Kubernetes and Bluemix

Cloud Mumbai Meetup | 14th Oct 2017 | Mohan Pawar

Agenda

- Getting started with Kubernetes
  - Why k8s and its future
  - Container Orchestration
- K8s architecture
- Deploying apps into cluster using Bluemix Container Service(BCS)
- Picking the Right Solution

Containers are Future Deployment Units.

How to deploy containers ?

1. Manual Deployment : using ssh

2. Automated Deployment: Chef/Puppet/Ansible/Saltstack

3. Container Orchestration Tools: Docker Swarm/Apache Mesos/ Kubernetes/Nomad

Why K8s ?

- Engineering
  - **You can only know where you’re going if you know where you’ve been**
- Community
- Easier Container Deployment
- Infrastructure Cost

Cons

- Risk of running latest features in production
- Difficulty understanding to new users
- Needs more documentation

Container Orchestration

- Single controller/management unit
- Scheduling
- Fault tolerant
- Scale on demand
- Optimal resources
- Service discovery
- Update/Rollback without any downtime

What is Kubernetes ?

"Kubernetes is an open-source system for automating deployment, scaling, and management of containerized applications."

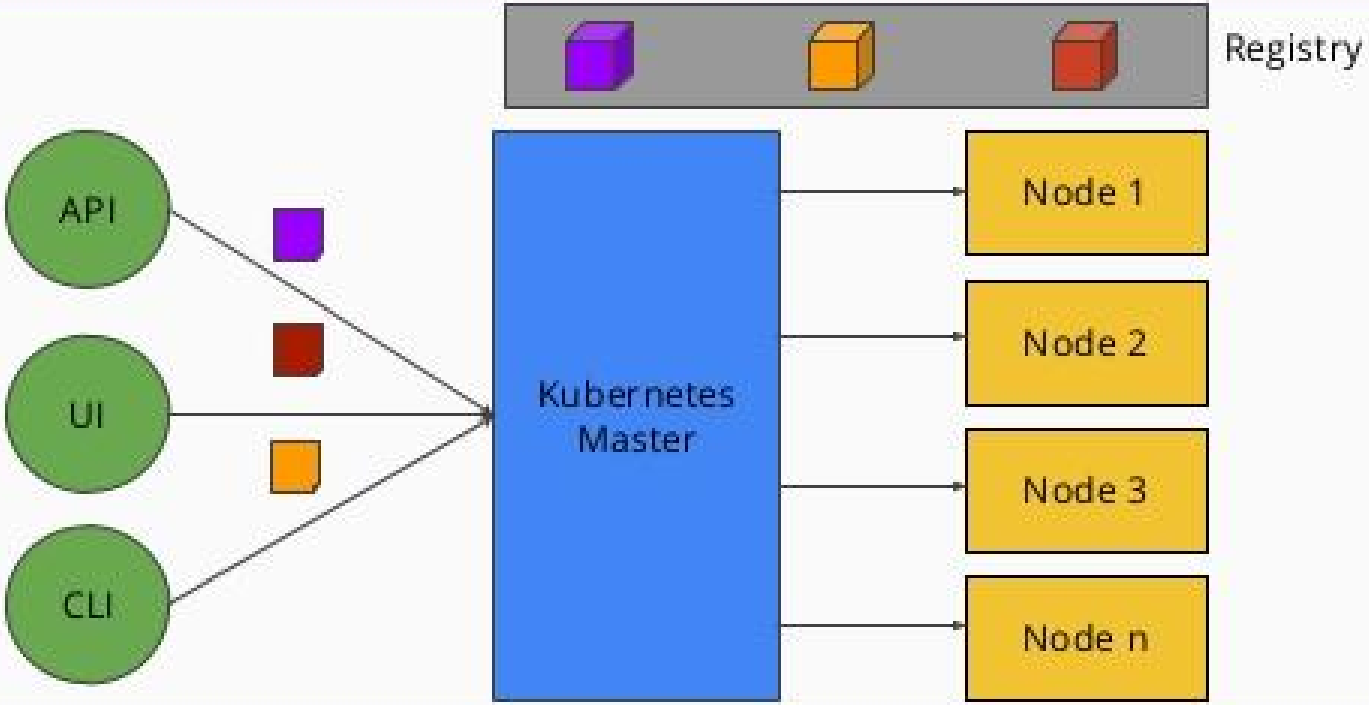
From Borg to Kubernetes

"Google's Borg system is a cluster manager that runs hundreds of thousands of jobs, from many thousands of different applications, across a number of clusters each with up to tens of thousands of machines."

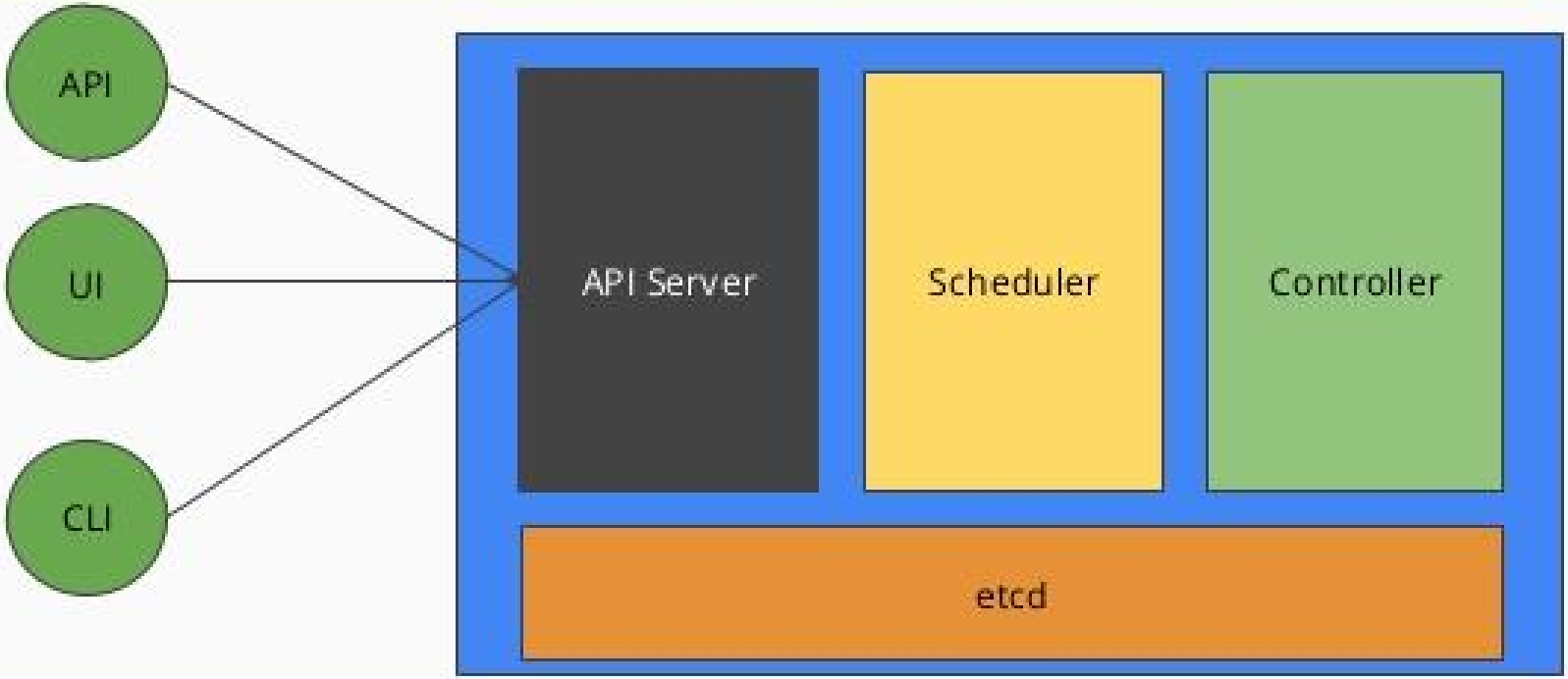
K8s Features

- Automated Scheduling
- Self healing
- Horizontal Scaling
- Service discovery and Load balancing
- Secrets and Configuration Management
- Automated Rollouts and Rollbacks
- Storage orchestration
- Batch Execution

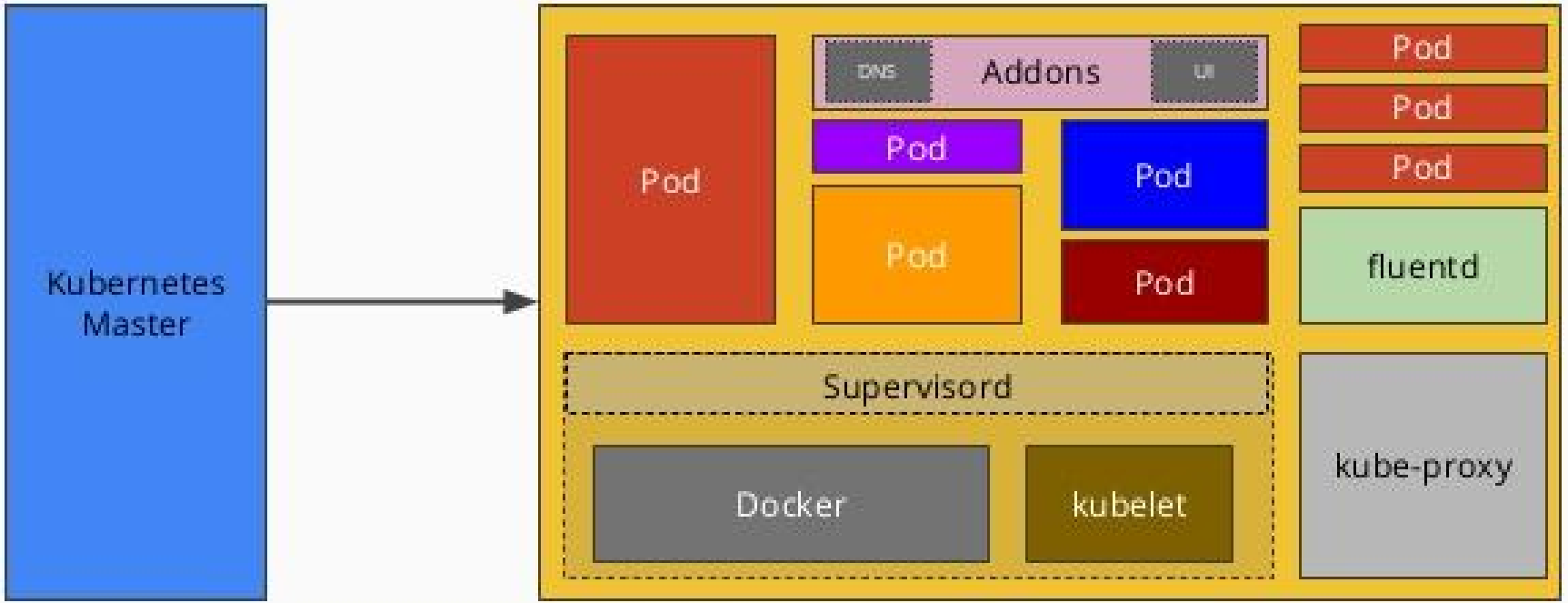
Kubernetes Architecture



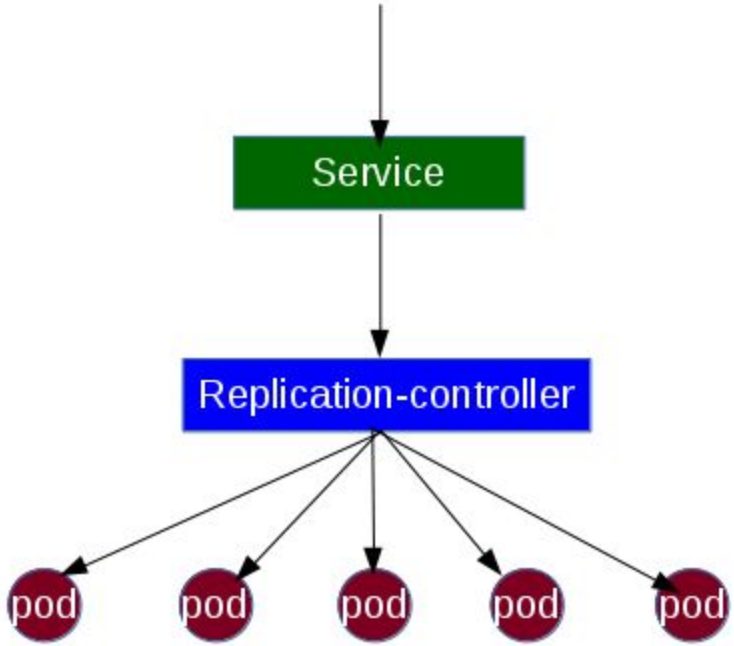
Kubernetes Master



Kubernetes Node



How Kubernetes Works?



HTTP Port : 8000	MYSQL Port : 3306	WORDPRESS Port : 8001
Replicas = 2	Replicas = 1	Replicas =2
Pod x 2	Pod x 1	Pod x 2

Docker host | Docker host | Docker host

We must treat the datacenter itself as one massive warehouse-scale computer.

Kubernetes Key Concept

Pod: Group of tightly coupled containers and volume

Replication Controller: A loop that drives the current state to desired state

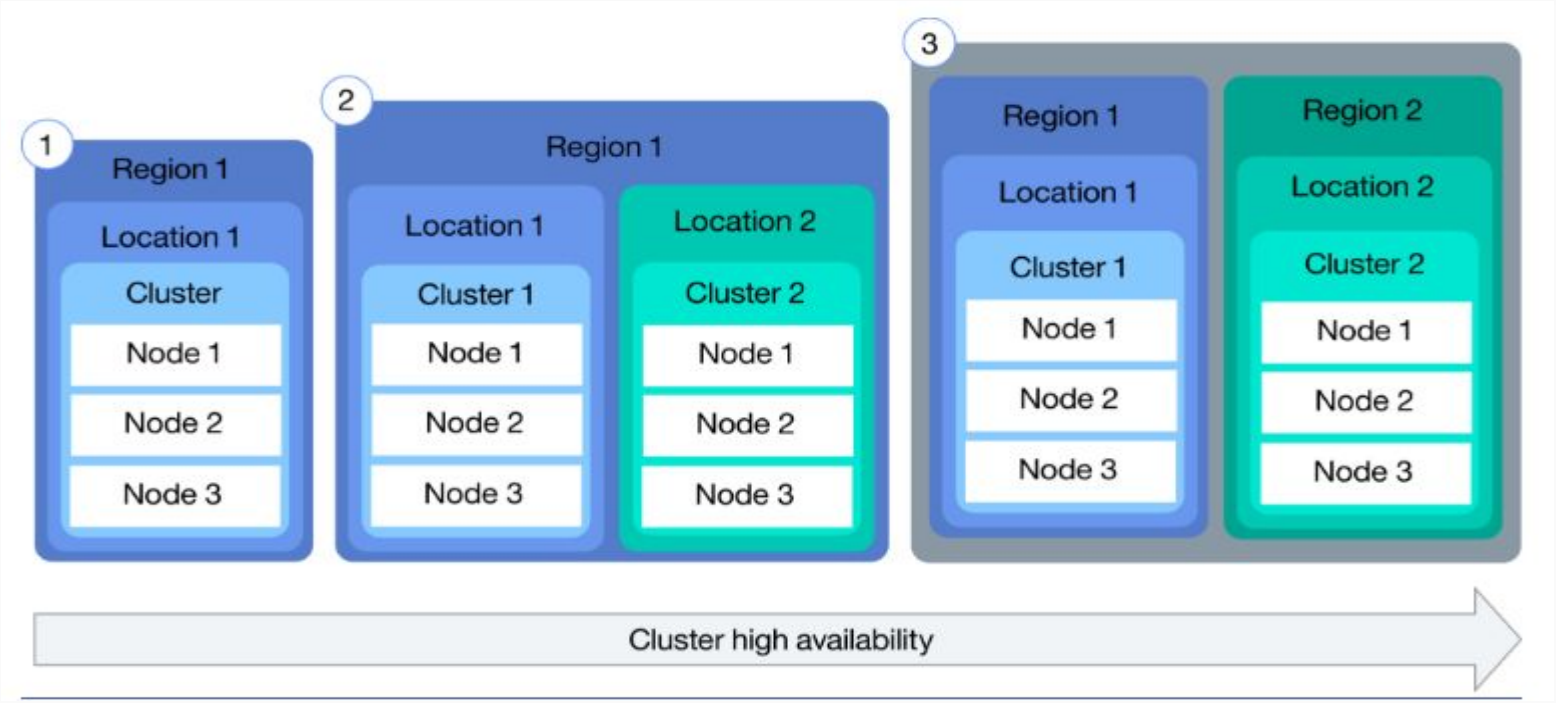
Service: A set of running pods that work together

Volumes: Pod level storage and configuration

Kubernetes components

- One or more Master Components - **API Server, Scheduler, Controller manager, etcd(can be configured externally)**
- One or more Worker Nodes - **Container Runtime, kubelet, kubeproxy**
- Distributed Key-Value store - **etcd(based on Raft Consensus Algorithm)**

Bluemix Container Service(BCS)



Application Lifecycle with IBM BCS

Step 1 - Acquire

Step 2 - Build

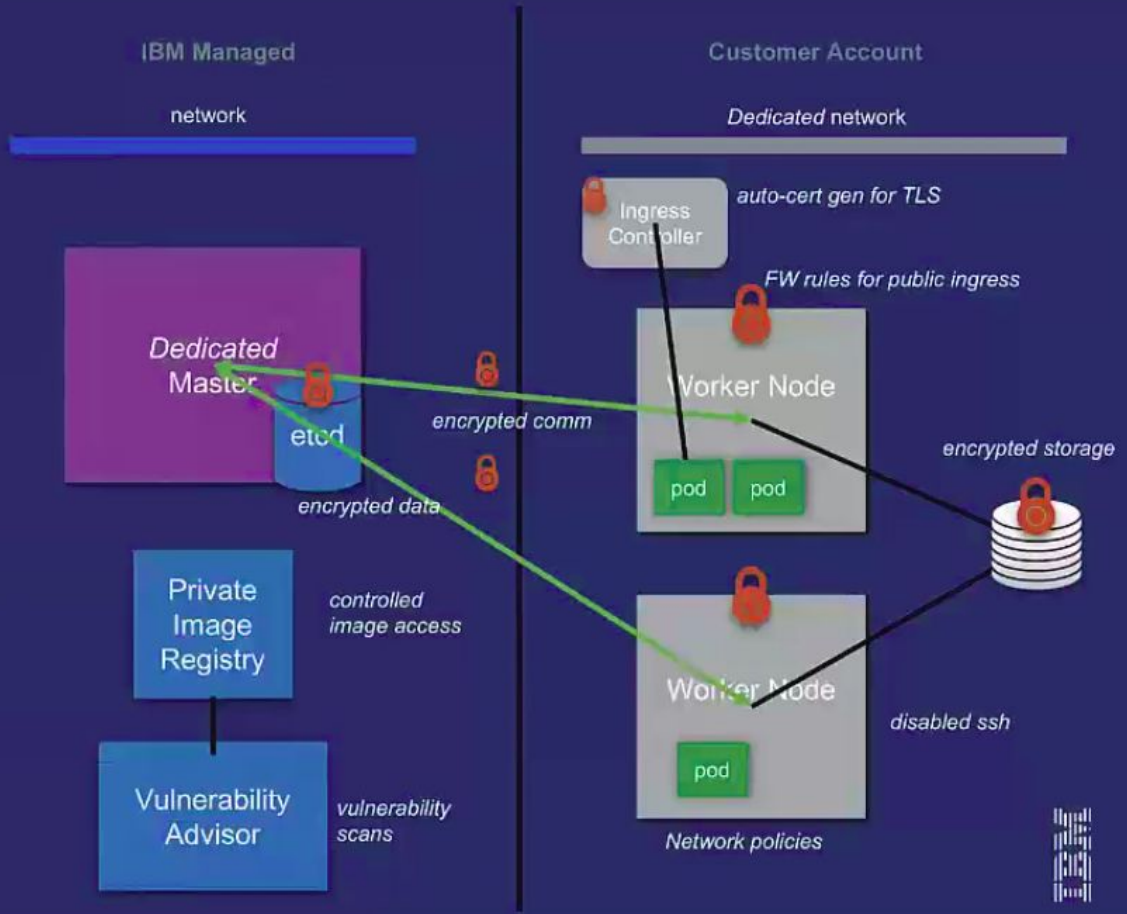
Step 3 - Deliver

Step 4 - Run

Step 5 - Maintain

Characteristics	Lite clusters	Standard clusters
Available in Bluemix Public	✓	✓
Private networking within a cluster	✓	✓
Public app access by a Nodeport service	✓	✓
User access management	✓	✓
Bluemix service access from the cluster and apps	✓	✓
Disk space on worker node for storage	✓	✓
Persistent NFS file-based storage with volumes		✓
Public or private app access by a load balancer service		✓
Public app access by an Ingress service		✓
Portable public IP addresses		✓
Available in Bluemix Dedicated (Closed Beta)		✓

Secure Clusters: Public Default



Setting up K8s Cluster on Bluemix

$ bx plugin list

$ bx login

$ bx target -o org_name -s space_name

$ bx cs clusters

$ bx cs cluster-config cluster_name

$ bx plugin update container-service -r Bluemix

$ kubectl proxy

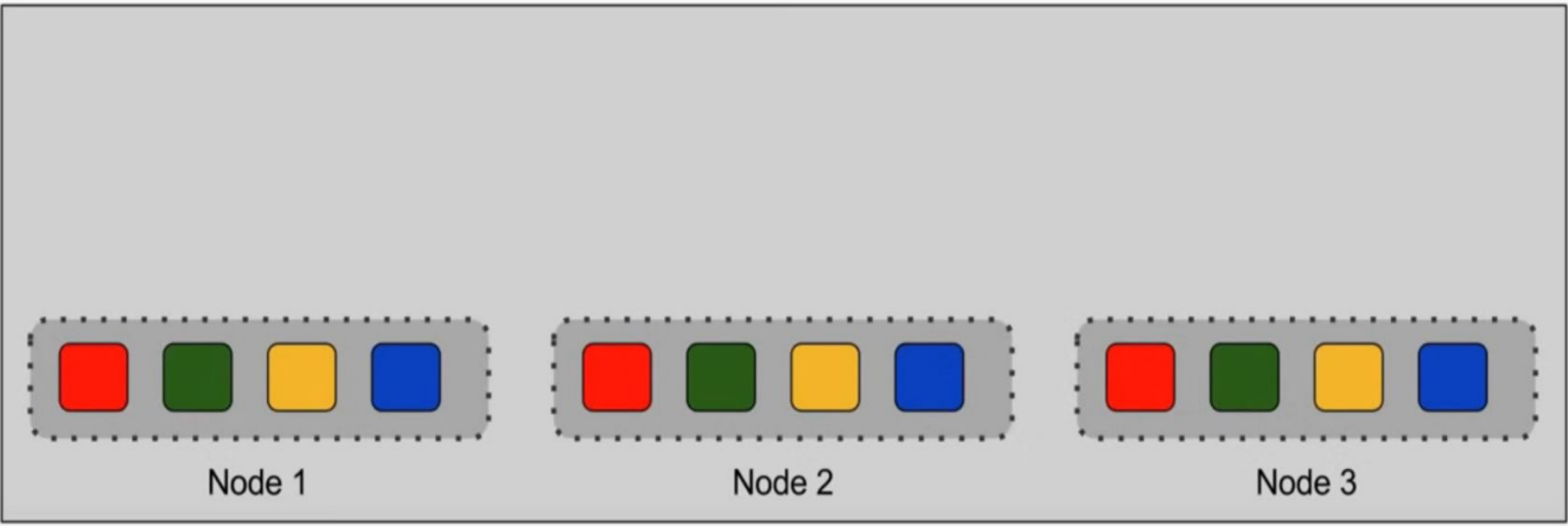
CREATING CLUSTER

USING CLI

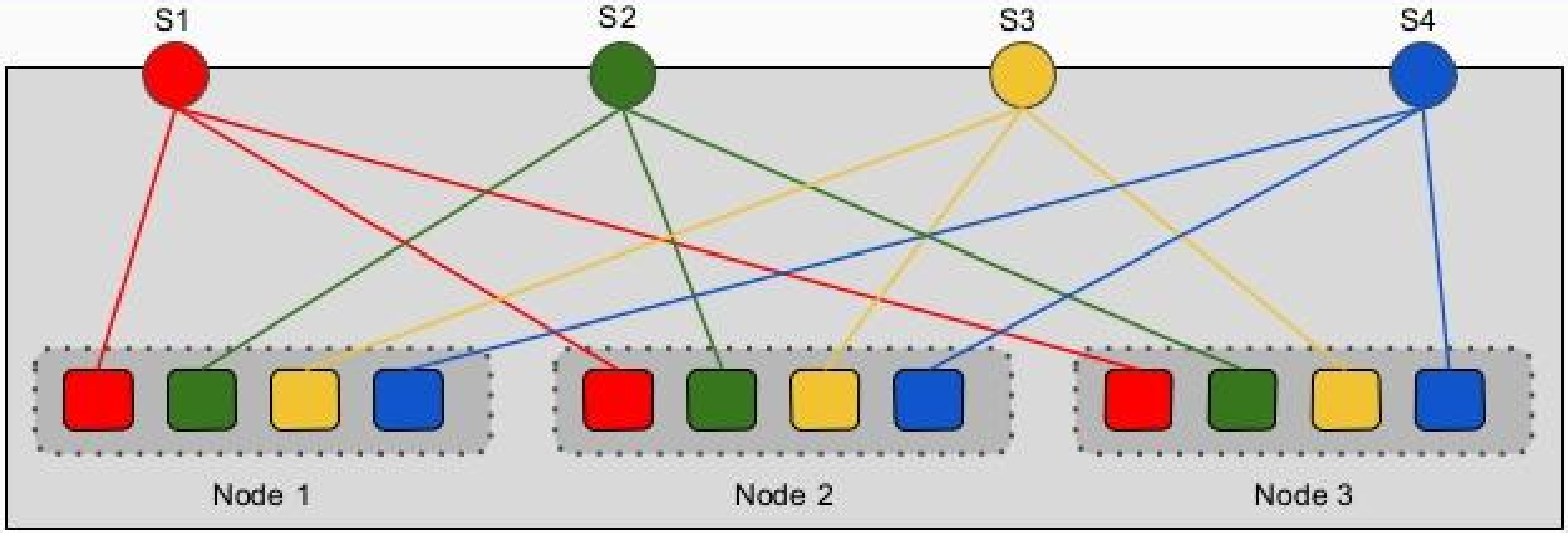
Demo

- Deploying apps into cluster using Bluemix Container Service(BCS)

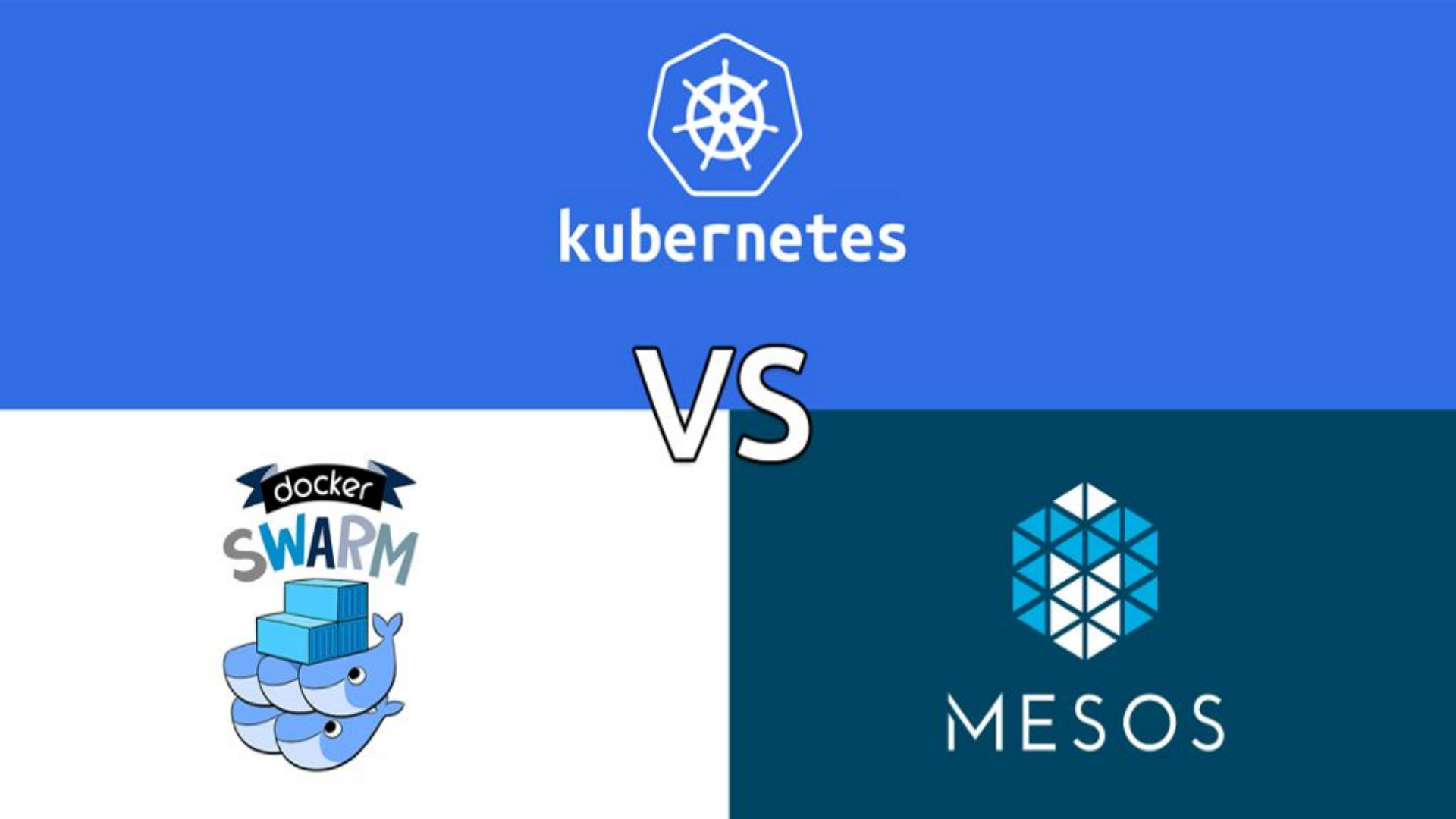
ColorApp Demo



Understanding Services



Picking the Right Solution


kubernetes
VS
docker
SWARM
MESOS

Conclusion

- Kubernetes allows you to deploy and manage application running on multiple host using Docker.
- Container, Micro-service, Kubernetes are long way to go.
- Bluemix Container Service automate the underlying cluster creation and monitoring task.
- Hybrid cloud strategy is the key aspect kubernetes.

Q/A

Thank you

Ask any further questions.

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