Build, run & manage cloud-native apps met Kubernetes

SD Lijn

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About

Viktor van den Berg

SE App Platforms Tanzu @ VMware

Part of the Tanzu team since May 2022
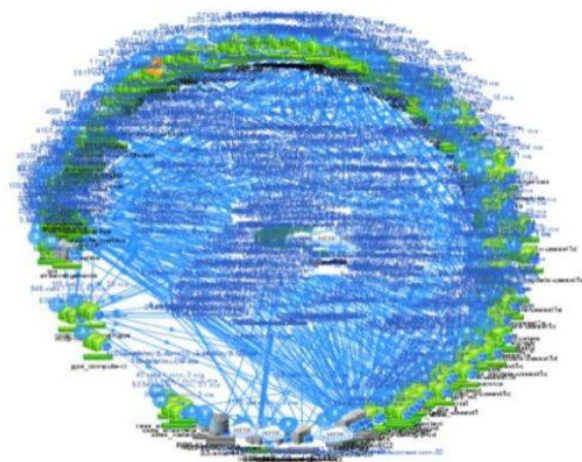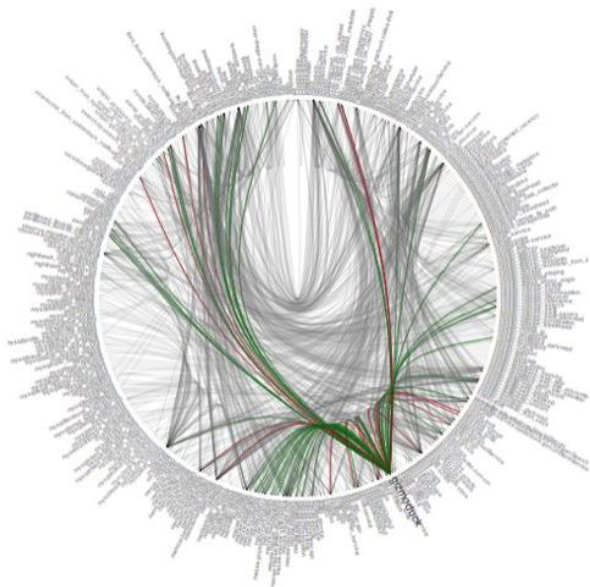
@viktoriousss

https://www.viktorious.nl
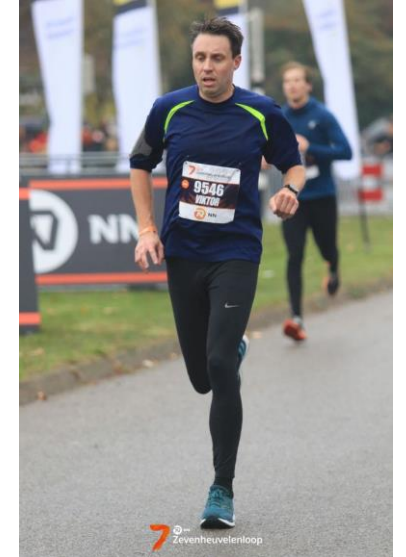
Kubernetes is built for these needs

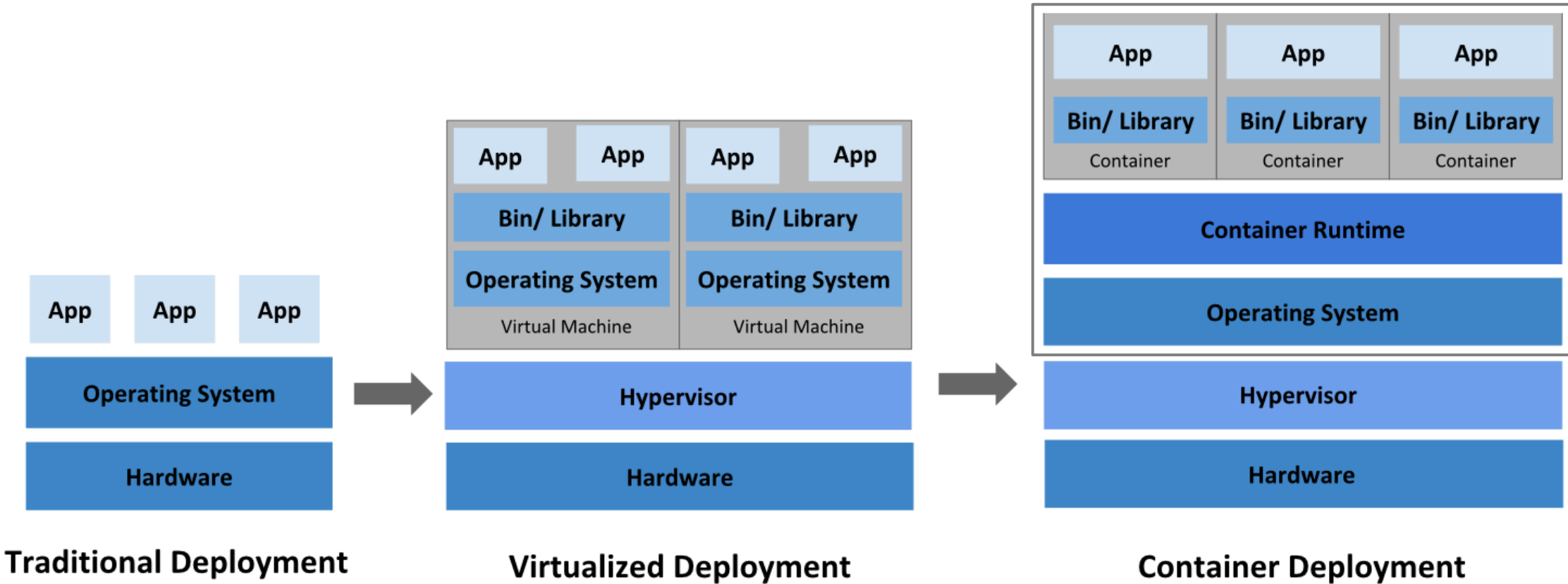**Netflix 200+ million subscribing users**

Twitter 190+ million daily users

**Google 5.6 billion searches daily**

Evolution of how we run apps
Moving to Cloud Native Applications

App **App** **App**

Operating System

Hardware

Traditional Deployment

App **App** **App** **App**

Bin/ Library **Bin/ Library**

Operating System **Operating System**

Virtual Machine | Virtual Machine

Hypervisor

Hardware

Virtualized Deployment

App **App** **App**

Bin/ Library **Bin/ Library** **Bin/ Library**

Container | Container | Container

Container Runtime

Operating System

Hypervisor

Hardware

Container Deployment

Creating an OCI container

```
</:docker build -t myApp:latest>

FROM python:3.9.1
RUN apt-get update -y && \
    apt-get install -y python-pip python-dev

COPY ./requirements.txt /app/requirements.txt

WORKDIR /app

RUN pip3 install -r requirements.txt

COPY . /app

ENTRYPOINT [ "python3.9" ]

CMD [ "app.py" ]
```
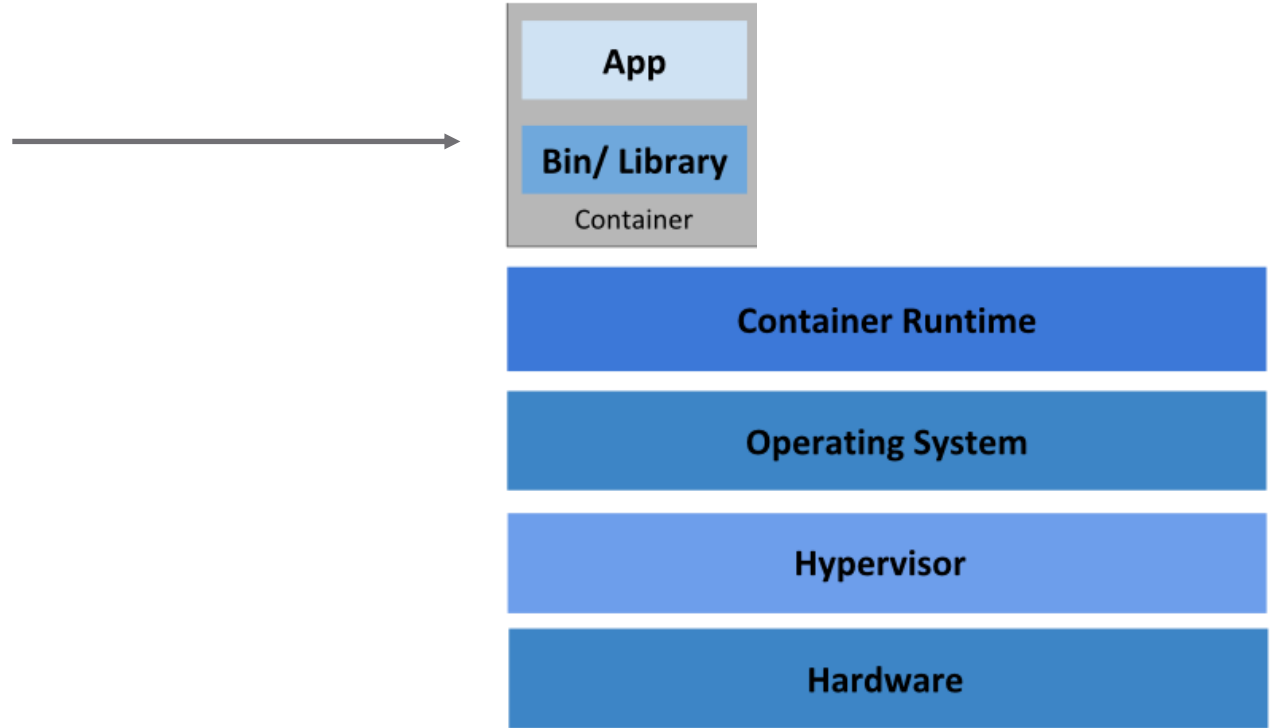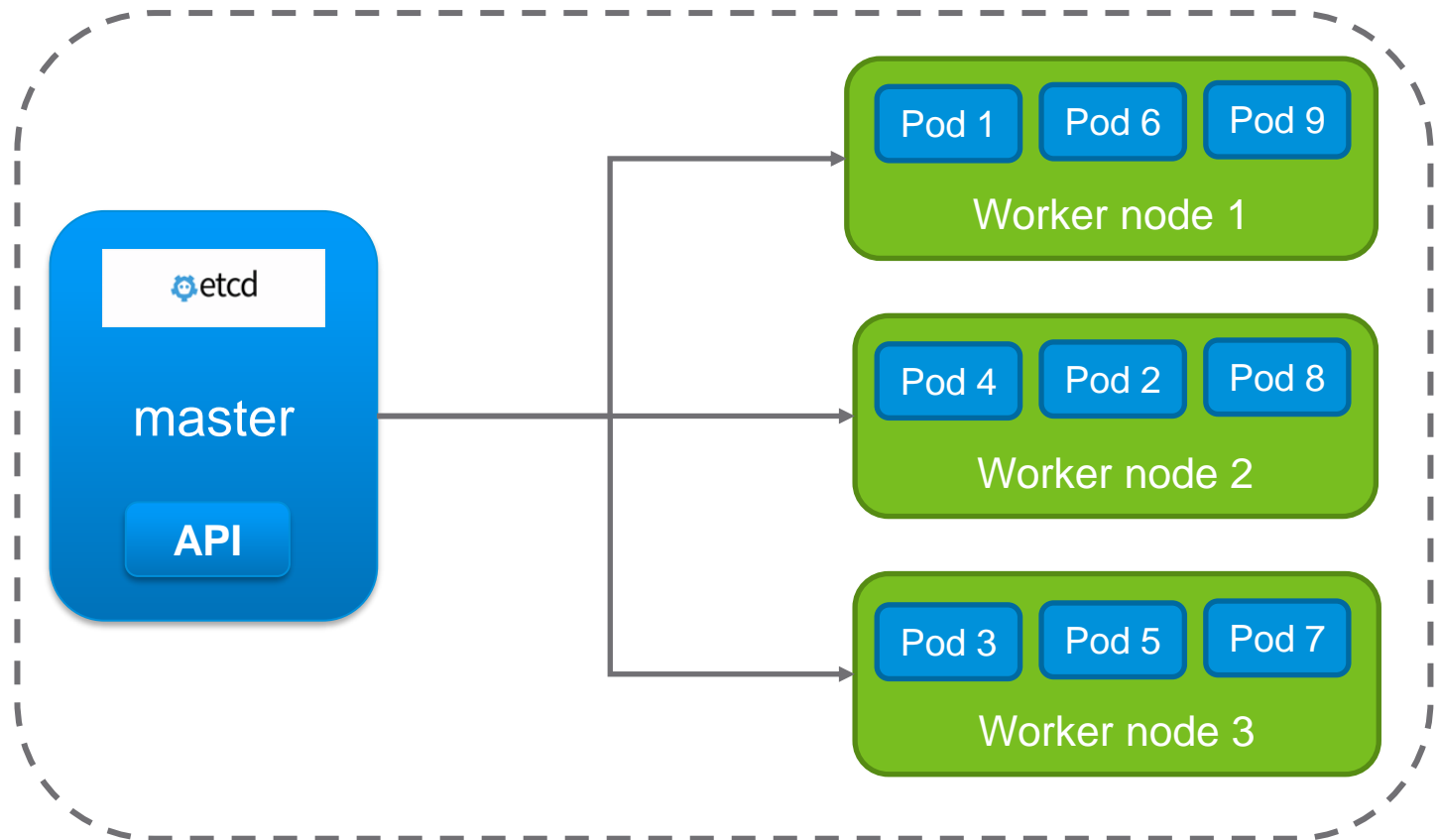
What is Kubernetes?

Kubernetes comprises a set of independent, composable control processes that continuously drive the current state towards the provided desired state.

K8S components:

- Master
- Worker(s)
- Pods
- Cluster

Kubernetes - capabilities

Some of the Kubernetes capabilities:
- Service discovery & load balancing
- Storage orchestration
- Automated rollouts and rollbacks
- Self-healing
- Network policies
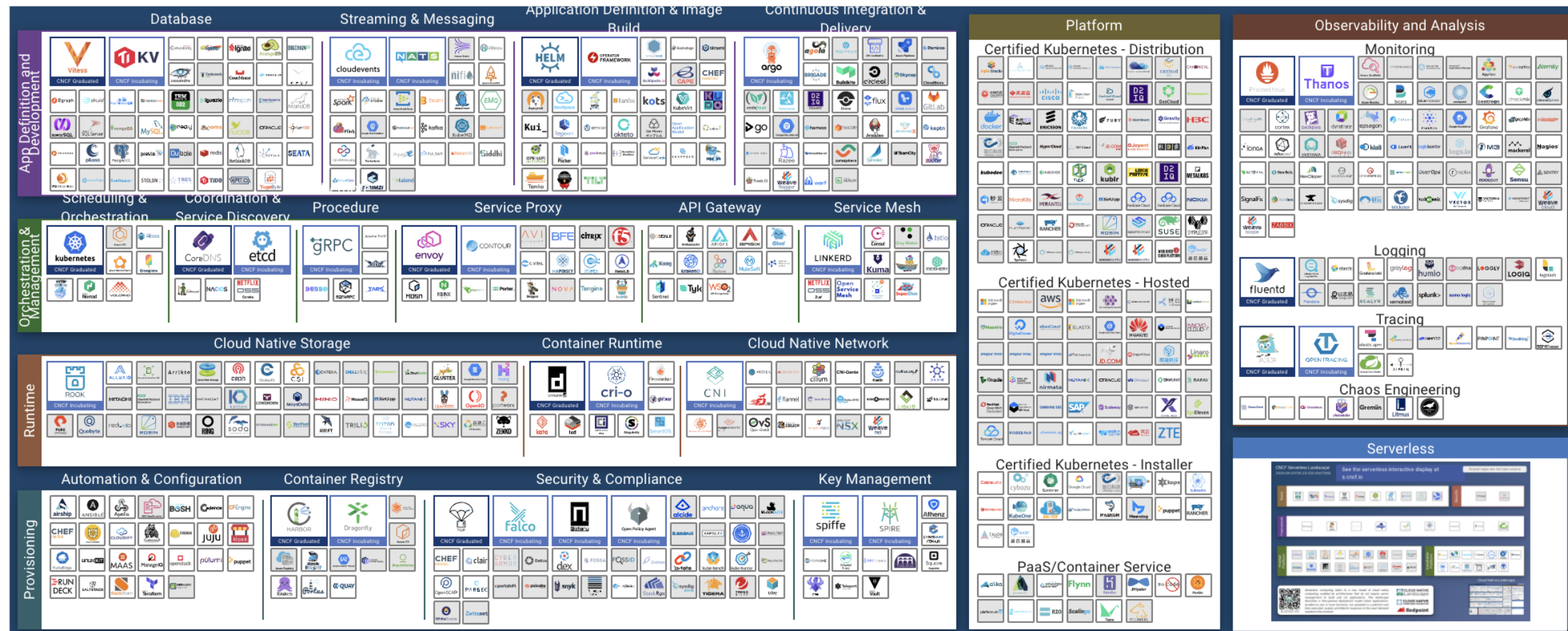- Secret and configuration management

Kubernetes is very extensible
- K8S cluster deployment
- Ingress
- Logging
- Monitoring/observability
- Directory integration

vmware®

It's not only about containers & kubernetes

Navigate the CNCF ~~landscape~~…jungle?

Introducing
VMware Tanzu

Build Modern Apps

Run Enterprise Kubernetes

Manage Kubernetes for Developers AND IT

Why Tanzu?

Modernize your apps & infrastructure to continuously deliver better software to production

VMware Tanzu™

Applications

| Code and containerize custom applications | Speed development with open-source containers | Automate deployment of apps into production |

DEVELOPER EXPERIENCE

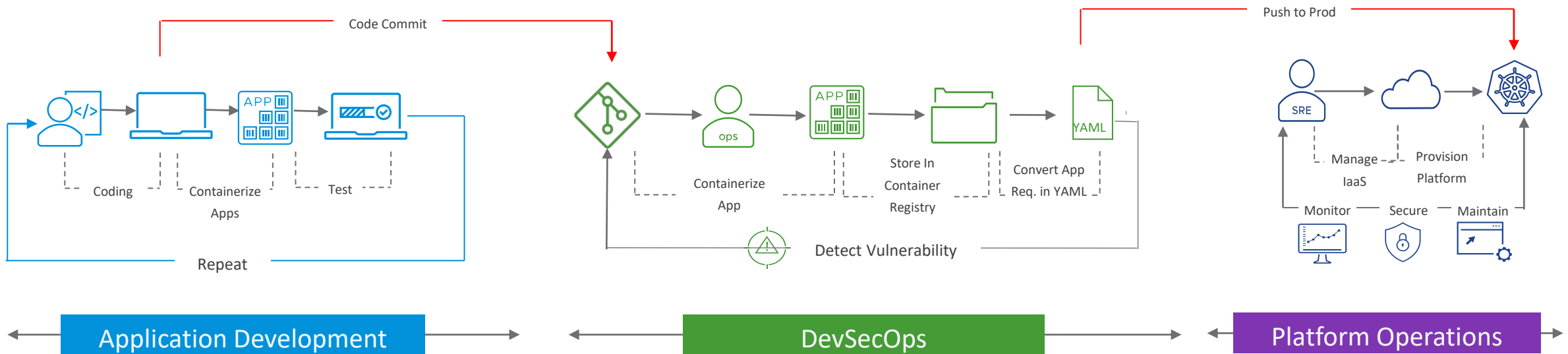Azure · aws · **Multi-Cloud** · IBM Cloud · Google Cloud

Infrastructure

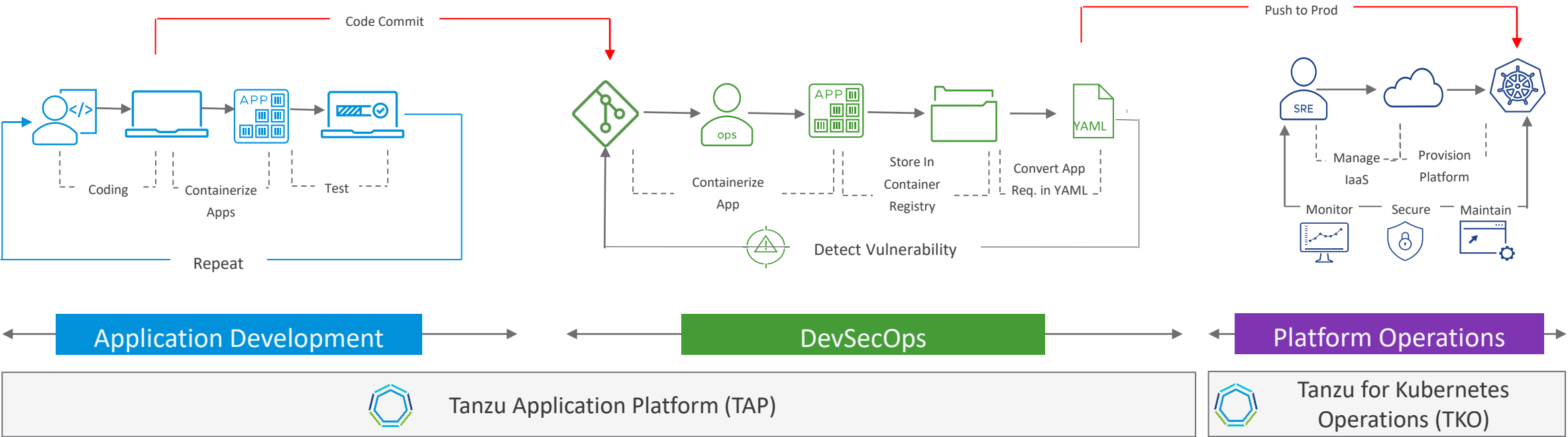| Deploy and manage K8s across clouds, clusters and teams | Apply enterprise observability to drive decisions | Ensure secure and reliable communication between services |

OPERATOR EXPERIENCE

Cloud Native Application Development Process

Code Commit

Coding Containerize Apps Test

Repeat

Containerize App

Store In Container Registry

Convert App Req. in YAML

YAML

Detect Vulnerability

Push to Prod

SRE

Manage IaaS

Provision Platform

Monitor Secure Maintain

Application Development

DevSecOps

Platform Operations

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Application Development · **DevSecOps** · **Platform Operations**

Tanzu Application Platform (TAP)

Tanzu for Kubernetes Operations (TKO)

Build Modern Apps

Deploying an App Today

Too much Developer Toil

Deploying an App with Tanzu Application Platform

A Superior Developer Experience
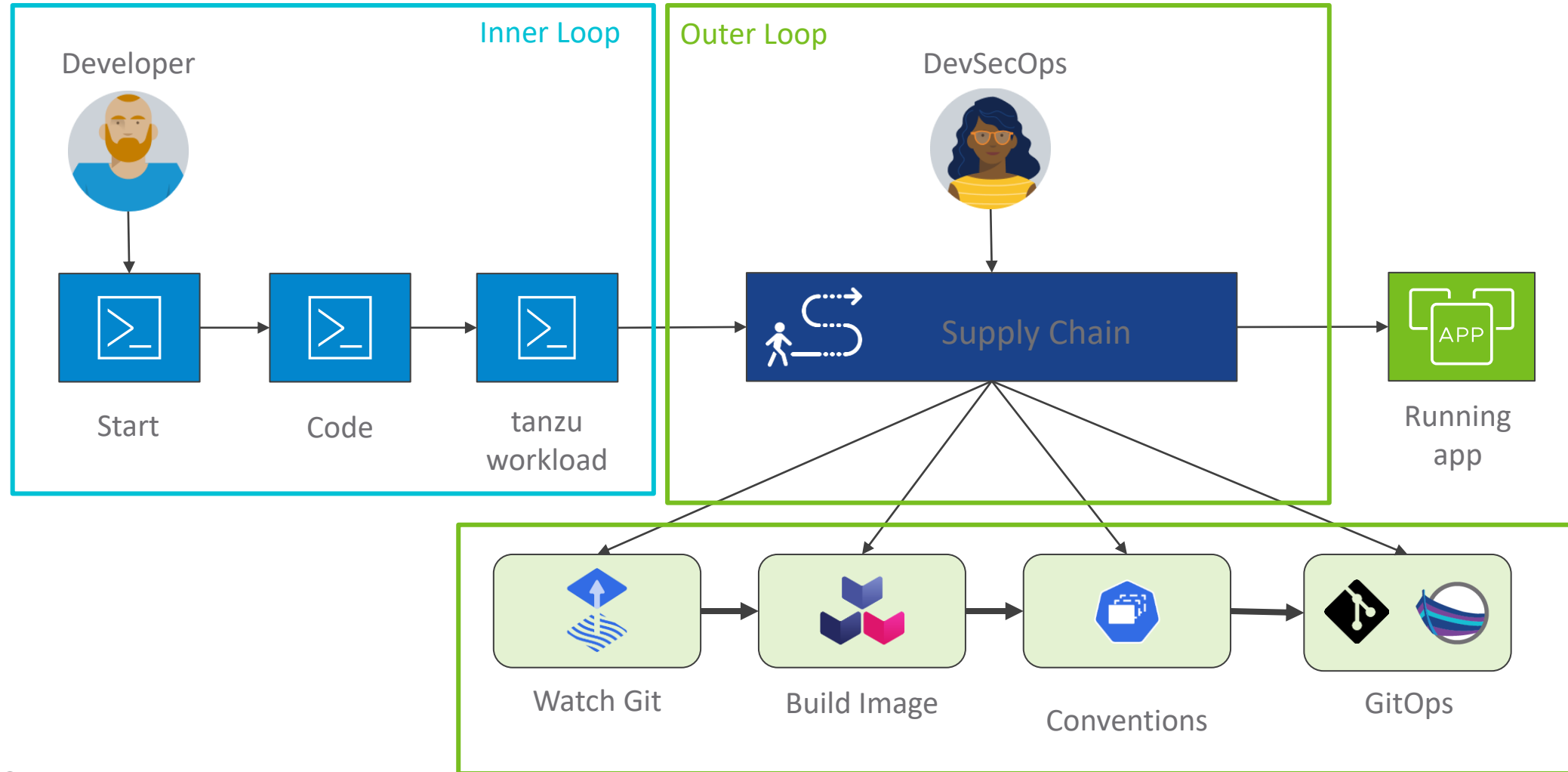
How does code get to production?
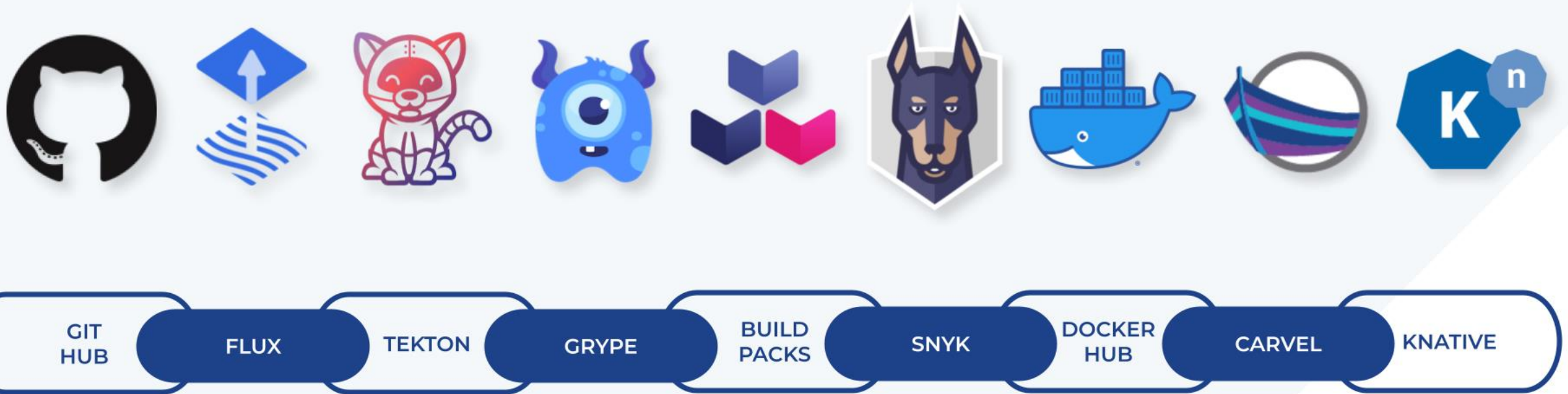
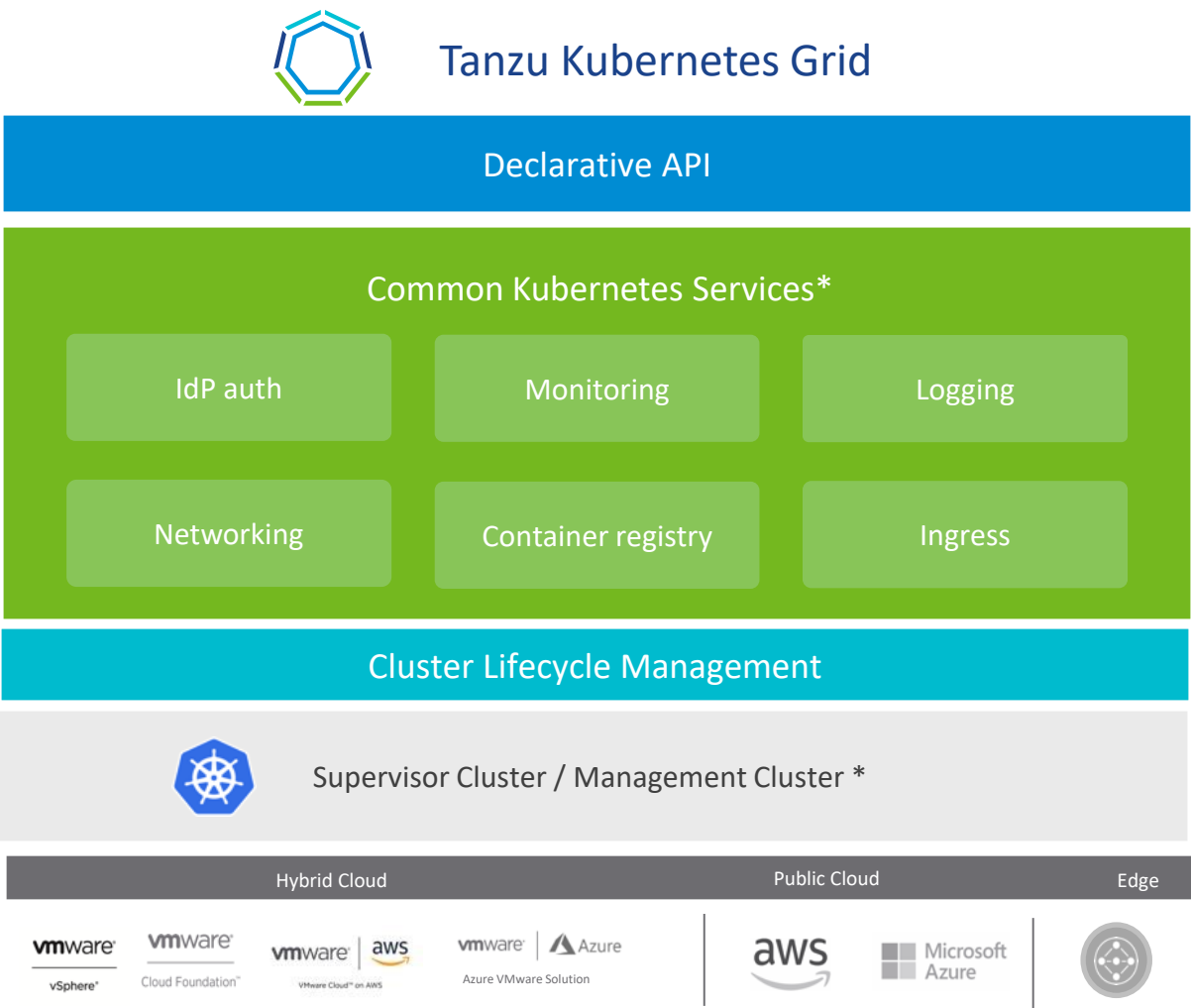GIT HUB — FLUX — TEKTON — GRYPE — BUILD PACKS — SNYK — DOCKER HUB — CARVEL — KNATIVE
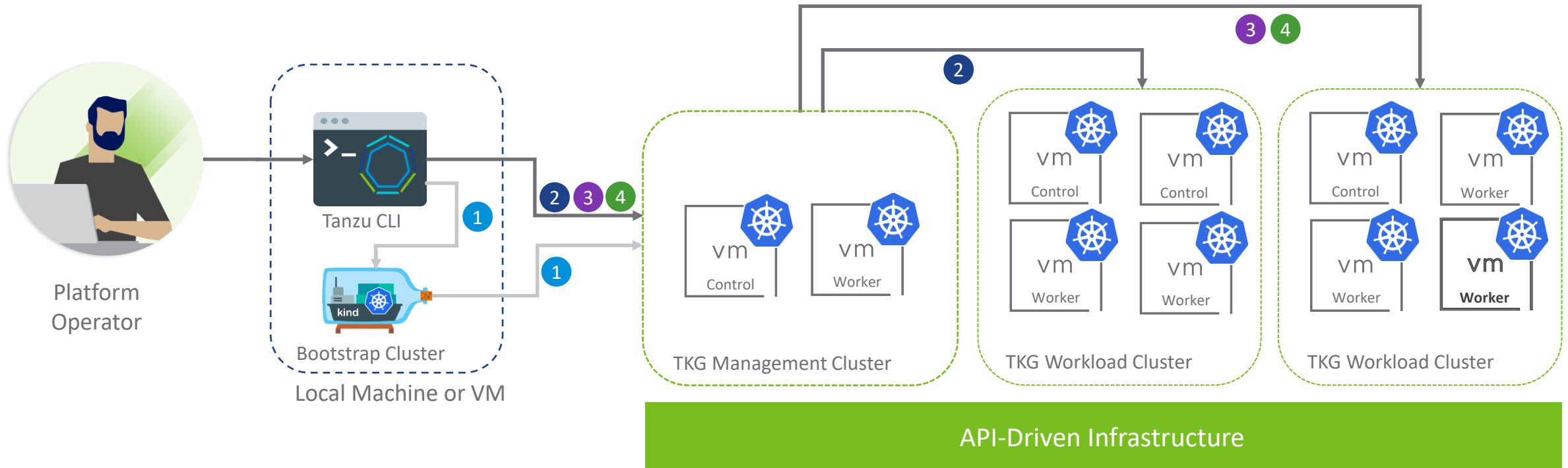
Run & Manage Modern Apps

Full Kubernetes runtime built with best open-source technologies

Packaged for enterprise adoption and supported by VMware
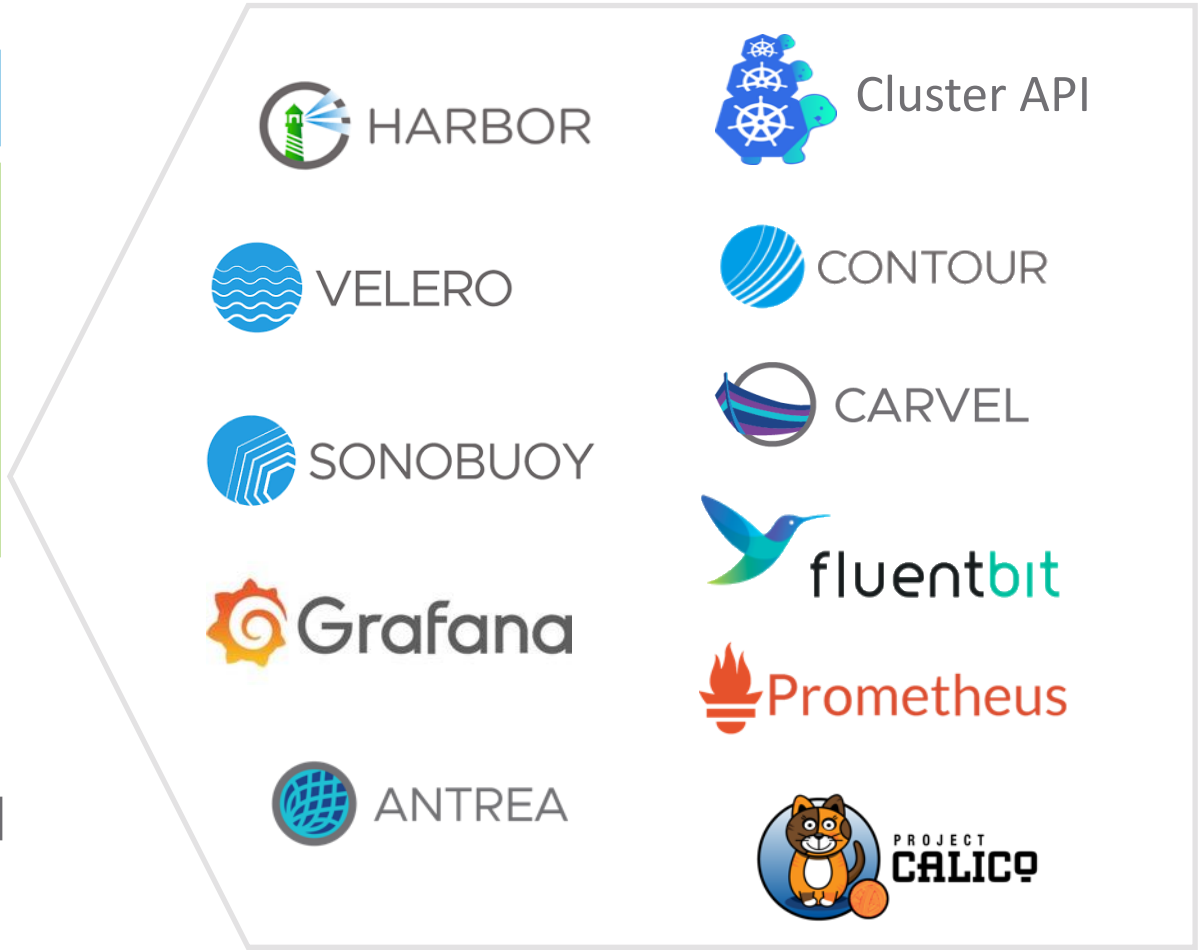
TKG Deployment & Cluster Management

Done by the Operator using the Tanzu CLI

API-Driven Infrastructure

1 `tanzu management-cluster create --ui`
2 `tanzu cluster create `**`my-prod-k8s`**` -f config.yaml`
3 `tanzu cluster create `**`my-dev-k8s`**` -f config.yaml`
4 `tanzu cluster `**`scale`**` my-dev-k8s -w 3`

Converged Kubernetes Ingress Services

Single L4 and L7 platform for holistic app operation

Consolidated Application Services

Ingress + LB
+
WAF
+
GSLB / DNS / IPAM

Tanzu
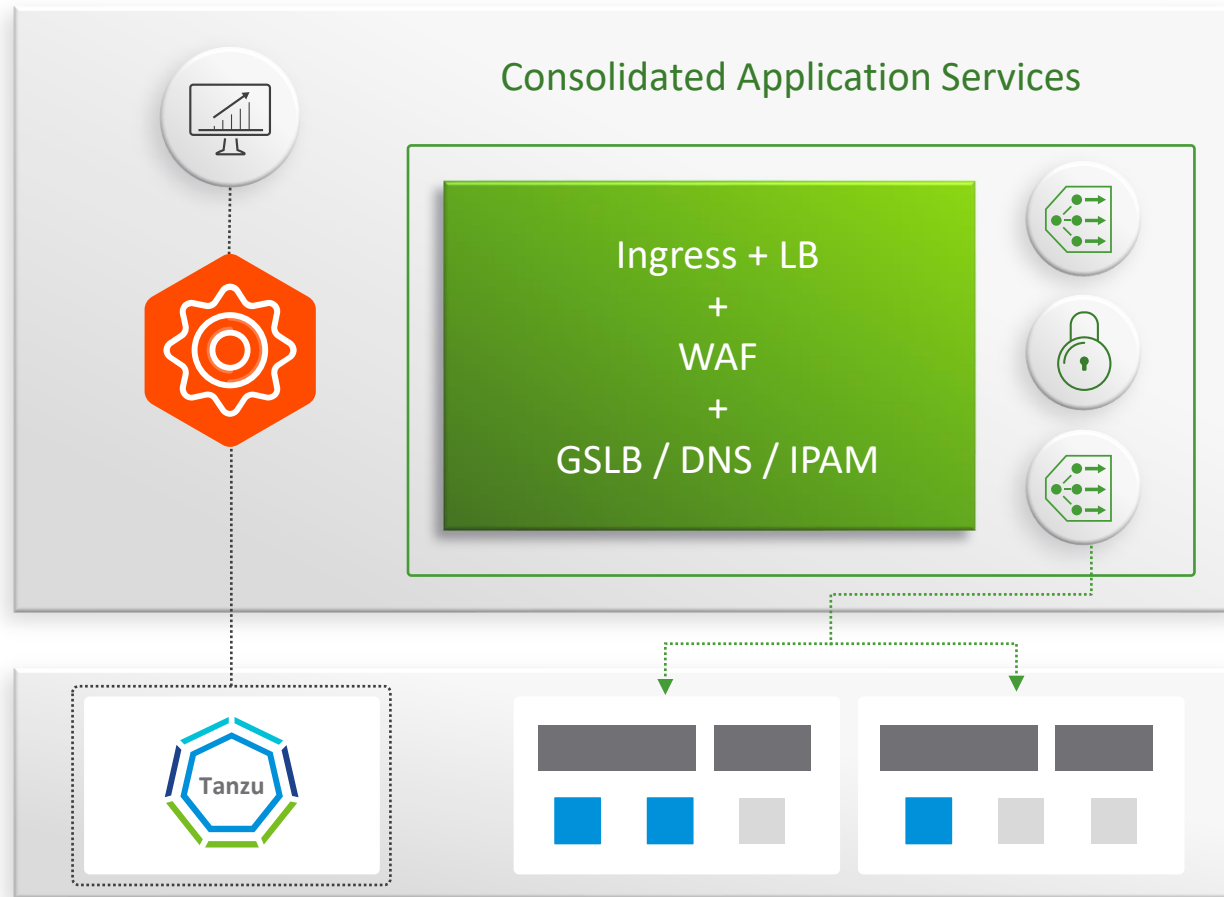
- **Integrated solution**
  Comprehensive LB, Ingress, intrinsic security, WAF, GSLB, DNS, and IPAM

- **Operational simplicity**
  A single solution with central control and ease of troubleshooting

- **Rich observability**
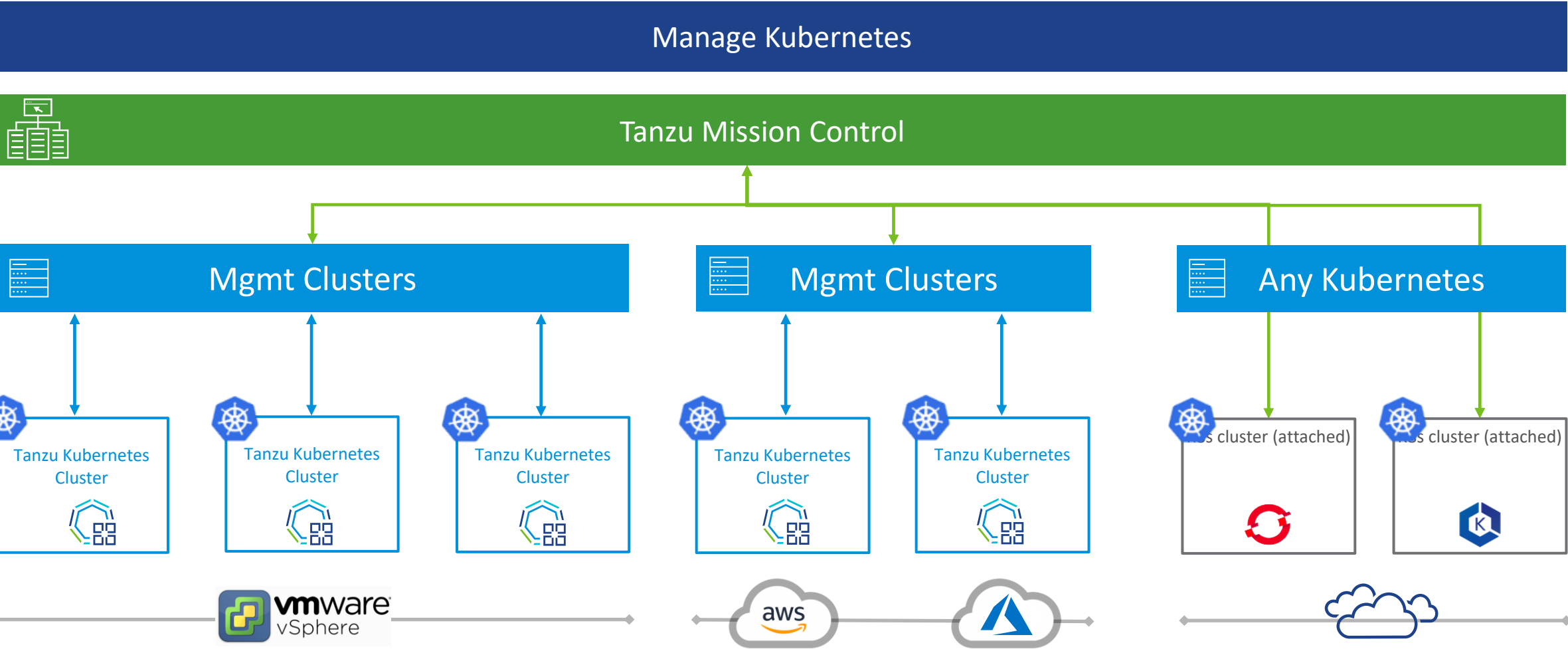 Real-time telemetry with application insights

- **Cloud-native automation with elasticity**
  Elastic autoscaling based on closed-loop analytics and decision automation

Global Control Plane Visibility, Lifecycle, & Policies
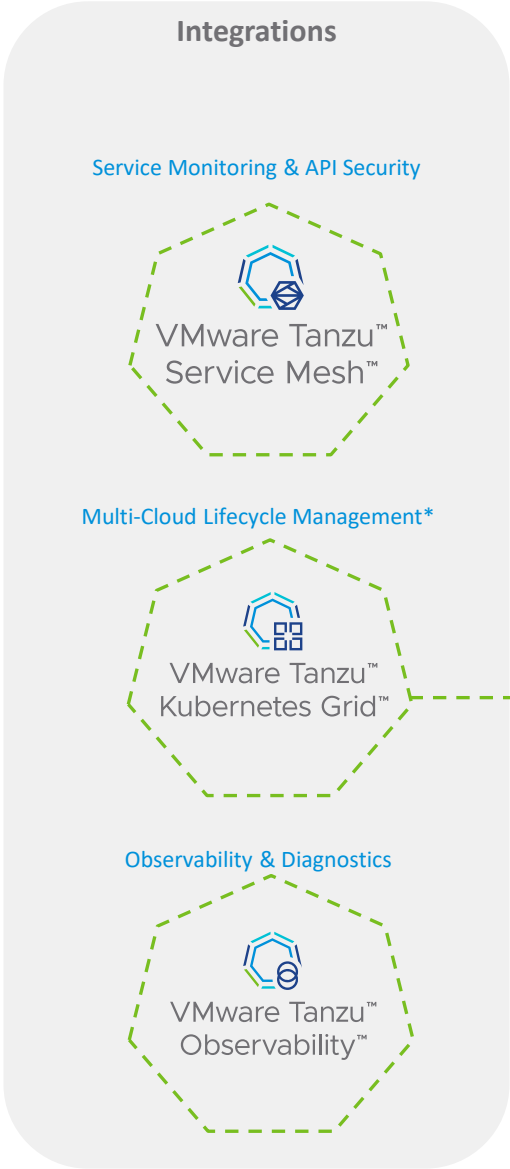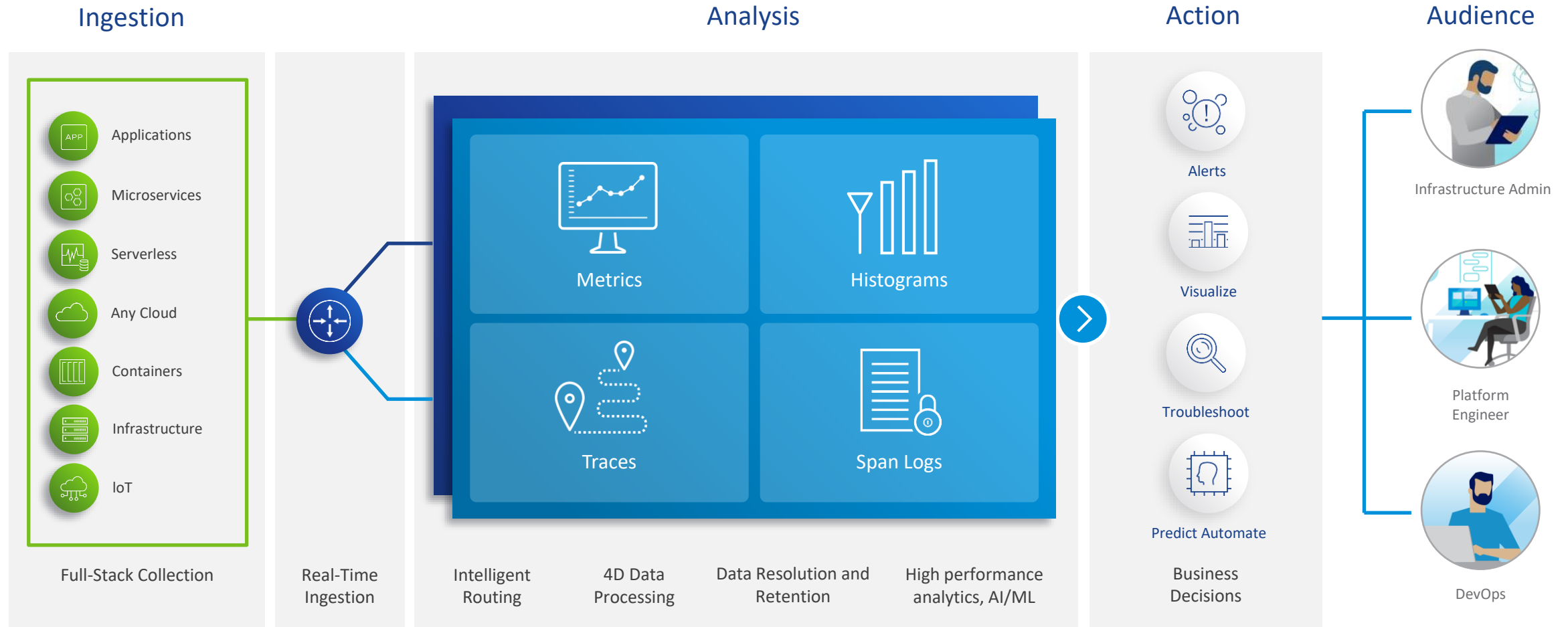
For any Kubernetes

Manage Kubernetes

Tanzu Mission Control

Mgmt Clusters	Mgmt Clusters	Any Kubernetes

Tanzu Kubernetes Cluster

Tanzu Kubernetes Cluster

Tanzu Kubernetes Cluster

Tanzu Kubernetes Cluster

Tanzu Kubernetes Cluster

EKS cluster (attached)

AKS cluster (attached)

vmware vSphere

aws

Tanzu Mission Control Capabilities

More than a control plane

Integrations

Service Monitoring & API Security

VMware Tanzu™
Service Mesh™

Multi-Cloud Lifecycle Management*

VMware Tanzu™
Kubernetes Grid™

Observability & Diagnostics

VMware Tanzu™
Observability™

Unified Policy Engine

Security &
Compliance

Lifecycle
Management*

Data Protection

VMware Tanzu®
Mission Control™

Baseline Diagnostics

Identity &
Access Management

Configuration
Management

*Tanzu Kubernetes Grid clusters only

vmware
vSphere

aws

Full Stack Visibility for Everyone

Ingestion

Analysis

Action

Audience

Applications
Microservices
Serverless
Any Cloud
Containers
Infrastructure
IoT

Metrics

Histograms

Traces

Span Logs

Alerts

Visualize

Troubleshoot

Predict Automate

Infrastructure Admin

Platform Engineer

DevOps

Full-Stack Collection | Real-Time Ingestion | Intelligent Routing | 4D Data Processing | Data Resolution and Retention | High performance analytics, AI/ML | Business Decisions

End to End Observability

Enterprise-Class Service Mesh

Consistent Visibility, Control, and Security, for Applications Across Clouds

Multi-platform and multi-cloud federation	Centralized visibility and remediation	Global policies for users, services and data	Centralized security, audit, and compliance	No changes to application code

Kubernetes   Public Clouds   VMs   SaaS   Serverless
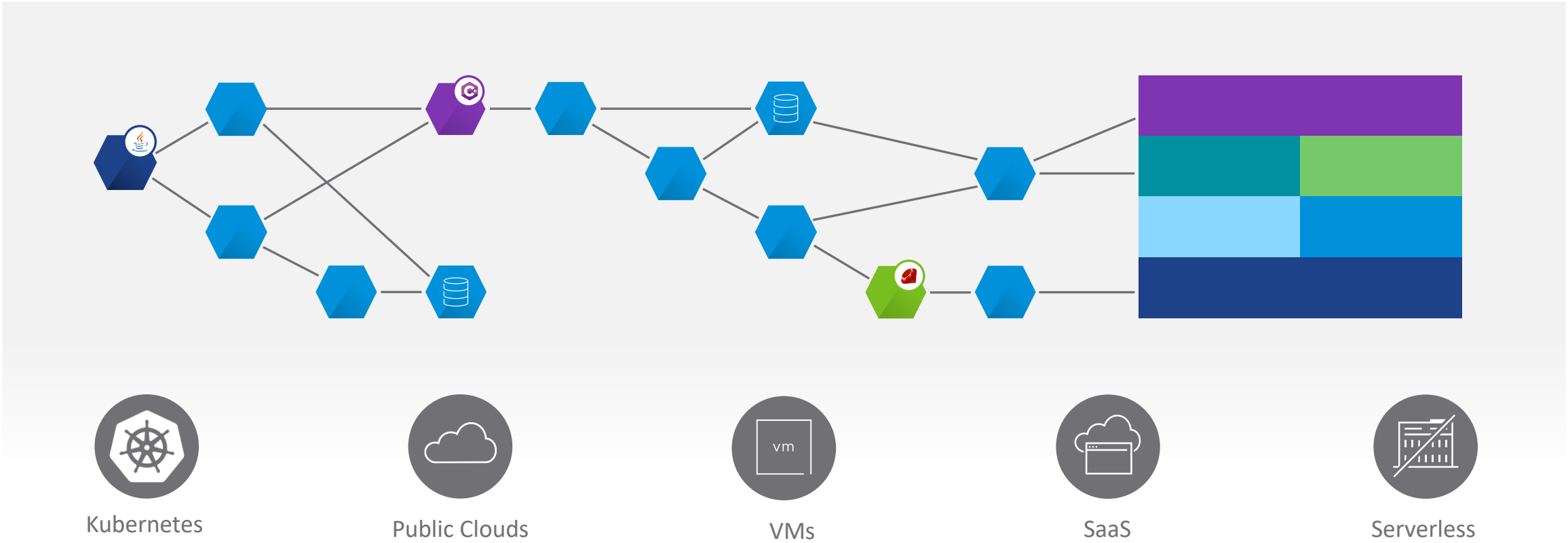
To summarize

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Manage IaaS — Provision Platform

Monitor — Secure — Maintain

| Application Development | DevSecOps | Platform Operations |

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Learn more?

YouTube: Kubernetes - The Documentary [Part 1+2]

Free training: KubeAcademy

Containers 101

Kubernetes 101

Getting started with Kubernetes

Introduction to Kubernetes for the Virtual Infrastructure Administrator

Kubernetes in depth

Kubernetes platform security

https://kube.academy

vmware®

Kubernetes certifications

YouTube: DevOps Toolkit

Thank You