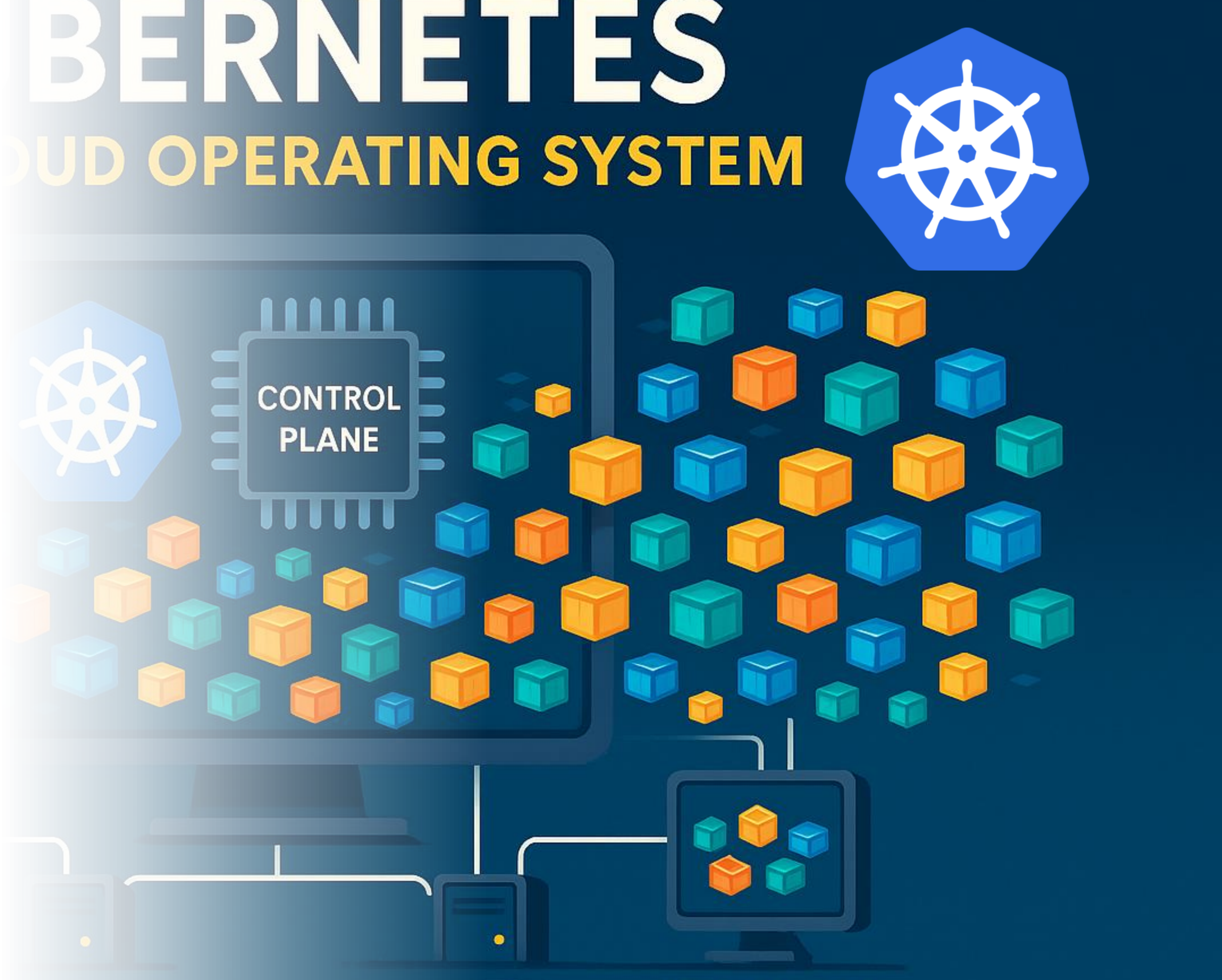
CS-UY 3913
Container
Operating Systems



K8 Service

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Agenda

- What is a Service?
- Why Services are Needed
- Service Types
- Service Discovery and DNS
- Headless Services
- Exposing Applications

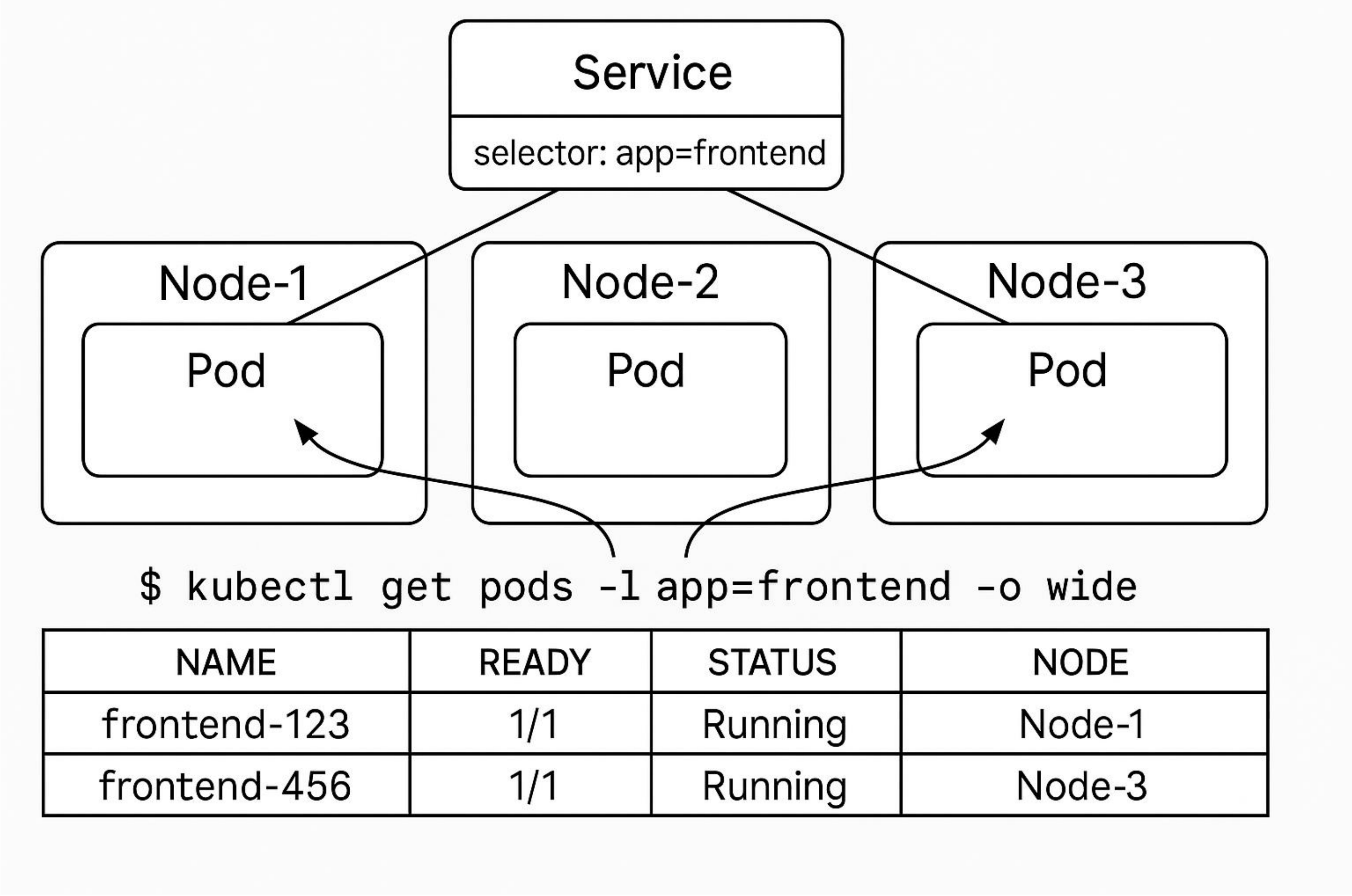
What is a Service?

- An abstraction to expose Pods as a network service
- Enables communication within and outside the cluster
- Provides a stable IP address and DNS name
- Automatically load balances traffic across selected Pods

Why Services are Needed

- Pods are ephemeral and can be recreated on failures
- Pod IPs are dynamic and not reliable for access
- Services ensure persistent access to a group of Pods
- Service selector matches Pods using labels

Why Services are Needed



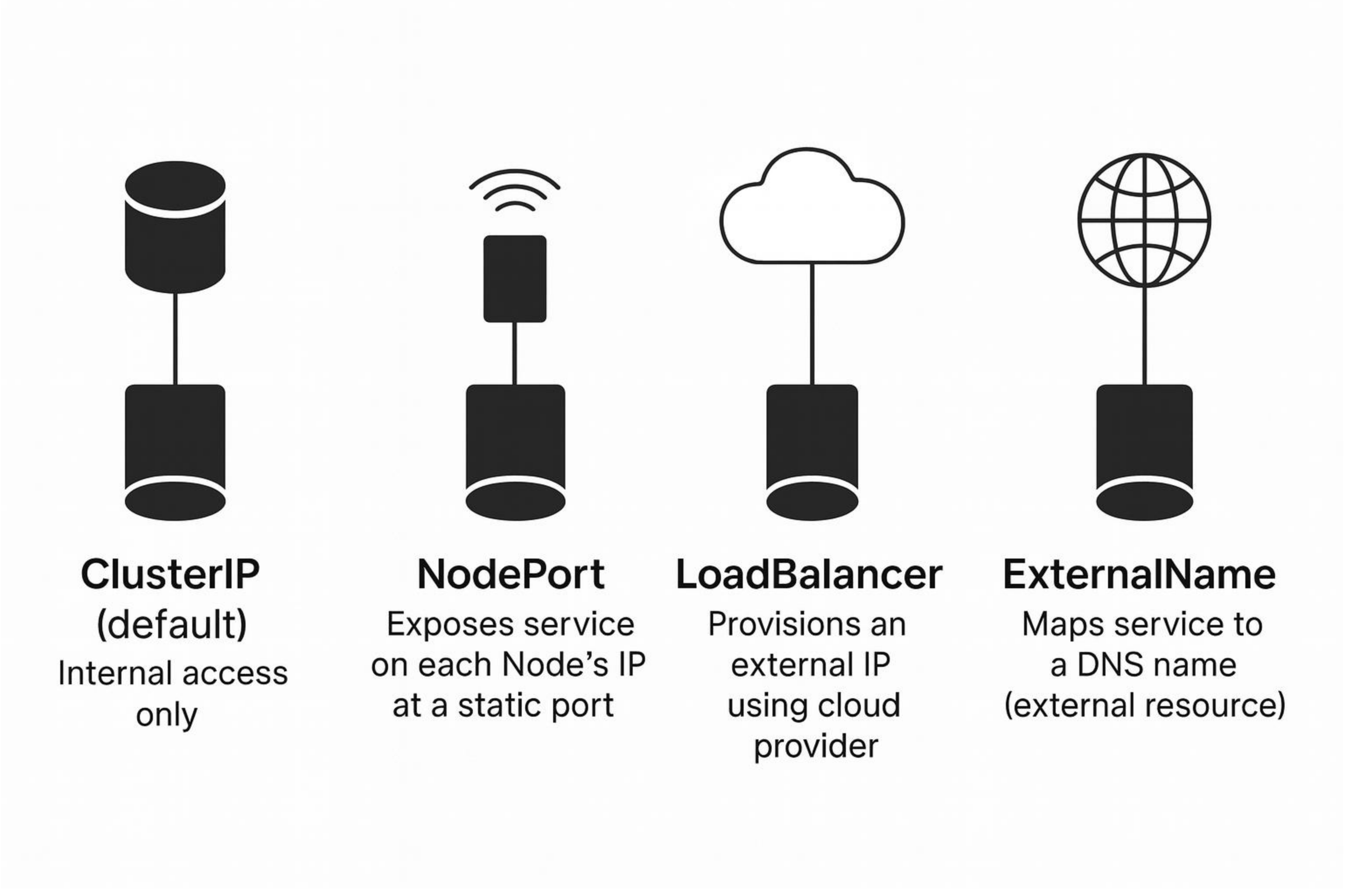
```
$ kubectl get pods -l app=frontend -o wide
```

NAME	READY	STATUS	NODE
frontend-123	1/1	Running	Node-1
frontend-456	1/1	Running	Node-3

Types of Services

- ClusterIP (default): Internal access only
- NodePort: Exposes service on each Node’s IP at a static port
- LoadBalancer: Provisions an external IP using cloud provider
- ExternalName: Maps service to a DNS name (external resource)

Types of Services



ClusterIP (default)
Internal access only

NodePort
Exposes service on each Node's IP at a static port

LoadBalancer
Provisions an external IP using cloud provider

ExternalName
Maps service to a DNS name (external resource)

Service Discovery and DNS

- Kubernetes creates a DNS record for each service
- Services can be accessed by their name within the same namespace
- Example: http://my-service.my-namespace.svc.cluster.local
- DNS resolution is handled by CoreDNS

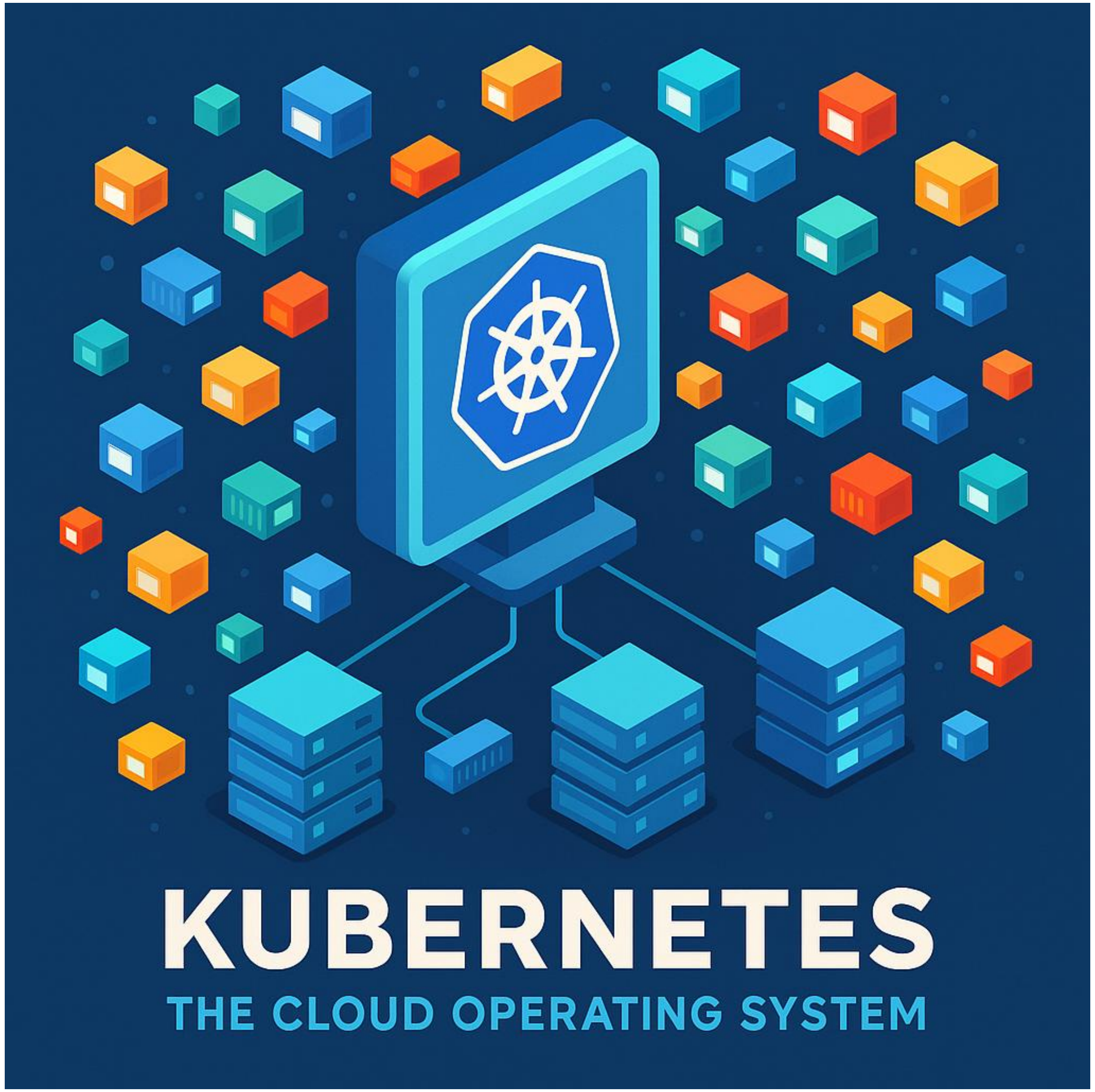
Headless Services

- Defined by setting clusterIP: None
- No load-balancing or cluster IP
- Enables clients to connect directly to Pod IPs
- Useful for StatefulSets and direct Pod discovery

Best Practice

- Expose Deployment using ClusterIP for internal communication
- Use NodePort for basic external access (port 30000-32767)
- Use LoadBalancer for production-grade external access
- Combine with Ingress for more advanced routing

Demo



Lab