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Deploying & Managing Containerized Workloads in the Cloud

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Session 3

Getting Started with Kubernetes

Agenda

- The changing face of the data center
- Kubernetes overview
- Setting up Kubernetes Cluster
- Configuring & exploring development environment
- Getting familiar with Kubernetes CLI
- Deploying an application in Kubernetes

The Changing Face of Data Center

- The unit of deployment is changing from a machine to a container
- Infrastructure has become immutable
- Emphasis on treating the data center as a large server (cluster)
- Tools are evolving to manage the new data center infrastructure
 - Docker Swarm
 - Kubernetes
 - Mesosphere DC/OS
- Automate the distribution of applications
- Ensure higher levels of utilization and efficiency

The Transformation of Datacenter

Cluster Manager / Orchestration Engine

Application

Cluster 3

Application

Cluster 4

Application

Cluster 1

Application

Application

Cluster 2

Application

VM

VM

VM

VM

VM

VM

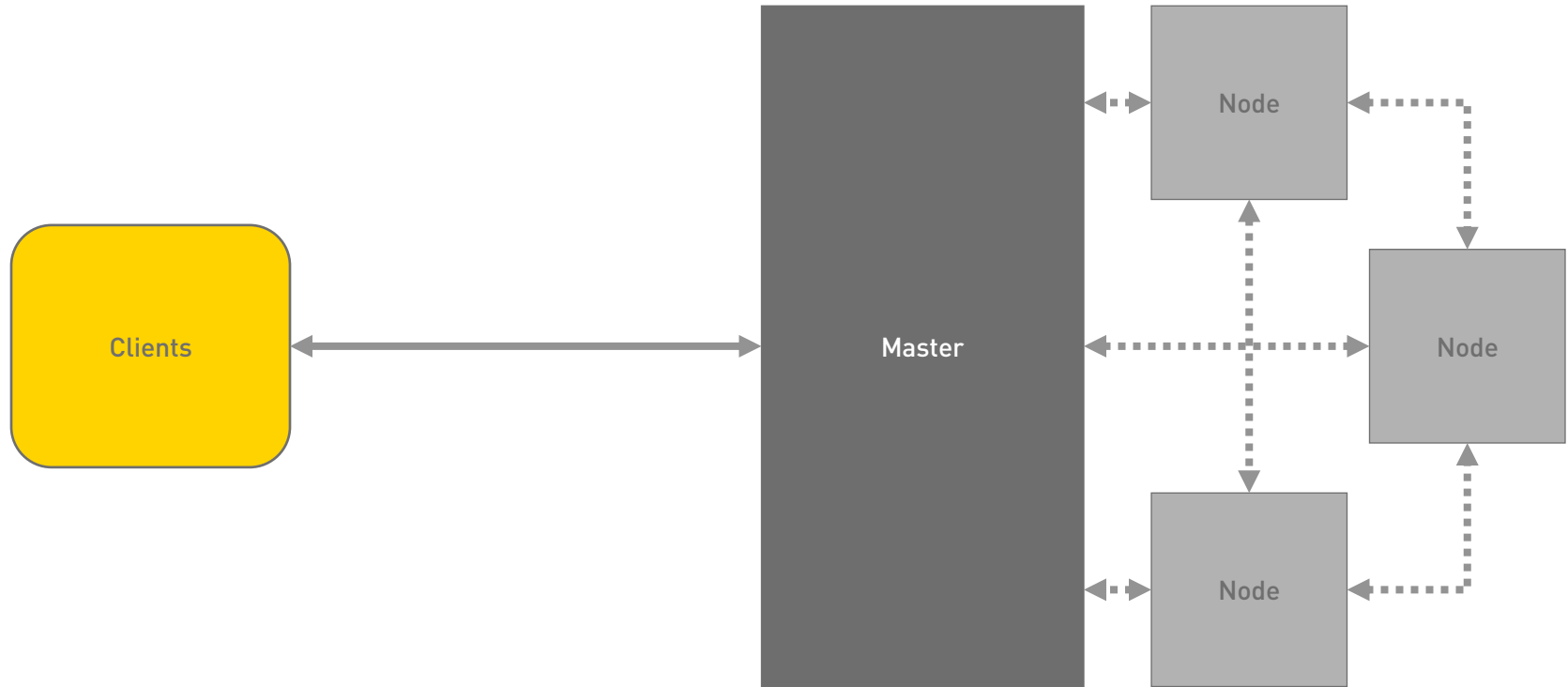
VM

Physical Infrastructure

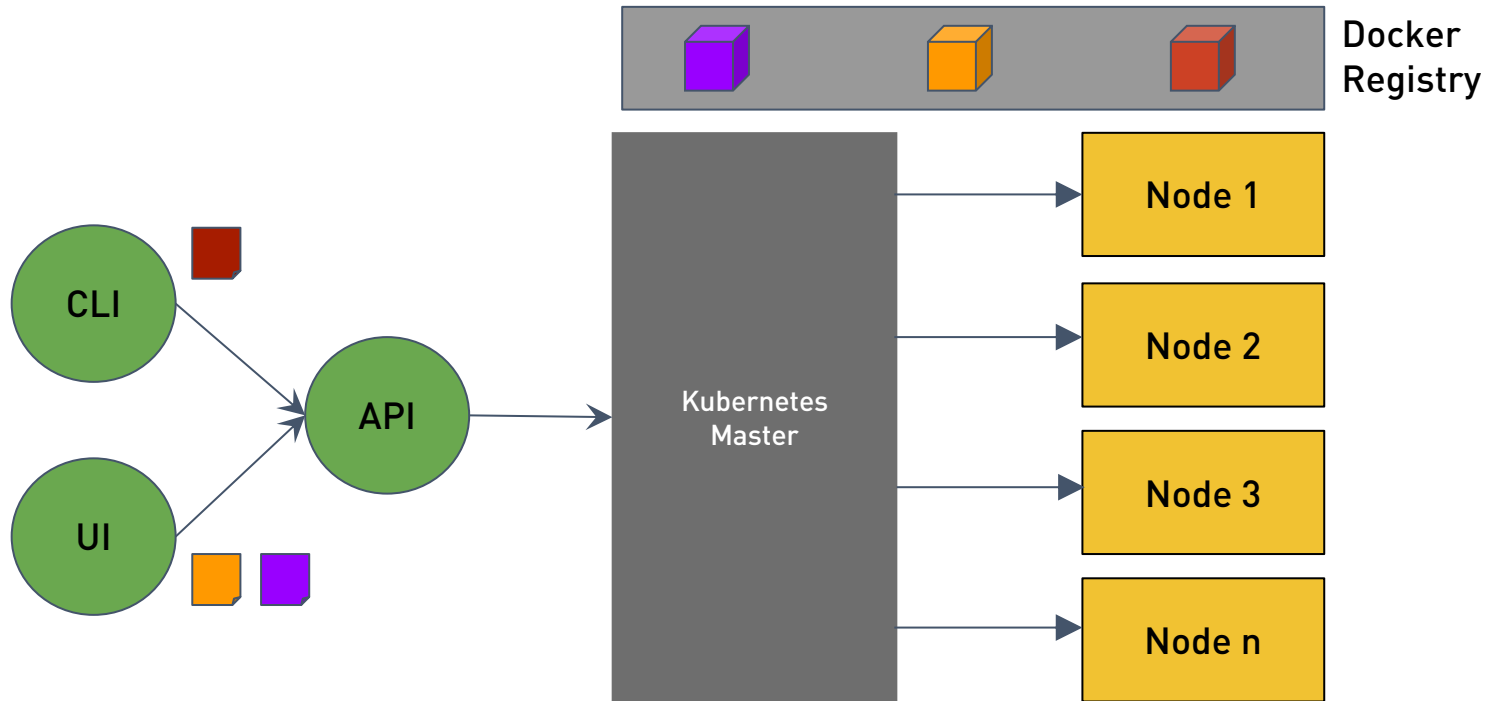
What is Kubernetes?

- Kubernetes came from an internal Google project called Borg
- Unified API for deploying web applications, batch jobs, and databases
- Decouples applications from machines through containers
- Declarative approach to deploying applications
- Automates application configuration through service discovery
- Maintains and tracks the global view of the cluster
- APIs for deployment workflows: rolling updates, canary deploys, and blue-green deployments

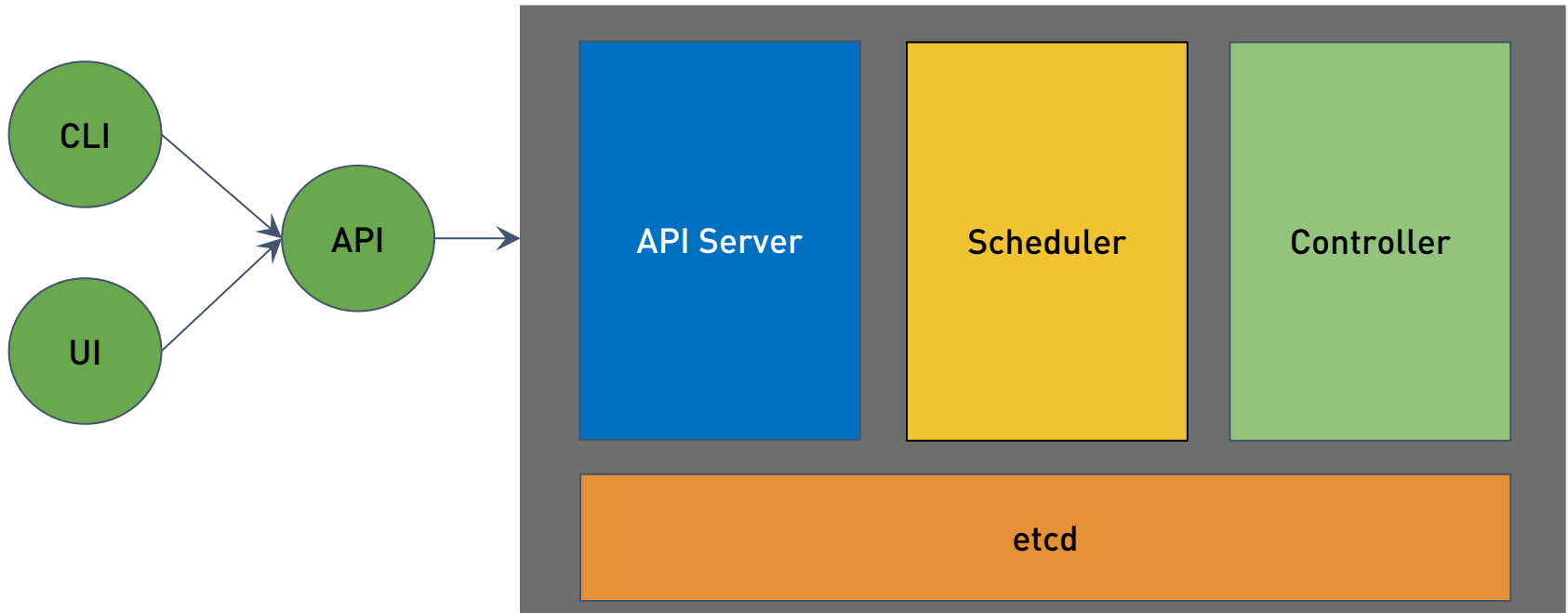
Kubernetes Logical Architecture



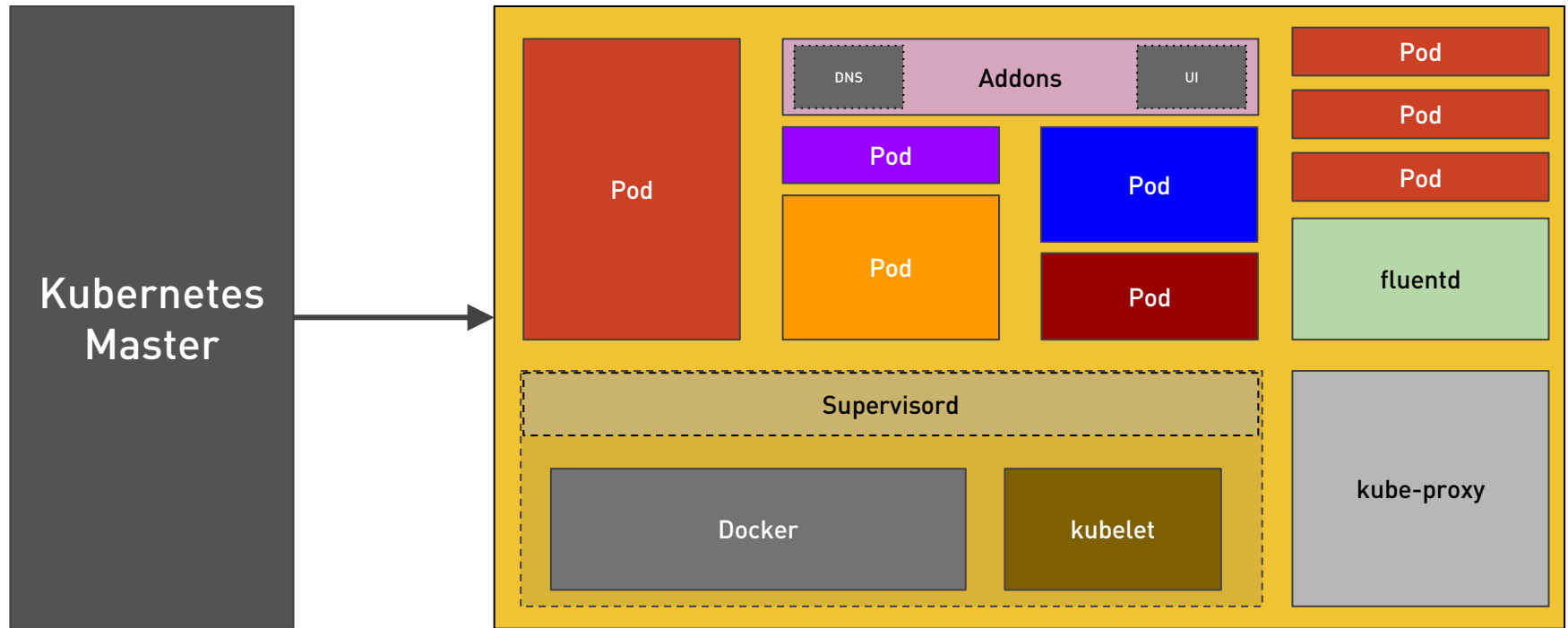
Kubernetes Architecture



Kubernetes Master



Kubernetes Node



Installing Kubernetes – Option 1

- At least two machines running CentOS 7 or Ubuntu 16.04
- 1GB or more of RAM
- Network connectivity between all the machines of the cluster
- Install **docker**, **kubelet**, **kubectl**, and **kubeadm** on each machine
- Setup Kubernetes Master
 - *kubeadm init*
- Setup Kubernetes Node
 - *kubeadm join*
- Configure networking
- Install Addons
- Additional Nodes can be added later

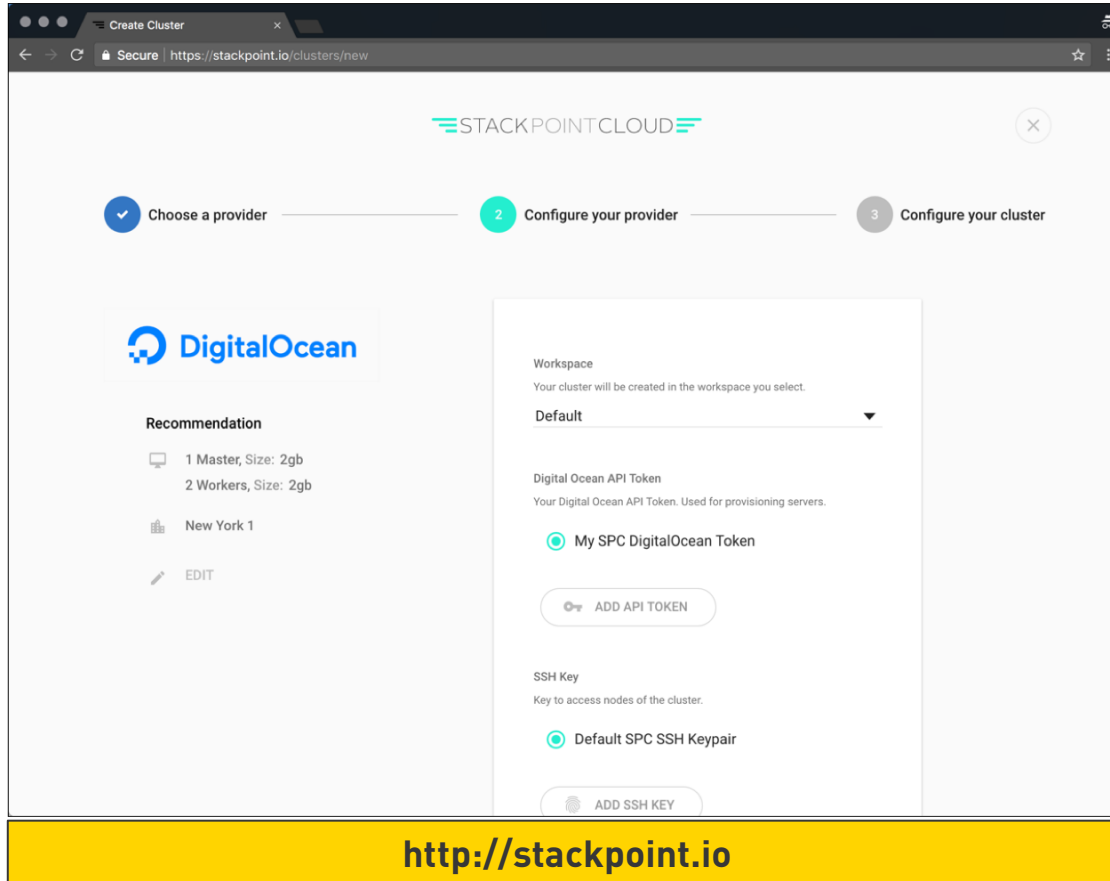
<http://bit.ly/do-k8s-tut>

Step-By-Step Tutorial

<http://bit.ly/do-k8s-video>

Video Tutorial

Installing Kubernetes – Option 2



The screenshot shows the 'Create Cluster' page on the Stackpoint Cloud website. The page is divided into three steps: 1. Choose a provider, 2. Configure your provider, and 3. Configure your cluster. The second step is currently active. On the left, the DigitalOcean logo is displayed, along with a 'Recommendation' section that lists '1 Master, Size: 2gb' and '2 Workers, Size: 2gb' for the 'New York 1' region. An 'EDIT' button is also present. The main configuration area on the right includes a 'Workspace' dropdown menu set to 'Default', a 'Digital Ocean API Token' section with a radio button selected for 'My SPC DigitalOcean Token' and an 'ADD API TOKEN' button, and an 'SSH Key' section with a radio button selected for 'Default SPC SSH Keypair' and an 'ADD SSH KEY' button. A yellow banner at the bottom of the screenshot contains the URL <http://stackpoint.io>.

Demo

Setting up and Verifying Kubernetes Installation

Summary

- Kubernetes is an orchestration manager for containerized workloads
- Master Nodes act as the control plane managing the cluster
- Worker Nodes run the containers packaged as Pods
- Kubernetes can be installed manually or through a managed service provider like StackPoint.io
- The cluster can be accessed through the CLI, *kubectl*

Key Kubernetes Commands to Explore

- `kubectl cluster-info`
- `kubectl get cs`
- `kubectl get nodes`
- `kubectl run`
- `kubectl expose`
- `kubectl delete`

Thank You!



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