



KubeCon



CloudNativeCon

Europe 2020

Welcome to CloudLand!

An Illustrated Intro to the Cloud Native Landscape

*Kaslin Fields
Developer Advocate, Google*

Virtual



Kaslin Fields

Developer Advocate at Google

CNCF Ambassador

Member of SIG-Contribex

Cloud Native, DevOps, Kubernetes

Tech Comic Creator (<https://kaslin.rocks>)

Twitter: @kaslinfields



KubeCon



CloudNativeCon

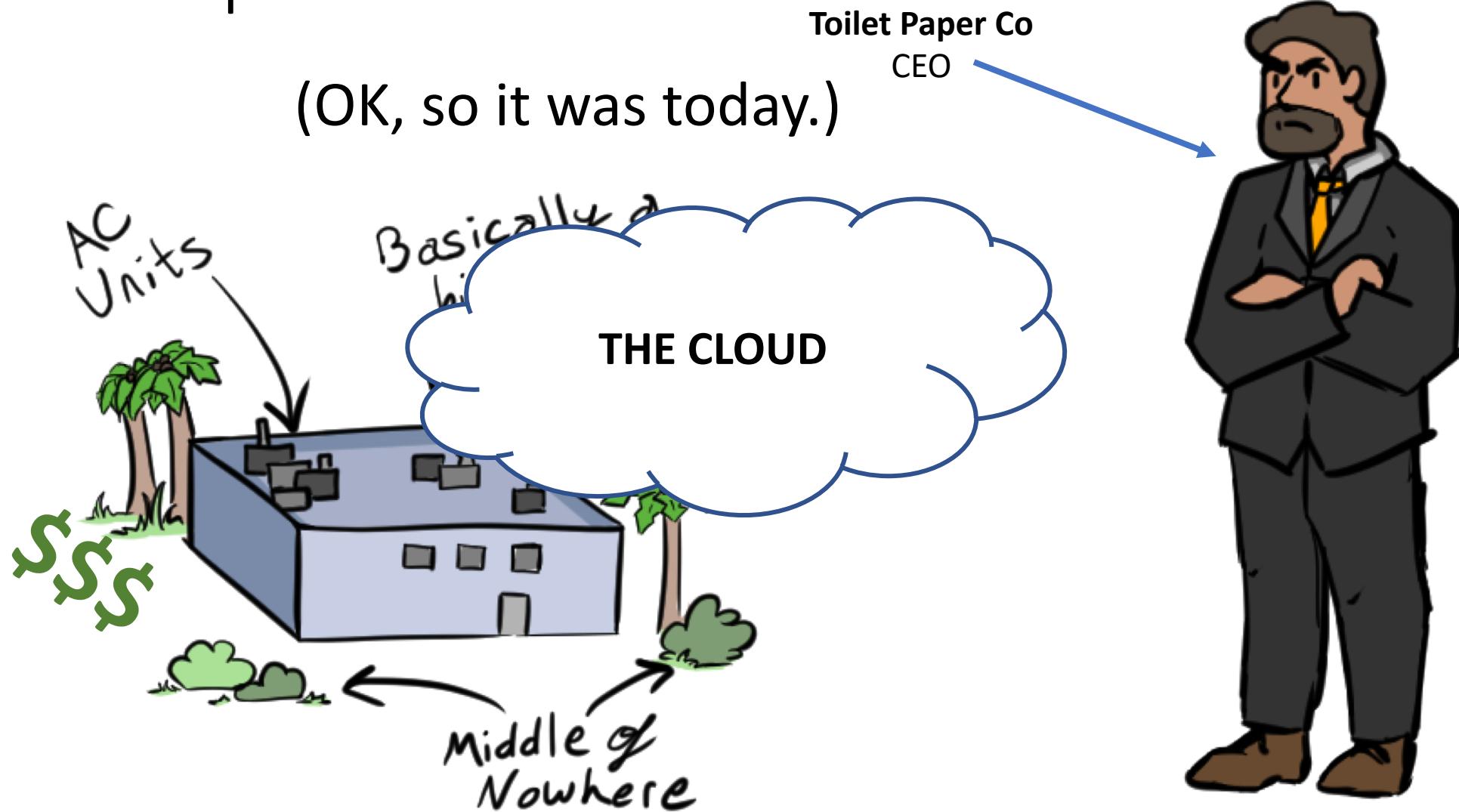
Europe 2020

Virtual

Tell me about Cloud Native!

Once Upon a time...

(OK, so it was today.)



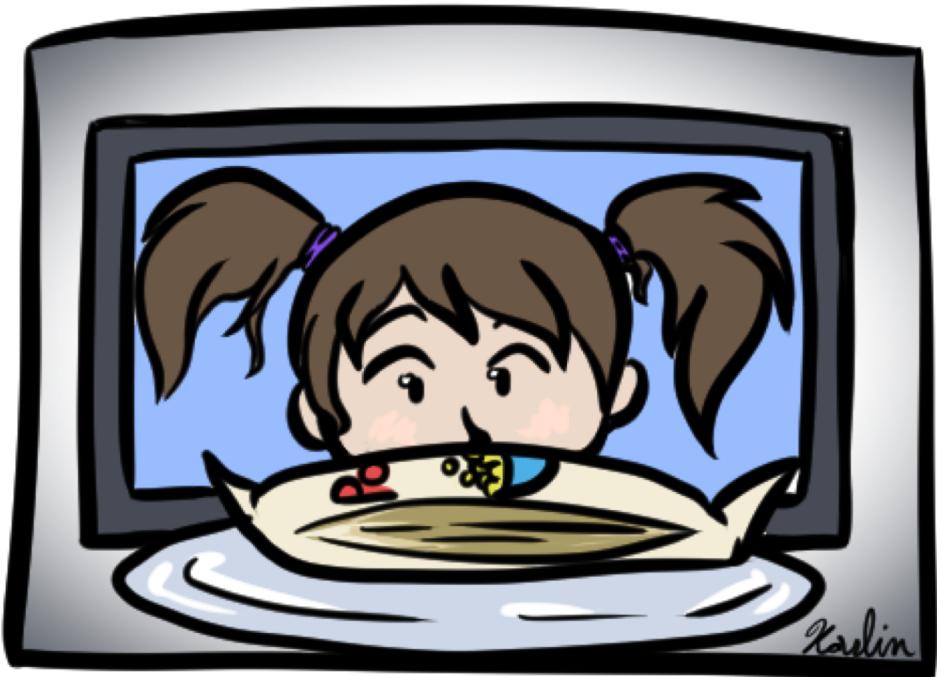
“Lift and Shift”

- Moving applications/systems as-is to the cloud

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



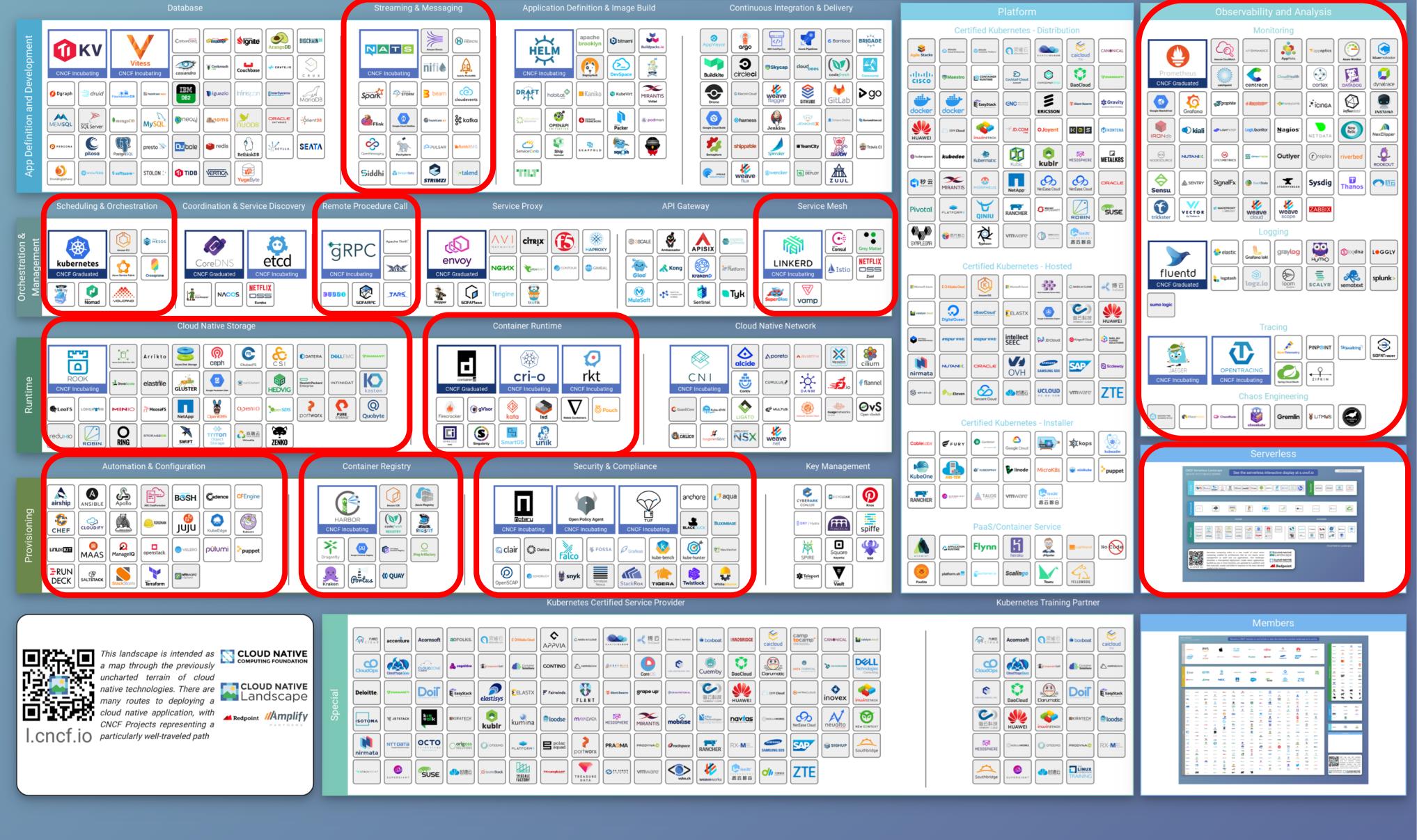
VS



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

Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at l.cncf.io



@kaslinfields



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

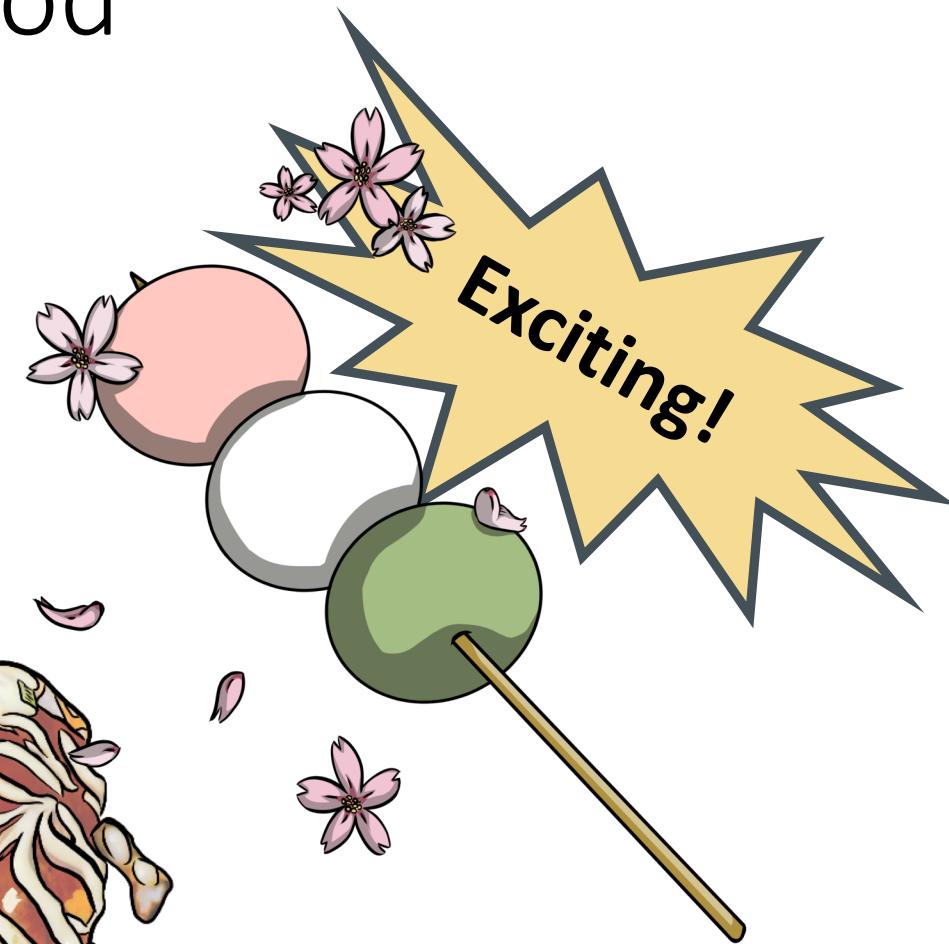
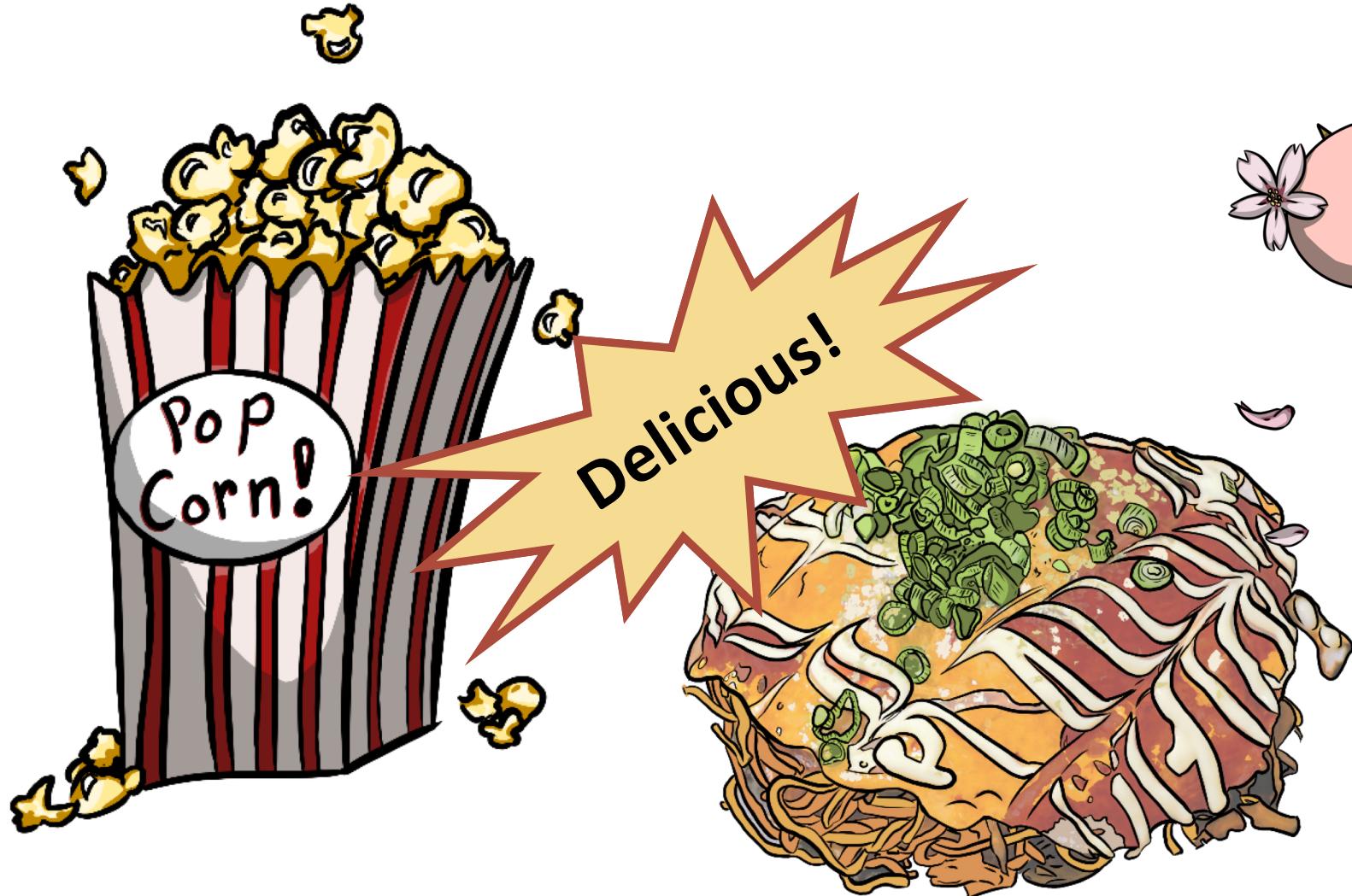


welcome to CloudLand



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

Amusement Park / Festival Food

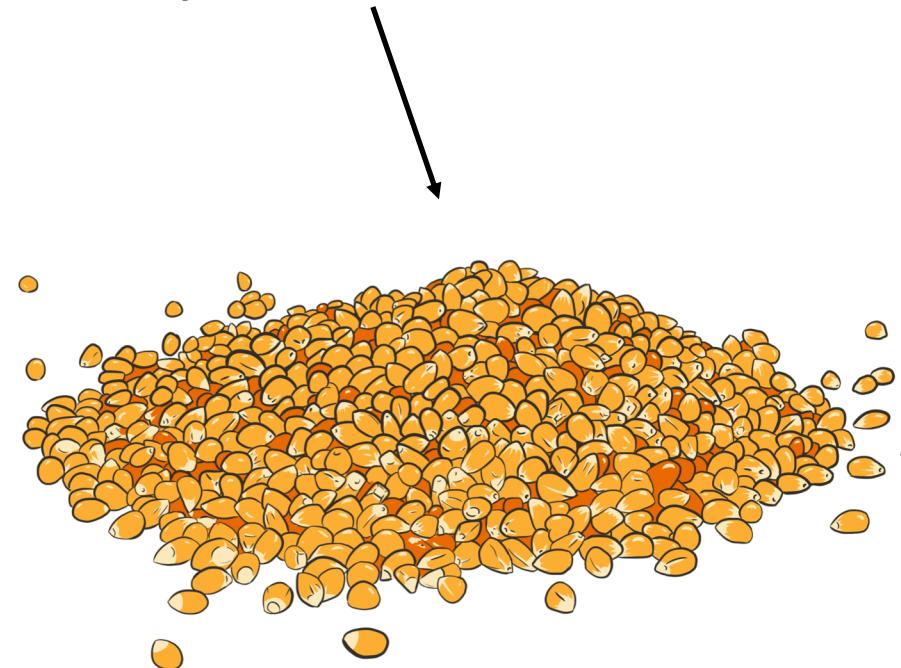


Containers

Benefits of Popcorn

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

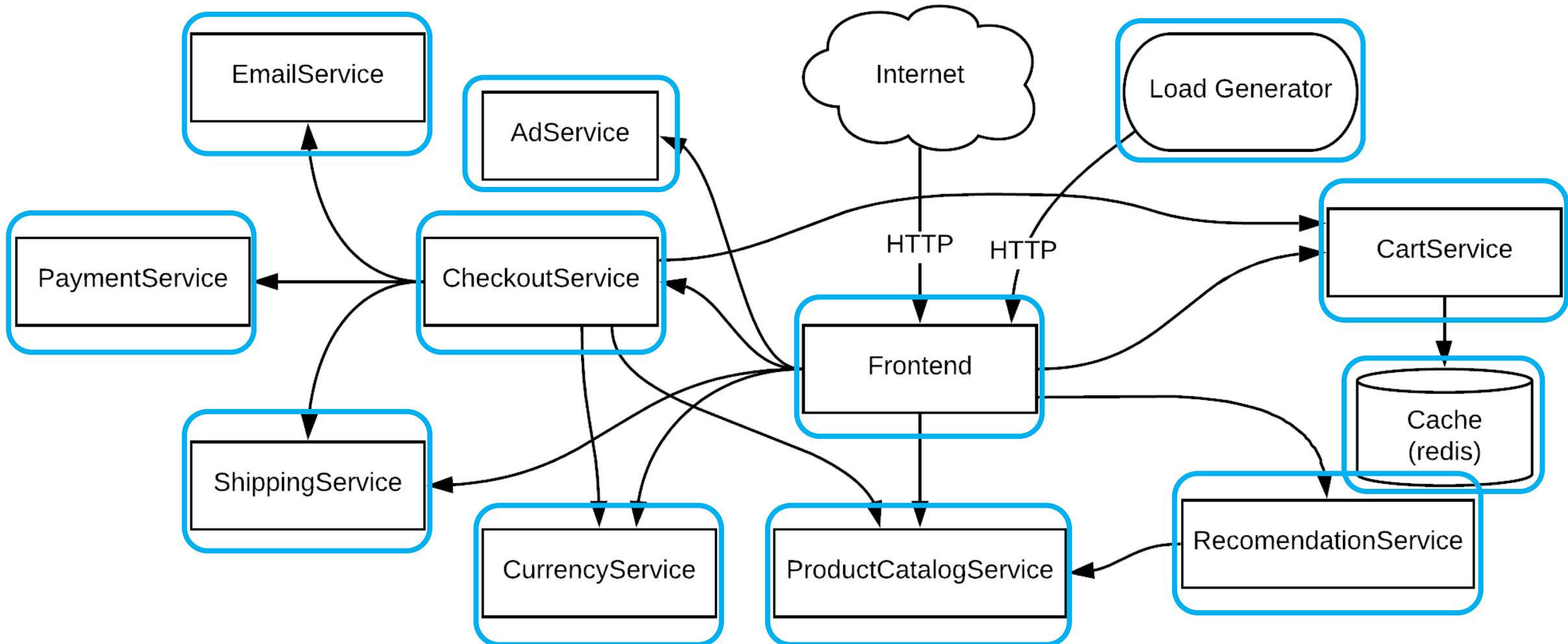
Popcorn Kernels



Benefits of Containers

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

Example Microservice



<https://github.com/GoogleCloudPlatform/microservices-demo>

Container Registries

Storage and Retrieval

Provisioning - Container Registry (12)

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

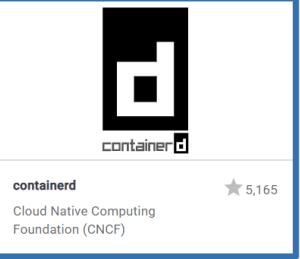
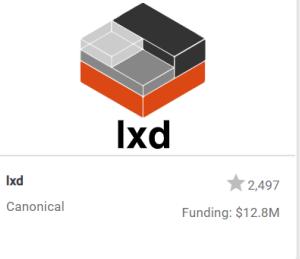
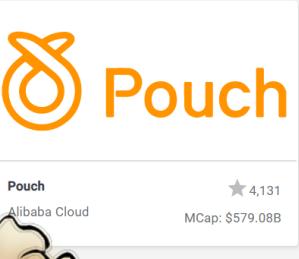
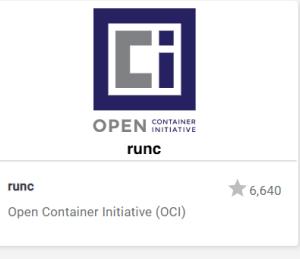
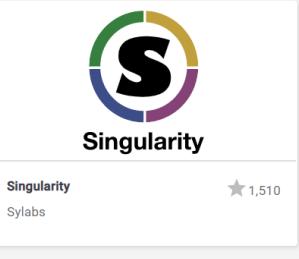
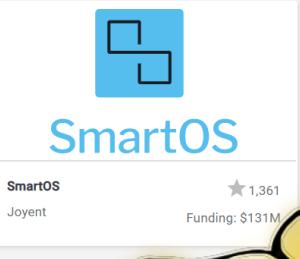


@kaslinfields

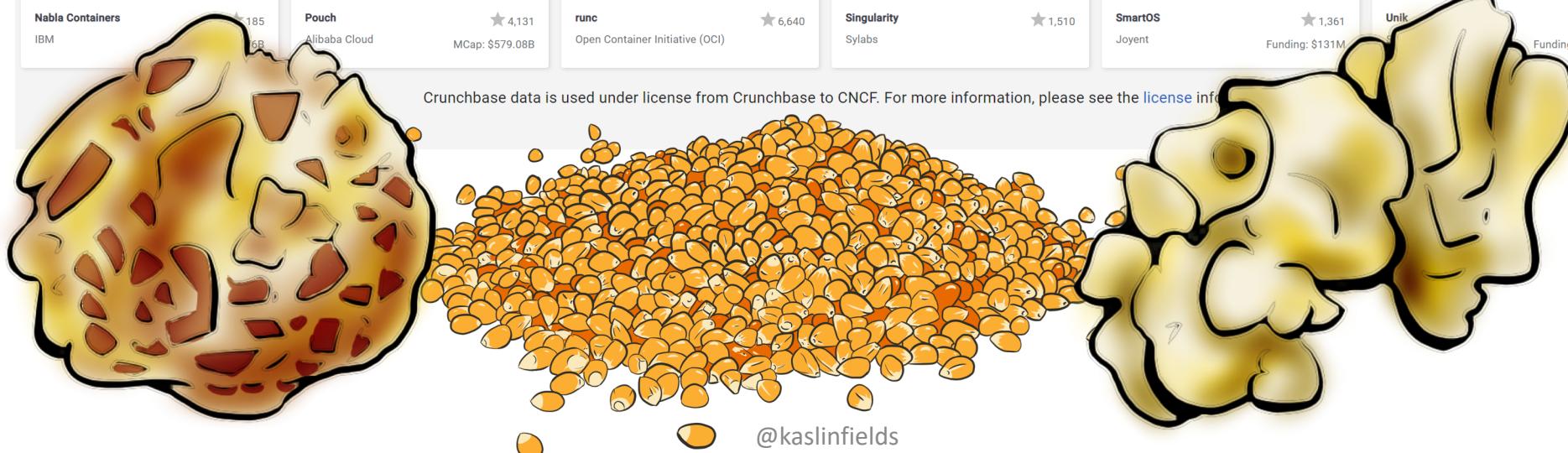
Container Runtimes

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 MCap: \$1.02T ★ 10,593	 gVisor Google MCap: \$996.9B ★ 9,513	 Kata Containers OpenStack ★ 1,769	 lxd Canonical Funding: \$12.8M ★ 2,497
 Nabla Containers IBM ★ 185	 Pouch Alibaba Cloud MCap: \$579.08B ★ 4,131	 runc Open Container Initiative (OCI) ★ 6,640	 Singularity Sylabs ★ 1,510	 SmartOS Joyent Funding: \$131M ★ 1,361	 unik ★ 2,089

Crunchbase data is used under license from Crunchbase to CNCF. For more information, please see the [license info](#).

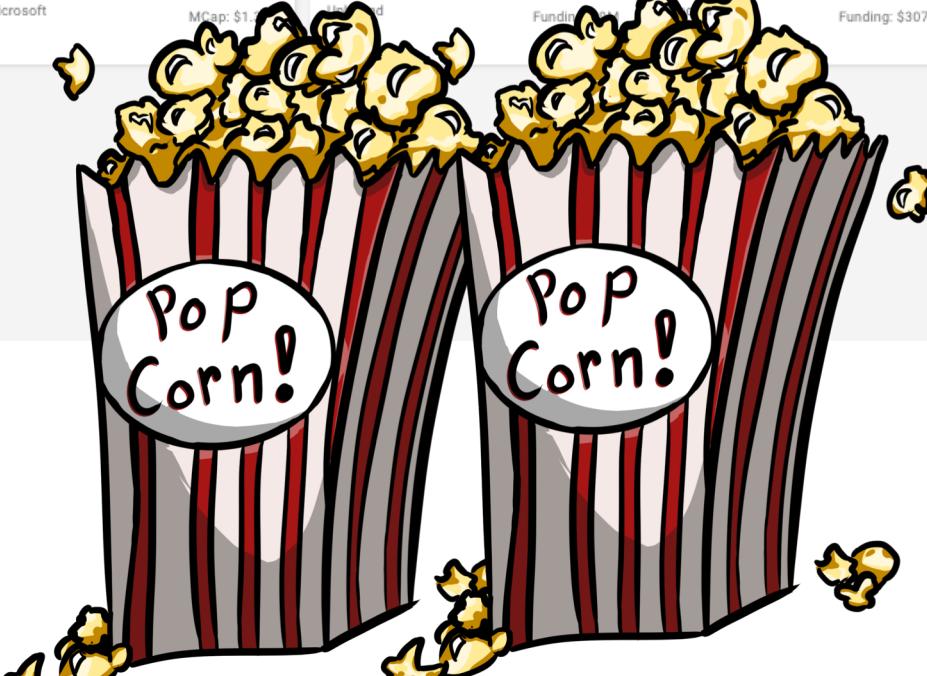


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Container Orchestration

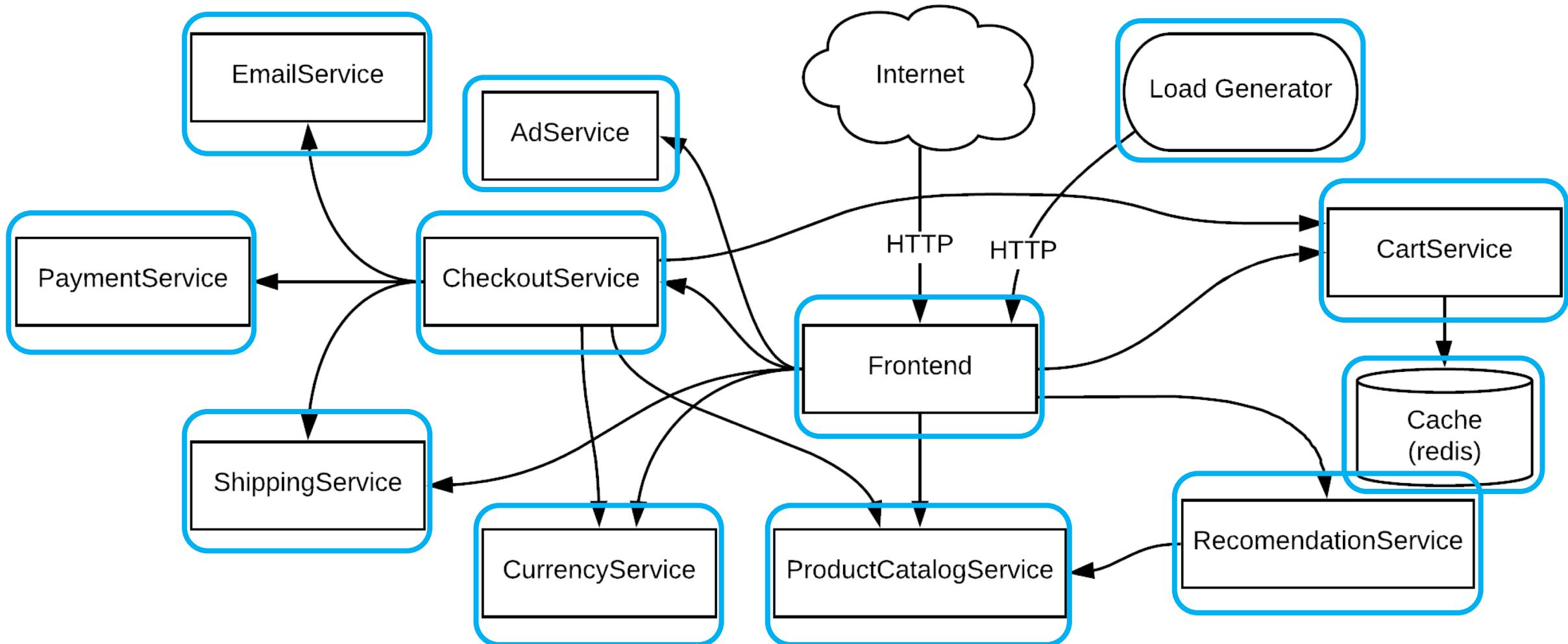
Operating at Scale

Orchestration & Management - Scheduling & Orchestration (8)

 Amazon ECS Amazon Elastic Container Service (ECS) Amazon Web Services	 Apache MESOS™ Apache Mesos Apache Software Foundation	 Azure Service Fabric Azure Service Fabric Microsoft	 Crossplane Crossplane Cloud Native Computing Foundation (CNCF)	 Docker Swarm Docker Swarm Funding: \$307.86M	 kubernetes Kubernetes Cloud Native Computing Foundation (CNCF)
 Nomad Nomad HashiCorp	 VOLCANO Volcano Huawei Technologies				

@kaslinfields

Example Microservice

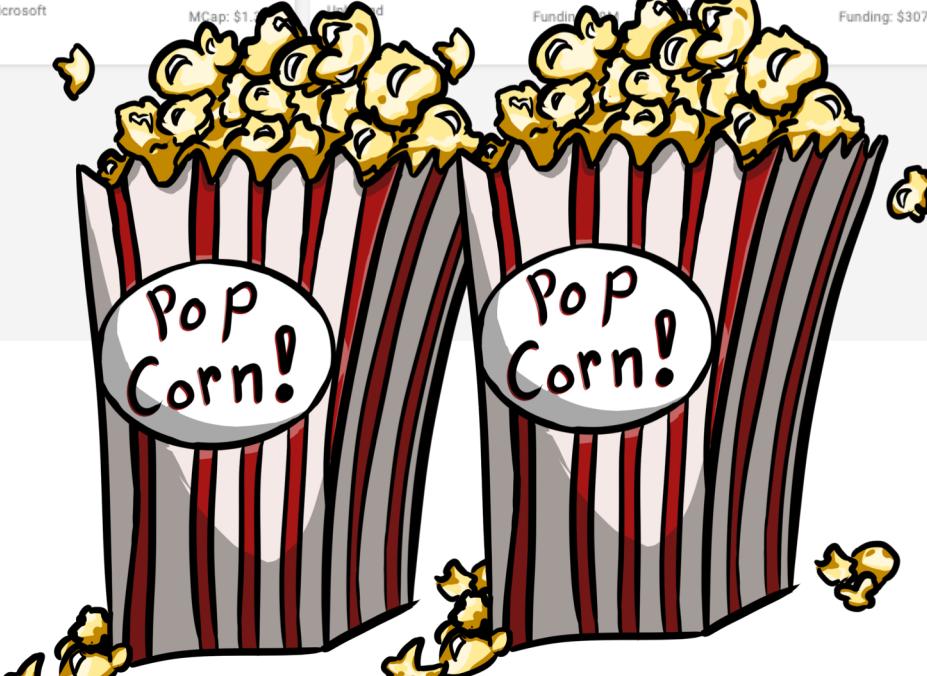


<https://github.com/GoogleCloudPlatform/microservices-demo>

Container Orchestration

Operating at Scale

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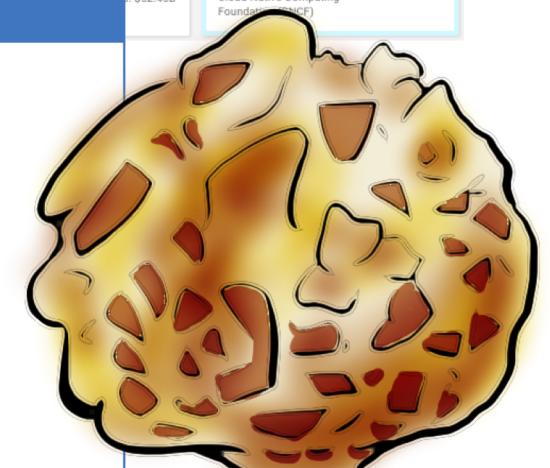
Serverless / Functions as a Service

Focus on Code



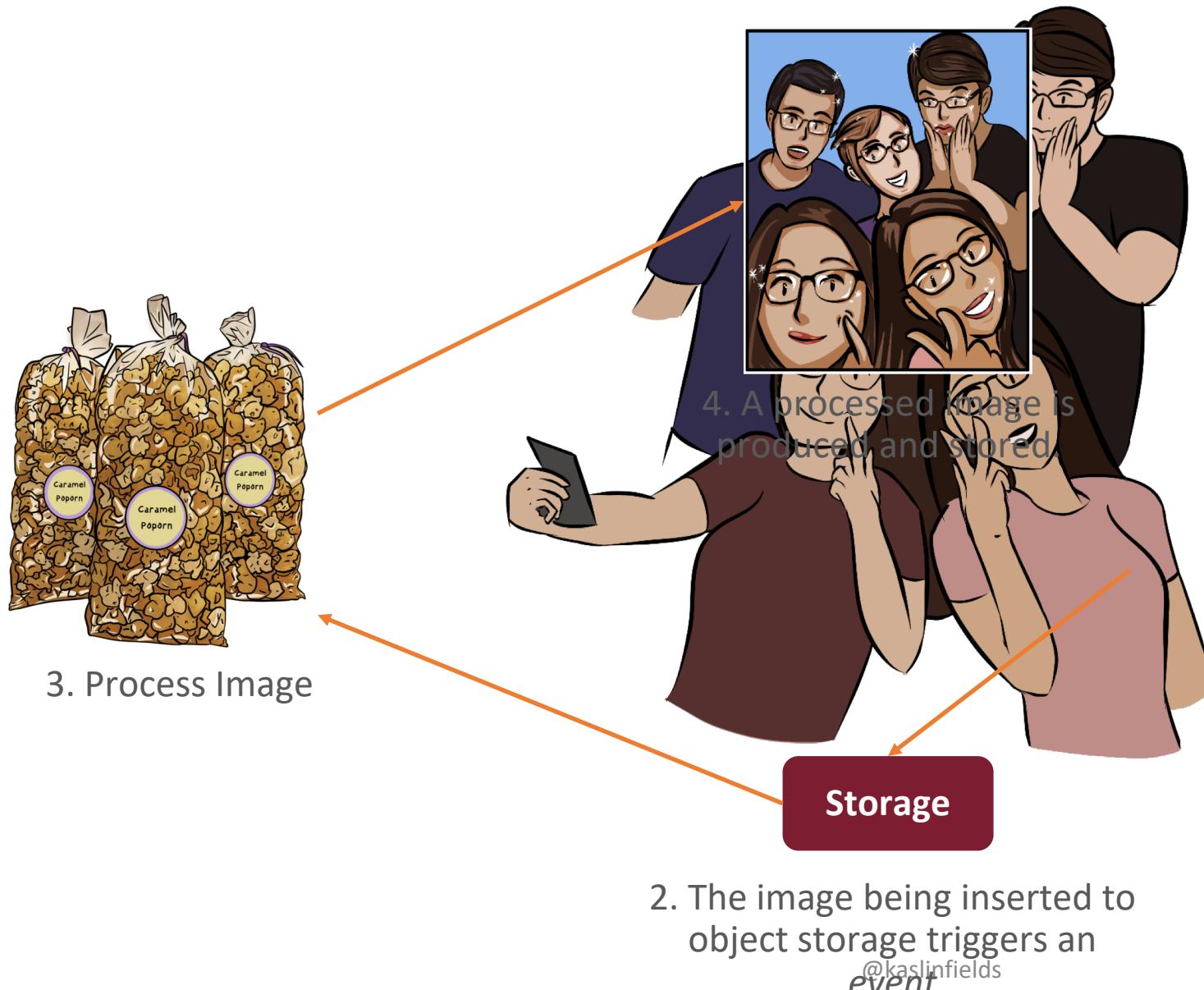
Serverless - Installable Platform (14)

Apache Camel Apache Camel K Apache Software Foundation ★ 384	APACHE OpenWhisk Apache OpenWhisk Apache Software Foundation ★ 4,607	AppScale AppScale AppScale Systems ★ 2,406	fission fission Platform9 ★ 4,974 Funding: \$61.5M	fn fn Oracle ★ 4,477 MCap: \$168.92B	KEDA KEDA Microsoft ★ 1,808 MCap: \$1.36T	Knative Knative Google ★ 2,745 MCap: \$951.62B
Kubeless Kubeless SAP ★ 5,494	Kyma Kyma SAP	Nuclio Nuclio	OPENFAAS OpenFaaS	PipelineAI PipelineAI	riff riff	Virtual Kubelet Virtual Kubelet Cloud Native Computing Foundation (CNCF) ★ 2,462



Functions Use Case

Focus on Code



Infrastructure as Code

“GitOps”

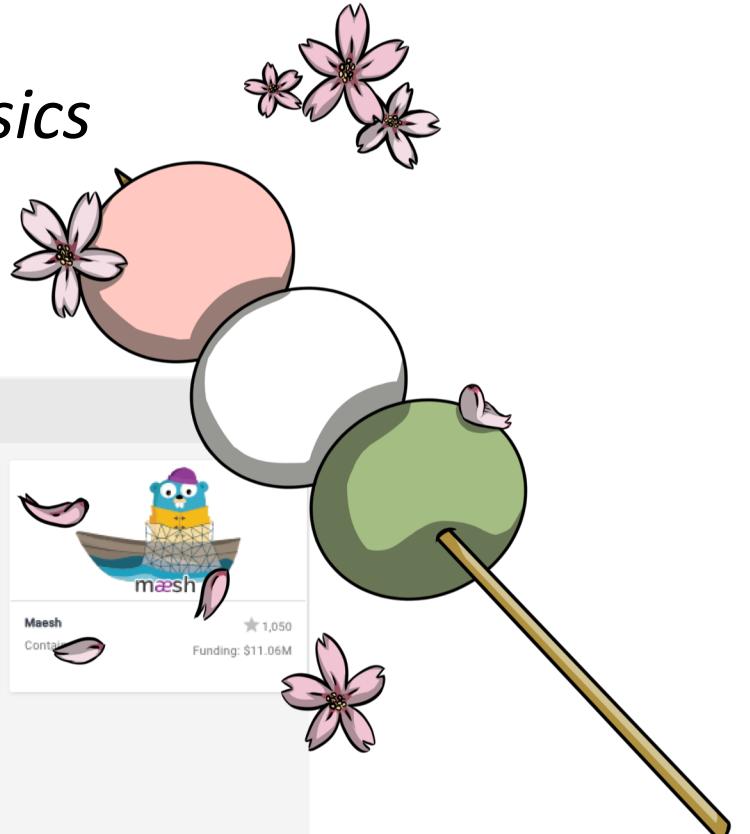
DevOps - Manage your “Ops” like you manage your “Dev”



Provisioning - Automation & Configuration (25)											
 airship OpenStack ★ 26	 ANSIBLE Red Hat ★ 42,044 MCap: \$119.24B	 Apollo Ctrip ★ 19,680 Funding: \$500K	 AWS CloudFormation Amazon Web Services ★ 983.59B	 BOSH Cloud Foundry Foundation ★ 1,879	 Cadence Uber ★ 3.4! MCap: \$59.5B						
 CFEngine CFEngine ★ 340 Funding: \$13M	 CHEF INFRA™ Chef Software ★ 6,163 Funding: \$105M	 CLOUDIFY Cloudify ★ 88 Funding: \$7M	 Digital Rebar RackN ★ 86 Funding: \$800K	 FOREMAN Foreman ★ 1,771	 JUJU Canonical ★ 1.6! Funding: \$12.8M						
 KubeEdge Cloud Native Computing Foundation (CNCF) ★ 2,256	 Kubicorn Kubicorn ★ 1,594	 LINUXKIT Docker ★ 6,090 Funding: \$307.86M	 MAAS Canonical ★ 107 Funding: \$12.8M	 ManageIQ ManageIQ ★ 1,005 Funding: \$5.4M	 openstack OpenStack ★ 3.4!						
 Pulumi Pulumi ★ 4,789 Funding: \$20M	 puppet Puppet ★ 5,684 Funding: \$149.5M	 RUN DECK Rundeck ★ 3,633 Funding: \$3M	 SALTSTACK SaltStack ★ 10,692 Funding: \$27.9M	 StackStorm StackStorm ★ 3,696	 Terraform HashiCorp ★ 21,0! Funding: \$174.18						
 vmware vSphere											

Service Mesh

Beyond Basics

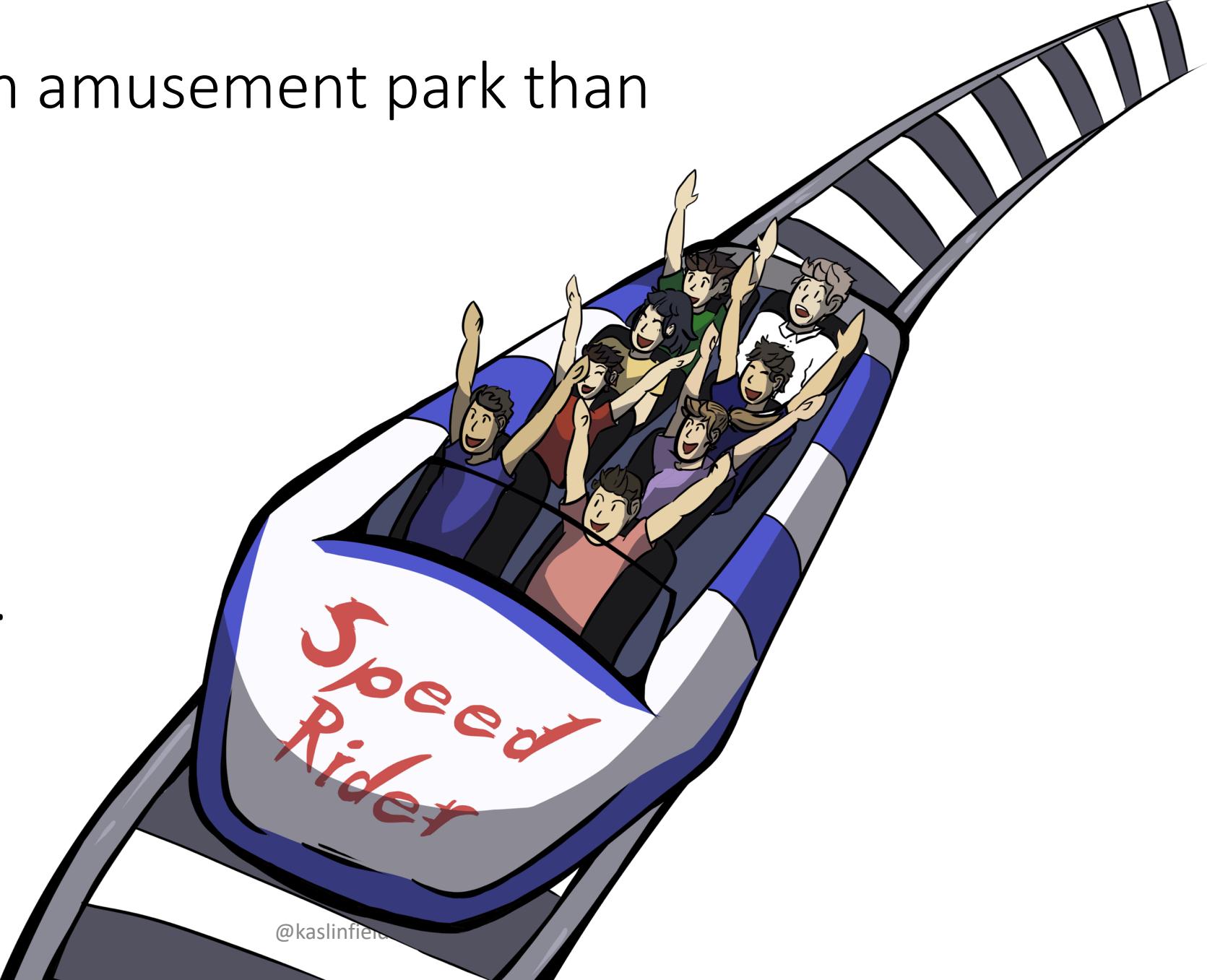


Orchestration & Management - Service Mesh (10)									
 Consul HashiCorp	 Grey Matter Decipher Technology Studios	 Istio Google	 Kuma Kong	 LINKERD Cloud Native Computing Foundation (CNCF)	 Maesh Container Solutions				
 NETFLIX OSS Zuul Netflix	 Service Mesh Interface (SMI) Microsoft	 SuperGloo Solo.io	 vamp Vamp.io						
★ 18,585 Funding: \$174.18M	★ 21,908 Funding: \$951.62B	★ 1,309 Funding: \$69.1M	★ 5,285 Funding: \$11.06M						

Day 2 Kubernetes

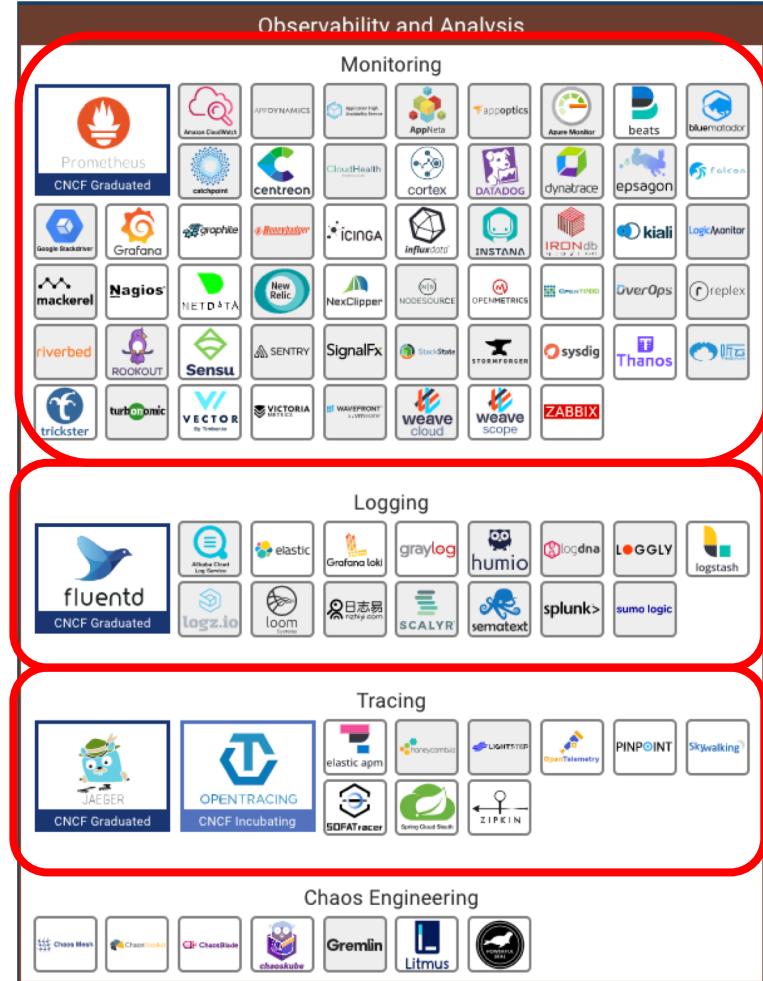
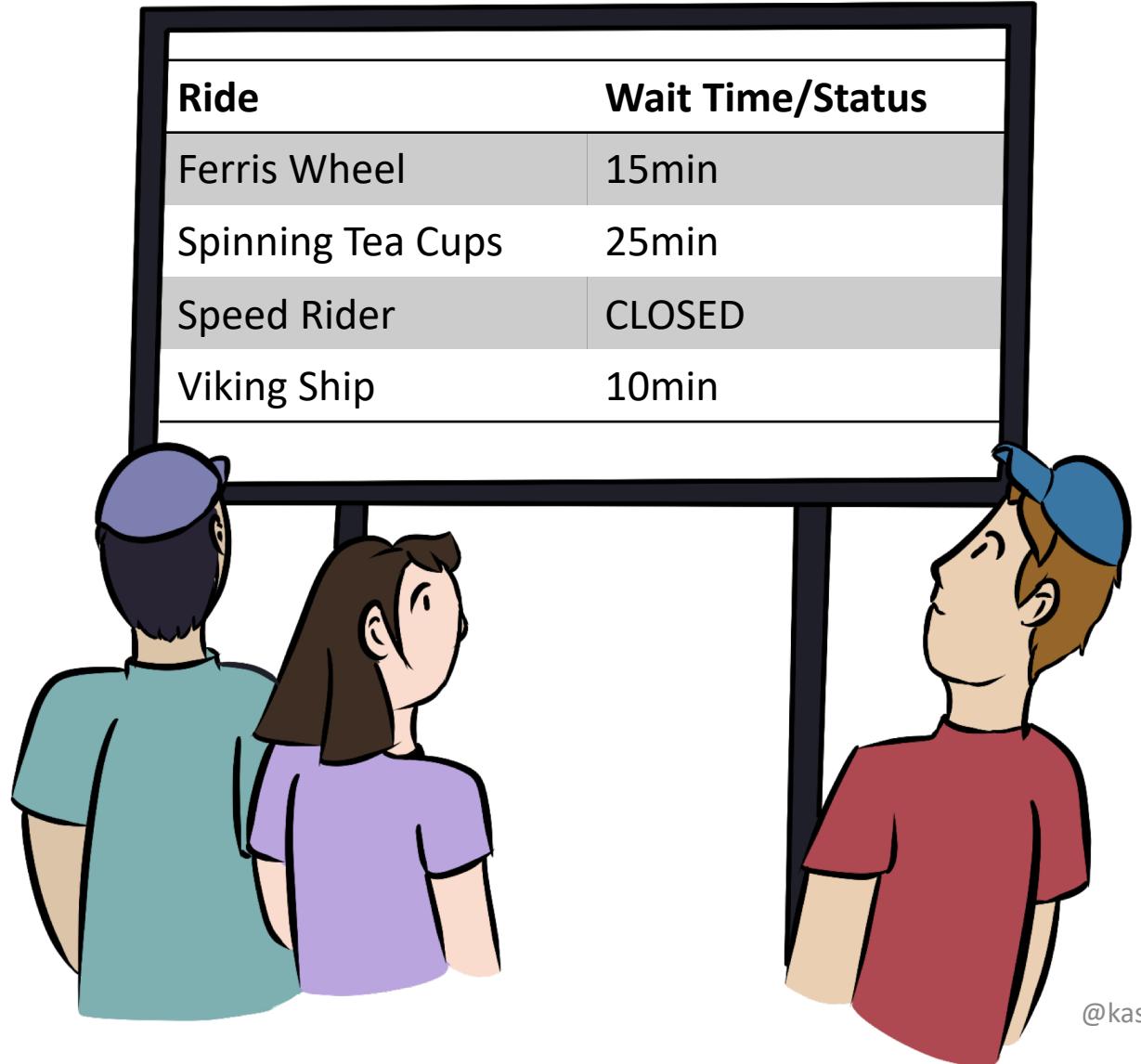
There's more to an amusement park than just food though.

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



Observability

Know Your System, Know Your Business



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	 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 ★ 388	 CloudHealth TECHNOLOGIES CloudHealth Technologies CloudHealth Technologies	 cortex Cortex Cloud Native Computing Foundation (CNCF) ★ 2,460	 DATADOG Datadog Datadog	 dynatrace Dynatrace Dynatrace	 epsagon Epsagon Epsagon	 falcon Falcon Xiaomi ★ 5,579 MCap: \$244.88B	 Google Stackdriver Google Stackdriver Google	 Grafana Grafana Grafana Labs ★ 34,073 Funding: \$25.23M		
 graphite Graphite Graphite	 Honeybadger Honeybadger Honeybadger	 icinga Icinga Icinga	 influxdata InfluxData InfluxData ★ 18,511 Funding: \$119.89M	 INSTANA Instana Instana	 IRONdb IronDB Circinus	 kiali Kiali Red Hat ★ 1,850 MCap: \$93.71B	 LogicMonitor LogicMonitor LogicMonitor	 mackerel Mackerel Hatena	 Nagios Nagios Nagios		
 NETDATA Netdata Netdata ★ 45,594 Funding: \$20.5M	 New Relic New Relic New Relic MCap: \$2.77B	 NexClipper NexClipper NexClipper ★ 447 MCap: \$2.77B	 NODESOURCE NodeSource NodeSource Funding: \$33.4M	 OPENMETRICS OpenMetrics Cloud Native Computing Foundation (CNCF) ★ 889	 OPENTSDB OpenTSDB OpenTSDB ★ 4,069	 OverOps OverOps OverOps ★ 4,069	 Prometheus Prometheus Cloud Native Computing Foundation (CNCF) ★ 29,776 Funding: \$49.5M	 replex Replex Replex	 ROOKOUT Rookout Rookout		
 Sensu Sensu Sensu ★ 2,966 Funding: \$12.5M	 SENTRY Sentry Sentry ★ 24,341 Funding: \$66.5M	 SignalFx SignalFx SignalFx Funding: \$178.5M	 StackState StackState StackState Funding: \$5M	 STORMFORGER StormForger StormForger	 sysdig sysdig sysdig ★ 6,041 Funding: \$191.5M	 Thanos Thanos Cloud Native Computing Foundation (CNCF) ★ 5,340	 TINGYUN Tingyun Tingyun	 trickster Trickster Comcast ★ 1,063 MCap: \$157.72B	 turbonomic Turbonomic Turbonomic Funding: \$149.5M		
 VECTOR By Timber.io Vector Timber ★ 3,620 Funding: \$2.28M	 VICTORIA METRICS VictoriaMetrics VictoriaMetrics ★ 1,075	 WAVEFRONT by VMware Wavefront VMware MCap: \$47B	 weave cloud Weave Cloud Weaveworks Funding: \$20M	 Weave Scope WeaveScope Weaveworks ★ 4,199 Funding: \$20M	 ZABBIX Zabbix Zabbix ★ 814						



Observability - Logging

Know what happened before

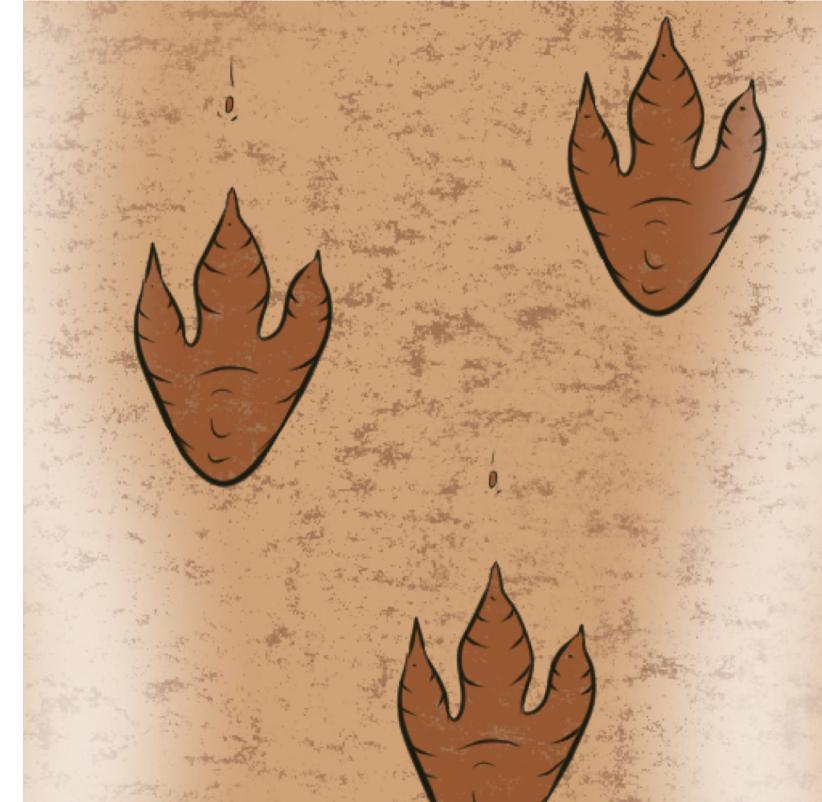
Observability and Analysis - Logging (16)									
 Alibaba Cloud Log Service Alibaba Cloud	 elastic Elastic	 fluentd Fluentd	 Grafana Loki Cloud Native Computing Foundation (CNCF)	 graylog Grafana Labs	 humio Humio				
 logDNA LogDNA	 LOGGLY Loggly	 logstash Logstash	 logz.io Logz.io	 loom Systems Loom Systems	 日志易 Rizhiyi				
 SCALYR® Scalyr	 sematext Sematext	 splunk® Splunk	 sumo logic Sumo Logic						

Observability - Tracing

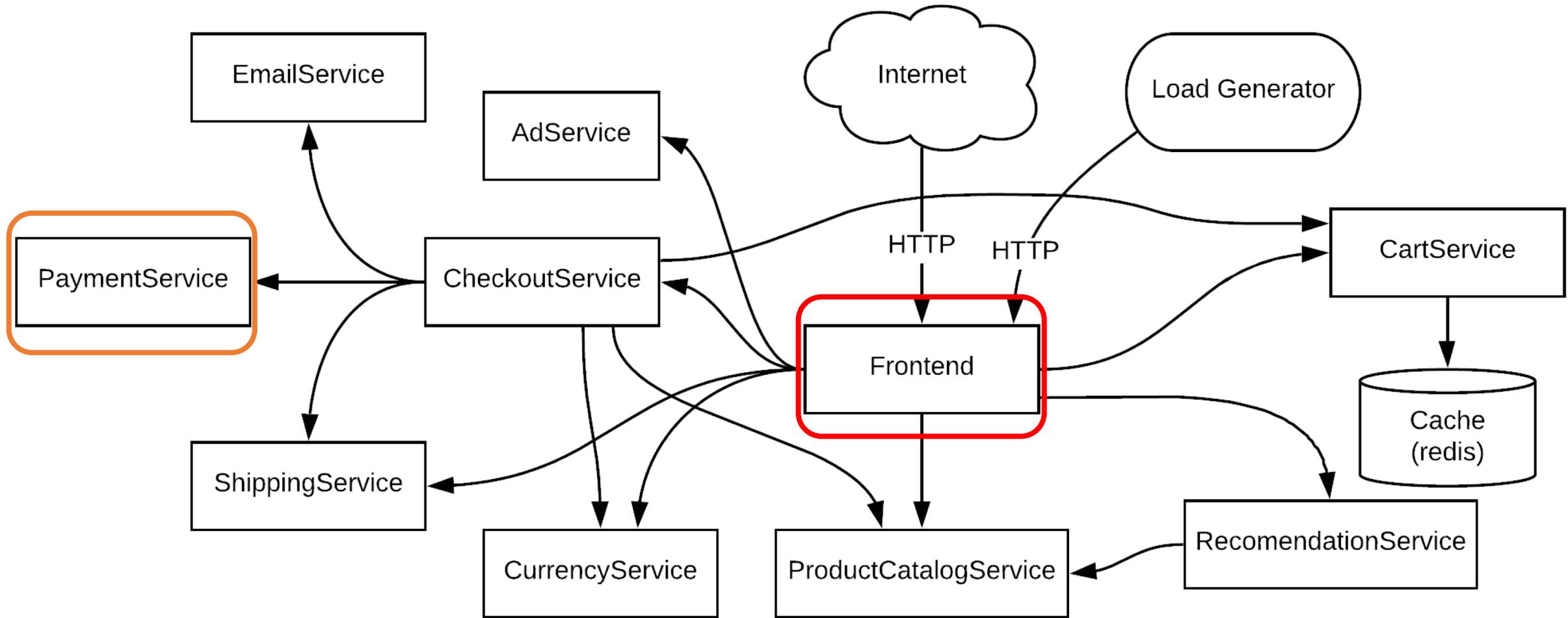
Follow where the trail leads

Observability and Analysis - Tracing (11)

 elastic apm Elastic APM Elastic ★ 745	 Honeycomb Honeycomb Funding: \$26.9M MCap: \$3.97B	 JAEGER Jaeger Cloud Native Computing Foundation (CNCF) ★ 10,545	 LightStep LightStep Funding: \$70M	 OpenTelemetry OpenTelemetry Cloud Native Computing Foundation (CNCF) ★ 540
 OPENTRACING OpenTracing Cloud Native Computing Foundation (CNCF) ★ 2,304	 PINPOINT Pinpoint ★ 10,104	 Skywalking SkyWalking ★ 12,814 Apache Software Foundation	 SOFATracer SOFATracer Ant Financial ★ 738	 Spring Cloud Sleuth Spring Cloud Sleuth VMware ★ 1,234 MCap: \$513.04B
 ZIPKIN Zipkin ★ 12,637				



Example Microservice



<https://github.com/GoogleCloudPlatform/microservices-demo>

Security & Compliance



Security & Compliance

TUF CNCF Graduated	falco CNCF Incubating	notary CNCF Incubating	Open Policy Agent CNCF Incubating	alcide	anchore	aqua				
CHEF INSPEC	clair	Datica	FOSSA	FOSSID	Grafeas	in-toto	kube-bench	BLACKDUCK	BLOOMBASE	CRYPTOHEROES
paloalto	snyk	Sonatype Nexus	SONOBUOY	StackRox	sysdig SECURE	TIGERA	kube-hunter	NeuVector	OpenSCAP	WhiteSource

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

Streaming & Messaging

Consume Data at Scale



App Definition and Development - Streaming & Messaging (25)

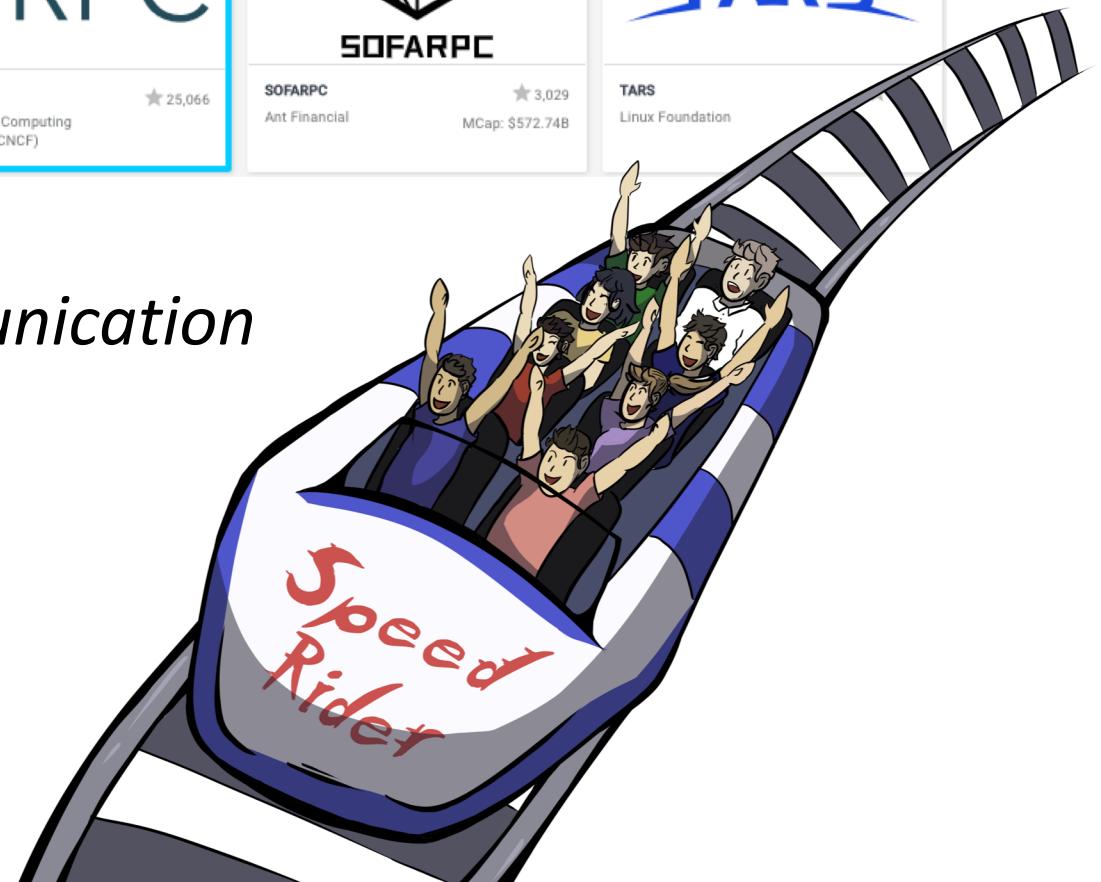
Amazon Kinesis Amazon Web Services MCap: \$983.59B	Apache HERON Apache Software Foundation 3,443	APACHE nifi Apache Software Foundation 1,916	Apache RocketMQ Apache Software Foundation 10,329	APACHE Spark™ Apache Software Foundation 25,287	APACHE STORM™ Apache Software Foundation 6,003
Azure Event Hubs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

Remote Procedure Call

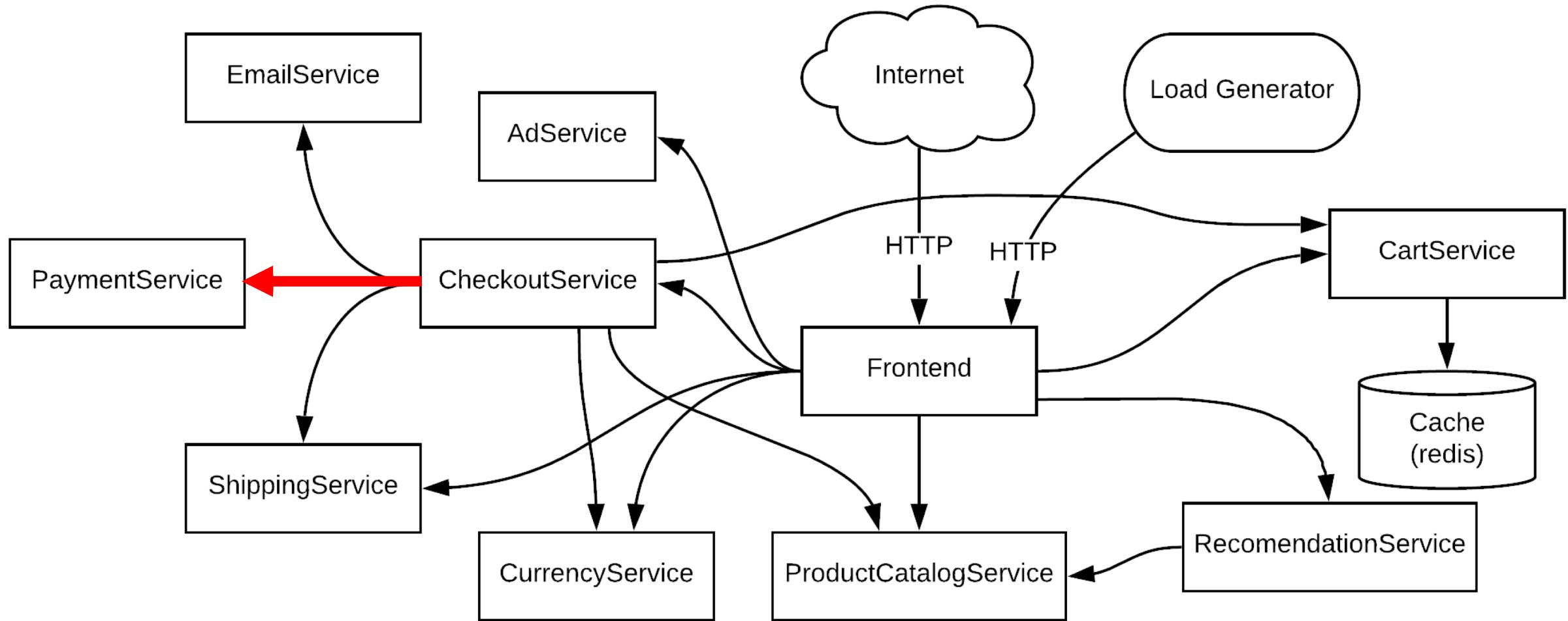
Orchestration & Management - Remote Procedure Call (6)

Apache Thrift™ Apache Thrift Apache Software Foundation ★ 7,246	AVRO™ Avro Apache Software Foundation ★ 1,497	DUBBO Dubbo Apache Software Foundation ★ 31,222	gRPC gRPC Cloud Native Computing Foundation (CNCF) ★ 25,066	SOFARPC SOFARPC Ant Financial ★ 3,029	TARS TARS Linux Foundation
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Distributed Systems, Distributed Communication



Example Microservice



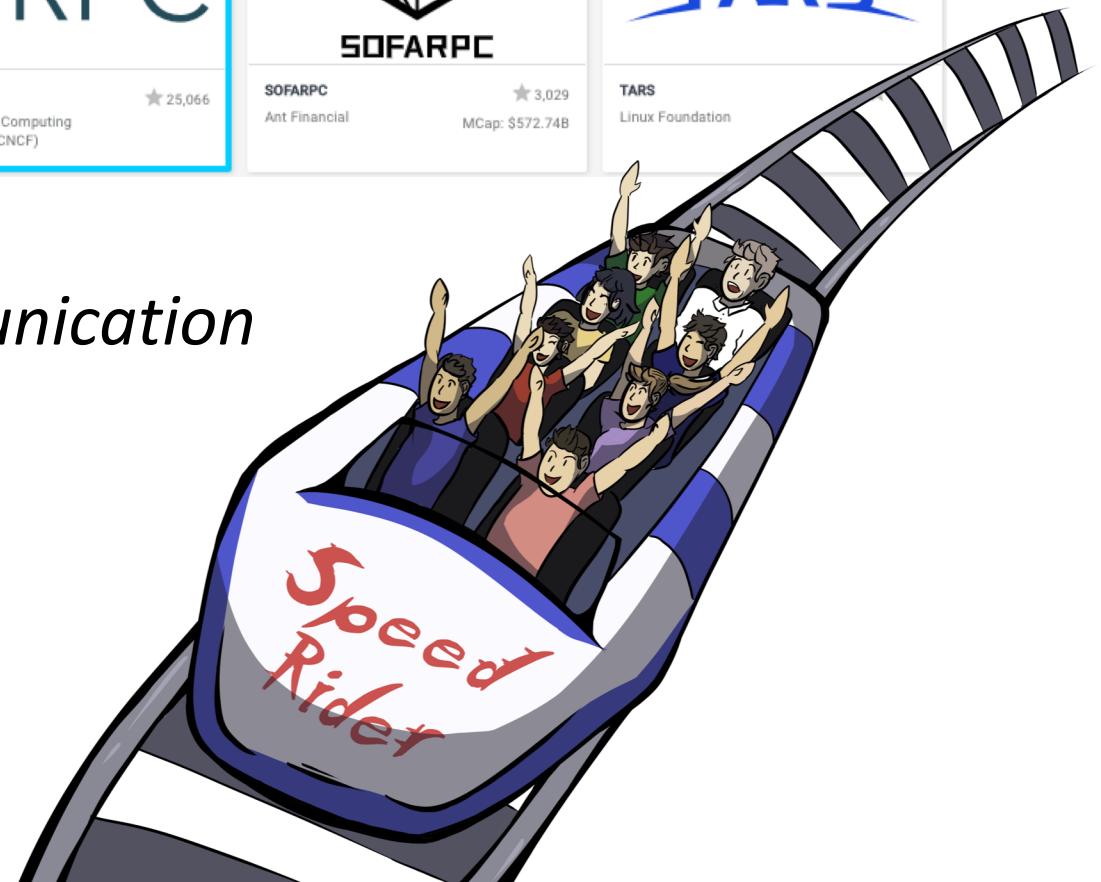
<https://github.com/GoogleCloudPlatform/microservices-demo>

Remote Procedure Call

Orchestration & Management - Remote Procedure Call (6)

Apache Thrift™ Apache Thrift Apache Software Foundation ★ 7,246	AVRO™ Avro Apache Software Foundation ★ 1,497	DUBBO Dubbo Apache Software Foundation ★ 31,222	gRPC gRPC Cloud Native Computing Foundation (CNCF) ★ 25,066	SOFARPC SOFARPC Ant Financial ★ 3,029	TARS TARS Linux Foundation
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Distributed Systems, Distributed Communication



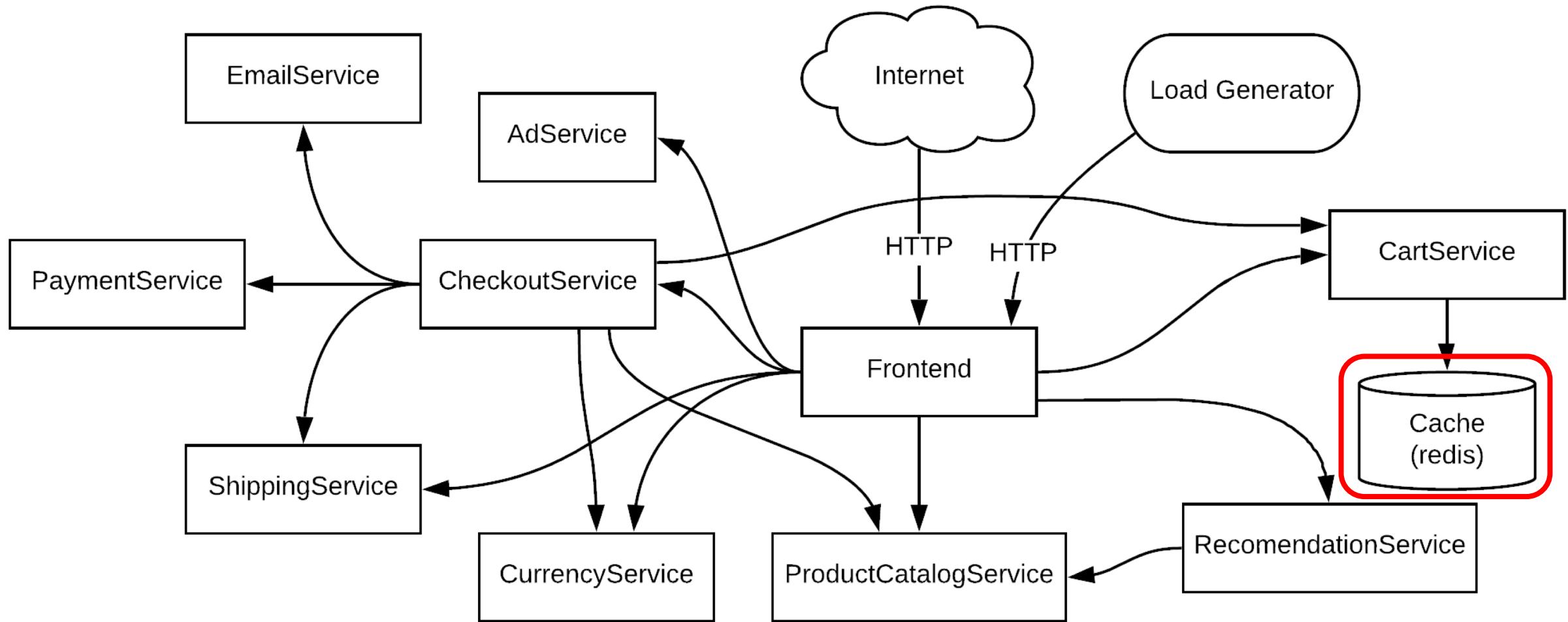
Cloud Native Storage

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 Persistent Disk	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	MooseFS Tunera	NetApp® NetApp	NUTANIX™ Nutanix Objects
OpenEBS OpenEBS Cloud Native Computing Foundation (CNCF)	OpenIO OpenIO	openSDS OpenSDS	portworx Portworx	PURE STORAGE® Pure Storage	Quobyte Quobyte	reduxio Reduxio	ROBIN Robin Systems
ROOK 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	YRCloudFile YRCloudFile YanFong
ZENKO Zenko Scality							

Example Microservice



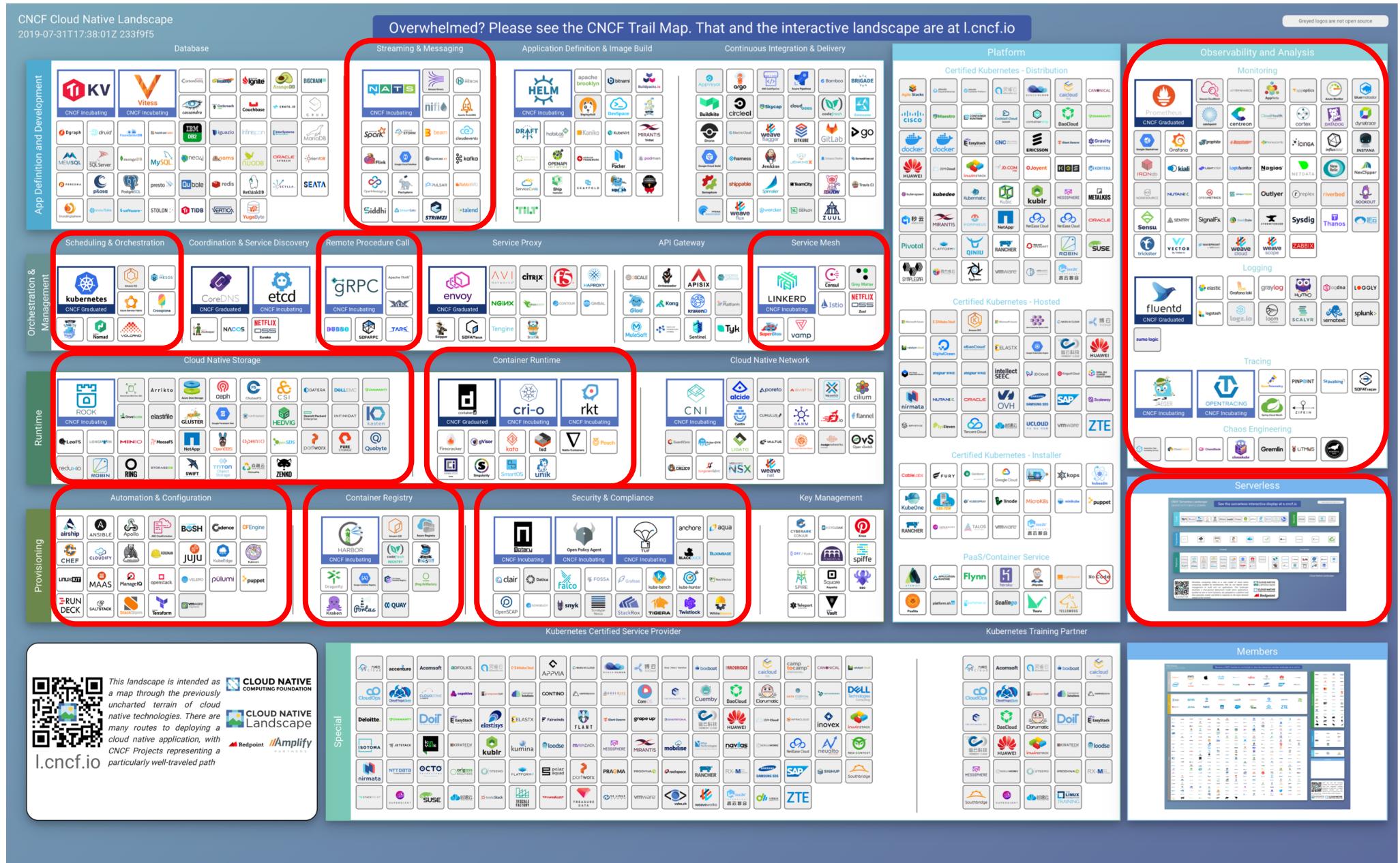
<https://github.com/GoogleCloudPlatform/microservices-demo>

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 Persistent Disk	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	MooseFS Tunera	NetApp® NetApp	NUTANIX™ Nutanix Objects
OpenEBS OpenEBS Cloud Native Computing Foundation (CNCF)	OpenIO OpenIO	openSDS OpenSDS	portworx Portworx	PURE STORAGE® Pure Storage	Quobyte Quobyte	reduxio Reduxio	ROBIN Robin Systems
ROOK 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	YRCloudFile YRCloudFile YanFong
ZENKO Zenko Scality							



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KubeCon



CloudNativeCon

Europe 2020

Virtual





KEEP CLOUD NATIVE CONNECTED

A collage of various icons on a dark background. The icons include: a yellow hand pointing up; a teal globe with a grid pattern; red vertical bars of increasing height; a purple vertical capsule with three circles (two teal, one pink); a blue wavy line; a pink circle with a red 'X'; a yellow rounded rectangle; a blue U-shaped line; a yellow power button icon; a red switch with a teal base; a teal square with a yellow border containing a purple circle with a teal outline; a teal asterisk inside a cyan circle; a teal zigzag line; a teal cartoon character wearing a hat and holding a pipe; and a red 'X' next to three pink dots.