- Order is vital for scale
- Abstractions make systems manageable

Because we want you to know where you are and how to get where you're going.
Problems of Distributed Systems

- Reliability
- Data throughput
- Latency
Abstracted Tools

- Allow us to leverage complex systems with little work
- When things get too complicated, we add another layer of abstraction
- ....and we repeat this process
● The Origin Community Distribution of Kubernetes that powers Red Hat OpenShift
● Built around Kubernetes container cluster management, carries all k8s features, e.g.
  ○ Services, Pods, Controllers
  ○ Readiness & liveness probes
  ○ Persistent Volumes and Persistent Volume Claims
  ○ Release versions correspond to k8s releases
● Complete open source container application platform
  ○ Security and multi-tenancy
    ■ Access to namespaces per users/groups
  ○ Container image registry and source-to-image builds
  ○ CI/CD and devops workflows
Kafka

- A publish/subscribe messaging system
- Scalable and reliable data delivery
- Integrates well with other systems
Use Case
Integrate distributed Logging with Kafka
Origin Aggregated Logging

- Part of OKD
- Based on Elasticsearch, Fluentd and Kibana
- Collecting distributed logs
- Common data model
- Security model - multi-tenancy
- All open source
Container Logging

Node

Container

stdout

stderr

Single-line logs

cri-o

/var/log/containers/*.log

Files on disk

Collector (Fluentd)

Kubernetes master

send off the node

kubectl logs <pod>

kubelet

Node
Loggy

- Loggy is a log message
- Needs to get to work safely and reliably
Log Collector

● Collects all container logs from node’s filesystem

● Ability to tag, filter and enrich logs for export
  ○ Add Kubernetes metadata to every log line
Kafka Connect Source

- Imports data from external systems into Kafka brokers
- Pluggable Connectors
- Rest Interface, Tasks and Workers
Kafka Broker

- Like a post box
- Topics, partitions and the distribution of load
- Smart clients / dumb brokers
Broker Reliability

- Replication
- Partition Leadership
- Performance/Reliability trade offs
Kafka Connect Sink

- Exports Kafka broker data to external systems
- Distributed mode
- Convenience of Connect Framework
Strimzi Operators

- OKD/Kafka Integration
- Automates and manages Kafka deployment
- Operator Pattern
Cluster Operator

- Manages clusters:
  - Kafka
  - Kafka Connect
  - Zookeeper
  - Mirror Maker

- Advanced integration features
Entity Operator

- Manages different Kafka objects
- Currently consists of two Operators:
  - Topic Operator
  - User Operator
Custom Resources

- Blueprint to describe Kafka cluster components
- Operators monitor these blueprints, matching cluster state with what is described
apiVersion: kafka.strimzi.io/v1alpha1
kind: Kafka
metadata:
  name: my-cluster
spec:
  kafka:
    replicas: 3
  listeners:
    plain: {}
    tls: {}
  config:
    offsets.topic.replication.factor: 3
    transaction.state.log.replication.factor: 3
    transaction.state.log.min.isr: 2
  storage:
    type: ephemeral
  zookeeper:
    replicas: 3
    storage:
      type: ephemeral
  entityOperator:
    topicOperator: {}
    userOperator: {}
DEMO
Image Credits

In order of appearance:

Content Credit

THANK YOU
EXTRAS
Cluster-level logging multi-tenancy

Logging System - OpenShift Platform

Fluentd

ES service/route

Elasticsearch (Cluster)

SearchGuard plugin

OpenShift ES plugin

OpenShift OAuth

User project and roles

Token and userid headers

Browser

Kibana Pod

oauth proxy container

Add token and userid headers

Kibana container

OpenShift API