Infrastructure Automation using Nephio

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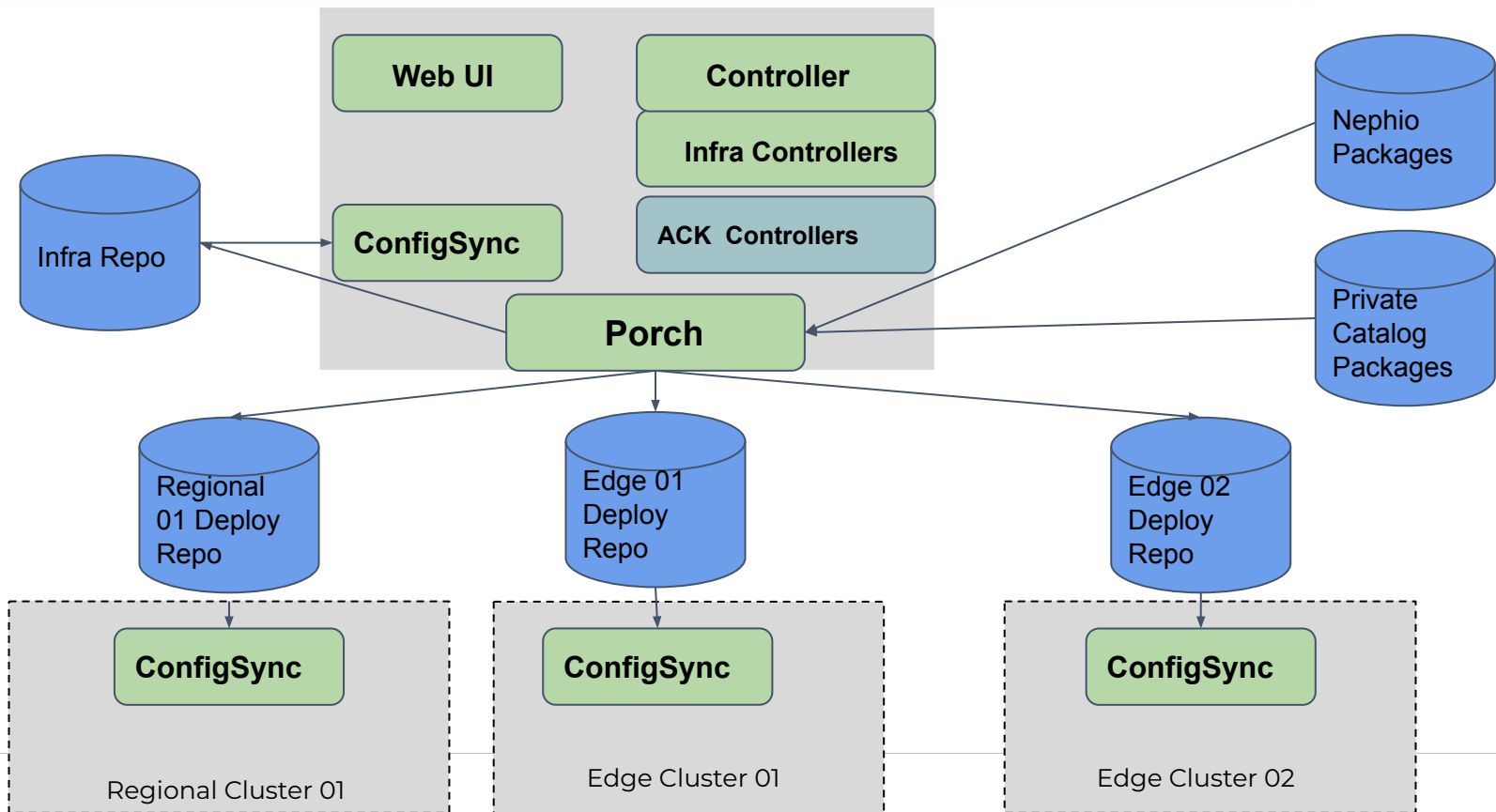
https://lfnetworking.org

Introduction

- In this session we are going to explore how Nephio can be used for provisioning and bootstrapping a kubernetes clusters on a cloud provider PaaS.
- Nephio controllers along with Cloud provider kubernetes controllers (ACK in this demo) will be used for cluster provisioning. But the approach is not limited to or dependent on AWS (ACK). Following are the packages and controllers,
  - KPT package comprising KRM resources which define an EKS cluster.
  - Nephio Package Deployment Controller
  - Nephio Cluster bootstrap controller - (this is a POC)
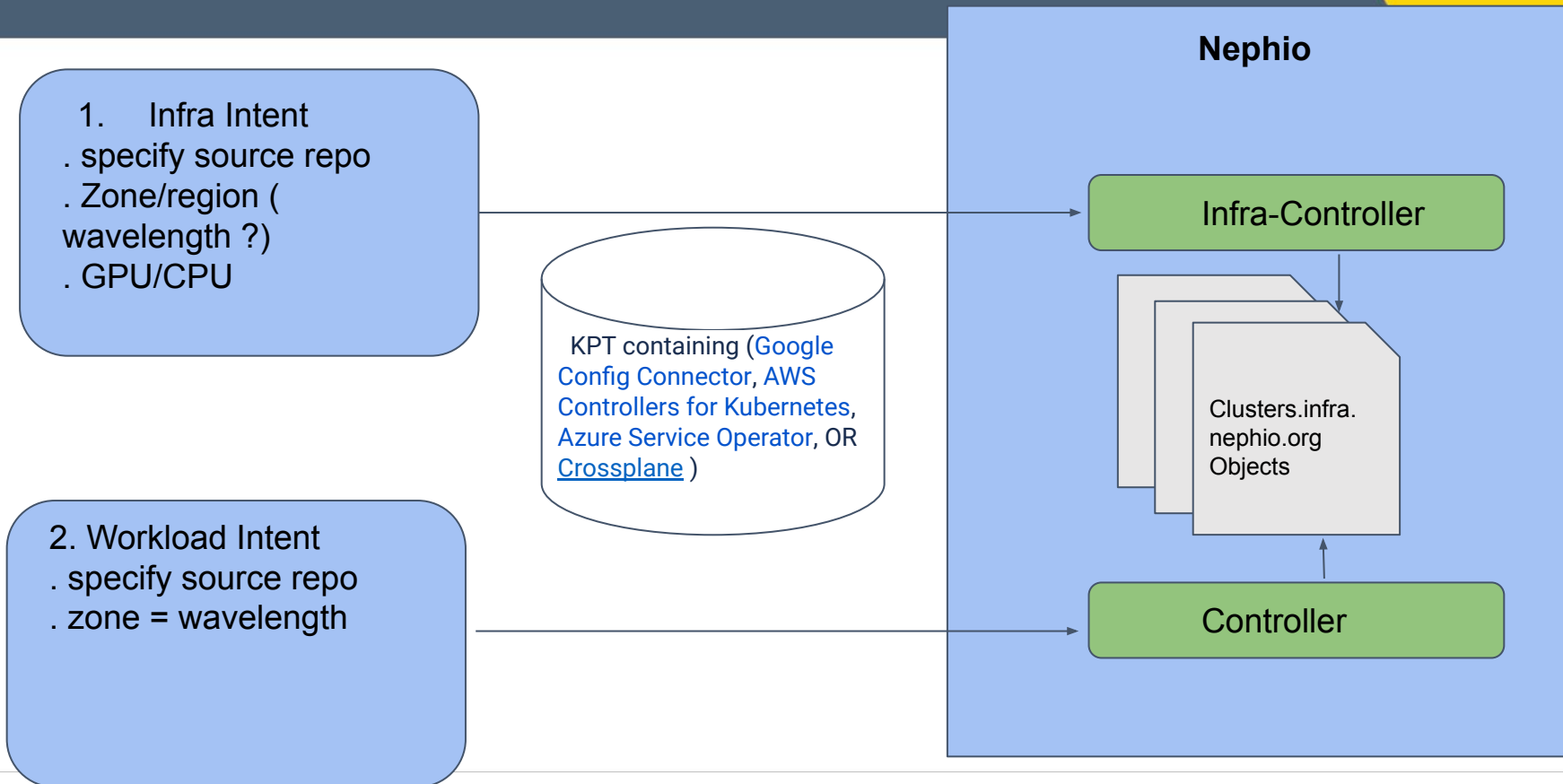 - ACK CRDs

Cloud and Network Function Operators

- Cloud K8s Operators bridge Nephio with cloud providers
  - Rely on existing cloud provider Kubernetes operators
  - Connect Nephio CRDs to Cloud Provider CRDs
  - Google with open source Nephio / GCP CRDs and controllers

- Network Function Operators manage specific NFs
  - Nephio builds CRDs, operators, toolkits for common portions
  - Vendors provide CRDs, operators for their NFs

- Nephio `kpt` functions for manipulating and validating Nephio resources
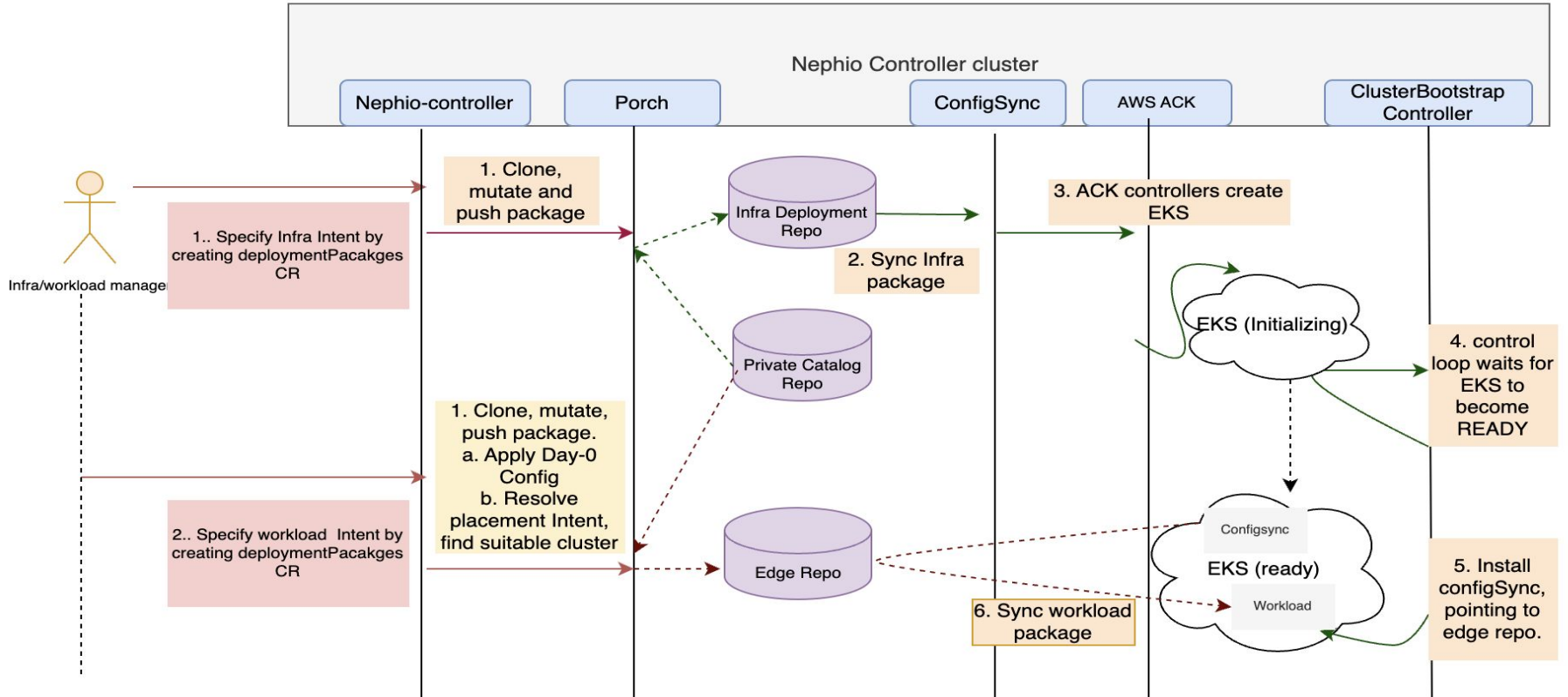
Nephio Management Cluster

Intents (Example)

Nephio

1. Infra Intent
. specify source repo
. Zone/region (
wavelength ?)
. GPU/CPU

Infra-Controller

KPT containing (Google
Config Connector, AWS
Controllers for Kubernetes,
Azure Service Operator, OR
Crossplane)

Clusters.infra.
nephio.org
Objects

2. Workload Intent
. specify source repo
. zone = wavelength

Controller

- Configure ConfigSync in Nephio management cluster to point to its Infra Repo.
- Specify Intent to create EKS cluster
  - The Package Deployment Controller reconciles this Intent by hydrating the Infra KPT package.
  - Package contains EKS ACK KRMs and Nehpio Cluster object.
  - Package deployment controller pushes the package to Infra Repo.
- Approve the KTP package. ConfigSync will reconcile the EKS KPT package.
- ClusterBootstrap controller watches the state of the Cluster.
  - Deploy Config Sync in the target cluster once the cluster comes to Ready state.
  - ConfigSync is configured to point to its corresponding Edge repo.

Thank You!

Questions?