SIG-Service Catalog Introduction

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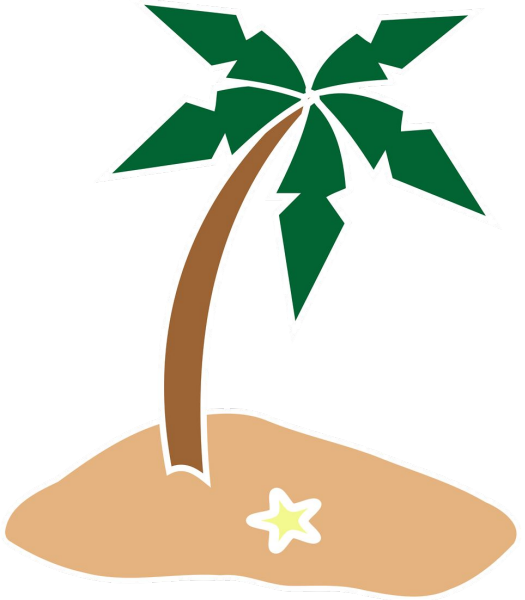
Applications are rarely islands

- Often applications leverage ancillary "Services"
  - E.g. Application stores data in database

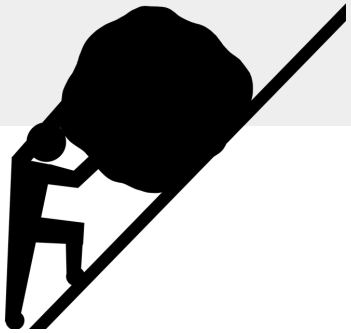
- Critical to application's success
  - But developers shouldn't spend their time managing them



Services - an overloaded term

- Kubernetes “Services”
  - Applications running in the cluster accessible via DNS discovery
- **Platform managed/hosted Services**
  - e.g. Object Storage
- **External Services - 3rd Party Services**
  - e.g. Twillio

Access to services can be challenging



- Creating and managing services is non-trivial
  - Duplication of effort across teams
  - Ops team manages it for you on their schedule
  - Managing credentials could be problematic
    - Sent via email, sticky-notes, etc…
    - Where are they stored? Plain text in config files?
  - Each service has its own set of provisioning APIs

- Let’s shift the burden to the Platform via self-service model
  - "Tell us what you need and we'll manage it for you"
  - Service Credentials are protected and provided at runtime

What if ...?

```
$ svcat marketplace
    CLASS                PLANS                      DESCRIPTION
+------------+-------------------------+-------------------------+
  mysql         free                          Simple SQL
                basic
                enterprise
  mongodb       free                          No-SQL DB

$ svcat provision myDB --class mysql --plan free
$ svcat bind myDB
```

Credentials (and connection info) in “myDB” secret

The magic

Cluster Admin:

- **Service Brokers** are registered with Kubernetes
  - Each Broker manages one or more **Services**
  - Each Service offers a set of variant-QoSs/**Plans**
- Services are available via a "**Marketplace**" in Kubernetes

```
$ svcat marketplace
```

Developer:

- Chooses a **Service** from the **Marketplace**

```
$ svcat provision myDB...
```

- Kubernetes talks to owning **Broker** to provision it and obtain the credentials

```
$ svcat bind myDB
```

- **Secret** (credentials, connection info) is available to the app

Making it all possible

OPEN SERVICE BROKER API™

- API between Kubernetes (or CF) and a Service Broker
  - get list of services / provision / deprovision / bind / unbind
- Abstracts the Service Lifecycle APIs
- Service Brokers
  - Manage all aspects of Service's lifecycle
  - User Initiated: Create, Delete, Provide Credentials
  - Automatic: Auto-Scale, Backup, Recovery, QoS, …
  - Hosted anywhere – in or out of the Platform
    - Application is usually unaware

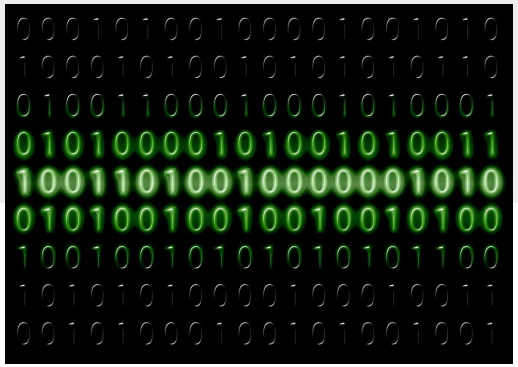
Why?

- Application Developers
  - Can focus on their business logic
  - Services managed by the experts
  - Self-service model **speeds up** CI/CD timelines
  - Platforms can do more for you - e.g. sharing of services across clusters & platforms

- Service Providers
  - Low barrier or entry for new Service Providers
  - **Interop**: easily integrated into environments that supports the API
    - Kube, CloudFoundry, custom platforms (e.g. IBM Cloud, SAP)
  - With ease of access to services, an increase in their usage ($)

Demo

YAML all the things



```yaml
apiVersion: servicecatalog.k8s.io/v1beta1
kind: ServiceInstance
metadata:
  name: myDB
spec:
  serviceClassName: mysql
  planName: free

apiVersion: servicecatalog.k8s.io/v1beta1
kind: ServiceBinding
metadata:
  name: myDB
spec:
  instanceRef:
    name: myDB
```

Credentials and connection info in “myDB” secret

Service Catalog Summary

Why?

- Help developers discover and connect to 3rd party services
- Allowing them to focus on their business logic
  - Ask for the service - connection information provided at runtime

Status

- Kubernetes incubator project
- Can be deployed into any Kubernetes cluster via a Helm chart
- Beta

One last thing about Services

- A service can be just about anything

- Data & Analytics – e.g. DBs, ElasticSearch
- Integration – e.g. Box, Twitter, SendGrid
- Utilities – e.g conversions, speech to text
- Infrastructure – networks, volumes, routing
- DevOps – monitoring, metrics, auto-scaling

Questions

More information:

- https://svc-cat.io
- https://github.com/kubernetes-incubator/service-catalog
- https://www.openservicebrokerapi.org/
- Deep Dive session: Wednesday, May 22nd, 14:00 - 14:35 (Hall 8.1 G3)
- If you're interested in contributing, we'll be hosting weekly SIG meetings at 1 PM PST or 7 AM PST on the first Monday of every month @ https://zoom.us/j/7201225346

SIG-Service Catalog Deep-Dive

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Agenda

- Open Service Broker API
- Kube-Service Catalog Architecture
- Design Challenges
- Recent Features
- Future Plans

Open Service Broker API

- Specification of an API to allow automated deployment, management, and use of services
  - Cloud-native apps require resources such as stable storage, etc
  - App developers shouldn’t have to care about how the service is managed
  - OSB API abstracts all of this away

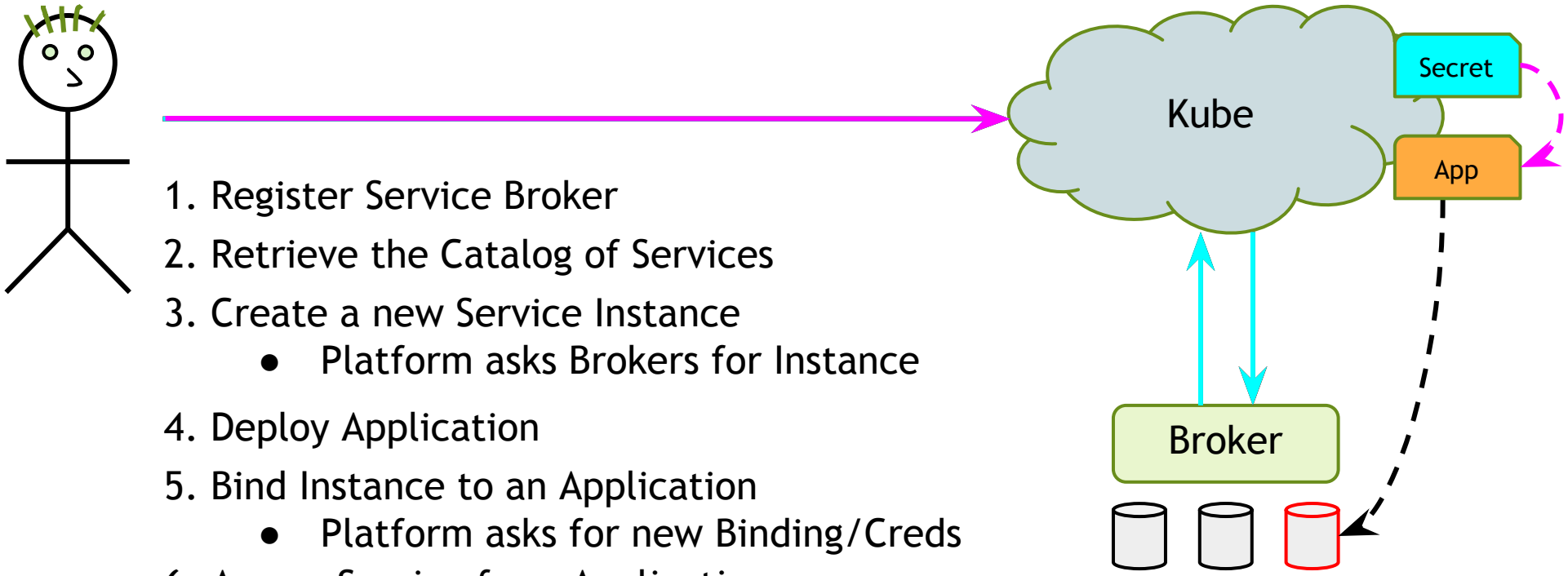
- Client side implemented by Service Catalog
  - managed through custom resource types

- Server side implemented by service provider as a ‘broker’
  - get catalog endpoint
  - provision service endpoint
  - bind service endpoint

Service Catalog Resource Types

- ClusterServiceBroker
  - A server running somewhere that offers various services, e.g. MySQL Broker
- ClusterServiceClass
  - A category of services offered by a Broker, e.g. MySQL Databases
- ServicePlan
  - A specific type of a Service that a Broker offers, e.g. 100 MB MySQL Databases
- ServiceInstance
  - A single instantiation of a Service/Plan, e.g. Jonathan's 100 MB MySQL Database
- ServiceBinding
  - A unique set of creds to access a specific Instance, e.g. username/password for Jonathan's 100 MB MySQL Database

The Magic



1. Register Service Broker
2. Retrieve the Catalog of Services
3. Create a new Service Instance
    - Platform asks Brokers for Instance
4. Deploy Application
5. Bind Instance to an Application
    - Platform asks for new Binding/Creds
6. Access Service from Application
    - Using Creds from Binding Secret

Design Issues - API Aggregation

- CRDs didn’t exist yet, TPRs were buggy
- Didn’t want Service Catalog to have access to the main etcd in Kube for security reasons
- Solution: implement our own apiserver, use API aggregation to hook it in
- Allows normal interaction, i.e. `kubectl create -f serviceinstance.yml`

Design Issues - GUIDs vs. Names

- Kube names are fixed
- OSB API resources have mutable names, and fixed GUIDs
- Service Catalog types use OSB API GUID as the name, and have a mutable ExternalName field
- svcat cli tool alleviates this pain by referencing human-readable ExternalNames as much as possible

```
metadata:
   name: 12kbac-adad12kbasd // from the broker; immutable
   uid: affd6f9b-defe-11e8-87bb-0242ac110007 // generated by Kube
spec:
   externalName: mysql // from the broker; can change
   externalID: 12kbac-adad12kbasd // same as metadata.name
```

Design Issues - Broker Synchronization

- Kube isn’t the sole source of truth
- Declarative control flow allows users to manipulate Service Catalog resources at-will
- Broker can still reject these changes
- Ongoing work to fix these sync issues

Release 0.2.0

- Official release of namespaced resources
  - Allows operators to make specific services available to specific users
  - Allow developers to manage their own brokers
- Original resource types available cluster-wide
- Allow Kube operators and users to grant selective access to service brokers/classes/plans
  - Namespaced brokers
  - Catalog Restrictions

CRDs

- Transitioning from an API Server to CRDs
- Adding a mutating webhook server to replicate minor functionality from our old API Server
- Still a work-in-progress

Future Plans

- Improve synchronization between Kube and brokers
- User-Provided Services to allow use of legacy services with service catalog
- Pod presets
- Coming up on 1.0.0

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