Operator Lifecycle Manager
Late 2017...

Tectonic 1.8 and the Open Cloud Services Catalog are now available

December 19, 2017 • By Neil McAllister

Tectonic 1.8, the latest release of our enterprise-ready Kubernetes platform, is now available. This version, which we announced ahead of KubeCon + CloudNativeCon North America earlier this month, is the first to ship with a catalog of industry-first Open Cloud Services that enable users to deploy key infrastructure components with the ease of managed cloud vendor offerings but without cloud vendor lock-in.

The first three offerings in the CoreOS Tectonic Open Cloud Service Catalog are based on etcd, Prometheus, and Vault. You can learn more about what each of these services delivers in our previous blog post, and we’ll dive into each of them in separate posts soon. What all Open Cloud Services share in common, though, is that they automate key operational tasks such as security updates, scaling and handling failover, making backups, and so on, allowing users to concentrate their focus on managing their applications and not the infrastructure they run on.

These powerful services are the latest building blocks in the complete Tectonic platform, which combines pure, upstream open source Kubernetes with features like authentication and authorization, monitoring and alerting, and ease of installation and management. For more information on what’s new with Tectonic 1.8, check out the release notes.
Tectonic 1.8 Dashboard with OCS

Open Cloud Services

<table>
<thead>
<tr>
<th>NAME</th>
<th>PROVIDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Cloud Services</td>
<td>CoreOS, Inc</td>
</tr>
</tbody>
</table>

Applications

<table>
<thead>
<tr>
<th>NAME</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>etcd 0.6.1 by CoreOS, Inc</td>
<td>Enabled (1 namespace)</td>
</tr>
<tr>
<td>Prometheus 0.14.0 by CoreOS, Inc</td>
<td>Enabled (1 namespace)</td>
</tr>
<tr>
<td>Vault 6.1.3 by CoreOS, Inc</td>
<td>Enabled (1 namespace)</td>
</tr>
</tbody>
</table>
What is the Operator Lifecycle Manager (OLM)?
OLM is the..

Installation (InstallPlan)

Definition (ClusterServiceVersion)

Resolution (CatalogSource)

Upgrading (Subscription/Package)

of....
Operators!
Okay..but what IS it?
OLM...

- Provides an App-Store like experience for discovering and installing Operators.
- Automated upgrades for Operators.
- Provides a framework building rich, reusable UIs.
- Package management and dependency resolution.
That’s all good..but seriously...

What IS IT?
An Operator.
But not just one Operator.

Three Operators.

- OLM-Operator
- Catalog-Operator
- Package-Server
Before we dive into the details, let’s take a couple of steps back and visualize our environment in the context of OLM.
Deploying an Operator via OLM
ClusterServiceVersion is Analogous to a Package
ClusterServiceVersion Manifest

ClusterServiceVersion

- Metadata
- Deployment Spec
- Owned CRD
  - Descriptors
- Required CRD
  - Descriptors
Updating to a New CSV

ClusterServiceVersion
myoperator.v0.1.0

- Metadata
- Deployment Spec
- Owned CRD
  - Descriptors
- Required CRD
  - Descriptors

ClusterServiceVersion
myoperator.v0.2.0

- Metadata
  - replaces
    - myoperator.v0.1.0
- Deployment Spec
- Owned CRD
- Descriptors
- Required CRD
- Descriptors
InstallPlan is similar to a Package Manager

- yum
- apt
- pip
- Gopkg.lock
InstallPlan Manifest

- InstallPlan
- Desired CSVs
- Status
  - Resolved CSVs
  - Resolved CRDs
# InstallPlan Manifest

<table>
<thead>
<tr>
<th>InstallPlan</th>
<th>Desired CSVs</th>
<th>Status</th>
<th>Resolved CSVs</th>
<th>Resolved CRDs</th>
</tr>
</thead>
</table>

Red Hat
Catalog Source Manifest

- CatalogSource
- CSVs
- CRDs
- Packages
- Channels
Subscription Manifest

- Subscriptions
- Package
- CatalogSource
Dependency Management!

- **CatalogSource**
  - CSVs
  - CRDs
  - Packages
  - Channels

- **Subscription**
  - Package
  - Channel
  - CatalogSource

- **ClusterServiceVersion**
  - Metadata
  - Deployment Spec
  - Owned CRD
  - Descriptors
  - Required CRD
  - Descriptors

- **InstallPlan**
  - Desired CSVs
  - Status
  - Resolved CSVs
  - Resolved CRDs
OLM OpenShift Environment

CRDs
- Subscription
- InstallPlan
- CatalogSource
- ClusterServiceVersion

Admin
accounting

kube-system

User

openshift-operator-lifecycle-manager

OLM-Operator
- olm-operator-serviceaccount

Catalog-Operator
- olm-operator-serviceaccount

Package-Server
- olm-operator-serviceaccount

CatalogSource1
- Publisher: Google
- sourceType: Internal

CatalogSource2
- Publisher: Red Hat
- sourceType: External

ConfigMap
- etcd.package.yaml
- etcdbackup.crd.yaml
- etcdcluster.yaml
- etcdexample.crd.yaml
- etcdoperator.clusterextension.yaml
- etcdoperator.v0.9.3.clusterextension.yaml
- etcdoperator.v0.9.2.clusterextension.yaml
- etcdoperator.v0.9.1.clusterextension.yaml
- etcdoperator.v0.9.0.clusterextension.yaml
Deploying an Operator via OLM

CRDs
- Subscription
- InstallPlan
- CatalogSource
- ClusterServiceVersion
- OperatorGroup
- InfraVars
- Add CRDs...

OwnerRef: ClusterServiceVersion
- ServiceAccount
  - Name: contrail-operator
  - ownerRef: ClusterServiceVersion
- Role
  - Name: contrailoperator.v0.9.0-0
  - ownerRef: ClusterServiceVersion
- RoleBinding
  - Name: contrailoperator.v0.9.0-0
  - ownerRef: ClusterServiceVersion
- contrail-operator (Deployment)
  - ownerRef: ClusterServiceVersion

Subscription
- name: contrail
  - channel: stable
  - source: CatalogSource2
  - ownerRef: Subscription

InstallPlan
- Subscription
  - clusterServiceVersion
  - contrail-operator.v0.1.0
  - Approval: Manual
  - ownerRef: Subscription

OperatorGroup
- InfraVars

CatalogSource
- sourceType: External
  - Publisher: Google
  - etcd.package.yaml
  - etcdbackup.crd.yaml
  - etcdcluster.crd.yaml
  - etcdoperator.cluster.crd.yaml

CatalogSource
- sourceType: Internal
  - Publisher: Red Hat
  - contrail-operator.yaml
  - contrail-operator.clusterversion.yaml
  - contrail-operator.cluster.crd.yaml

Package Server
- etcdoperator.cluster.crd.yaml
- contrail-operator.yaml

User
- Admin

kube-system
- openshift-operator-lifecycle-manager

accounting
User Creates CR

---

**kube-system**

**User**

- **Kind: Subscription**
  - Name: contrail
  - channel: stable
  - source: CatalogSource2

- **Kind: InstallPlan**
  - Name: contrail-operator.v0.1.0
  - Approval: Manual/Automatic

- **Kind: Role**
  - Name: contrailoperator.v0.1.0-0

- **Kind: RoleBinding**
  - Name: contrailoperator.v0.1.0-0

- **Kind: Deployment**
  - Name: contrail-operator

**CRDs**

- Subscription
- InstallPlan
- CatalogSource
- ClusterServiceVersion
- OperatorGroup
- InfraVars

**Operator Groups**

- openshift-operator-lifecycle-manager
- OLM-Operator
- Catalog-Operator
- Package-Server

**CatalogSources**

- CatalogSource1
  - Publisher: Red Hat
  - sourceType: External
  - CRDs
    - etcd.package.yaml
    - etcdbackup-crd.yaml
    - etcdcluster-cr.yaml
    - etcdOperator.cr.yaml
    - etcd-operator-cluster-serv-cr.yaml
    - etcdoperator.v0.0.cluster-serv-cr.yaml
    - etcdoperator.v0.0.cluster-serv-cr-yaml
    - etcdoperator.v0.2.cluster-serv-cr.yaml

- CatalogSource2
  - Publisher: Google
  - sourceType: Internal
  - CRDs
    - etcd.package.yaml
    - etcdbackup-crd.yaml
    - etcdcluster-cr.yaml
    - etcdOperator.cr.yaml
    - etcd-operator-cluster-serv-cr.yaml
    - etcdoperator.v0.0.cluster-serv-cr.yaml
    - etcdoperator.v0.0.cluster-serv-cr-yaml
    - etcdoperator.v0.2.cluster-serv-cr.yaml

**Add CRDs**
Updating CatalogSource

kind: ServiceAccount
Name: etcd-operator

kind: Role
Name: etcd-operator:v0.9.0-0

kind: RoleBinding
Name: etcd-operator:v0.9.0-0

Kind: Deployment
etcd-Operator
etcd-operator

ownerRef: ClusterServiceVersion

kind: CRDs
subscription
installplan
catalogsource
clusterserviceversion
etcdclusters
etcdbackups
etcdrestore

CRDs

kind: Subscription
name: etcd
channel: alpha
source CatalogSource1

Kind: InstallPlan
clusterServiceVersionName
-etcd-operator.v0.9.0
Approval: Manual/Automatic

Kind: etcdCluster
name: myetcdcluster
spec.node: 3

ownerRef: etcd-pod1
ownerRef: etcd-pod2
ownerRef: etcd-pod3

ownerRef: Subscription

kind: InstallPlan
clusterServiceVersionName
-etcd-operator.v0.9.2
Approval: Manual/Automatic

ownerRef: Subscription