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Porter - An Open Source Load Balancer for Bare Metal Kubernetes

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01

Introduction

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Service IP is an internal virtual-IP

In default mode (ClusterIP and kube-proxy in iptables)

- service can be used only in cluster
- the address of service is not bound to any device

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Expose services to external

NodePort

Pros:

1.Convenient

Cons:

1.Hard to remember

2.Single point and the bottle-neck problem

Ingress

Pros:

1.Understandable

Cons:

1. No Ingress for ingress controller

2. Single point and the bottle-neck problem

3. L7 use only

LoadBalancer

Pros:

1.Convenient

2.No single point and the bottle-neck problem

Cons:

1. Available in cloud provider only

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Porter is a porter to bring LoadBalancer to on-premise kubernetes

1

- Traffic load balance
- BGP dynamic configure

2

IP Access Management

3

- Open Source
- Kubernetes Native

02

Fundamentals

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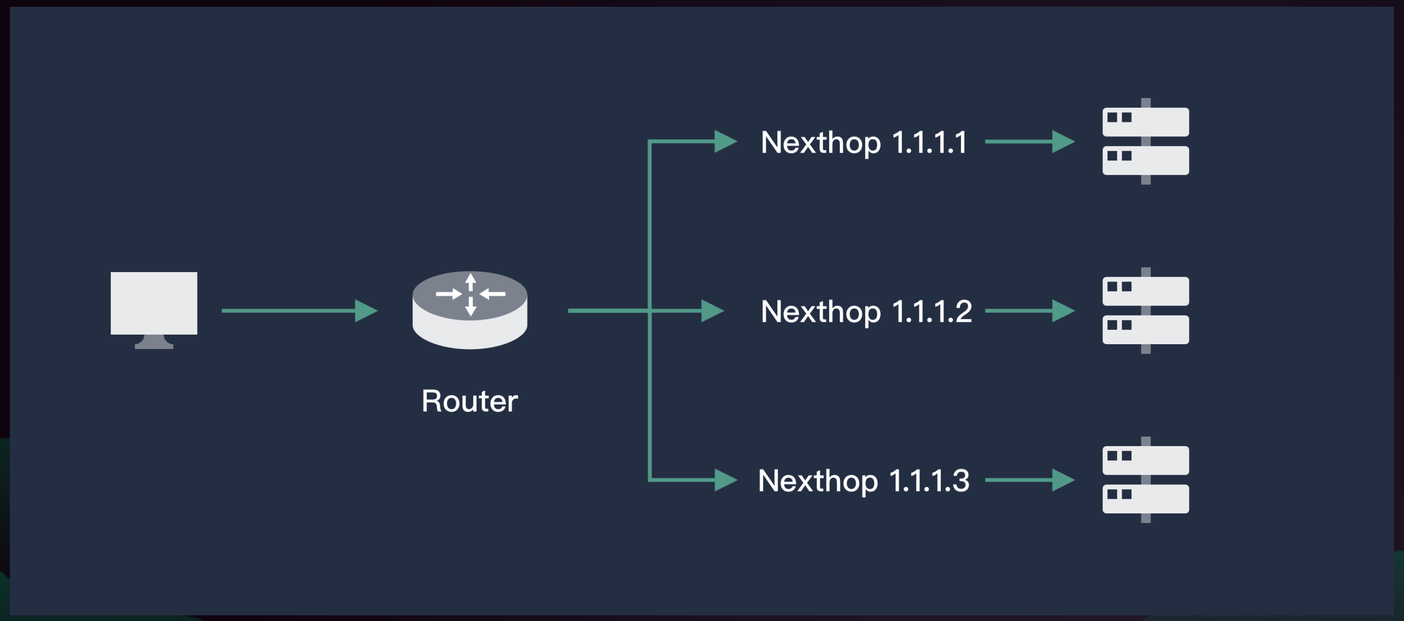
ECMP (Equal-cost multi-path)

Porter use ECMP to implement load balance



ECMP

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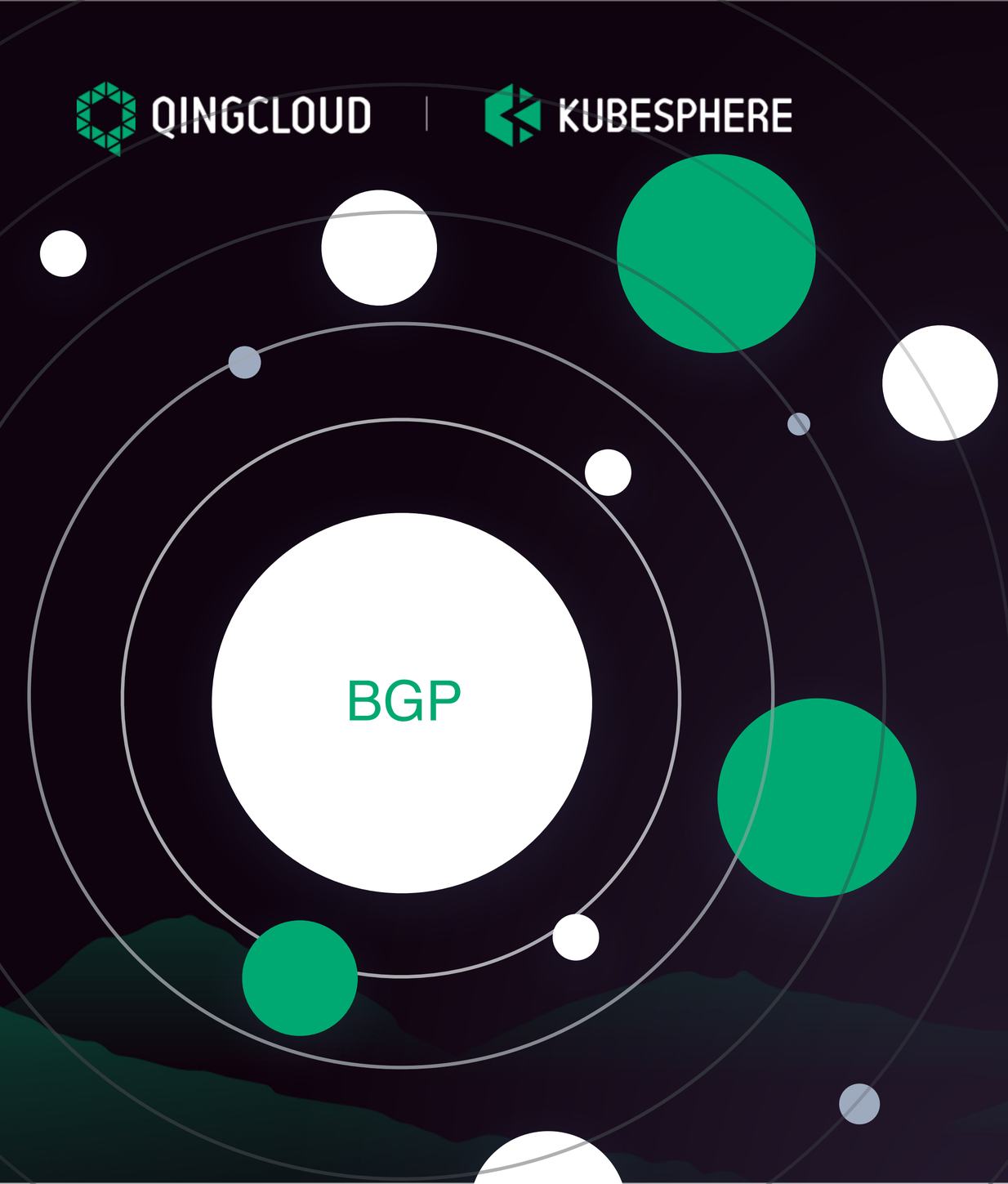

BGP (Border Gateway Protocol)

BGP is the routing protocol for the Internet. Much like the post office processing mail, BGP picks the most efficient routes for delivering Internet traffic.

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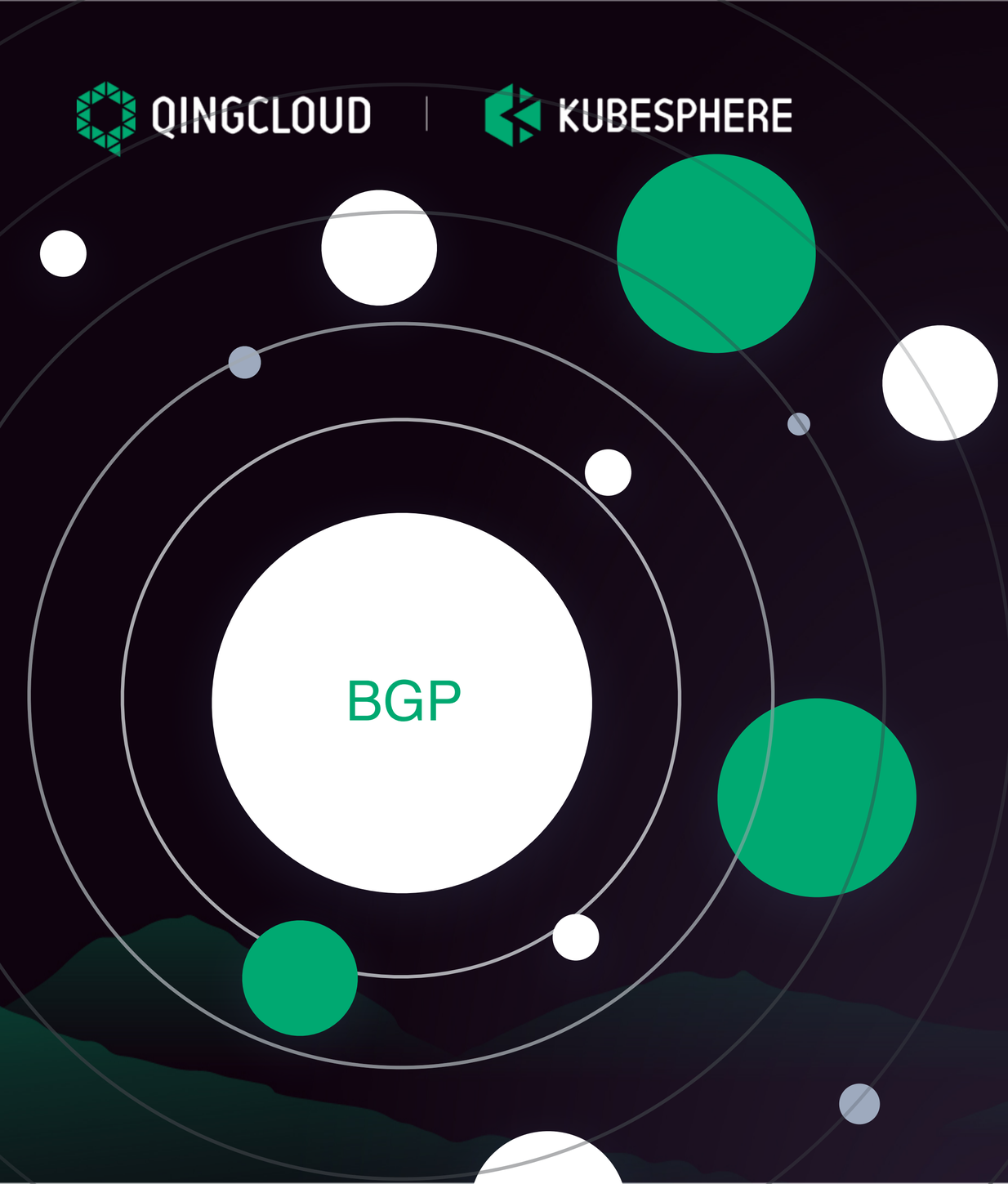

BGP ECMP

BGP support multipath, multipath allows you to install multiple internal BGP paths and multiple external BGP paths to the forwarding table. Selecting multiple paths enables BGP to **load-balance** traffic across multiple links

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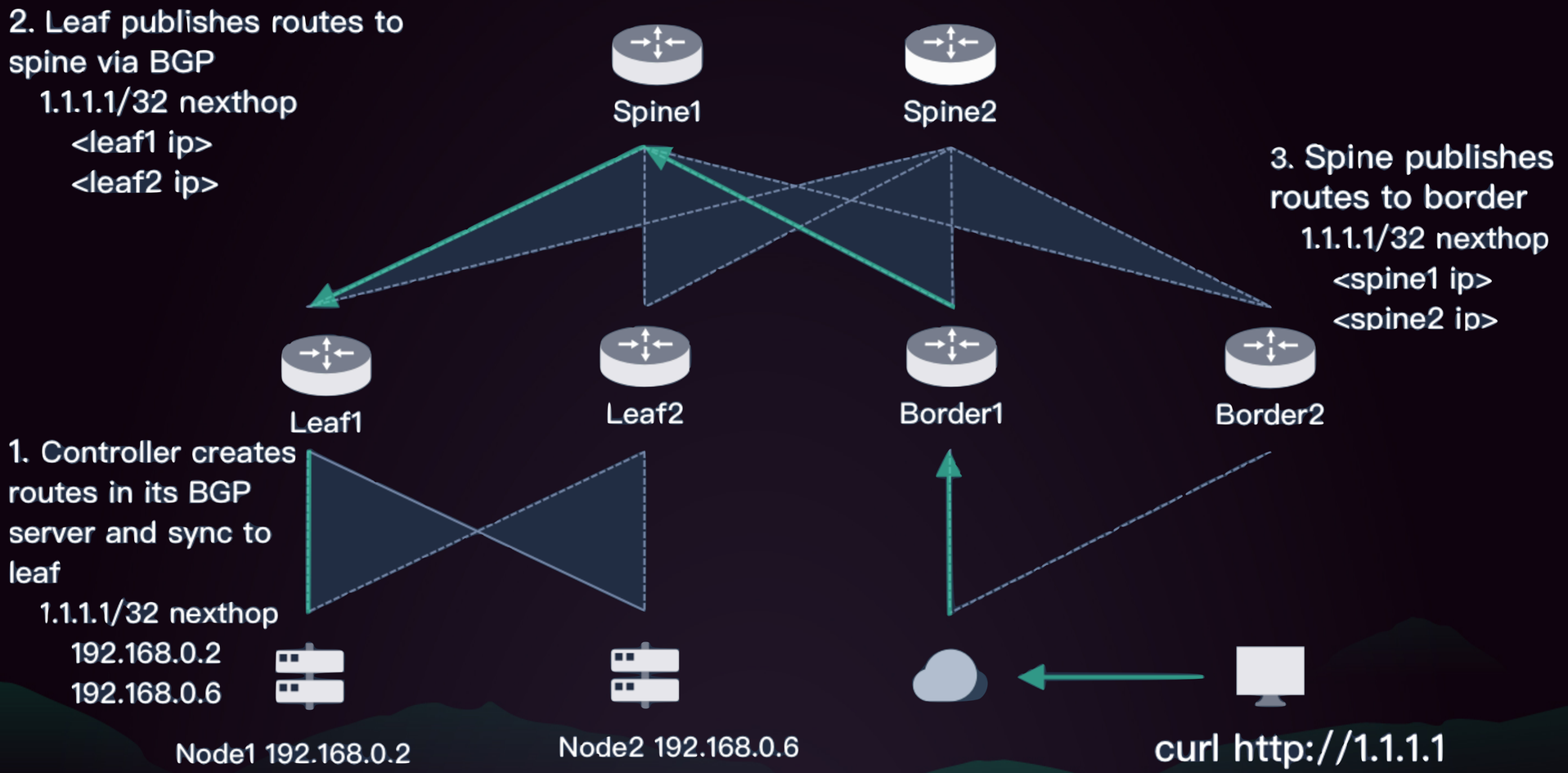
How BGP works



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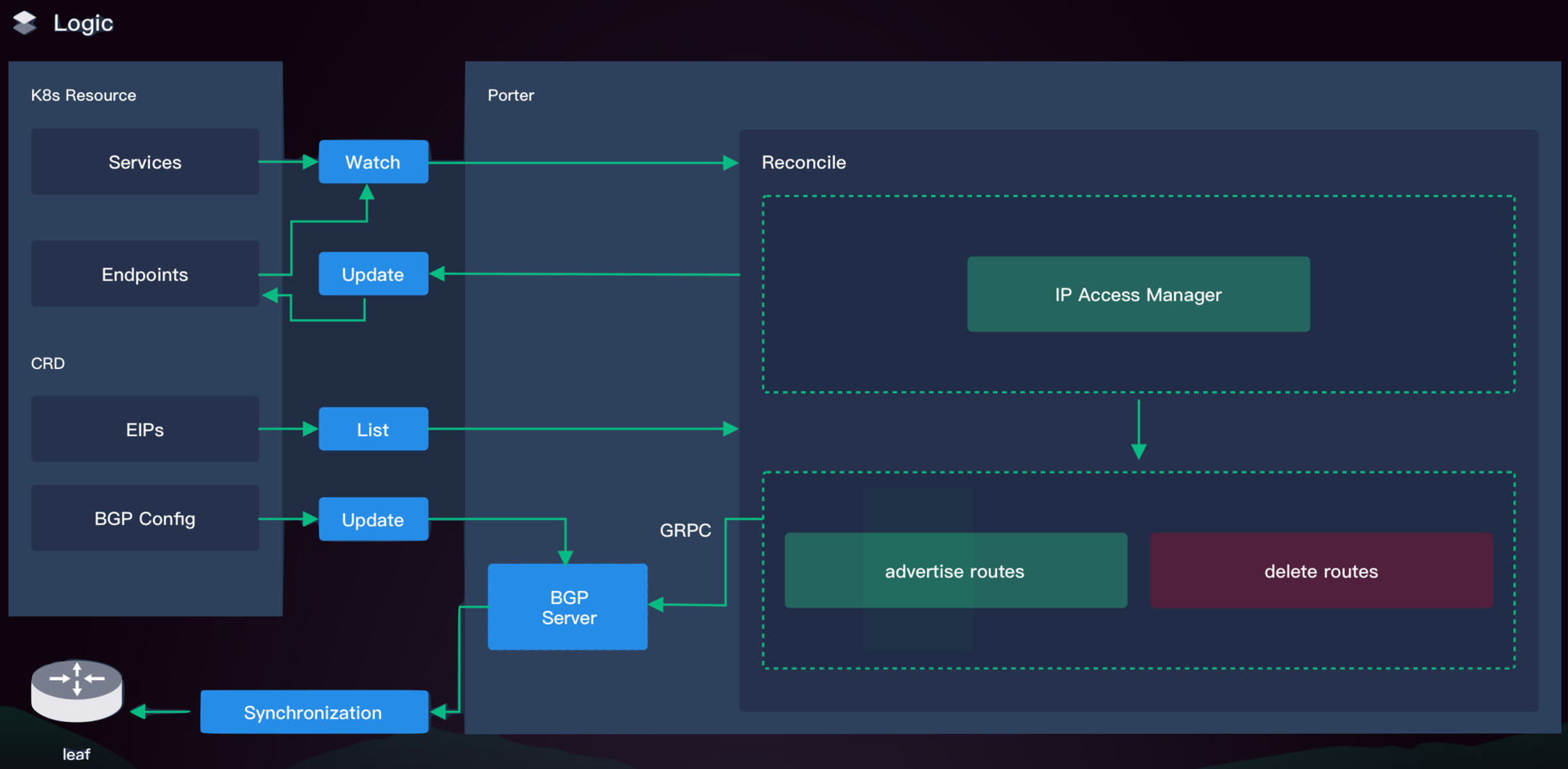
Workflow



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Dynamic Configure with zero downtime

When endpoints changed -> change the route

When bgp neighbours changed -> update the BGP server

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Kubernetes Native

Using CRD to configure BGP

Using CRD to configure IPAM

Using Annotations to configure address of services

We can use kubectl or k8s client-go to configure porter

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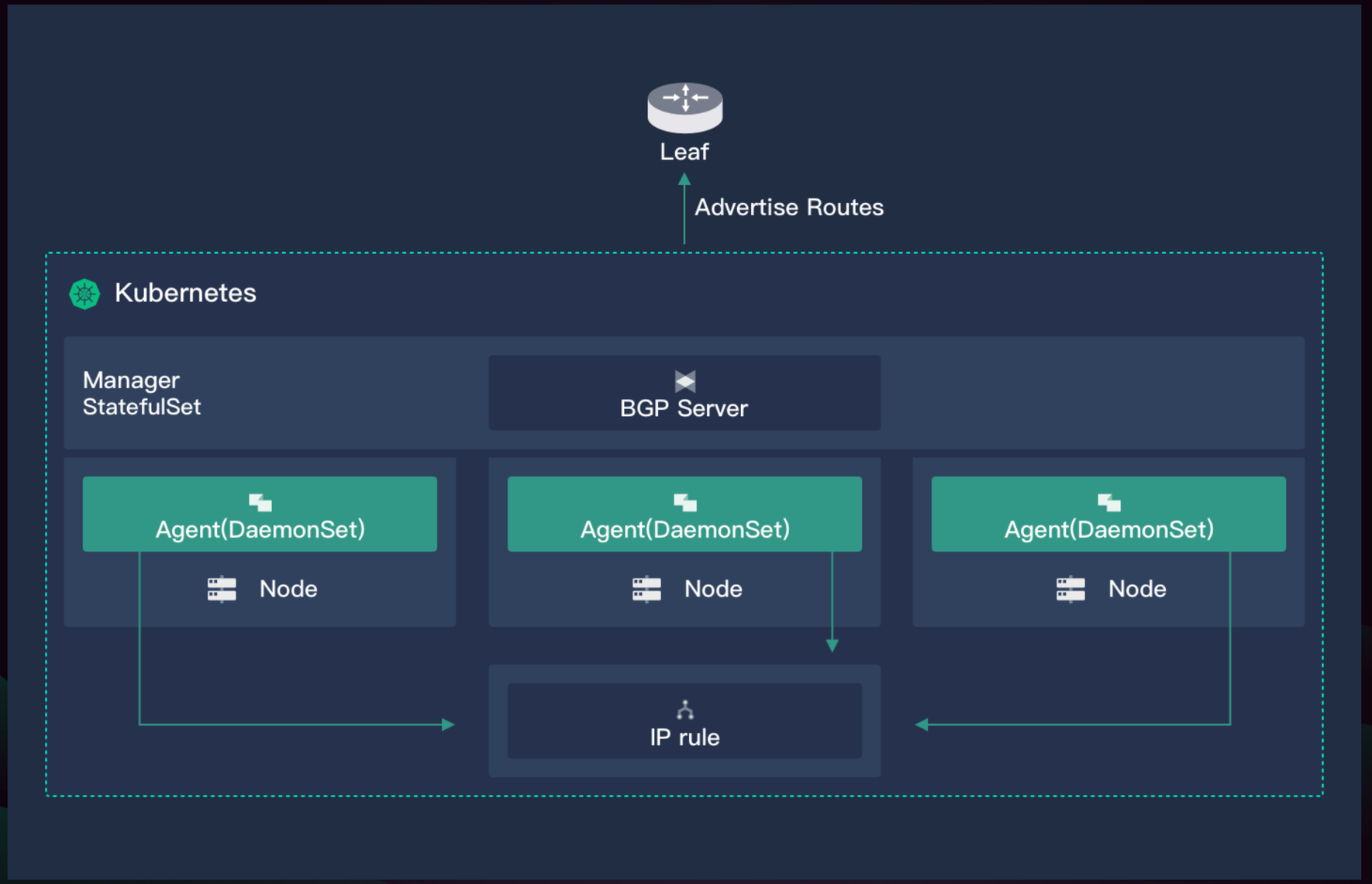

03

Usage

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```
#!/bin/bash

#Apply yamls

kubectl apply -f https://github.com/kubesphere/porter/releases/download/v0.1.0/porter.yaml

#Configure neighbors

kubectl edit configmaps -n porter-system bgp-cfg
```

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Sample Config

```
[global.config]
    as = 65000
    router-id = "192.168.98.111"
    port = 17900
[porter-config]
    using-port-forward =true
[[neighbors]]
    [neighbors.config]
        neighbor-address = "192.168.98.5"
        peer-as = 65001
    [neighbors.add-paths.config]
        send-max = 8
```

Add a peer and
using 17900 as BGP port

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Add an ip to pool

```yaml
apiVersion: network.kubesphere.io/v1alpha1
kind: EIP
name: eip-sample
spec:
    address: 192.168.2.2
    disable: false
```

Add a ip with address 192.168.2.2 to ippool

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Create a service using porter

```yaml
kind: Service
apiVersion: v1
metadata:
name:  mylbapp
annotations:
    lb.kubesphere.io/v1alpha1: porter
spec:
    selector:
        app:  mylbapp
    type:  LoadBalancer
    ports:
    - name:  http
        port:  8088
        targetPort:  80
```

Using annotation to tell system to use porter for load-balancing

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Plan

1. More flexible ip configure
2. Using other protocols or methods as optional way for users do not support BGP
3. Support BGP policy to control route advertisement

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Thank you

Q&A

https://github.com/kubesphere/porter