Operator Framework to manage Stateful Workloads in eBay
AGENDA

- Background
- Introduction
- Features
- Conclusion
eBay has the data platform and shared data ecosystem to provide the off-line and real-time data that power eBay's vision of a buyer experience, seller insights and agile, data driven business to serve the eBay employees all around the world.
**Example: Tiered Kafka Architecture**

For each message category, it has a cluster named local containing messages created in the datacenter.

The aggregate cluster combines messages from all local clusters for a given category.

Kafka mirror maker is used to copy messages forward, from local into aggregate. This avoids any message loops between local clusters.
BACKGROUND

StatefulSet:
1. Auto Recover for Disk Failure
2. Defined order for rolling restart
3. Cross K8s clusters deployment

Helm Charts:
1. On-demand configuration changes for related components
2. Customize the docker images
BACKGROUND

**Simplify Management**
- Multiple Kubernetes Clusters
- Internal Dependency
- Complex Data Operation
  - Scaling
  - Rolling Restart

**Improve Reliability**
- Always Available
- Resiliency
- Highly Scalable
- High Performance

**Security**
- Integrate with existing enterprise security policies
INTRODUCTION

Operator Pattern + Workflow

An Operator represents human operational knowledge in software to reliably manage an application.
Operator Framework: One Stack Management for Stateful Workloads
FEATURES

On-demand Lifecycle Management functions to reduce the maintain effort

Provision/ Decommission
Rest API and Kubernetes native API for one step create or delete a cluster

Scaling
The cluster could on-demand flexup and flexdown

Configuration Management
Modify the application configuration parameters and update to the cluster

Auto Remediation
If one node is down, the WISB flow will automatically triggered to bring back the missed node

Rolling Restart / Upgrade
Upgrade the cluster to new version

Replacement
Replace the bad node or low performance node

WISB Management Workflow

- Declarative with simple syntax via yaml, easy to modify and maintain
- Decompose complex logic with idempotent reusable and retryable tasks
- Design for failure
- Reusable and parallelism subflows
- Special design for group operation
Reuse common flow and customize WISB flow
Cross Kubernetes Clusters Deployment and Management
FEATURES

Deploy Pattern

1. Pure Pods + Local Volume
2. Deployment
3. DeploymentSets
4. StatefulSet
Security

**Authentication**
Keystone authentication and integration with LDAP

**RBAC**
Grant the CRU permission to specific namespace, only the user have the CRU permission could manage the cluster

**SASL**
Enhance the SASL with JWT Token
FEATURES

Logging

**Annotation** on Pod template and collect by Elasticsearch

Metrics

**Sidecar** Deployment for Metrics Agent
Collect metrics by Prometheus & Grafana

Health Check

Scheduling triggered **healthcheck flow** to check cluster Status
Send notification by email or stack if any unhealthy detected
Conclusion

Simplify Management

- One-click deployment for multi-component with high flexibility
- Easily configure and maintain multi-cluster deployments
- Automatic manage for data operations

Improve Reliability

- Toleration
- Anti-Affinity
- Application settings

Security

- API Authentication
- Cluster Admission Control
- End to End encryption – data on wire
Thanks !