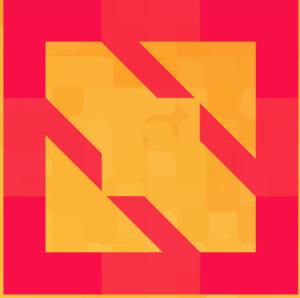




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CloudNativeCon

North America 2019





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Provider IBM Cloud

Subproject of Kubernetes SIG Cloud Provider

*Sahdev Zala
Richard Theis
Khalid Ahmed
Brad Topol*



Agenda

- Overview of the project
- Overview of the IBM Cloud
- Deep dive
 - Activities
 - IBM Cloud Provider
 - Cluster API Provider IBM Cloud
 - Discussion

Introduction

- ❑ What happened after KubeCon Barcelona 2019 in the Kubernetes Cloud Provider SIGs?
- ❑ SIG IBM Cloud is now Provider IBM Cloud
 - Subproject of Cloud Provider SIG

Overview of Provider IBM Cloud



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- ❑ A Cloud Provider SIG subproject for building, deploying, maintaining, supporting, and using Kubernetes on IBM Public and Private Clouds
 - Both participate in the CNCF Certified Kubernetes Conformance Program and are certified
- ❑ Many developers and leaders from IBM Cloud work openly in this group to determine the future of IBM Cloud team's involvement in the Kubernetes community
- ❑ You can follow the evolution of the IBM Cloud platforms with respect to Kubernetes and related CNCF projects
- ❑ You interact directly with the team that builds and operates IBM Cloud

Structure



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❑ Co-chairs

- Khalid Ahmed (ICP)
- Richard Theis (IKS and ROKS)
- Sahdev Zala (OSS)

❑ Charter

- Scope and Governance

<https://github.com/kubernetes/community/blob/master/sig-ibmcloud/charter.md>

❑ Mailing List

<https://groups.google.com/forum/#!forum/kubernetes-provider-ibmcloud>

❑ More about the project

<https://github.com/kubernetes/community/tree/master/sig-ibmcloud>

Activities

❑ Meet every other week

- Wednesday at 14:00 EST
- Meeting recordings

<https://bit.ly/sig-ibmcloud-videos>

- Presentations on various topics
- Presentation from SIG members from IBM, Sysdig etc

❑ Slack discussions #sig-ibmcloud

❑ Quarterly updates to the Kubernetes community

❑ Subprojects and upstream contributions

- Cluster-api-provider-ibmcloud
- Support for out-of-tree IBM Cloud Provider (WIP)

❑ Participation in the SIG Cloud Provider general activities

Overview of IBM Cloud



❑ Public

- IBM Cloud Kubernetes Service (IKS)
- Red Hat OpenShift on IBM Cloud (ROKS)

❑ Multi Cloud Manager (MCM)

IBM Cloud Kubernetes Service is a **managed offering** to create your own Kubernetes cluster of compute hosts to deploy and manage containerized apps on IBM Cloud. As a certified Kubernetes provider, IBM Cloud Kubernetes Service provides intelligent scheduling, self-healing, horizontal scaling, service discovery and load balancing, automated rollouts and rollbacks, and secret and configuration management for your apps.

<https://www.ibm.com/cloud/container-service>



IKS and **Kubernetes** had **4** releases in **2019**. Are you staying current? Are users of IKS (or other cloud providers) staying current? Does **Kubernetes** need an **LTS**? There are many question and concerns around this pace. Please contribute to the community discussions: <https://docs.google.com/presentation/d/12tzP3scecY-rc7GItcOGAC41ZpMBXdBcuT5a7cl-n0/>

Supported?	Version	IBM Cloud Kubernetes Service release date	IBM Cloud Kubernetes Service unsupported date
✓	1.16	04 Nov 2019	Nov 2020 
✓	1.15	05 Aug 2019	Aug 2020 
✓	1.14	07 May 2019	May 2020 
!	1.13	05 Feb 2019	19 Feb 2020 
✗	1.12	07 Nov 2018	03 Nov 2019

Red Hat OpenShift on IBM Cloud is a **managed offering** to create your own OpenShift cluster of compute hosts to deploy and manage containerized apps on IBM Cloud. Red Hat OpenShift on IBM Cloud provides intelligent scheduling, self-healing, horizontal scaling, service discovery and load balancing, automated rollouts and rollbacks, and secret and configuration management for your apps.

<https://www.ibm.com/cloud/openshift>

Supported?	OpenShift / Kubernetes version	Red Hat OpenShift on IBM Cloud release date	Red Hat OpenShift on IBM Cloud unsupported date
	3.11 / 1.11	1 Aug 2019 at 0:00 UTC	

IBM Cloud Provider: KCM

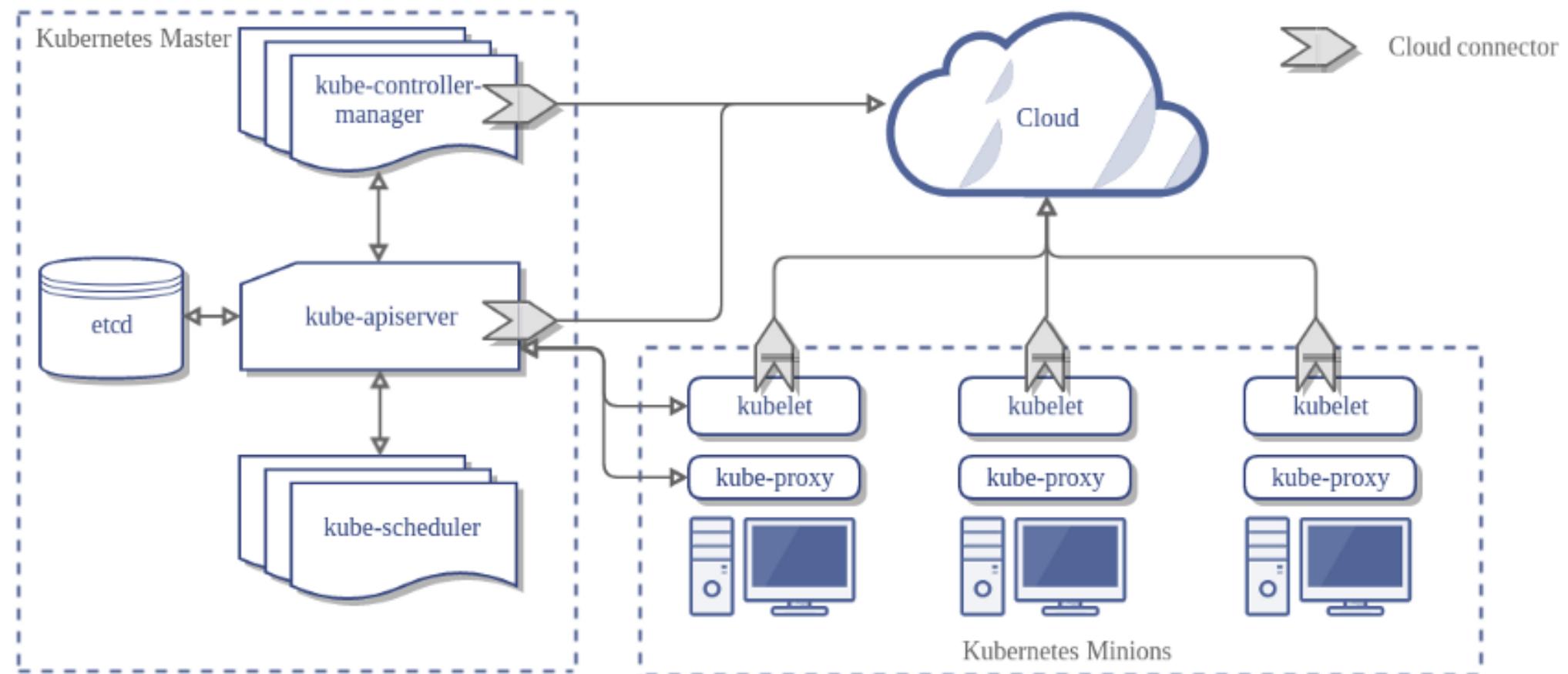


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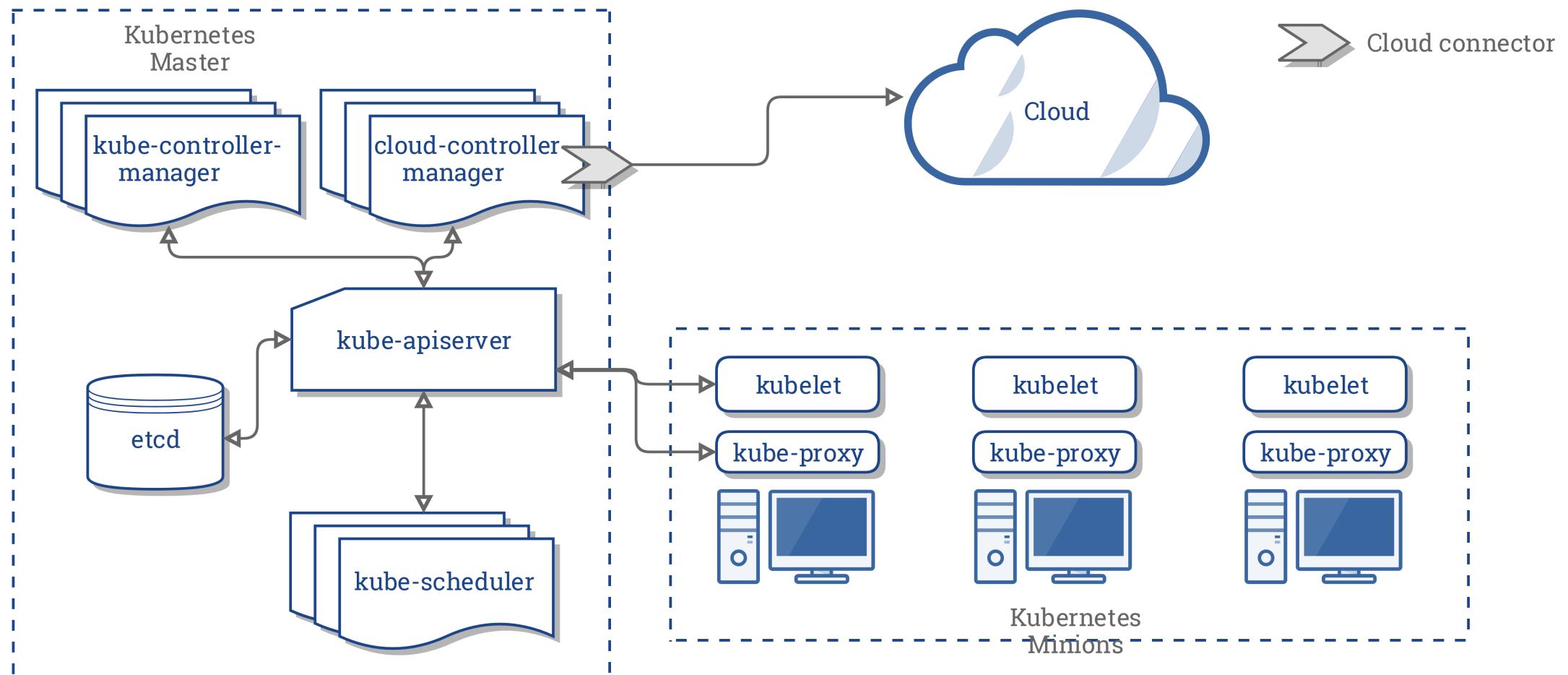
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Kubernetes cluster architecture **without** cloud controller manager



IBM Cloud Provider: CCM

Kubernetes cluster architecture **with** cloud controller manager



IBM Cloud Provider: Interfaces



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❑ Load Balancer

- NLB version 1.0, iptables based, in-cluster network load balancer
- NLB version 2.0 (beta), IPVS based, in-cluster network load balancer
- **New:** VPC layer 7 LB

❑ Instances (i.e. Nodes)

- Relies on node bootstrap to setup node labels
- **New:** Now works with KCM or CCM architecture

❑ Zones

- Relies on node bootstrap to setup node labels
- **New:** Now works with KCM or CCM architecture

IBM Cloud Provider: Interfaces



❑ Clusters

- Not implemented.

❑ Routes

- Not implemented. Calico provides routing.

IBM Cloud Provider: Migration

- ❑ ROKS clusters already use CCM
- ❑ IKS clusters will migrate from KCM to CCM soon
 - Community tracking sheet with IBM Cloud Provider status:
<https://docs.google.com/spreadsheets/d/1gg0lWRQs26BgbNRmNHSykX065IakSnwN9WDRpNGoY78/>
 - Migration tentatively planned to align with Kubernetes version 1.17
 - Controller locking is one of the key issues to be handled during migration

IBM Cloud Provider: Future



- Continue work on KCM to CCM migration
- Open source IBM Cloud Provider
- Improve documentation
- Integrate with Kubernetes test grid
- Container image security

Multi Cloud Manager (MCM)



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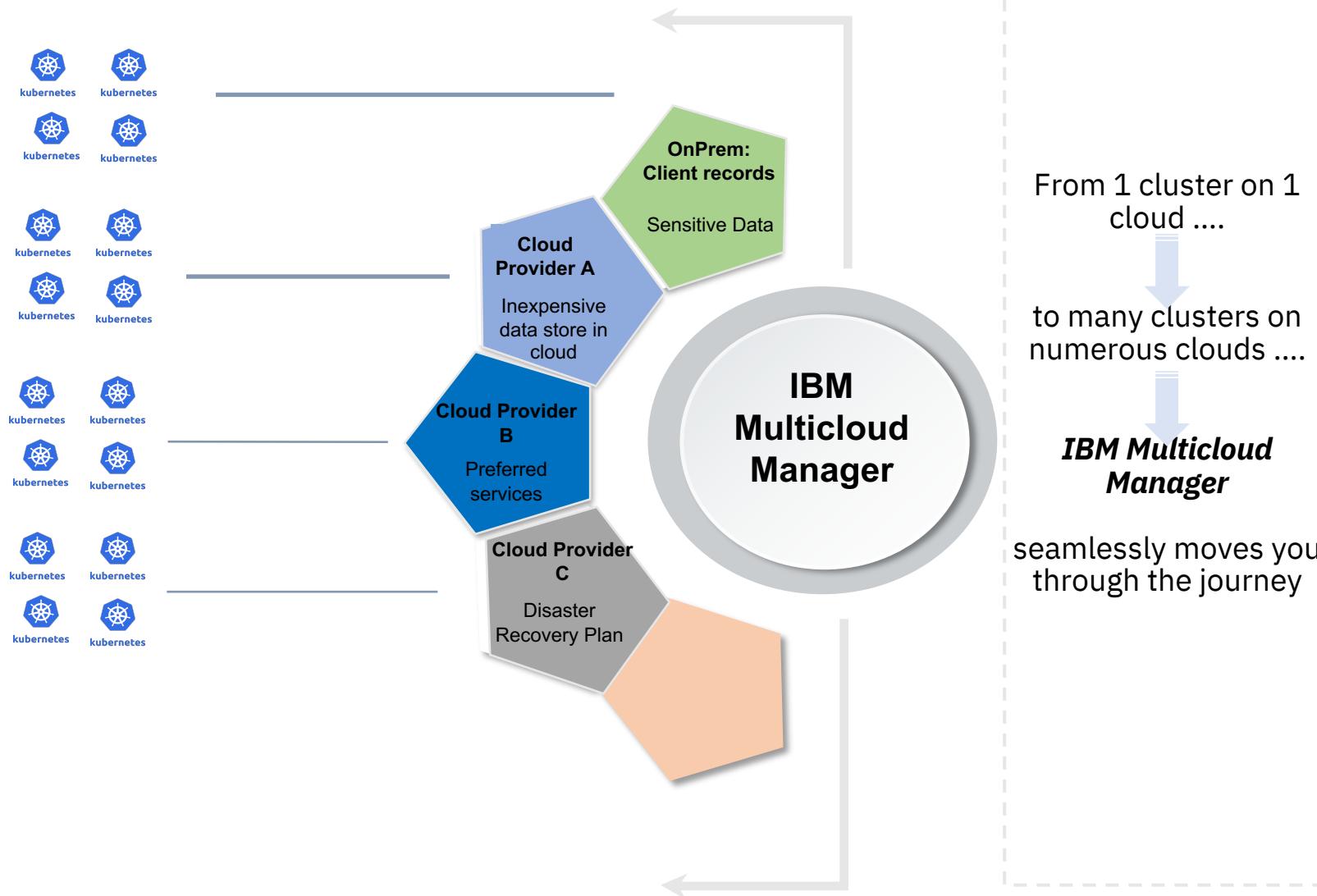
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Multiple clusters to manage geographical data residency laws

Reduce on prem storage costs by storing non sensitive data in public cloud

Leverage most desired services in preferred cloud (AI/Analytics/object storage)

Load all applications on another provider maintain operations if one provider goes down (disaster recovery)



Multi Cloud Manager



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Simplified Multi-Cluster Management



Policy Based Role & Compliance Management



Multi-Cluster Application Management



Works across Public & Private Environments



Event & Service Management Integration



Integrated Operational Tools

IBM Multicloud Manager

Overview

Create resource Catalog Refresh every 20s

AWS	Azure	Google	IBM
2 Clusters 01 EKS 01 RHOC	1 Clusters 01 AKS	2 Clusters 01 GKE	9 Clusters 04 ICP 02 IK8 01 RHOC 02 Other

Storage usage: below average (11.56 - 86.62GiB) above Used by: pods

1 Apps 13 Clusters 8 Kubernetes Types 4 Regions 15 Nodes 640 Pods

Group By Purpose Size Pods Shade Storage

Dev Prod

Cluster compliance 13 Pods 640 Cluster status 13

Create Compliance

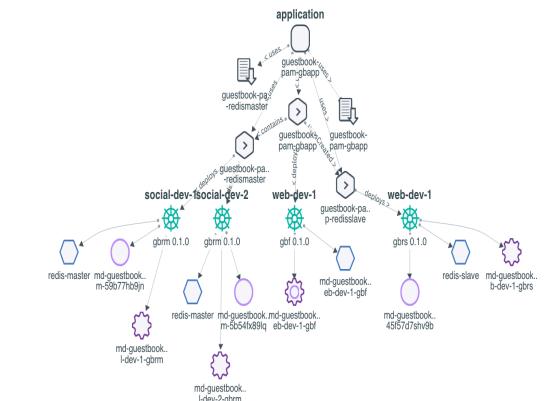
Paste content from your compliance YAML file in the editor.

```
1 51 -           - from:
2   52             - podSelector: {}
3   53               podSelector:
4   54                 matchLabels: null
5   55             - complianceType: musthave
6   56               objectDefinition:
7   57                 apiVersion: v1
8   58                 kind: LimitRange
9   59               metadata:
10      60                 name: mem-limit-range
11               spec:
12                 limits:
13                   - default:
14                     memory: 512Mi
15                   defaultRequest:
16                     memory: 256Mi
17                   type: Container
18               remediationAction: enforce
```

Cancel

Create Compliance

Create Application +



Hybrid Multicloud



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Modernize once,
Avoid recoding expense

Innovate anywhere
with anyone's technology

Move freely,
optimize for cost savings

Foundation

Common Services | RHEL | RH OpenShift | Multi-cluster Management

Infrastructure



IBM Public
Cloud



AWS



Azure



Google



Edge



Private



Systems

- *OpenShift Kubernetes platform for portability*
- *Choice of more cloud vendors and infrastructure*

- *Deployable as private cloud, on premises*
- *Support for multiple open standards across hybrid*

- *Virtualization to bridge legacy to the cloud*
- *Common services for consistency and compliance*

Cluster API Provider IBM Cloud



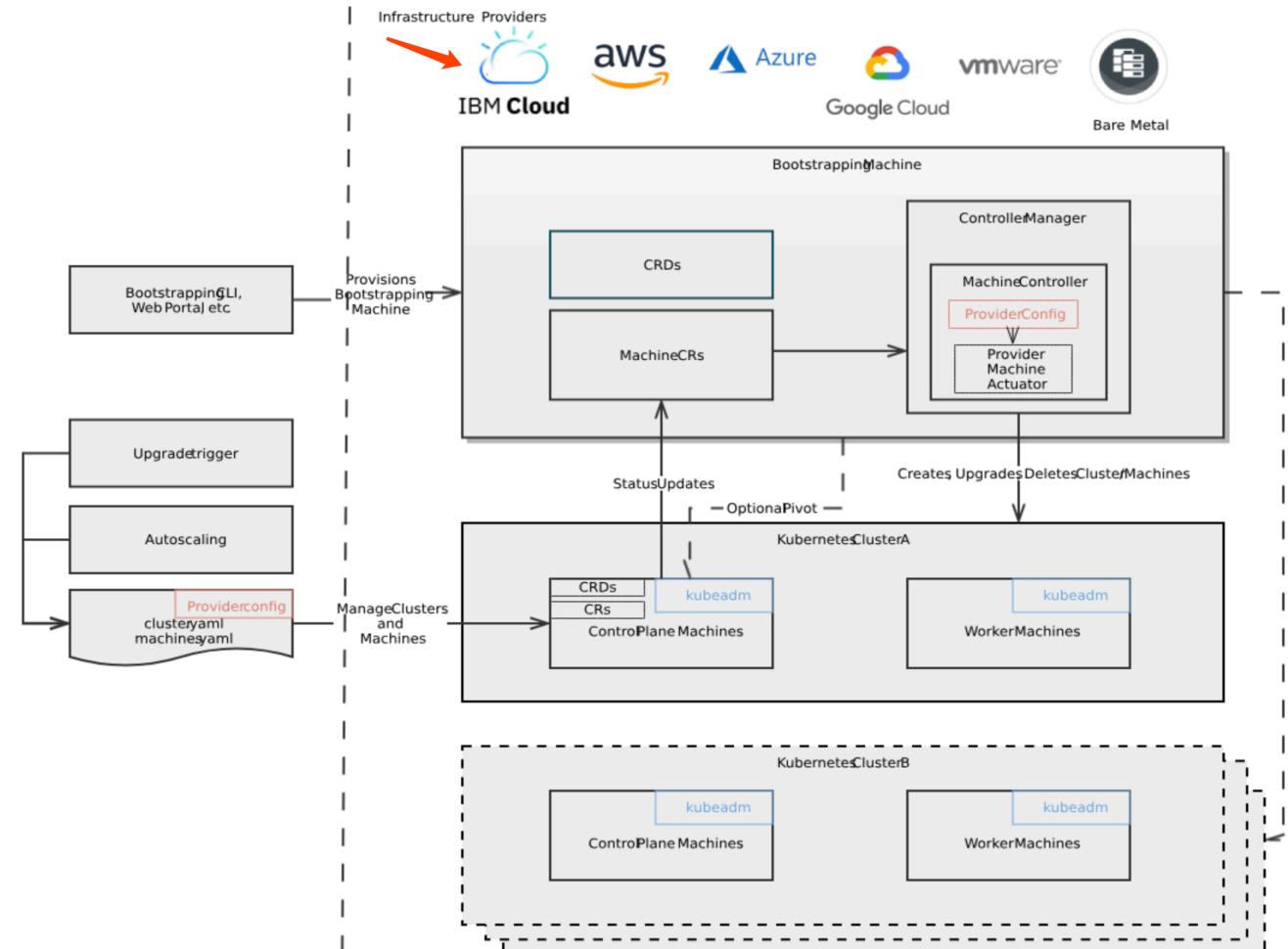
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Cluster API Overview

- Target cluster
 - The declared cluster we intend to create and manage
- Bootstrap/Management cluster
 - The cluster that manages the target cluster
 - Possibly the same cluster
- `clusterctl`
 - Community CLI tool that favors a provider implementation for creating and managing a cluster
- Provider implementation
 - An implementation of the API specific to a cloud (IBM Cloud, Google, OpenStack, etc)



Kabanero – 100% open source



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Built for developers, scaled for the enterprise

Cloud Native
Frameworks

Integrated Dev
Tools

Automated
DevOps Tools



Open Cloud Ecosystem

Simplified development

Scalable Development

Operate at Scale

Modernize your applications, operations, and culture

Appsody



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Pre-built stacks for popular open source runtimes and frameworks that simplify building cloud-native apps in containers

appsody: CLI

Containerized iterative development

dev | test | debug | build | deploy

Spring Boot® on Open Liberty Spring Boot on Open Liberty & OpenJ9 using Maven Select	Node.js Functions Serverless runtime for Node.js functions Select	Eclipse MicroProfile® Eclipse MicroProfile on Open Liberty & OpenJ9 using Maven Select
Python Flask Flask web Framework for Python Select	LoopBack 4 LoopBack 4 API Framework for Node.js Select	Quarkus Quarkus runtime for running Java applications Select

appsody: deploy

Production deploy to Kubernetes or Knative



appsody: stacks

100% Open Source, Built on Standard Technologies

Cloud Paks – Middleware anywhere



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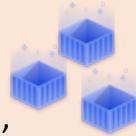
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A faster, more secure way to move your core business applications to any cloud through enterprise-ready containerized software solutions

IBM containerized software

Packaged with Open Source components,
pre-integrated with the common operational services,
and secure by design



Container platform and operational services

Logging, monitoring, security,
identity access management



Complete yet simple

*Application, data and AI services,
fully modular and easy to consume*

IBM certified

*Full software stack support, and
ongoing security, compliance and
version compatibility*

Run anywhere

*On-premises, on private and public
clouds,
and in pre-integrated systems*



Edge



Private



Systems



IBM Cloud

Cloud Paks – Pre-integrated for cloud use cases

Today, IBM offers clients the first five Cloud Paks...

Reduce dev time up to 84%*

Cloud Pak for Applications

Build, deploy, and run applications

IBM containerized software



Container platform and operational services



Make data ready for AI in days

Cloud Pak for Data

Collect, organize, and analyze data

IBM containerized software



Container platform and operational services



Eliminate 33% of integration cost

Cloud Pak for Integration

Integrate applications, data, cloud services, and APIs

IBM containerized software



Container platform and operational services



Reduce manual processes up to 80%*

Cloud Pak for Automation

Transform business processes, decisions, and content

IBM containerized software



Container platform and operational services



Reduce IT op expense by up to 75%*

Cloud Pak for Multicloud Management

Multicloud visibility, governance, and automation

IBM containerized software



Container platform and operational services



IBM Cloud



Discussion

- ❑ How to contribute to cluster-api-provider-ibmcloud
 - <https://github.com/kubernetes-sigs/cluster-api-provider-ibmcloud>
- ❑ In-tree vs out-tree provider
- ❑ Learn more about IBM Cloud Open Design
- ❑ IKS Kubernetes upgrade strategy
- ❑ More...