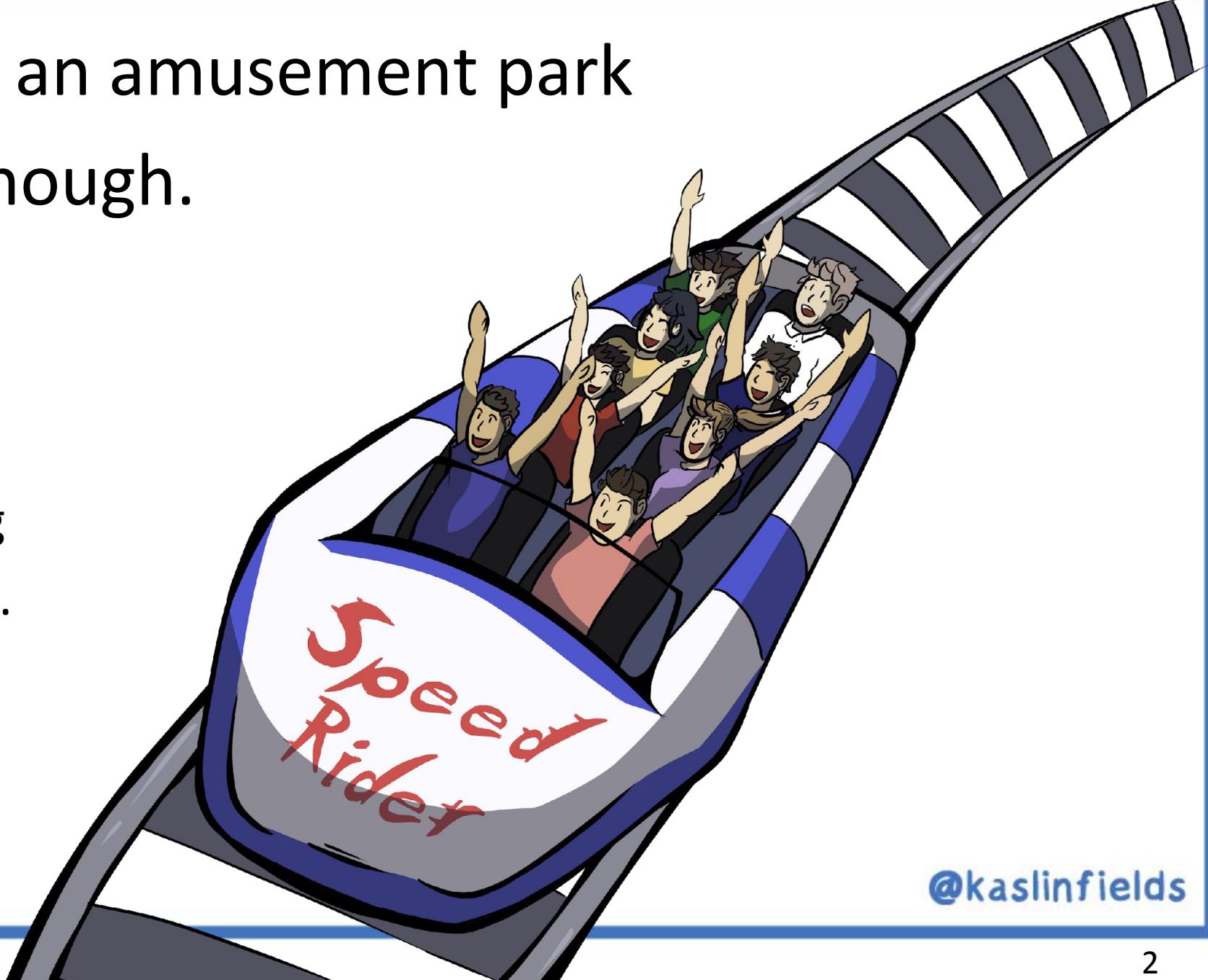
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Exercise 6

- 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.



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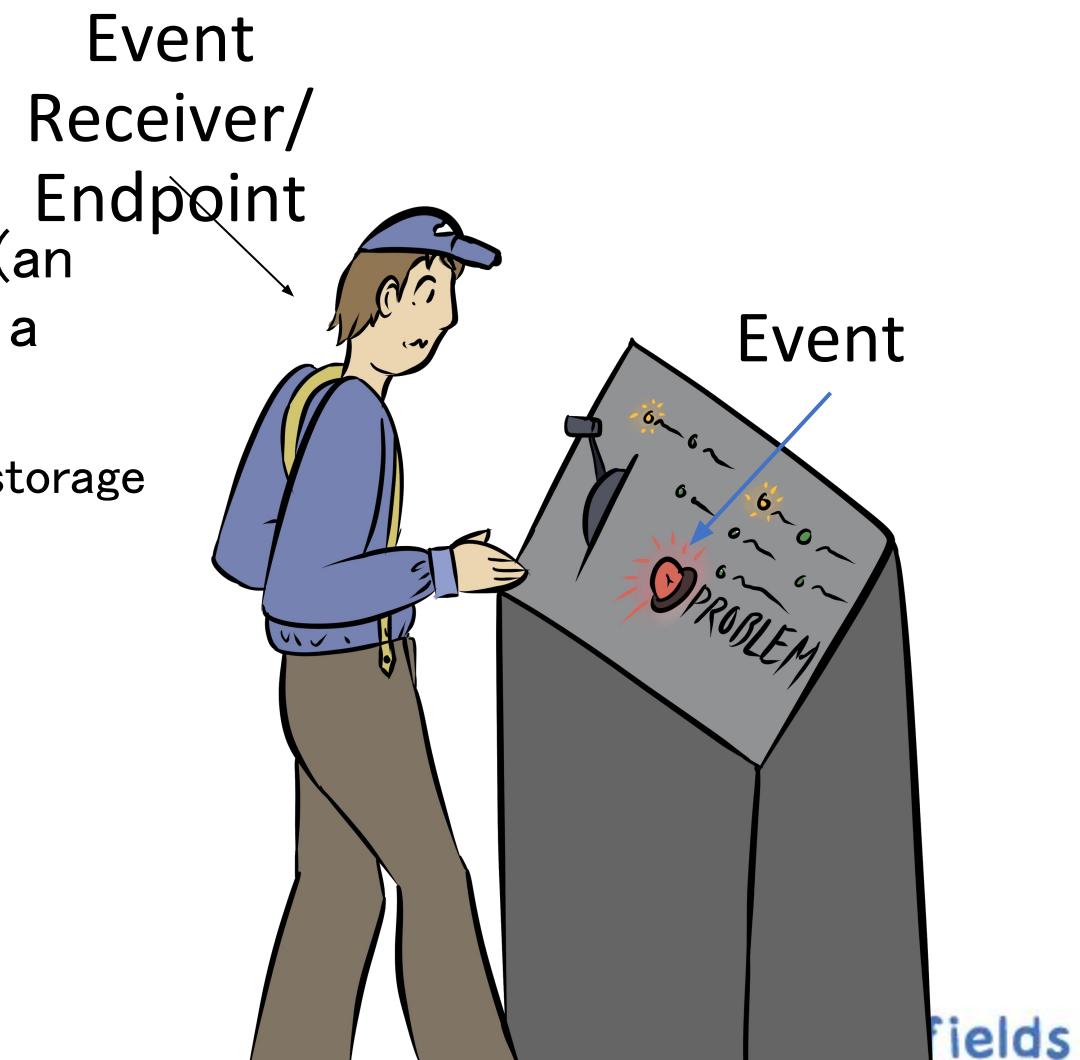
Cloud Events

- 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



3. Process Image

This trigger is
an event!

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



4. A processed image is
produced and stored.

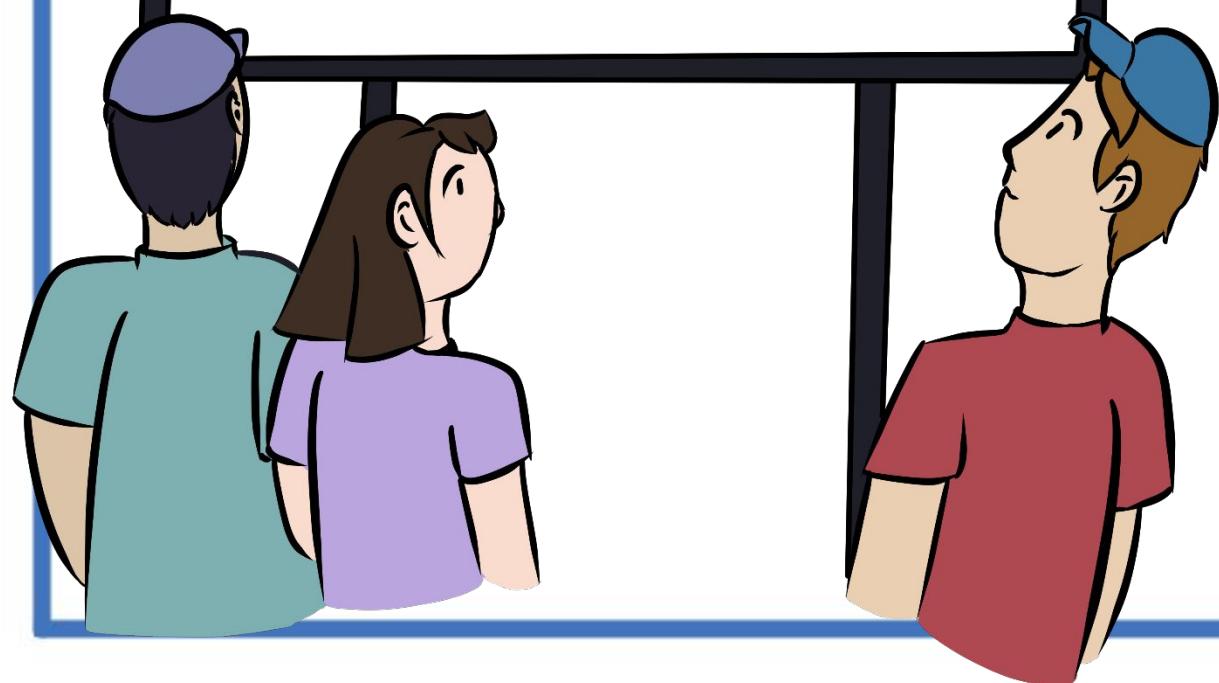


1. Upload an image

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Observability

Ride	Wait Time/Status
Ferris Wheel	15min
Spinning Tea Cups	25min
Speed Rider	CLOSED
Viking Ship	10min



Know Your System, Know Your Business

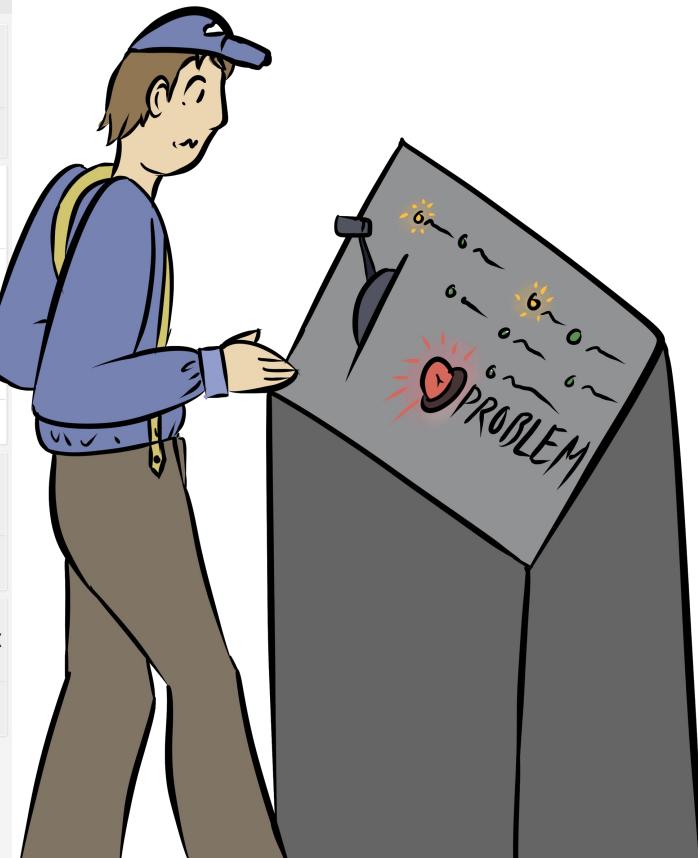
A screenshot of the Observability and Analysis dashboard. The dashboard is organized into four main sections: Monitoring, Logging, Tracing, and Chaos Engineering. The Monitoring section contains logos for Prometheus, Grafana, Nagios, SENSU, and many others. The Logging section contains logos for fluentd, logstash, logz.io, and others. The Tracing section contains logos for Jaeger, OpenTracing, and others. The Chaos Engineering section contains logos for Chaos Mesh, Chaosblade, and others. Three sections (Monitoring, Logging, and Tracing) are highlighted with red boxes.

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Observability - Monitoring

*Know what's happening,
when it happens*

Observability and Analysis - Monitoring (56)											
 Amazon CloudWatch Amazon CloudWatch Amazon Web Services	 APPDYNAMICS AppDynamics AppDynamics	 Application High Availability Service Application High Availability Service Alibaba Cloud	 ManageEngine Applications Manager ManageEngine Applications Manager	 AppNeta AppNeta	 appoptics AppOptics SolarWinds	 Aternity Aternity Riverbed Technology	 Azure Monitor Azure Monitor Microsoft	 beats Beats Elastic	 bluematador Blue Matador Blue Matador		
 catchpoint Catchpoint	 centreon Centreon	 CloudHealth TECHNOLOGIES CloudHealth Technologies	 cortex Cortex Cloud Native Computing Foundation (CNCF)	 DATADOG Datadog	 dynatrace Dynatrace	 epsagon Epsagon	 falcon Falcon Xiaomi	 Google Stackdriver Google Stackdriver	 Grafana Grafana Grafana Labs		
 graphite Graphite	 Honeybadger Honeybadger	 icinga Icinga	 influxdata InfluxData	 INSTANA Instana	 IRONdb IRONdb	 kiali Kiali Red Hat	 LogicMonitor LogicMonitor	 mackerel Mackerel	 Nagios Nagios		
 NETDATA Netdata	 New Relic New Relic	 NexClipper NexClipper	 NODESOURCE NodeSource	 OPENMETRICS OpenMetrics	 OPENTSDB OpenTSDB	 OverOps OverOps	 Prometheus Prometheus Cloud Native Computing Foundation (CNCF)	 replex Replex	 ROOKOUT Rookout		
 Sensu Sensu	 SENTRY Sentry	 SignalFx SignalFx	 StackState StackState	 STORMFORGER StormForger	 sysdig sysdig	 Thanos Thanos Cloud Native Computing Foundation (CNCF)	 TINGYUN Tingyun	 trickster Trickster	 turbanomic Turbonomic		
 VECTOR By Timber.io	 VICTORIA METRICS VictoriaMetrics	 WAVEFRONT by VMware Wavefront	 weave cloud Weave Cloud		 weave scope Weave Scope	 ZABBIX Zabbix					



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Observability - Logging

Know what happened before

Observability and Analysis - Logging (16)									
 Alibaba Cloud Log Service	 elastic	 fluentd	 Grafana loki	 graylog	 humio				
Alibaba Cloud Log Service Alibaba Cloud	Elastic Elastic	Fluentd Cloud Native Computing Foundation (CNCF)	Grafana Loki Grafana Labs	Graylog Graylog	Humio Humio				
MCap: \$495.28B	★ 47,762 MCap: \$4.49B	★ 8,960	★ 8,901 Funding: \$25.23M	★ 5,242 Funding: \$9.4M	Funding: \$11.83M				
 logDNA	 LOGGLY	 logstash	 logz.io	 loom Systems	 日志易 rizhiyi.com				
LogDNA LogDNA	Loggly Loggly	Logstash Elastic	Logz.io Logz.io	Loom Systems Loom Systems	Rizhiyi Rizhiyi				
Funding: \$33.42M	Funding: \$47.4M	★ 11,190 MCap: \$4.49B	Funding: \$98.9M	Funding: \$16M	Funding: \$11.36M				
 SCALYR®	 sematext	 splunk®	 sumo logic						
Scalyr Scalyr	Sematext Sematext	Splunk Splunk	Sumo Logic Sumo Logic						
Funding: \$27.6M		MCap: \$18.89B							

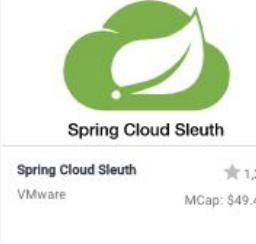


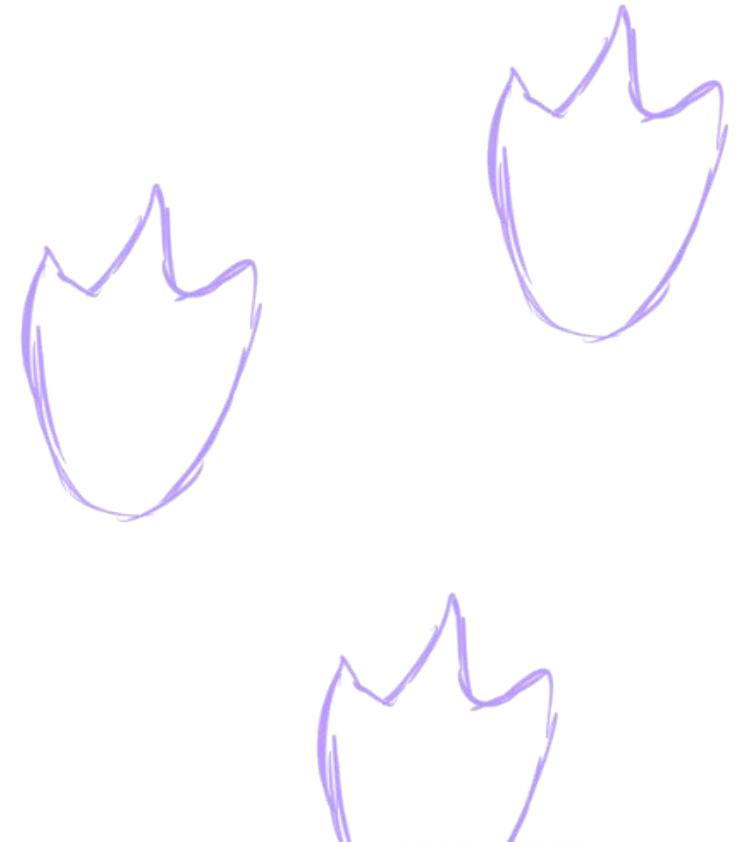
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Observability - Tracing

Follow where the trail leads

Observability and Analysis - Tracing (11)

 elastic apm Elastic APM Elastic ★ 745	 honeycomb.io Honeycomb Honeycomb Funding: \$26.9M	 JAEGER Jaeger Cloud Native Computing Foundation (CNCF) ★ 10,545	 LIGHTSTEP LightStep LightStep Funding: \$70M	 OpenTelemetry OpenTelemetry Cloud Native Computing Foundation (CNCF) ★ 540
 OPENTRACING OpenTracing Cloud Native Computing Foundation (CNCF) ★ 2,304	 PINPOINT Pinpoint Pinpoint ★ 10,104	 Skywalking SkyWalking Apache Software Foundation ★ 12,814	 SOFATracer SOFATracer Ant Financial ★ 738	 Spring Cloud Sleuth Spring Cloud Sleuth VMware ★ 1,234 MCap: \$513.04B
 ZIPKIN Zipkin ★ 12,637				



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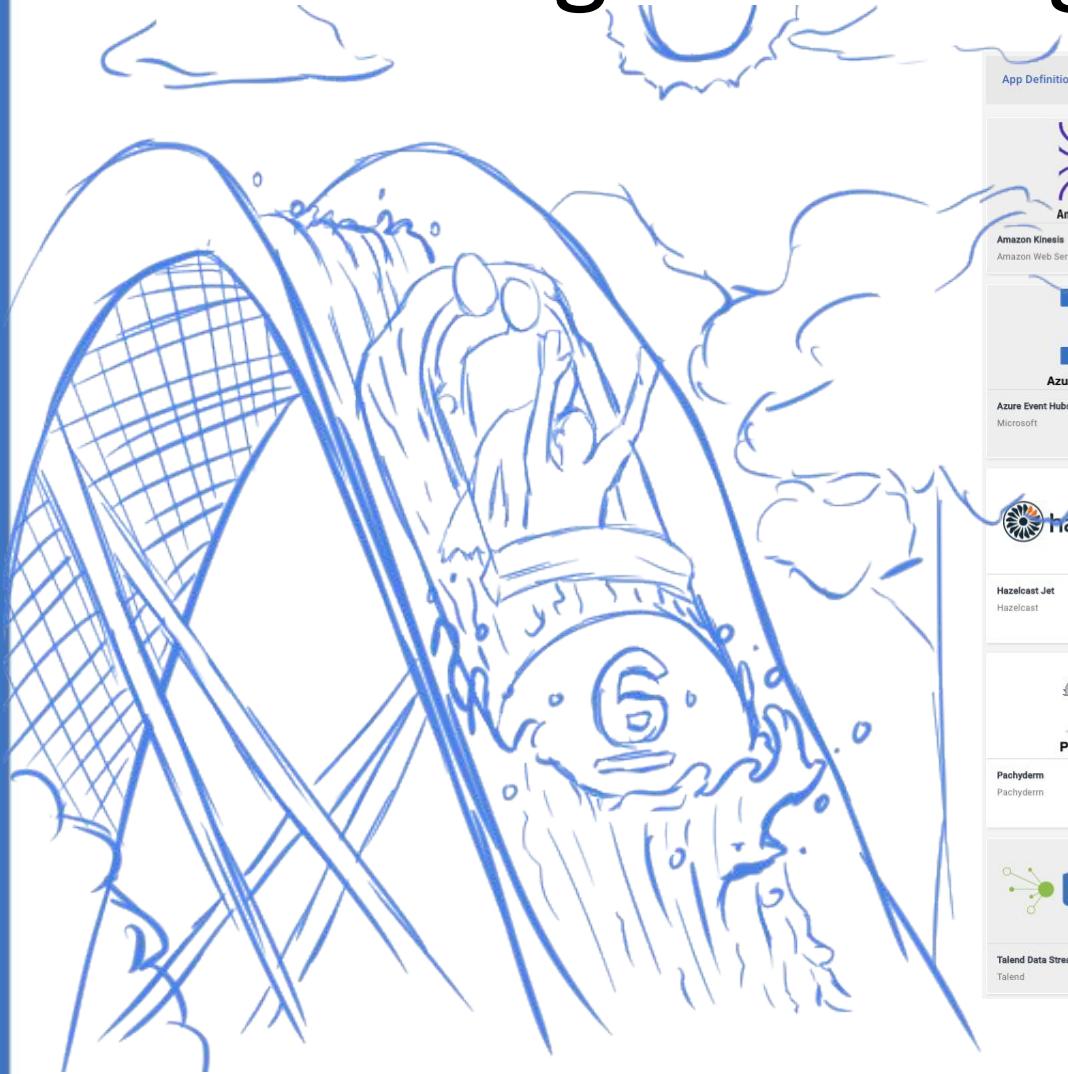
Security & Compliance



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

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Streaming & Messaging



Consume Data at Scale

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

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Remote Procedure Call

Orchestration & Management - Remote Procedure Call (6)

Apache Thrift™ Apache Thrift Apache Software Foundation	AVRO™ Avro Apache Software Foundation	DUBBO Dubbo Apache Software Foundation	gRPC gRPC Cloud Native Computing Foundation (CNCF)	SOFARPC SOFARPC Ant Financial	TARS TARS Linux Foundation
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Distributed Systems, Distributed Communication



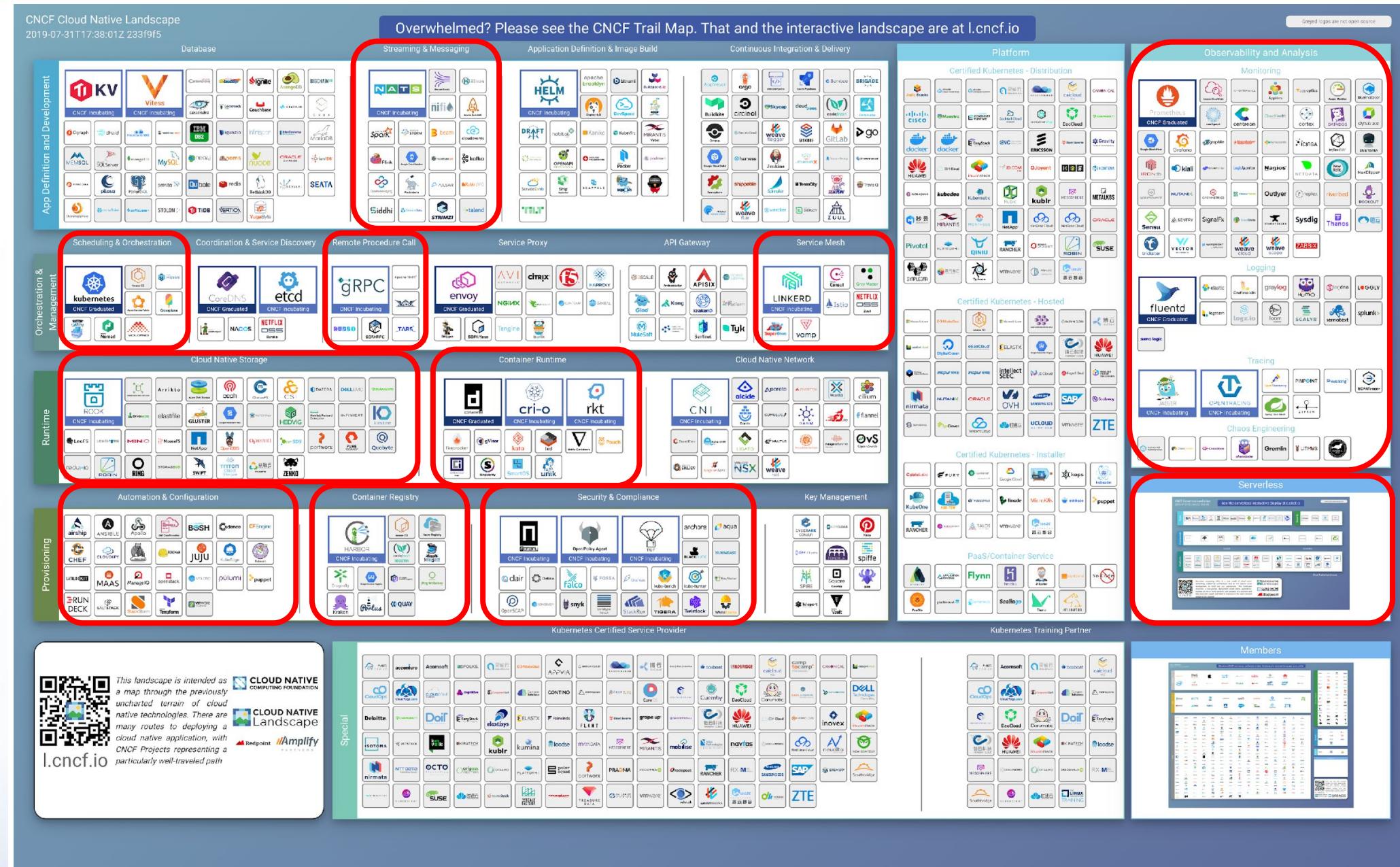
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Cloud Native Storage *If the system is distributed, where is the data?*



Runtime - Cloud Native Storage (41)							
ALLUXIO Alluxio Alluxio	Amazon Elastic Block Store (EBS) Amazon Web Services	Arrikto Arrikto	Azure Disk Storage Microsoft	ceph Ceph Foundation	ChubaoFS ChubaoFS Cloud Native Computing Foundation (CNCF)	CSI Container Storage Interface (CSI)	DATERA Datera
DELL EMC Dell EMC	DIAMANTI Diamanti	DriveScale DriveScale	elastifile Elastifile	GLUSTER Red Hat	Google Persistent Disk Google	Hedvig Hedvig	HITACHI Hitachi
Hewlett Packard Enterprise HPE Storage Hewlett Packard Enterprise	INFINIDAT Infinidat	kasten Kasten	LONGHORN Longhorn Cloud Native Computing Foundation (CNCF)	MINIO MinIO MinIO	MooseFS Tuera	NetApp® NetApp	NUTANIX™ Nutanix Objects Nutanix
OpenEBS Cloud Native Computing Foundation (CNCF)	OpenIO OpenIO	openSDS OpenSDS	portworx Portworx	PURE STORAGE® Pure Storage	Quobyte Quobyte	reduxio Reduxio	ROBIN Robin Systems
ROOK Cloud Native Computing Foundation (CNCF)	Scality RING Scality	STORAGEOS StorageOS	SWIFT Swift OpenStack	TRITON Object Storage Triton Object Storage Joyent	VELERO Velero VMware	XSKY XSKY Data Technology	焱融云 YAN RONG YRCloudFile Vanlong
ZENKO Zenko Scality							

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Thanks for Visiting Cloud Land!



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