OpenShift Networking

Optional subheading
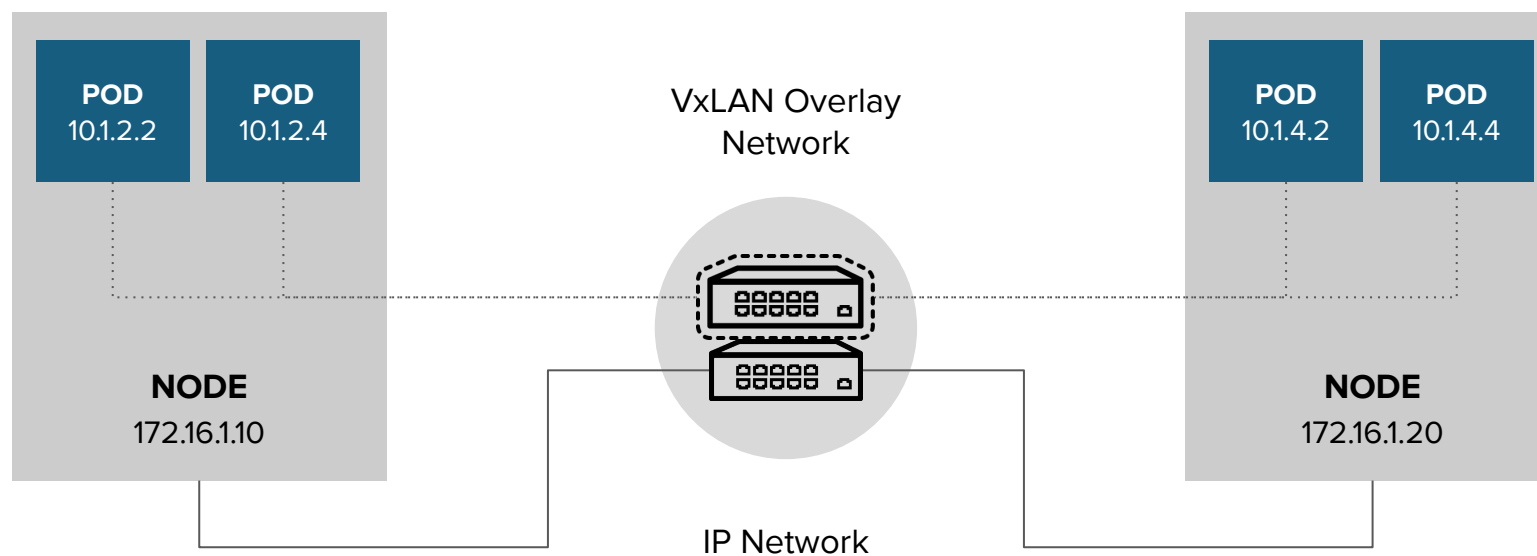
Presenter's Name

Title

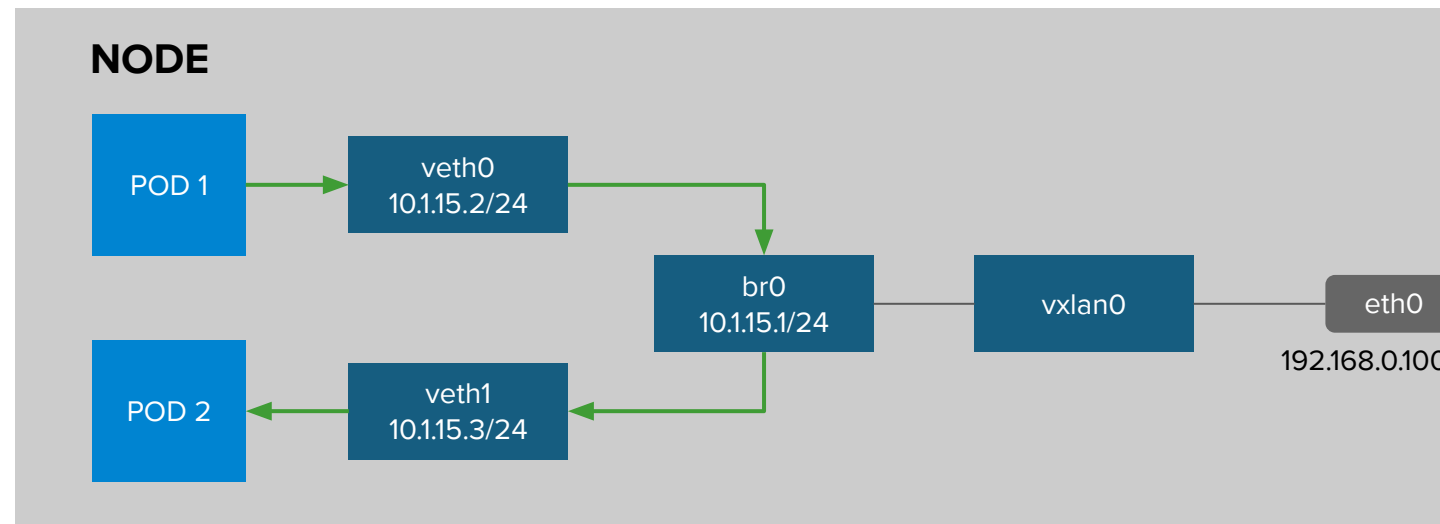Presenter's Name

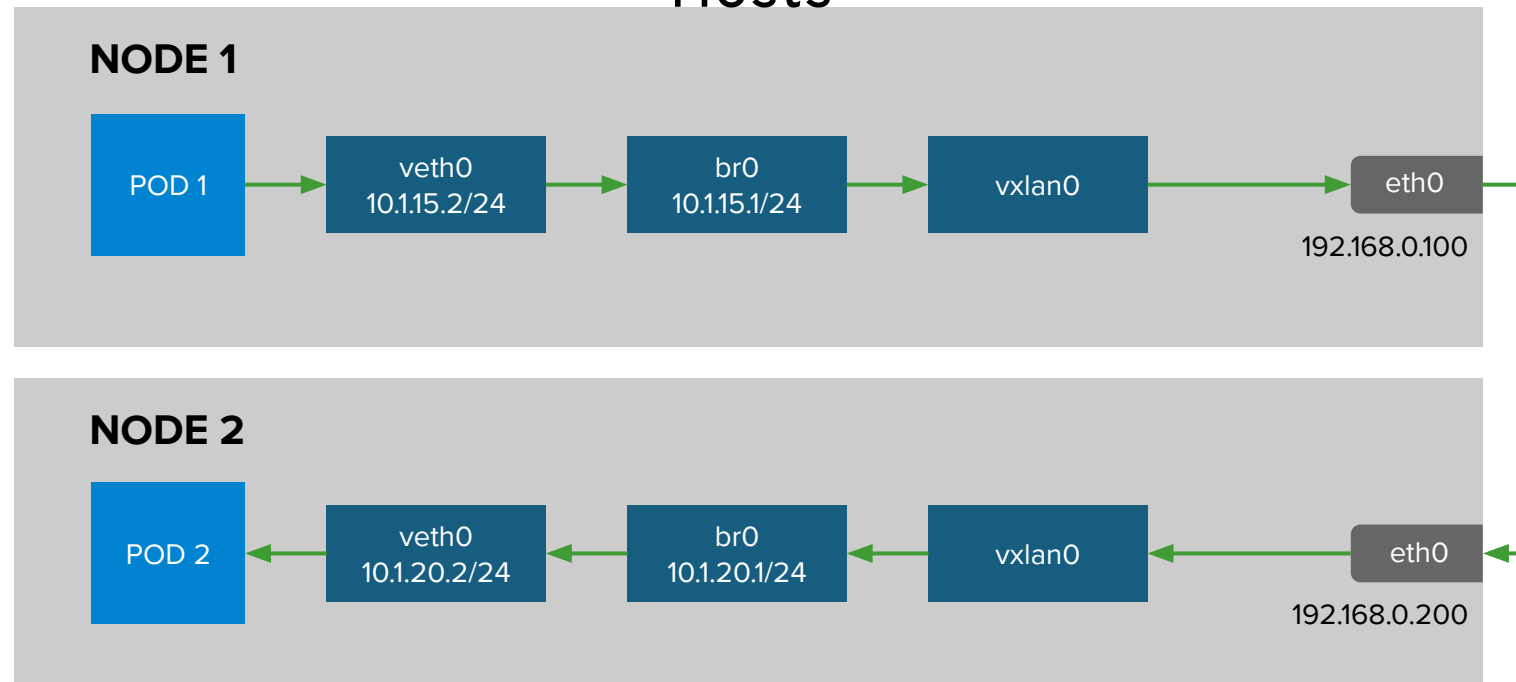Title

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OPENSHIFT NETWORKING

OPENSHIFT SDN – OVS PACKET FLOW

Container to Container on the Same Host

OPENSHIFT SDN – OVS PACKET FLOW

Container to Container on the Different Hosts

NODE 1

POD 1 → veth0 10.1.15.2/24 → br0 10.1.15.1/24 → vxlan0 → eth0 192.168.0.100

NODE 2

POD 2 ← veth0 10.1.20.2/24 ← br0 10.1.20.1/24 ← vxlan0 ← eth0 192.168.0.200

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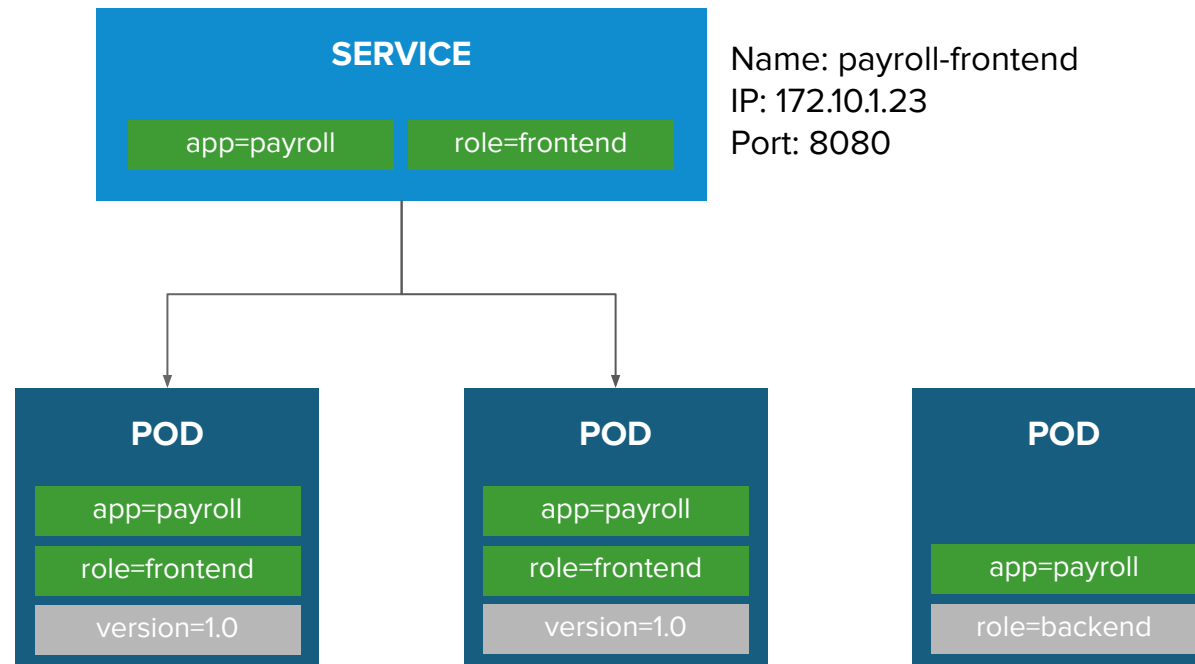# OPENSHIFT SDN – OVS PACKET FLOW

Container Connects to External Host
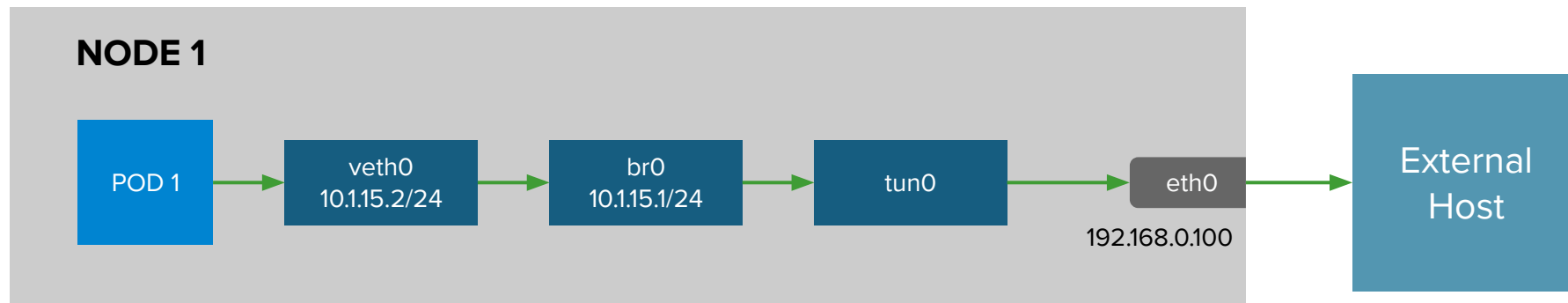
BUILT–IN SERVICE DISCOVERY INTERNAL LOAD-BALANCING

SERVICE

app=payroll   role=frontend

Name: payroll-frontend
IP: 172.10.1.23
Port: 8080

POD

app=payroll

role=frontend

version=1.0

POD

app=payroll

role=frontend

version=1.0

POD

app=payroll

role=backend

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BUILT–IN SERVICE DISCOVERY INTERNAL LOAD–BALANCING

SERVICE

app=payroll | role=frontend

Name: payroll-frontend
IP: 172.10.1.23
Port: 8080

POD

app=payroll

role=frontend

version=2.0

POD

app=payroll

role=frontend

version=1.0

POD

app=payroll

role=frontend

version=1.0

POD

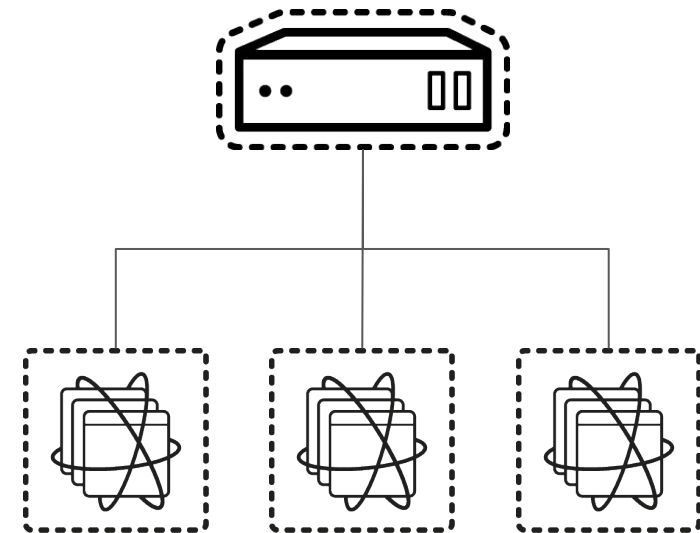app=payroll

role=backend

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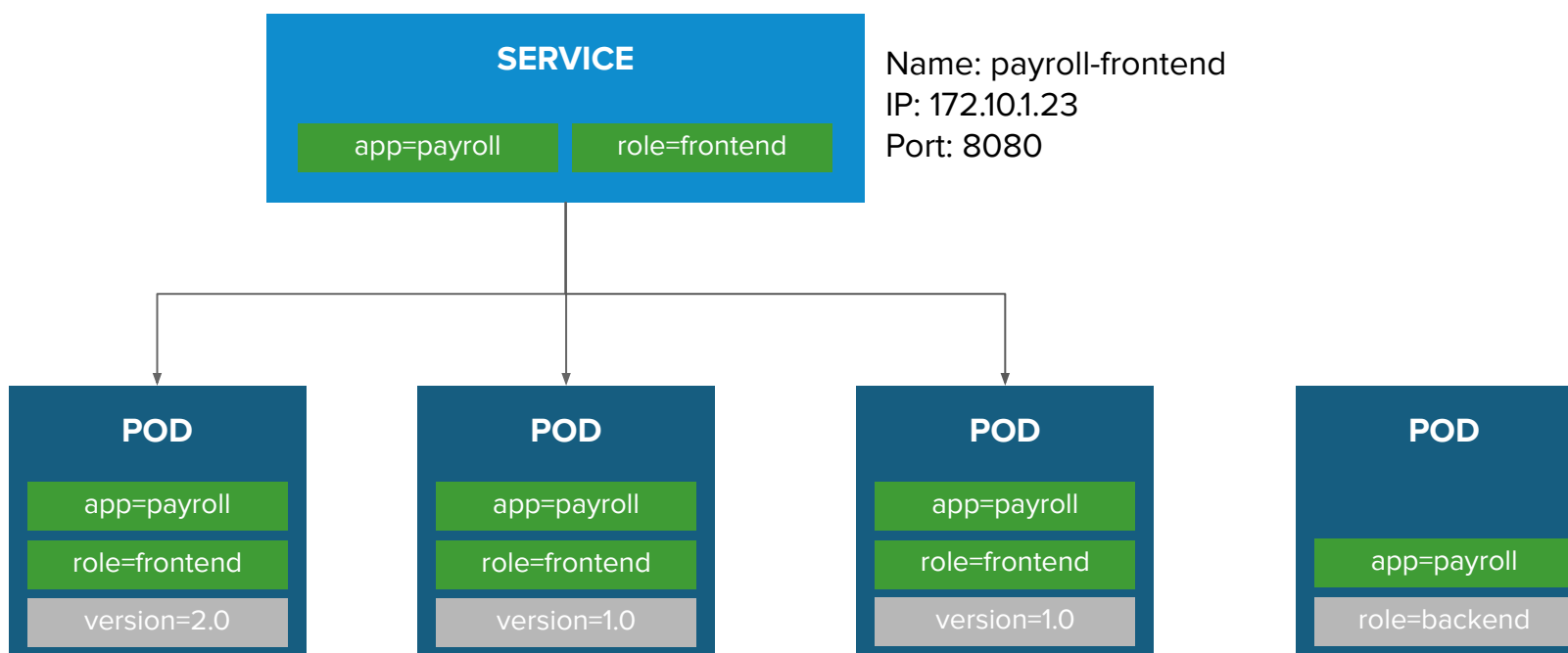
ROUTE EXPOSES SERVICES EXTERNALLY
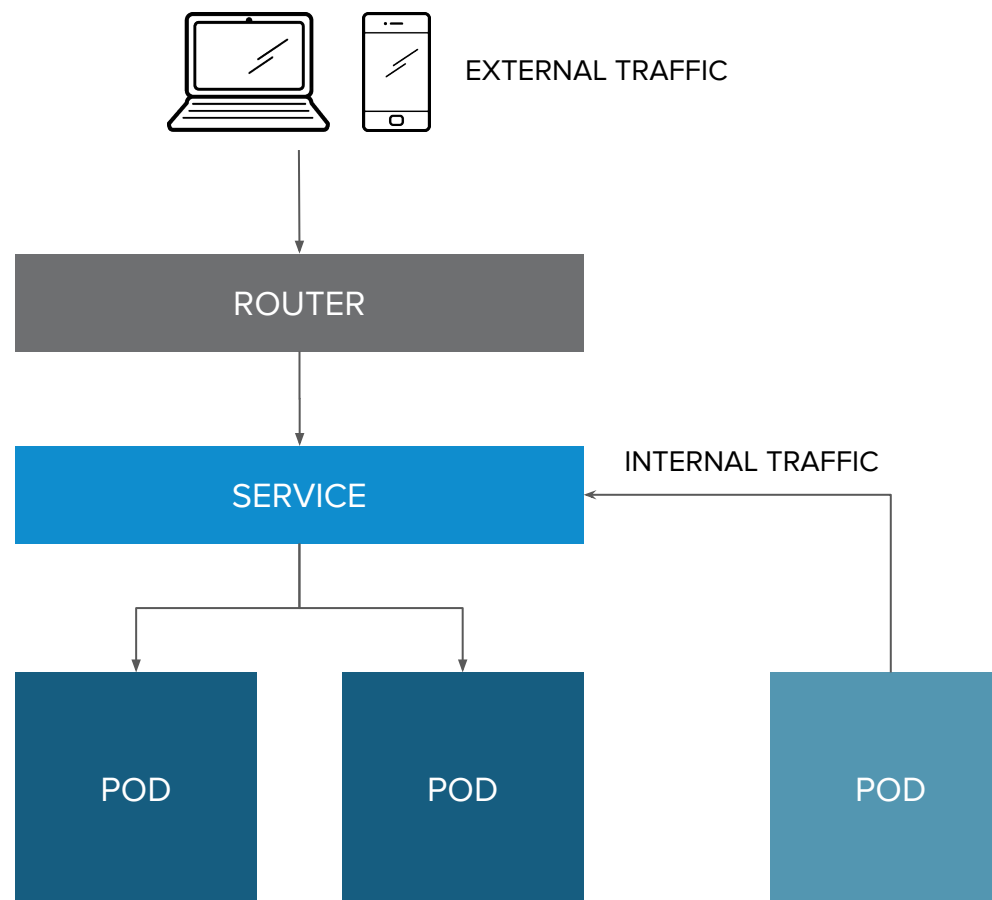
ROUTING AND EXTERNAL LOAD-BALANCING

▶ Pluggable routing architecture

- · HAProxy Router
- · F5 Router

▶ Multiple-routers with traffic sharding

▶ Router supported protocols

- · HTTP/HTTPS
- · WebSockets
- · TLS with SNI

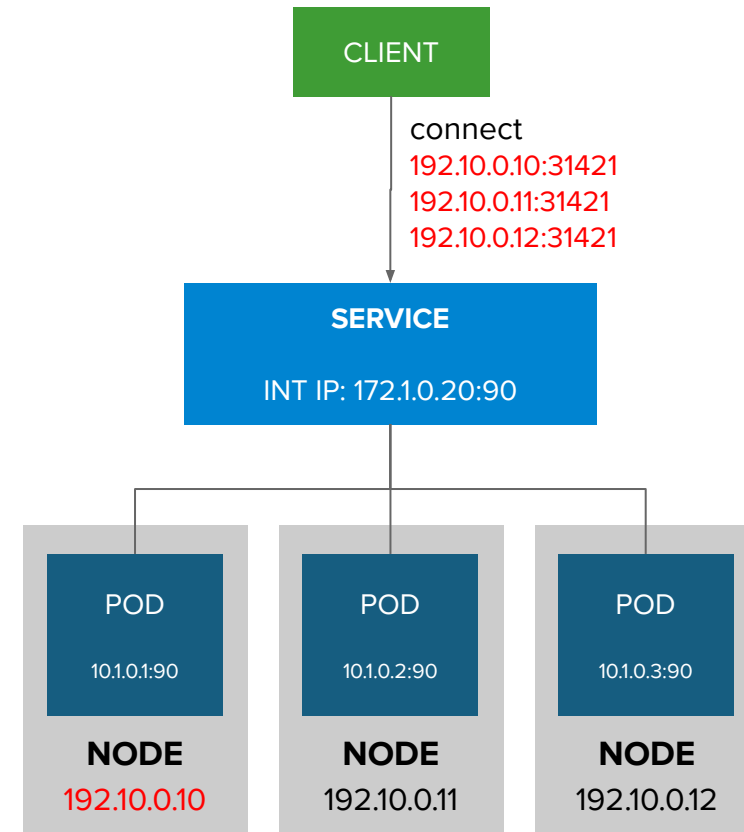▶ Non-standard ports via cloud load-balancers, external IP, and NodePort

ROUTE SPLIT TRAFFIC

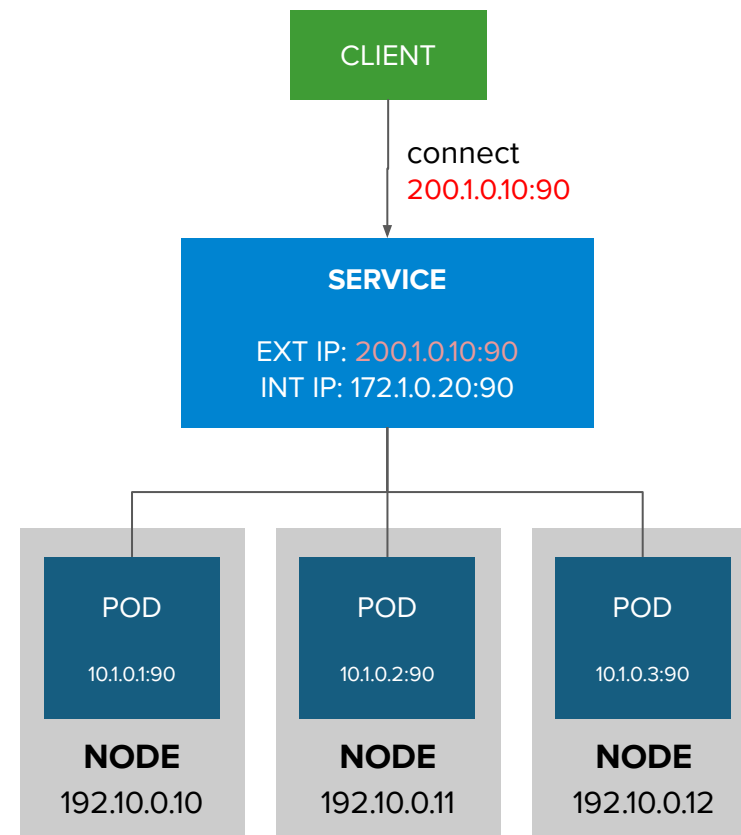Split Traffic Between Multiple Services For A/B Testing, Blue/Green and Canary Deployments

ROUTE

90% traffic   10% traffic

SERVICE A   **SERVICE B**

App A   App A   App B   App B

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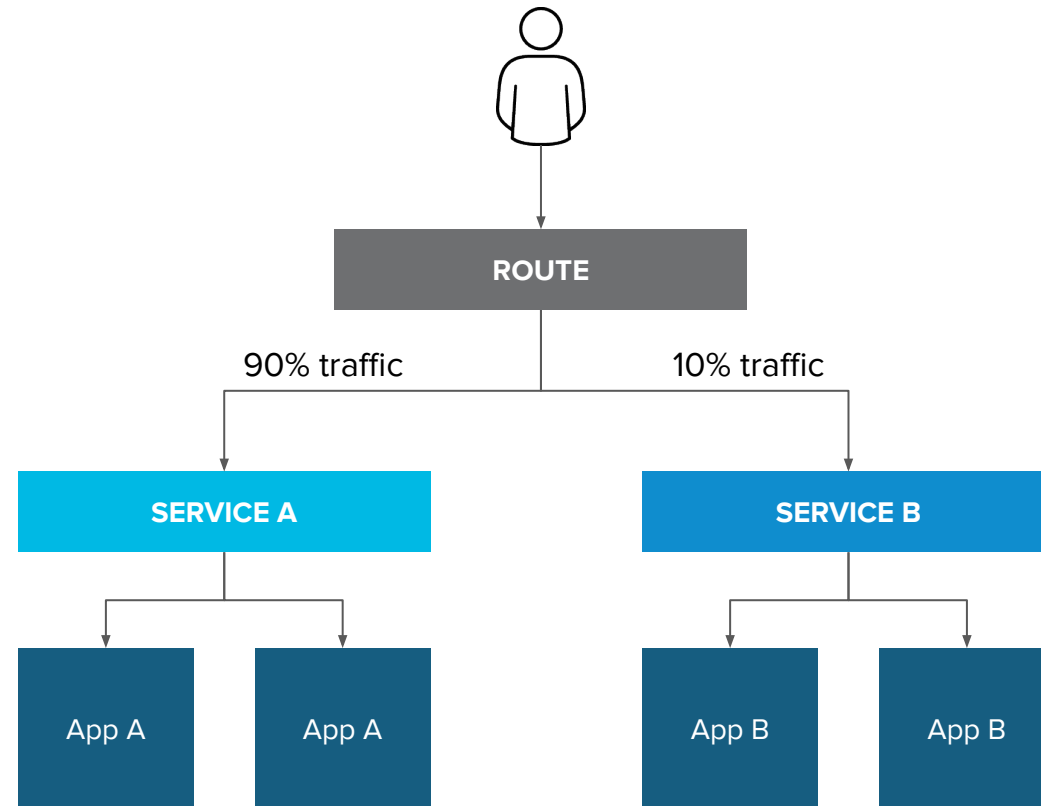
EXTERNAL TRAFFIC TO A SERVICE ON A RANDOM PORT WITH NODEPORT

▸ NodePort binds a service to a unique port on all the nodes

▸ Traffic received on any node redirects to a node with the running service

▸ Ports in 30K–60K range which usually differs from the service

▸ Firewall rules must allow traffic to all nodes on the specific port

CLIENT

connect
192.10.0.10:31421
192.10.0.11:31421
192.10.0.12:31421

SERVICE

INT IP: 172.1.0.20:90

POD

10.1.0.1:90

NODE
192.10.0.10

POD

10.1.0.2:90

NODE
192.10.0.11
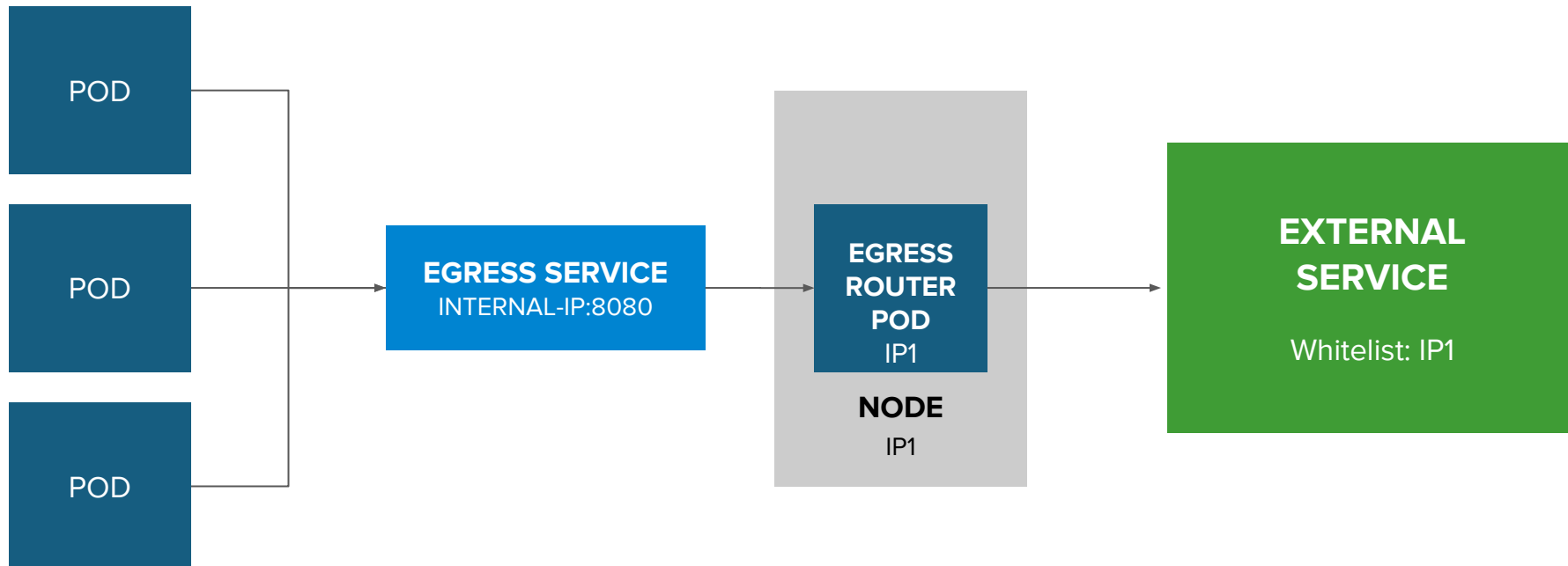
POD

10.1.0.3:90

NODE
192.10.0.12

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EXTERNAL TRAFFIC TO A SERVICE ON ANY PORT WITH INGRESS

▶ Access a service with an external IP on any TCP/UDP port, such as

- Databases

- Message Brokers

▶ Automatic IP allocation from a predefined pool using Ingress IP Self-Service

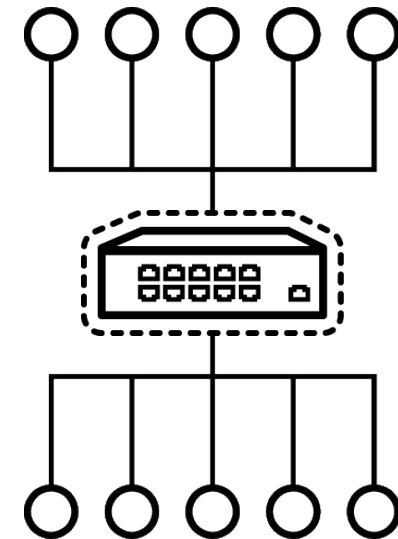▶ IP failover pods provide high availability for the IP pool

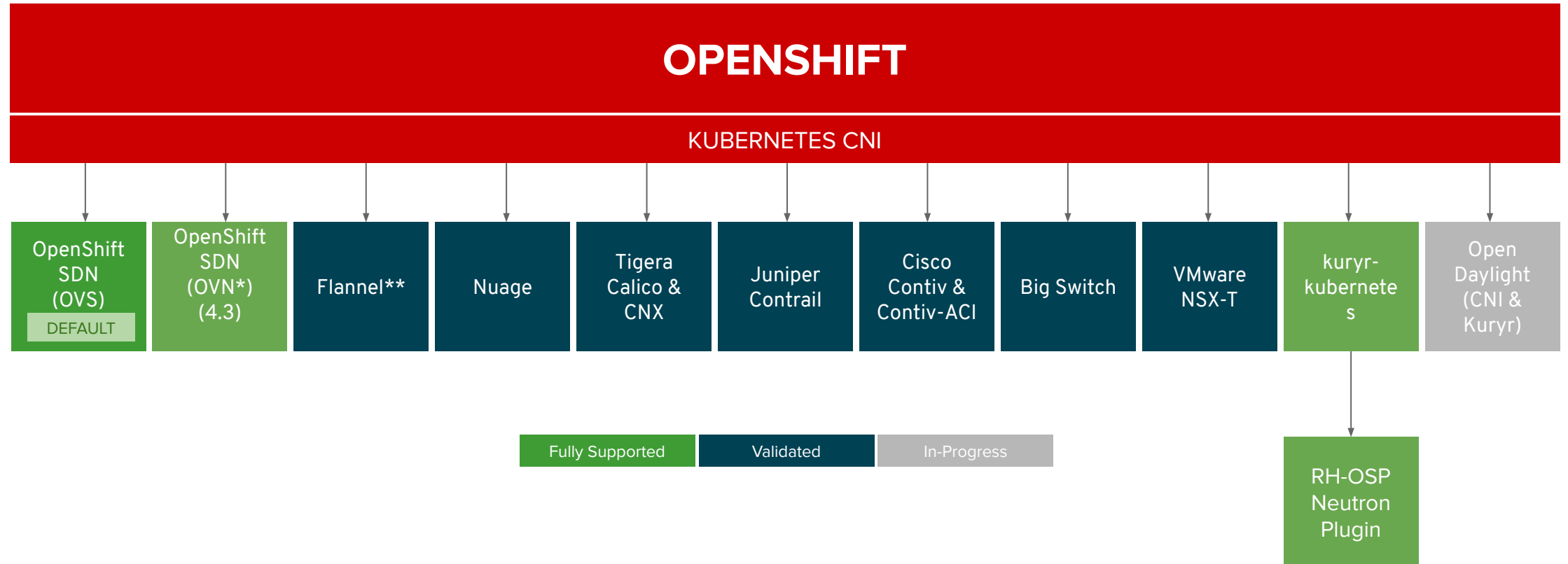# CONTROL OUTGOING TRAFFIC SOURCE IP WITH EGRESS ROUTER

POD

POD

POD

EGRESS SERVICE
INTERNAL-IP:8080

EGRESS ROUTER POD
IP1

NODE
IP1

EXTERNAL SERVICE

Whitelist: IP1

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OPENSHIFT NETWORKING

▶ Built-in internal DNS to reach services by name

▶ Split DNS is supported via CoreDNS

- Master answers DNS queries for internal services

- Other name servers serve the rest of the queries

▶ Software Defined Networking (SDN) for a unified cluster network to enable pod-to-pod communication

▶ OpenShift follows the Kubernetes Container Networking Interface (CNI) plug-in model

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OPENSHIFT NETWORK PLUGINS

OPENSHIFT

KUBERNETES CNI

| OpenShift SDN (OVS) DEFAULT | OpenShift SDN (OVN*) (4.3) | Flannel** | Nuage | Tigera Calico & CNX | Juniper Contrail | Cisco Contiv & Contiv-ACI | Big Switch | VMware NSX-T | kuryr-kubernetes | Open Daylight (CNI & Kuryr) |

| Fully Supported | Validated | In-Progress |

RH-OSP Neutron Plugin

* Coming as default in OCP 4.1
** Flannel is minimally verified and is supported only and exactly as deployed in the OpenShift on OpenStack reference architecture

V0000000

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