Deployment and Management in the Age of Cloud Distributed Applications

Neil Peterson | @nepeters
Agenda

- Software deployment through the years
- Redefining the application
- Terraform
- Kubernetes Service Catalog
- Cloud Native Application Bundles (CNAB)
Deployment

All of the activities that make a software system available for use.

- Operating System
- Application
- Software Updates
- Infrastructure
- Access Control
- Policy

https://en.wikipedia.org/wiki/Software_deployment
Rethinking the application

Kubernetes

- Get Tweets
- Process Tweets
- Visualize Results

Cloud Provider

- Message Queue
- Analytics API
- Data Store

Application - https://github.com/Azure-Samples/helm-charts/tree/master/chart-source/twitter-sentiment
Cloud Distributed Applications

A single application can be built / deployed across a diverse technical stack (Kubernetes, functions, hosted data store, etc.).

Deployment and management challenges
- Multiple deployment routines
- Multiple management tools
- Secrets management
- Instance management
Terraform

Terraform codifies APIs into providers that deploy infrastructure and other software related assets.

- Terraform 0.12.0 recently released
- Providers for major clouds ++
- Extensible through custom providers
Terraform State / Workspaces

State and Workspaces can provide an instance management experience.

- State: Clear text representation of current configuration
- Workspace: Namespace based state isolation
Terraform: My Impressions

- Instance Management: State and Workspaces
- Secrets Management: State and built in tooling
- Maturity / Community: High
- Flexibility / Extensibility: Medium
Kubernetes Service Catalog
Open Service Broker

API specification for a standard cloud provider interface.

- Framework for provisioning and accessing managed cloud services
- Specifies five operations (provision, bind, unbind, deprovision, update)
Kubernetes Service Catalog

Enlightens Kubernetes so that it "speaks" Open Service Broker.

Adds five new types to Kubernetes
- ClusterServiceBroker
- ClusterServiceClass
- ClusterServicePlan
- ServiceInstance
- ServiceBinding
How do these components line up
API Diagram

Kubernetes API Server

Service Catalog
ClusterServiceBroker
ClusterServiceClass
ClusterServicePlan
ServiceInstance
ServiceBinding

Open Service Broker
Class / Plans

K8S Secret
Application

Service Instance <-> Service Binding

Source - https://kubernetes.io/docs/concepts/extend-kubernetes/service-catalog/
SVCAT: My Impressions

- Instance Management: Helm
- Secrets Management: Kubernetes
- Maturity / Community: Low
- Flexibility / Extensibility: Low
Demo
Kubernetes Service Catalog
Cloud Native Application Bundles (CNAB)

A package format specification for bundling, installing, and managing cloud distributed applications.

- Thin / Thick Bundle
- OCI image format compliant
- Signed

Think along the lines of a make file for cloud distributed applications.
Bundle components

Bundle specification / components:

- bundle.json file: bundle metadata
- Invocation Image: container image for bootstrapping
- Bundle Runtime: payload entry point (ex: bash script)
CNAB: My Impressions

- Instance Management: Multiple tools
- Secrets Management: Flexible
- Maturity / Community: Low
- Flexibility / Extensibility: High
Demo

Cloud Native Application Bundles