Please turn on your lab according to the group

LAB 4 - GROUP1 FOR SEATING COLUMN A

LAB 4 - GROUP2 FOR SEATING COLUMN B

LAB 4 - GROUP3 FOR SEATING COLUMN C

Agenda :

Agenda	Speakers
Day 1 – 13th Sep 2022 (Tue)	
Opening : F5 Singapore Tech Xchange	Kok-Yong CHEONG
Chapter 1 : Modern application architecture – F5's vision & solutions	Davis LI
Chapter 2 : K8s fundamentals & networking (concept & labs)	Leong Keat QUAY Darren KOH
Chapter 3 : NGINX K8s Ingress Controller - deliver cloud-native applications (concept & labs)	Francois CHUA
Day 2 – 14th Sep 2022 (Wed)	
Chapter 4 : K8s and F5 BIG-IP LTM Integration (concepts & labs)	Joko YULIANTORO
Chapter 5 : K8s and F5 BIG-IP DNS Integration (concept & labs)	Joko YULIANTORO
Chapter 6 : Putting all together – F5 Active-active Kubernetes clusters (concept & labs)	Joko YULIANTORO
Chapter 7 : Security on cloud-native applications (concept & labs)	Cloe TANG

K8s and F5 BIG-IP LTM Integration

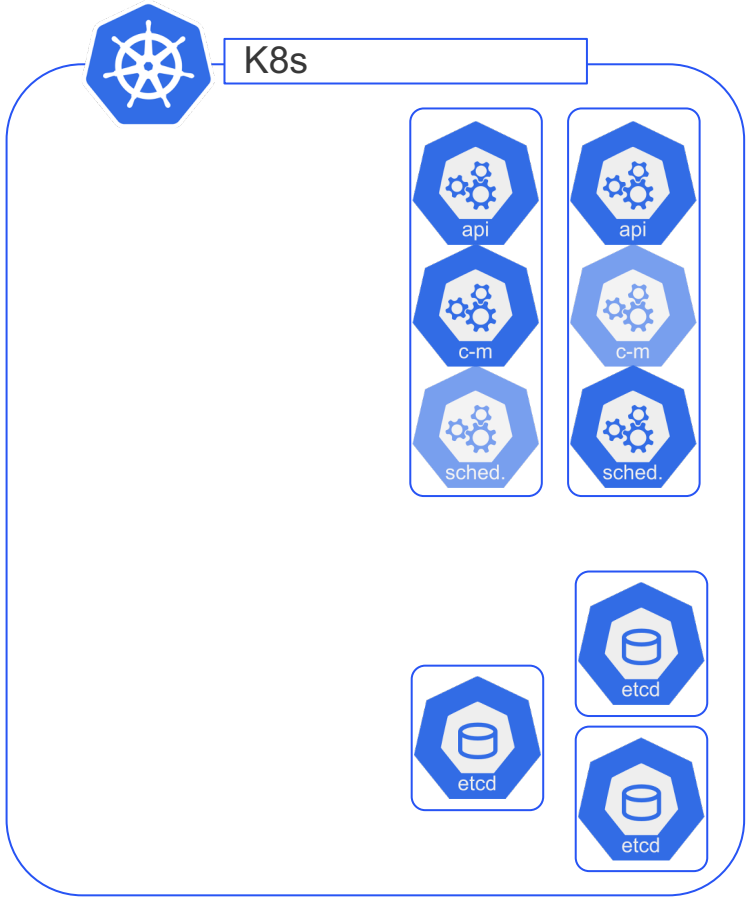
CHAPTER 4

What's Inside This Chapter?

- Quick Recap
- Integrating K8s Cluster to Existing Network Infra
- F5 CIS Overview
- Traffic Flow with CIS + KIC
- F5 CIS Deployment Options
- Break
- F5 CIS Configuration Mode
- F5 CIS Internal Mechanism
- F5 CIS Compatibility
- F5 CIS Design Guidelines
- F5 Better Together Solution Advantages

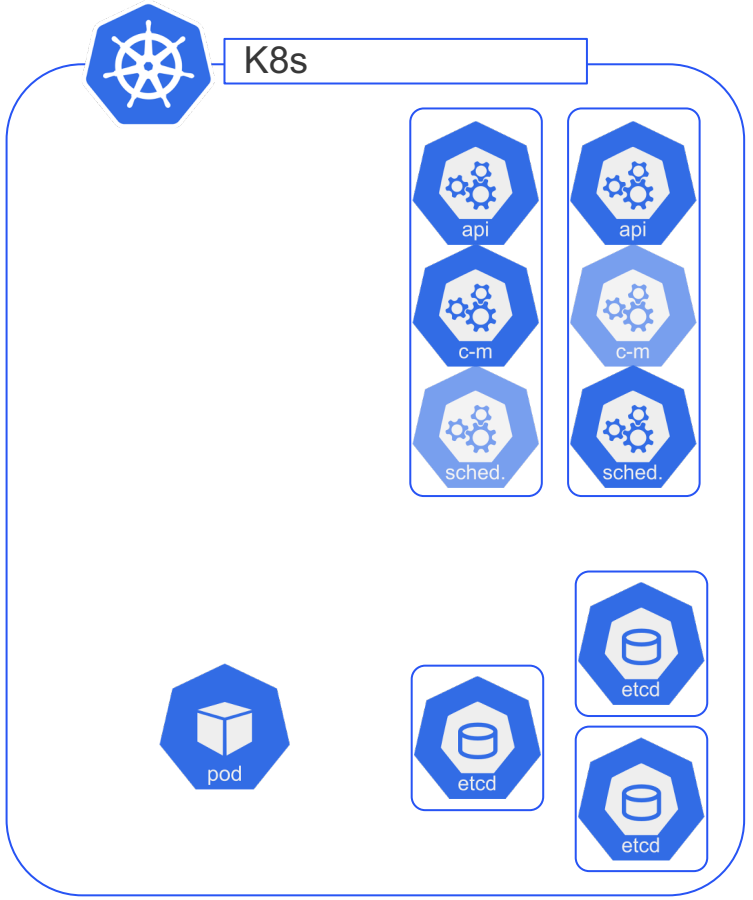
What Have Been Done So Far

Created a K8s cluster.



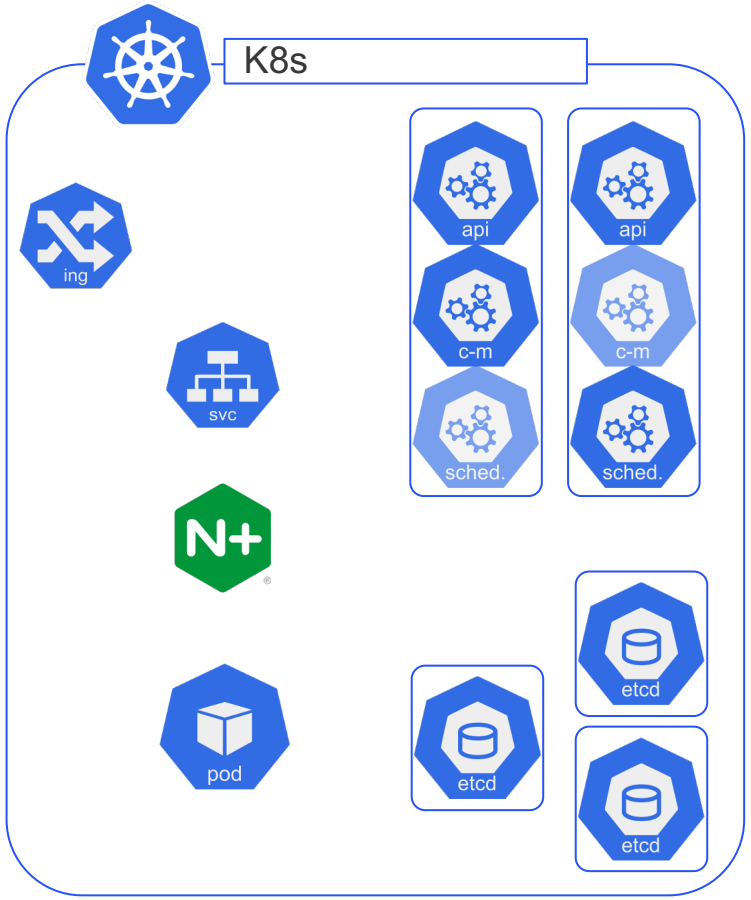
What Have Been Done So Far

Deployed a pod.



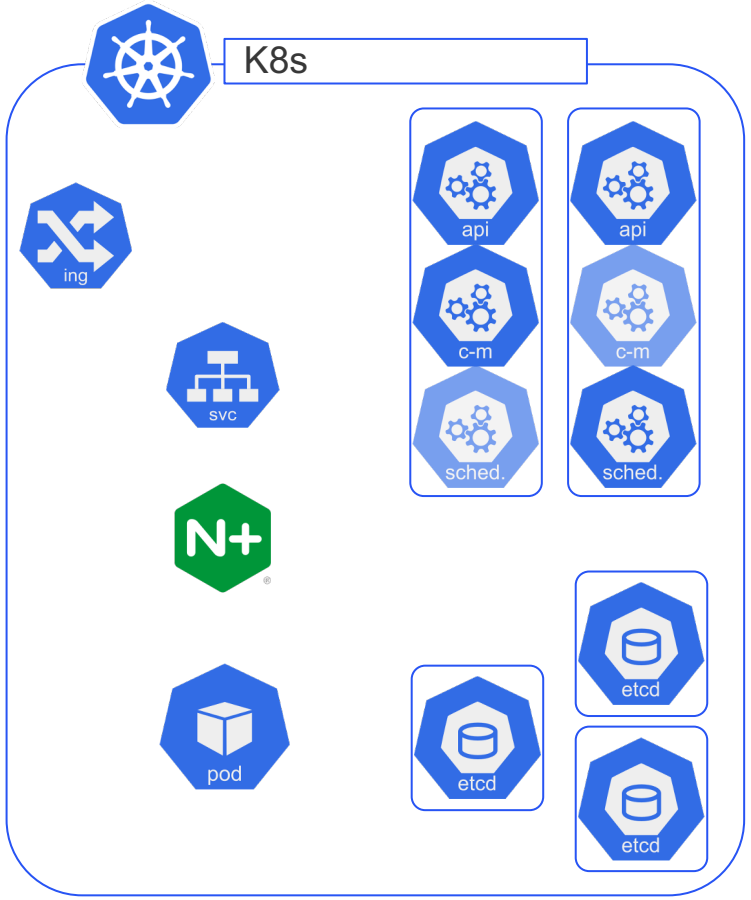
What Have Been Done So Far

Installed the Ingress Controller based on NGINX



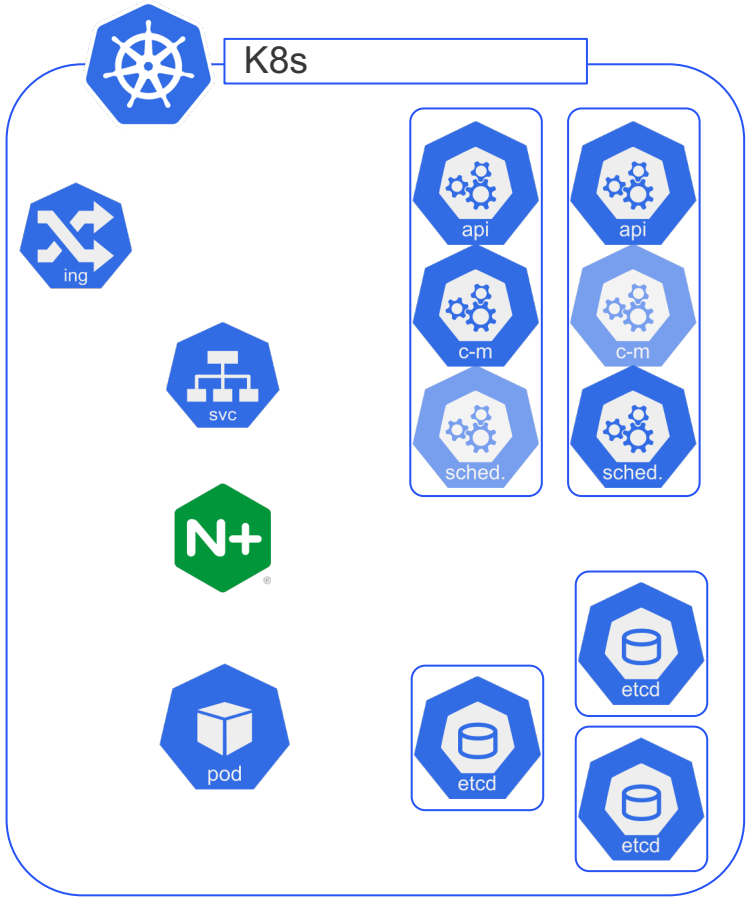
What Have Been Done So Far

The K8s cluster is part of the larger existing environment.



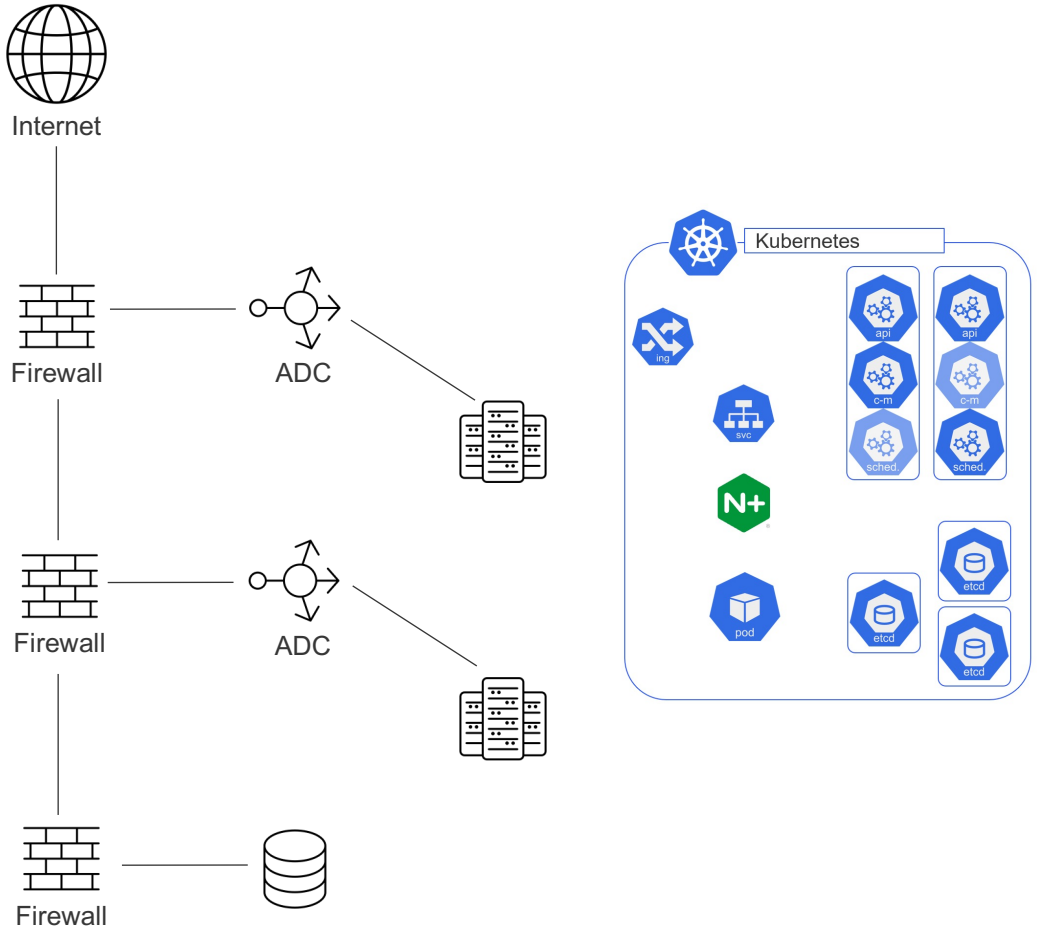
What Have Been Done So Far

How does it get integrated to the existing infrastructure and environment?



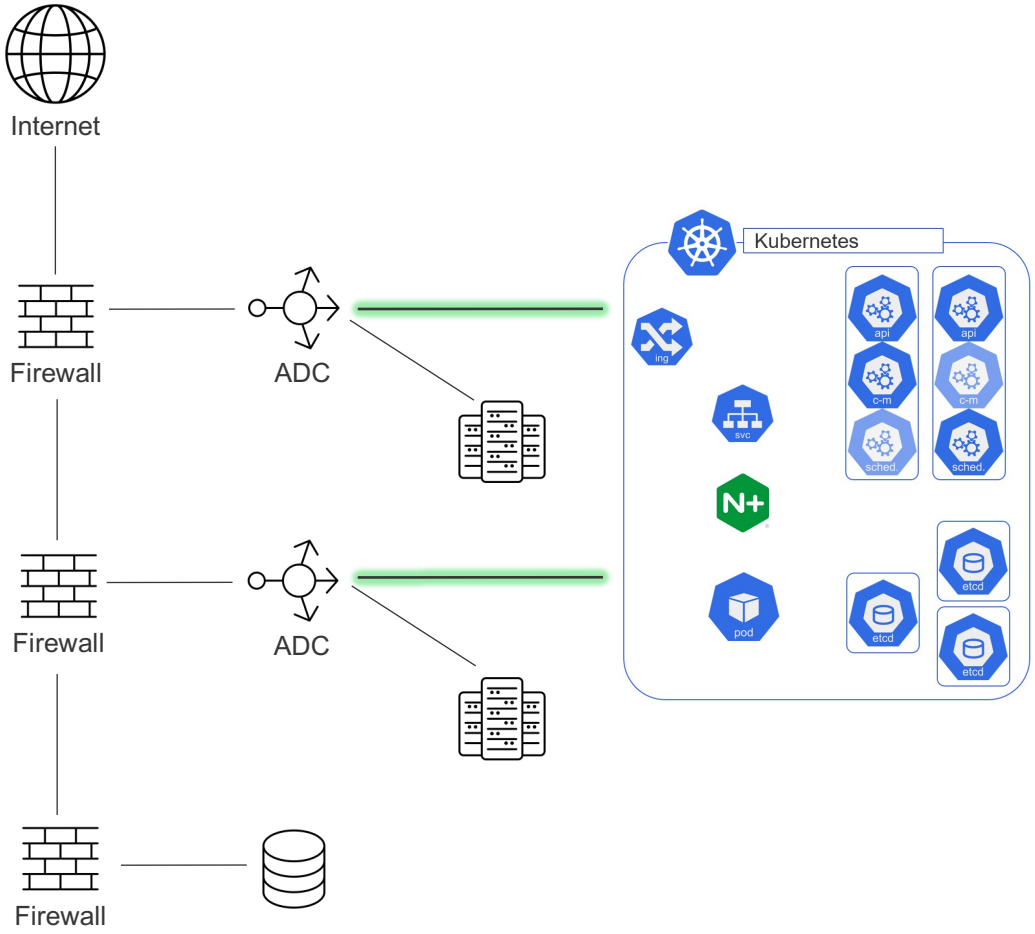
Integrating K8s Cluster to Existing Infra

How does it get integrated to the existing infrastructure and environment?



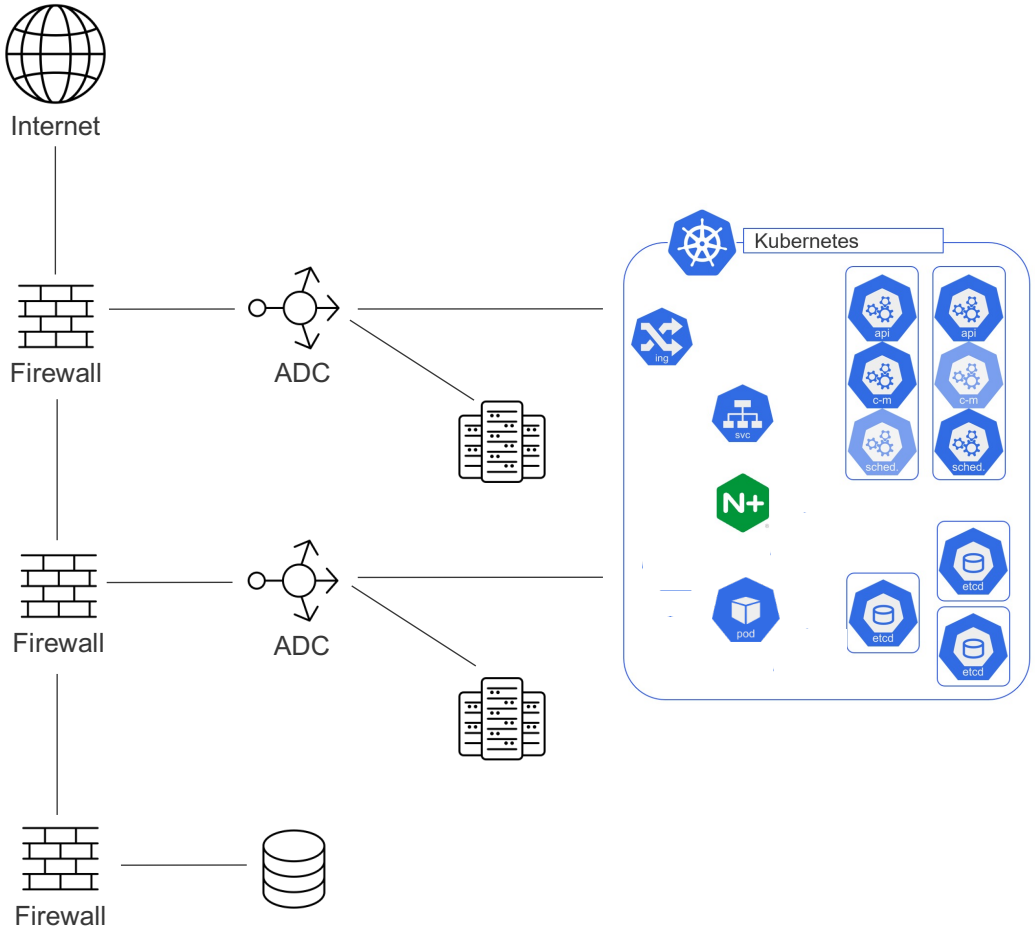
Integrating K8s Cluster to Existing Infra

The best way to connect K8s cluster to existing infra is to ADC.



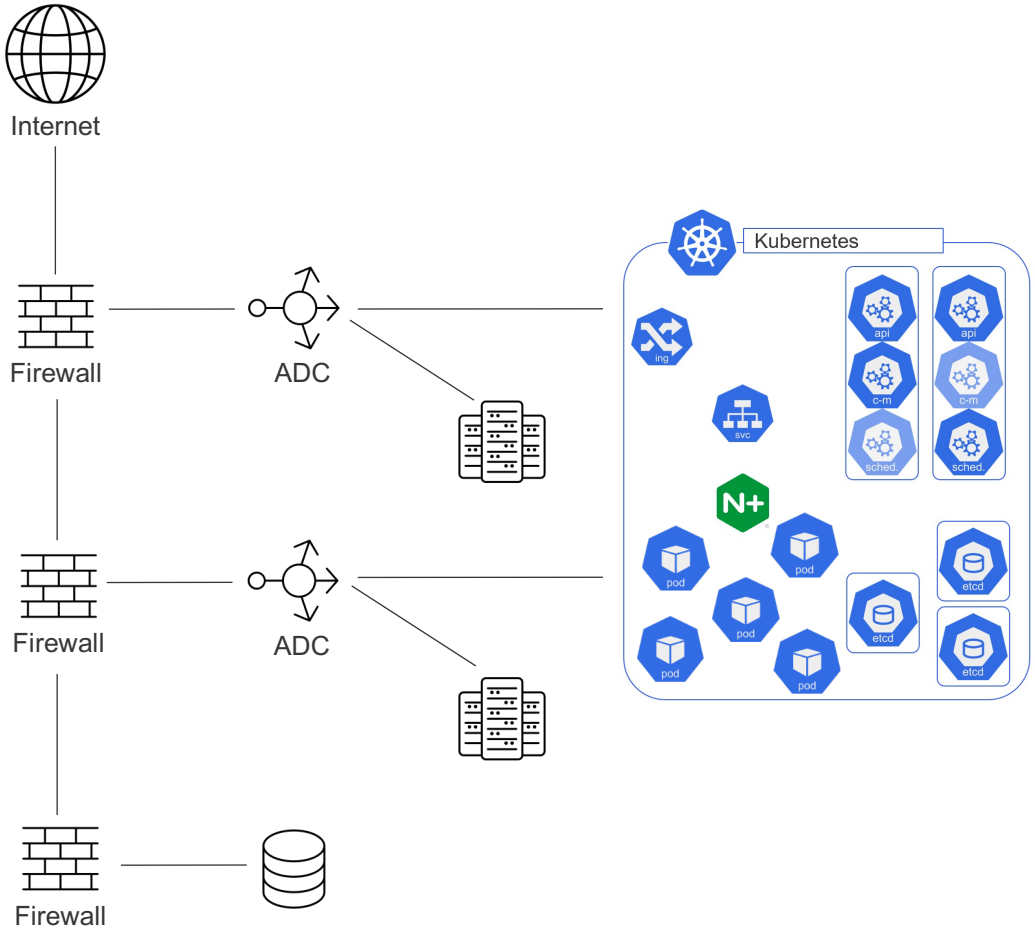
Integrating K8s Cluster to Existing Infra

Pod lifecycle in K8s cluster is very dynamic.



Integrating K8s Cluster to Existing Infra

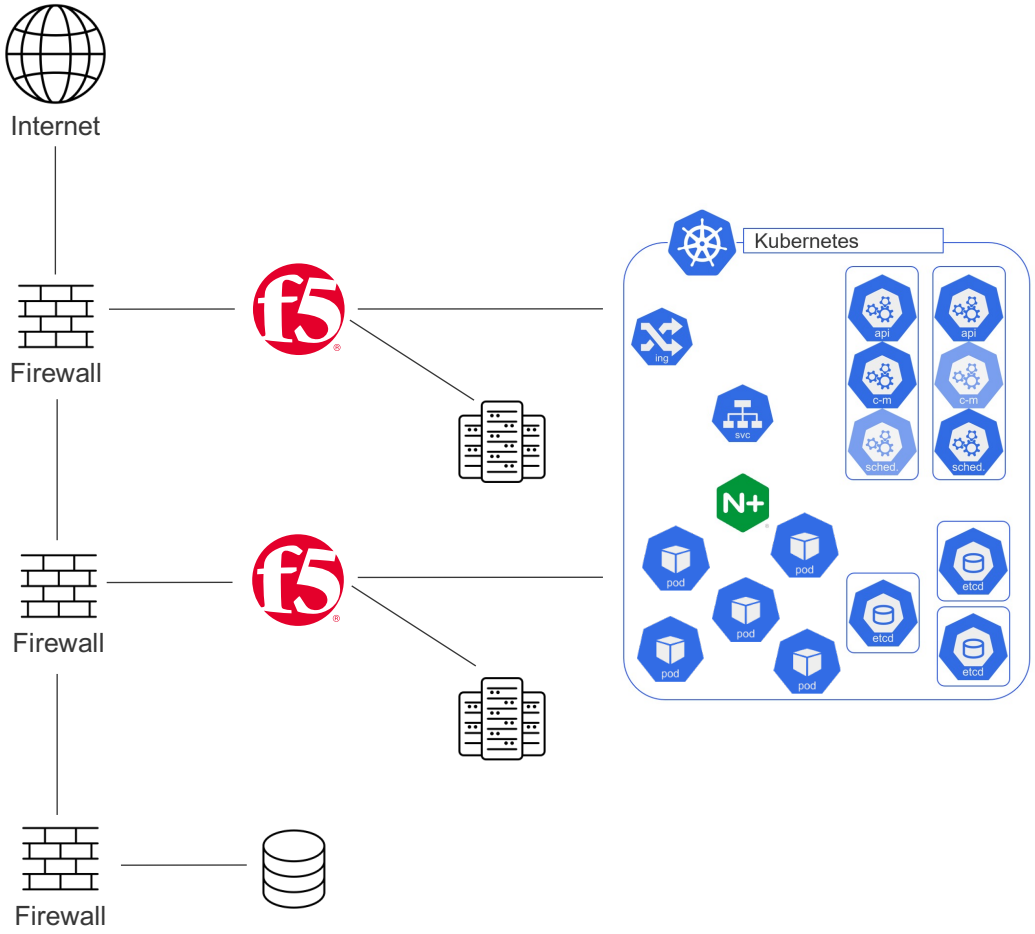
We need an ADC that has automation interface to follow the pod lifecycle dynamics.



Integrating K8s Cluster to Existing Infra

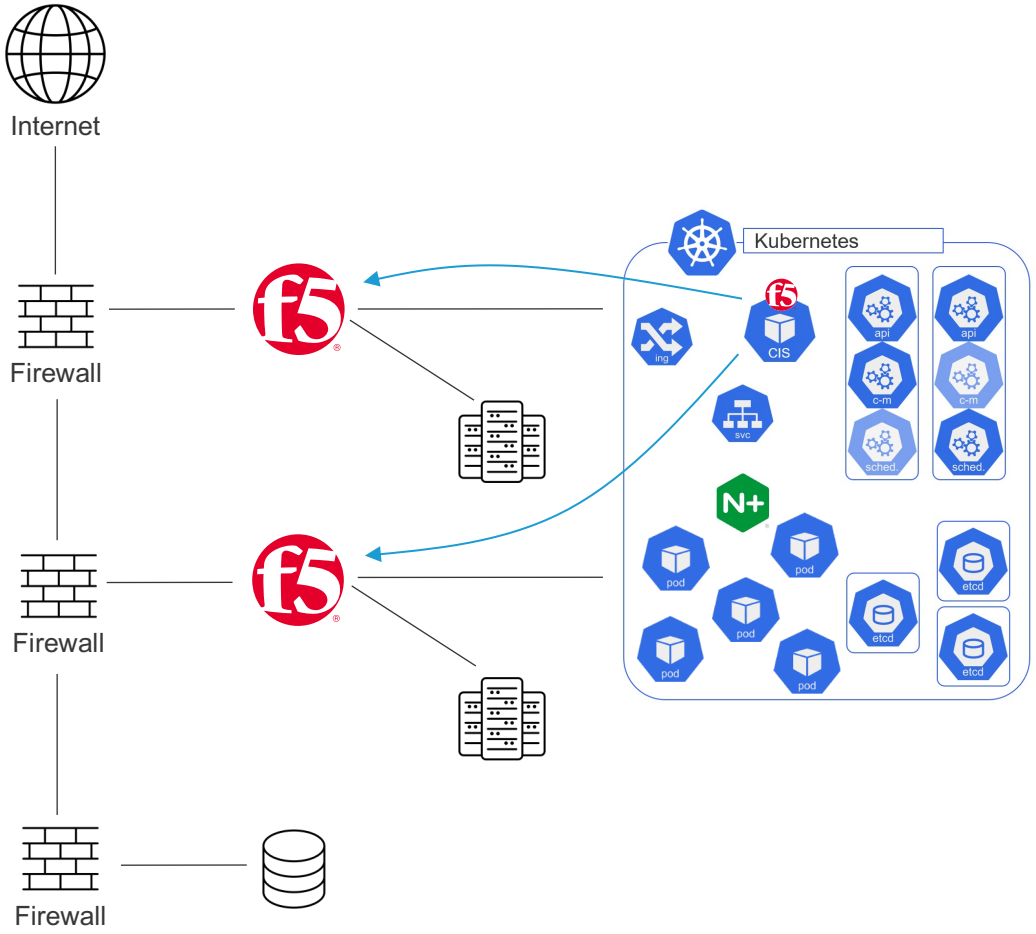
F5 BIG-IP is the most advanced ADC in the market.

F5 BIG-IP comes with modern automation interfaces.



Integrating K8s Cluster to Existing Infra

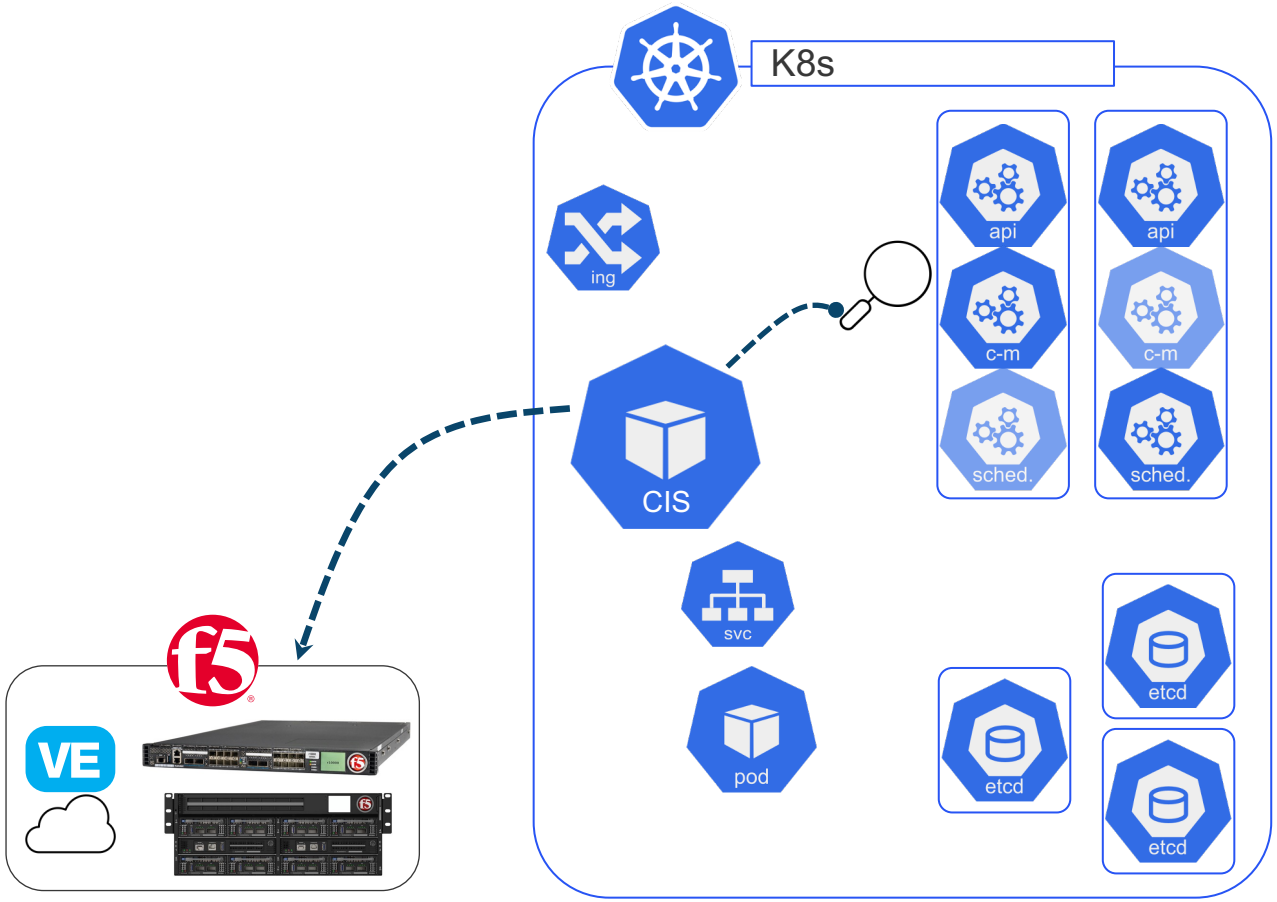
F5 Container Ingress Service (CIS) is a pod inside K8s that manage the F5 BIG-IP configuration based on pod lifecycle dynamics.



F5 Container Ingress Service (CIS) Overview

F5 Container Ingress Service (CIS) is a free K8s pod that is responsible for:

- Monitor K8s API server's orchestration traffic (e.g. Ingress (K8s), Routes (OCP), ConfigMap, CRD)
- Managing the F5 L4/L7 service configuration.
  - (F5) Node
  - Pool
  - SSL profiles
  - Virtual address
  - Virtual server
  - GSLB settings

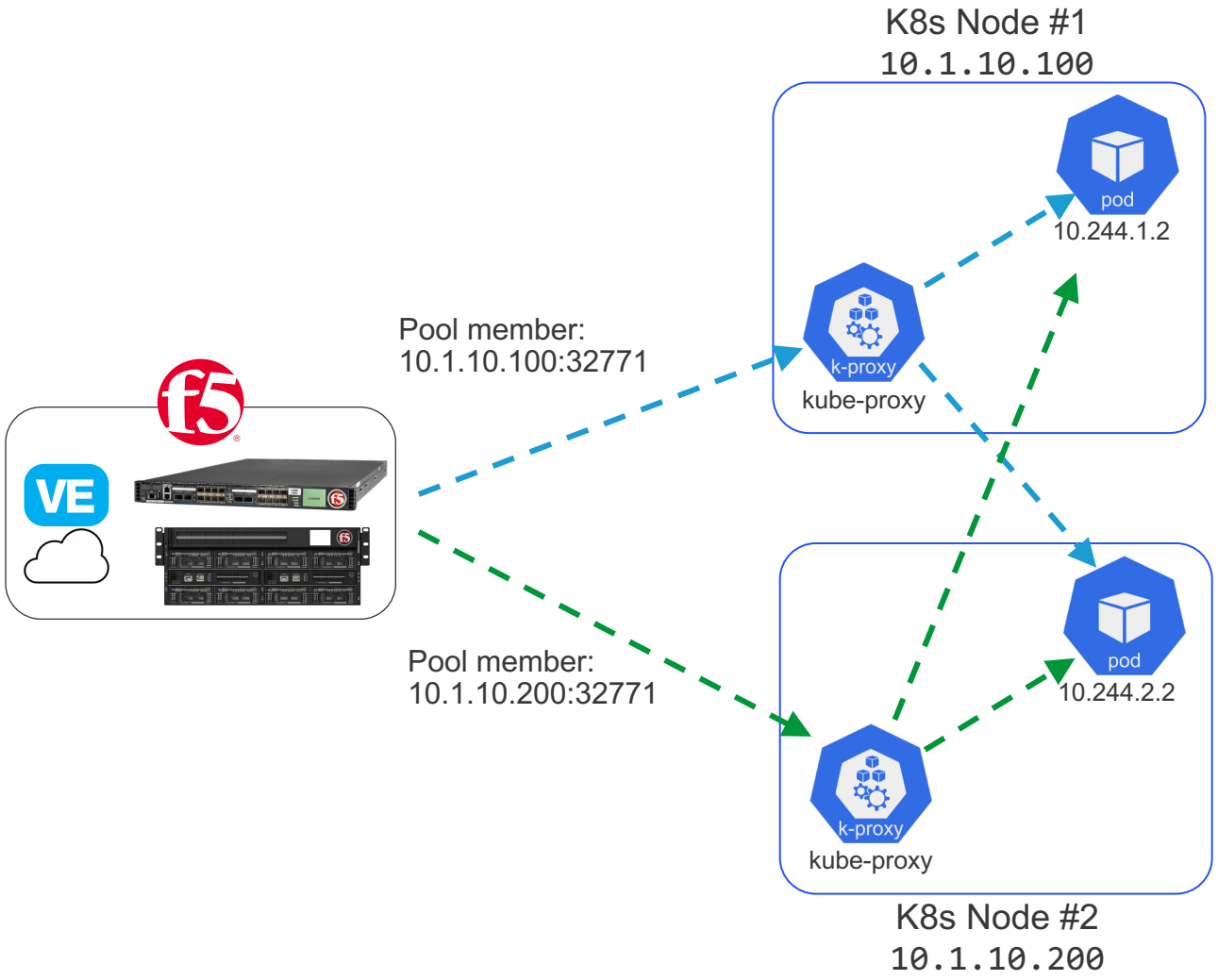


F5 CIS Configuration Options – (1/3) K8s NodePort

NodePort: F5 connect to kube-proxy service as the F5 pool member.

Features:

- It works with any K8s.
- No persistence/visibility to backend pod.
- Can be deployed for static workload.

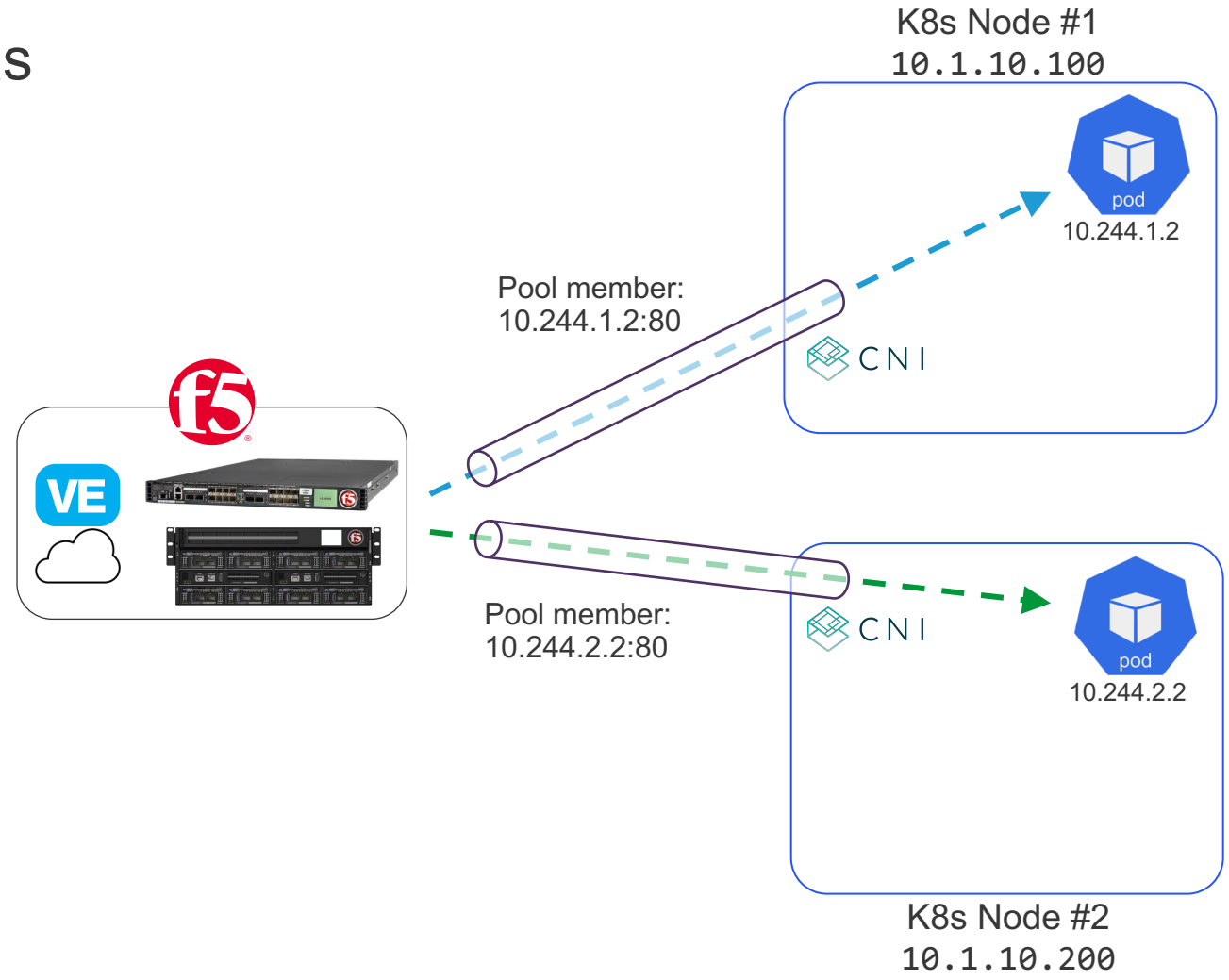


F5 CIS Configuration Options – (2/3) K8s ClusterIP

ClusterIP: F5 connect to pod's service as the pool member. Requires ability to route to pod (Calico BGP) or VXLAN.

Features:

- Connect directly to pod.
- Bypass kube-proxy and have direct access to K8s internal network

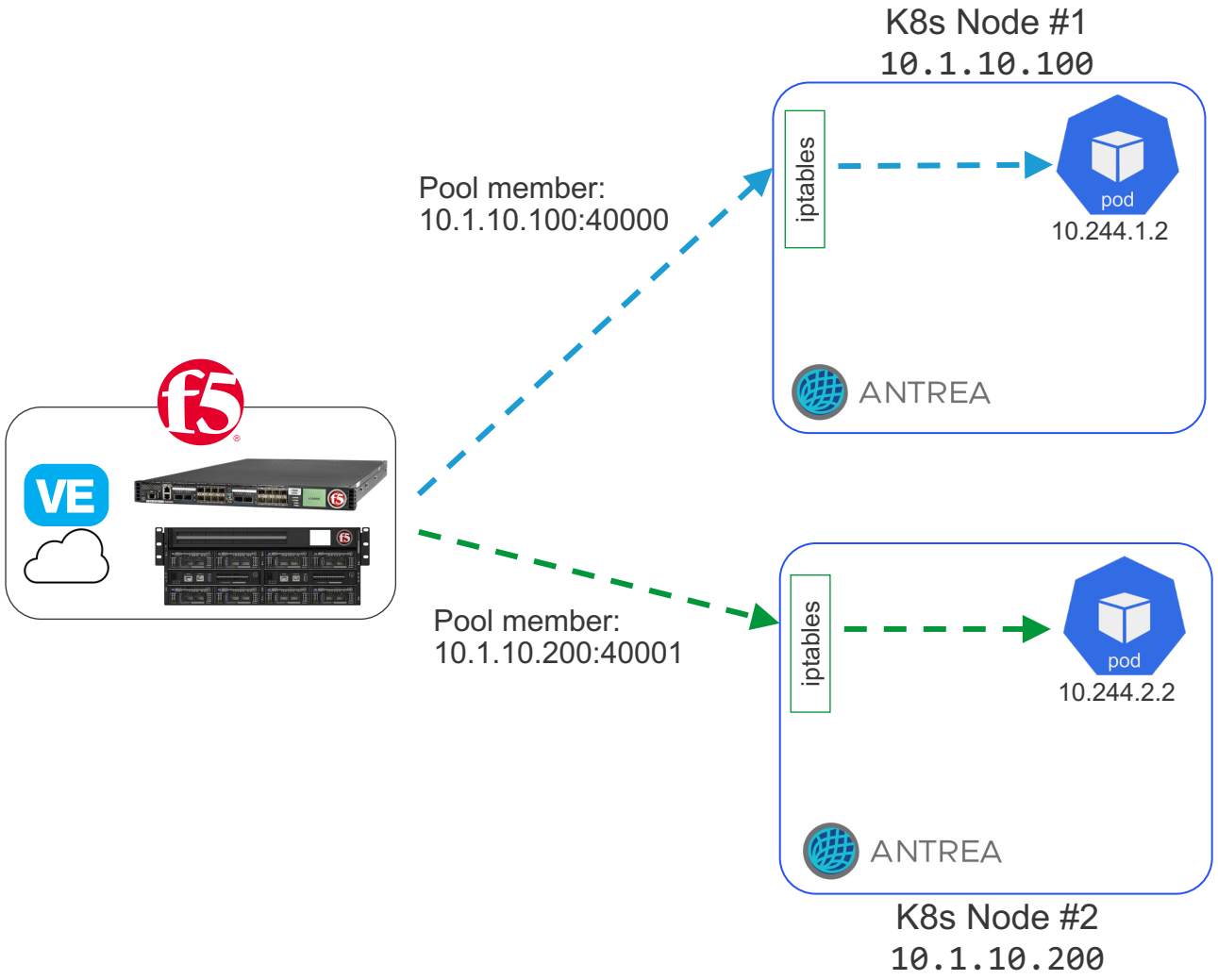


F5 CIS Configuration Options – (3/3) NodePortLocal

NodePortLocal: F5 connect to K8s node service mapped to pod service (maintained by Antrea – mostly for Tanzu).

Features:

- Connect directly to pod via iptables mapping.
- Decrease the port range requirement at K8s node level.

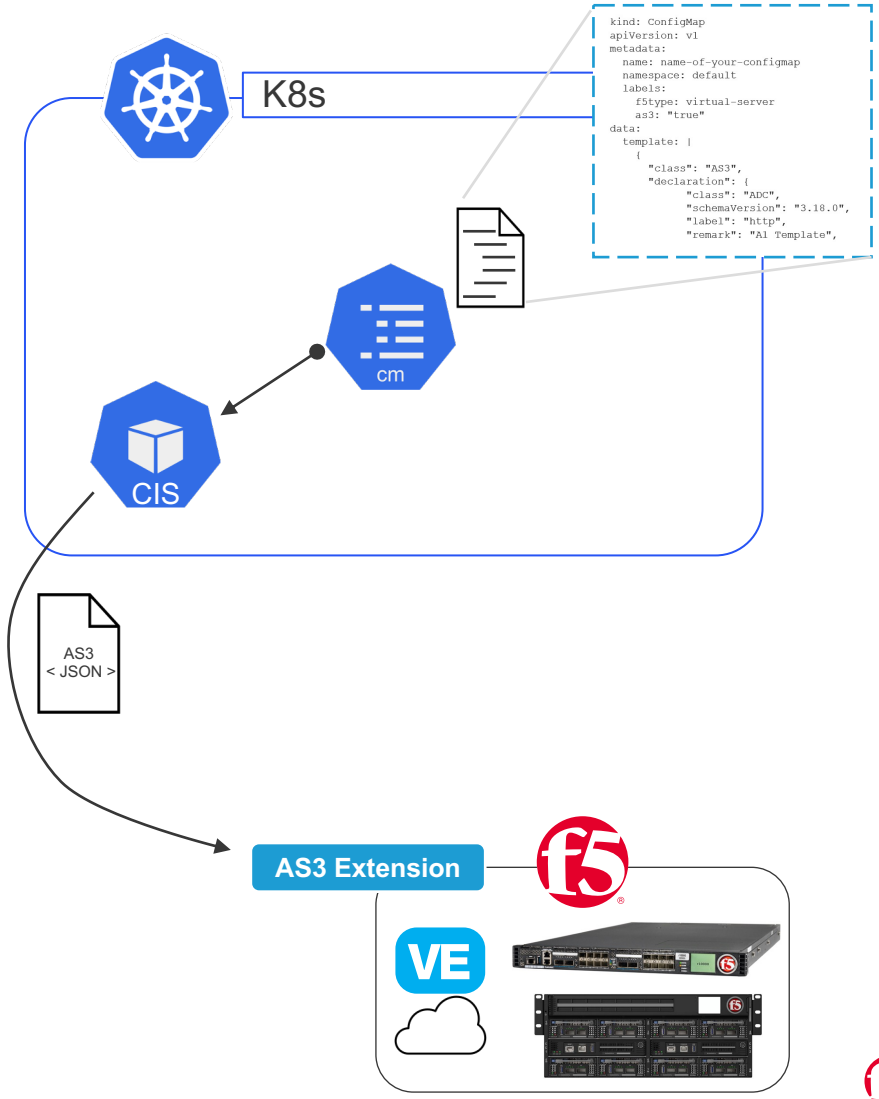


F5 CIS Configuration Mode – ConfigMap (1/2)

ConfigMap

The place to store F5 AS3 JSON Data.

- User-defined AS3 ConfigMap
  - Complete AS3 declaration is stored in ConfigMap
  - CIS send the complete declaration to F5 device
- Override AS3 ConfigMap
  - Part of the AS3 declaration is stored in ConfigMap
  - CIS send the declaration which affects only certain part of the F5 device config



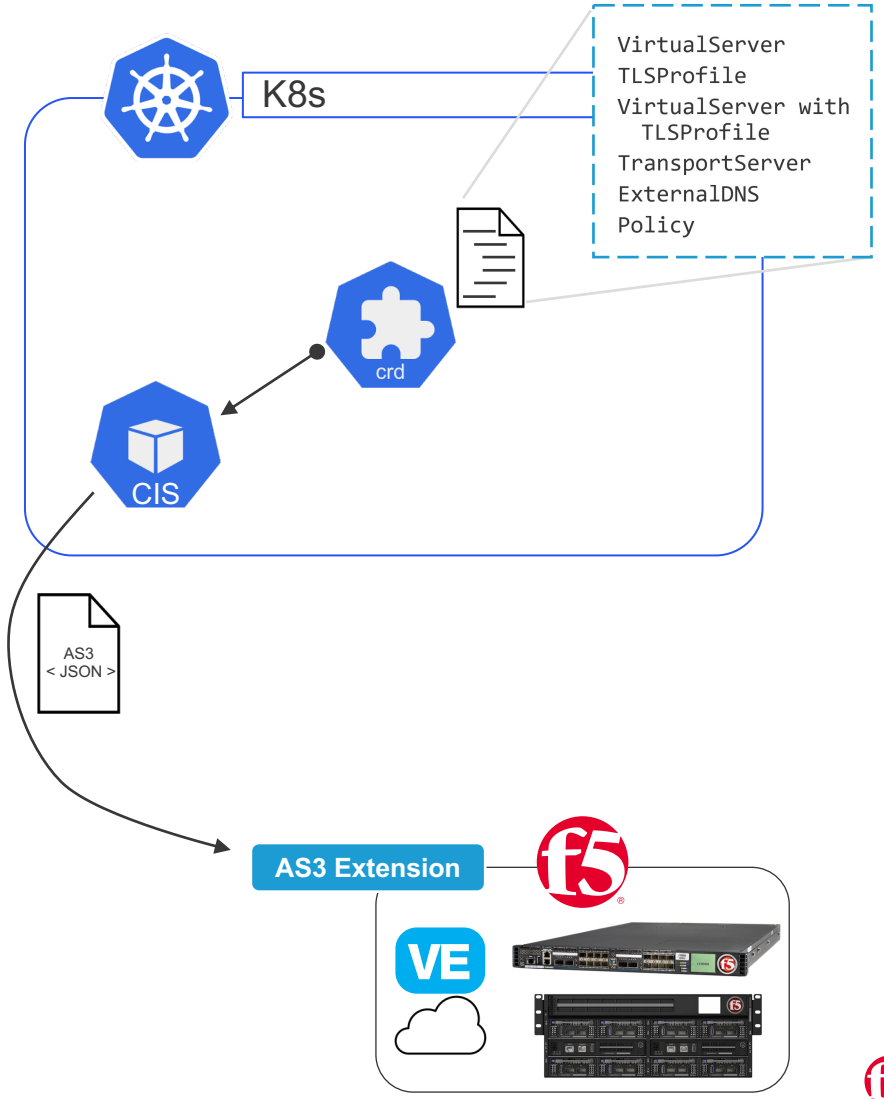
F5 CIS Configuration Mode – CRD (2/2)

Custom Resource Definition (CRD)

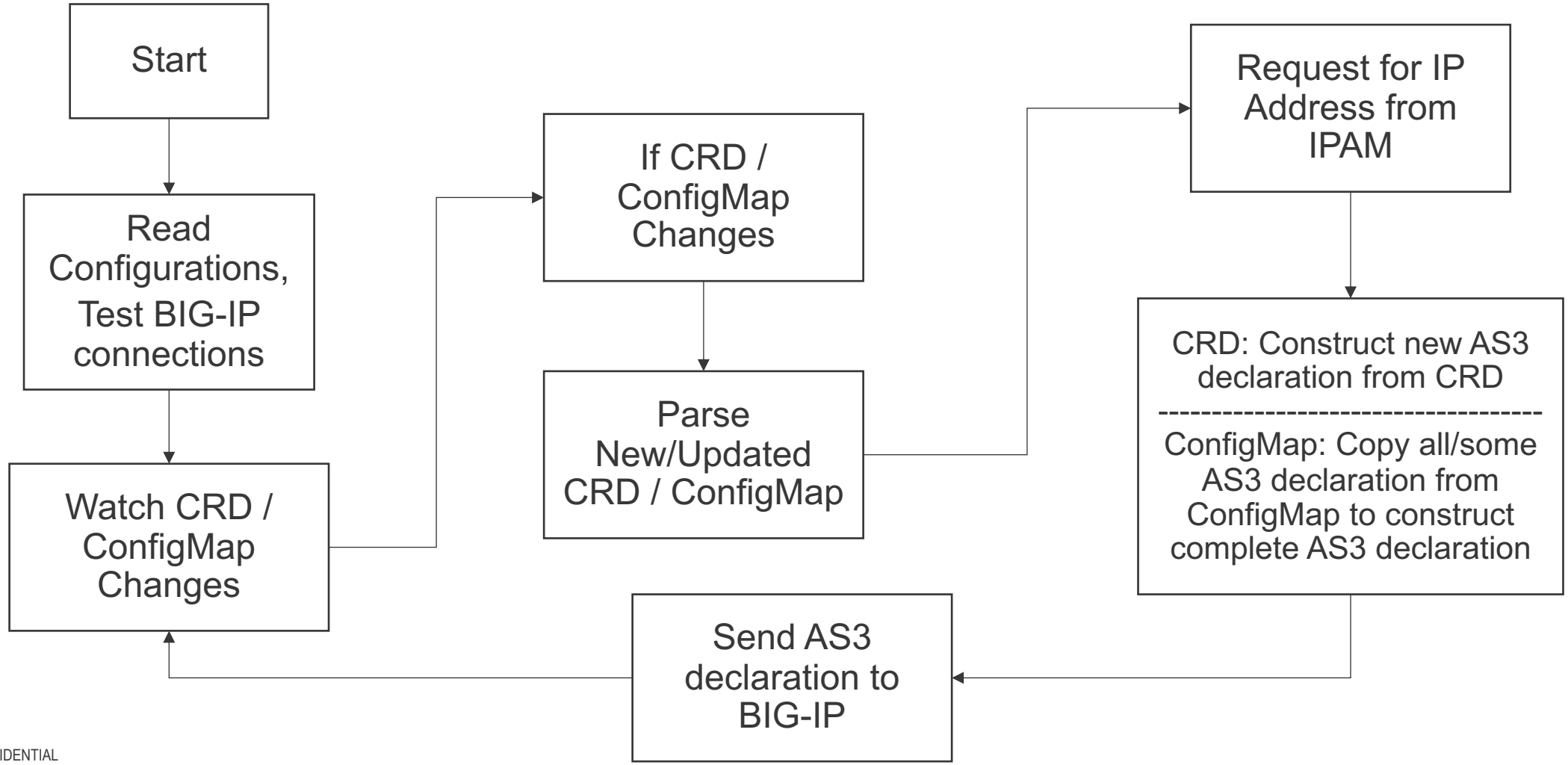
CIS monitors specific CRD lifecycle and triggers AS3 declaration to be sent to F5 device.

CIS does not monitor Ingress/Routes/ConfigMap when deployed in CRD mode.

Supported since Kubernetes v1.16.



How F5 CIS Internal Working – High Level Diagram



F5 CIS Compatibility

Currently, F5 CIS is compatible with the following:

- Kubernetes v1.13 – v1.23
- OpenShift Container Platform v3.11 – v4.10.3

F5 has tested CIS with the above versions.

F5 CIS may work with versions not shown above;
F5 has not verified functionality in those versions.

VMware Tanzu is supported through NodePortLocal mode.

VMware Tanzu uses Antrea CNI as default. Another supported CNI is Calico.

CIS Design Guideline

Single CIS Deployment per K8s Cluster

- Single CIS monitors all namespaces in the cluster.
- Single CIS only integrates to specific configuration partition in an F5 device.
- Centralized management – The CIS deployment is managed by same team/administrator covering all namespaces lifecycle.

Multiple CIS Deployments per K8s Cluster

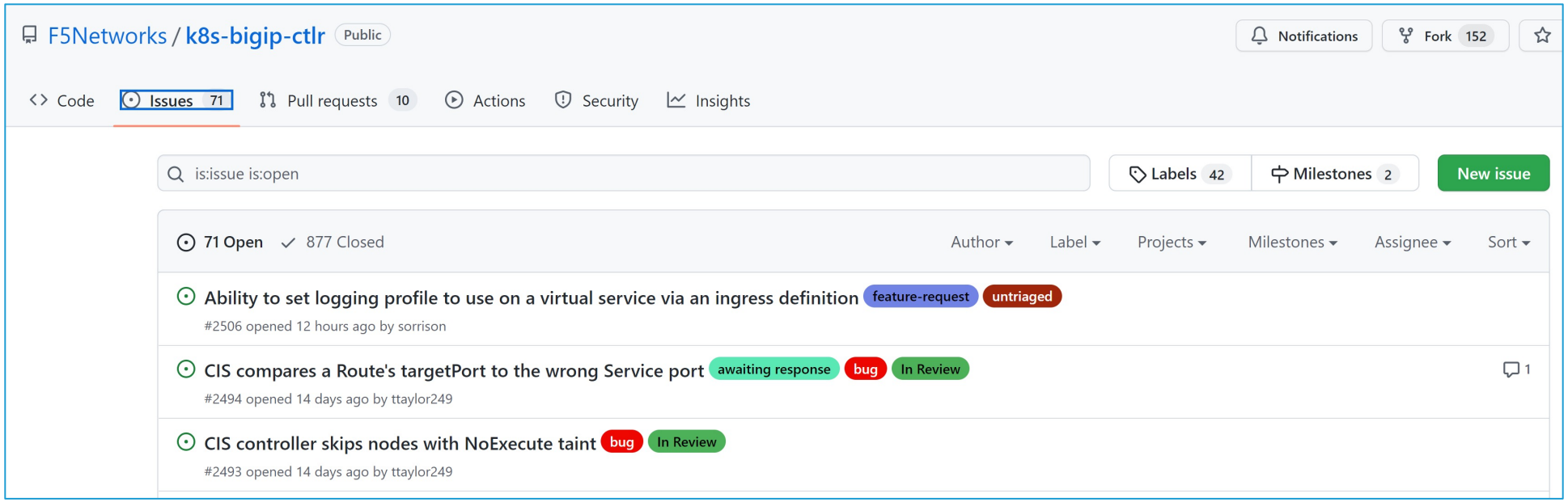
- Multiple CIS monitor different namespaces in the cluster.
- Each CIS integrate to specific configuration partition in an F5 device.
- Multiple CIS can integrate to the same F5 device in different configuration partition.
- Distributed management – Each CIS deployment is managed by different team.

Reporting CIS Issues and Requesting CIS Feature

CIS is always evolving according to the user requirements.

Users are encouraged to report any issues and any feature request to F5 CIS team.

Send your feedback request via https://github.com/F5Networks/k8s-bigip-ctlr/issues.



Lab 4 – CIS NodePort

Summary

What We Have Learned in This Chapter

- Connect K8s pod properly to outside K8s network using an ADC (Application Delivery Controller) that has automation capability.
- Deploy F5 CIS to automate the F5 BIG-IP LTM according to the pod lifecycle.
- Inspect the traffic flow from client → F5 → K8s pod.

Quiz Time!!!