Introduction to containerization with Red Hat OpenShift

IBM TechXchange (Milan - December 16, 2024)

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Containers are the new normal

$3.0B

2024 Container Software Market

36.2%

CAGR 2021-2026

Source: IDC: Worldwide Container Infrastructure Software Revenue 2021-2026($M), May 2022

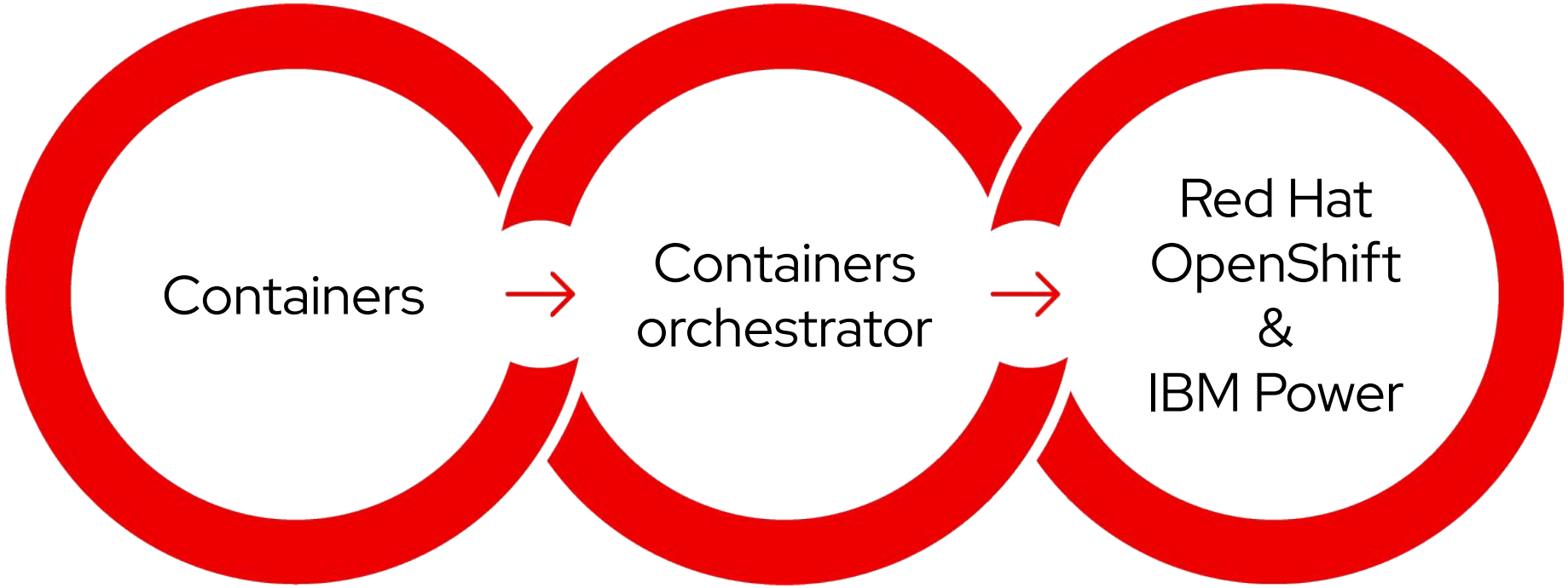
Why Red Hat ?

- Leader in the 2024 Gartner® Magic Quadrant™ for Container Management
- Part of IBM since 2019

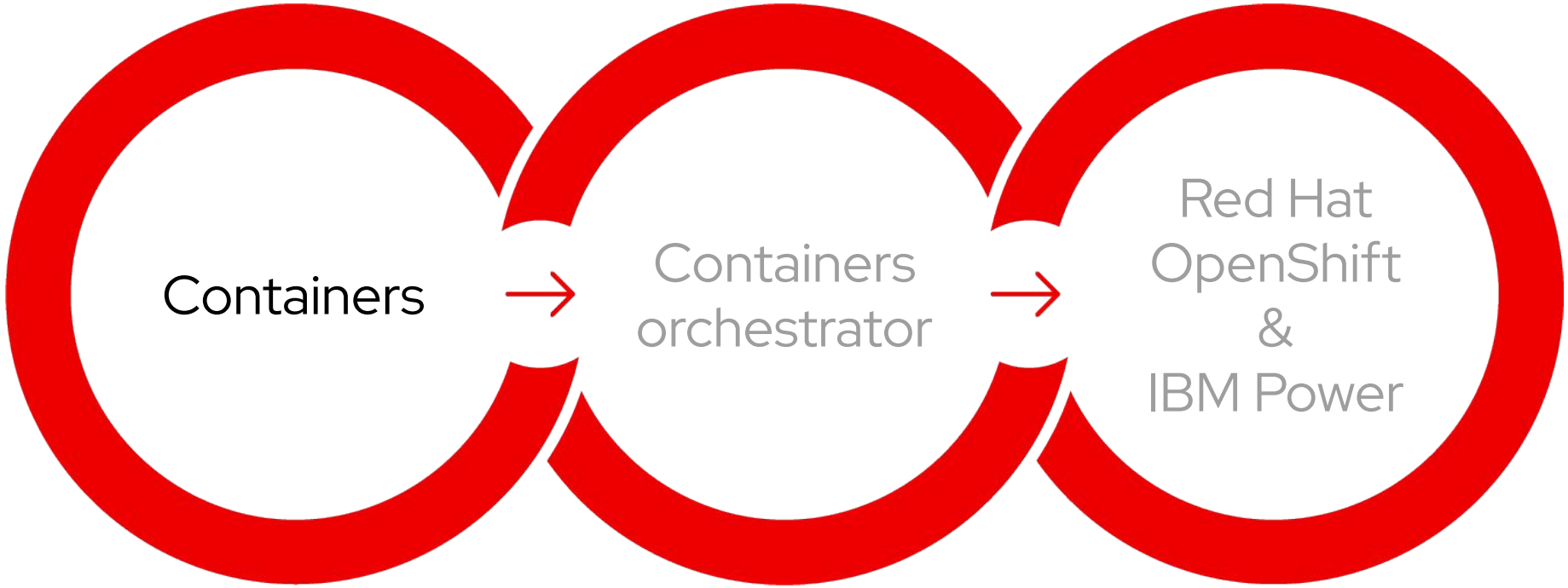
Why me ?

- Working on OpenShift as Red Hat associate since 2021
- Technical Account Manager for OpenShift on selected customers

What we'll discuss

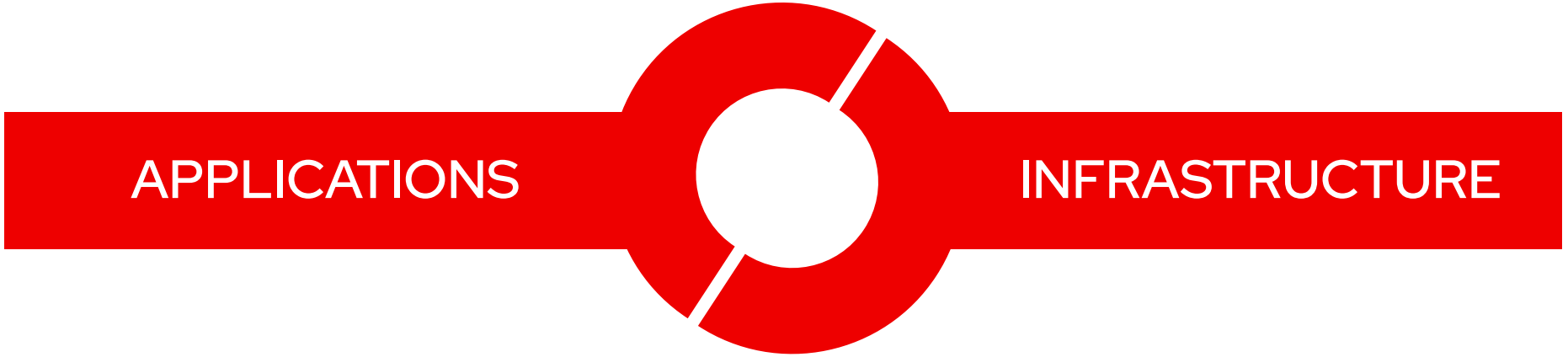


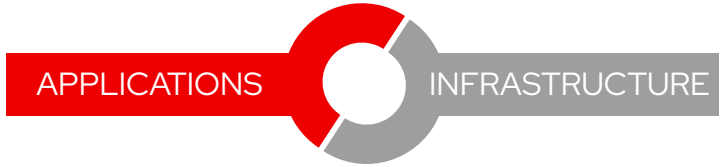
What we'll discuss



What are containers ?

It depends who you ask





The problem

Applications have different requirements: languages, libraries, and tools

The solution

Package applications as units of software that hold together all the needed components

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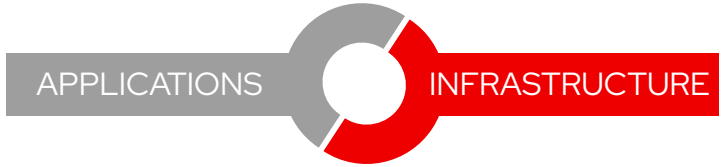
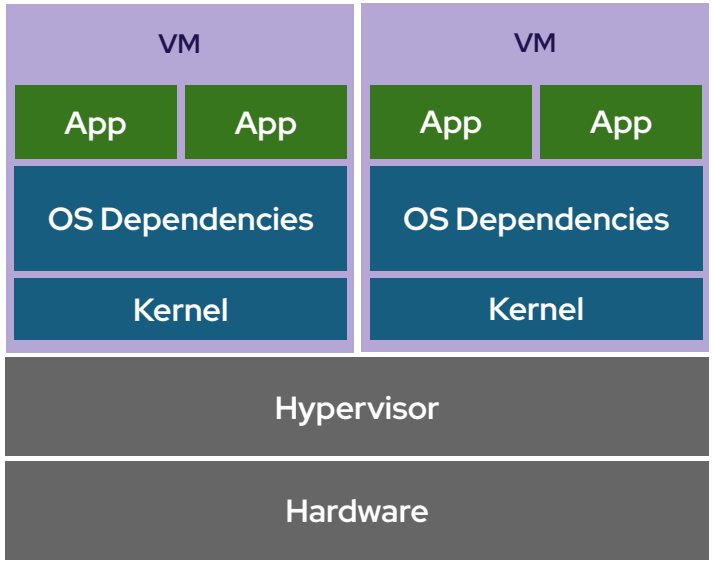
DEMO 1

Create a container image



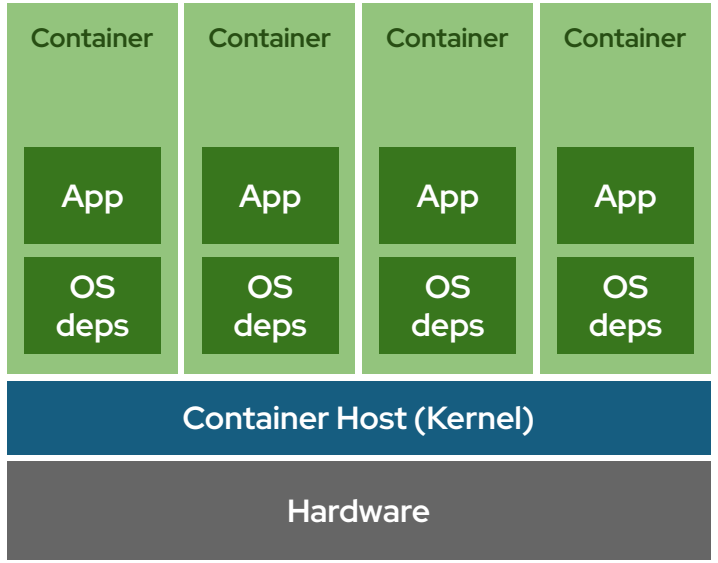
The problem

VMs are “heavy” and usually **not** portable across hypervisors



The solution

Isolated **processes** on a shared kernel (using Linux technologies)



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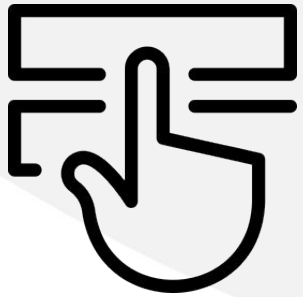
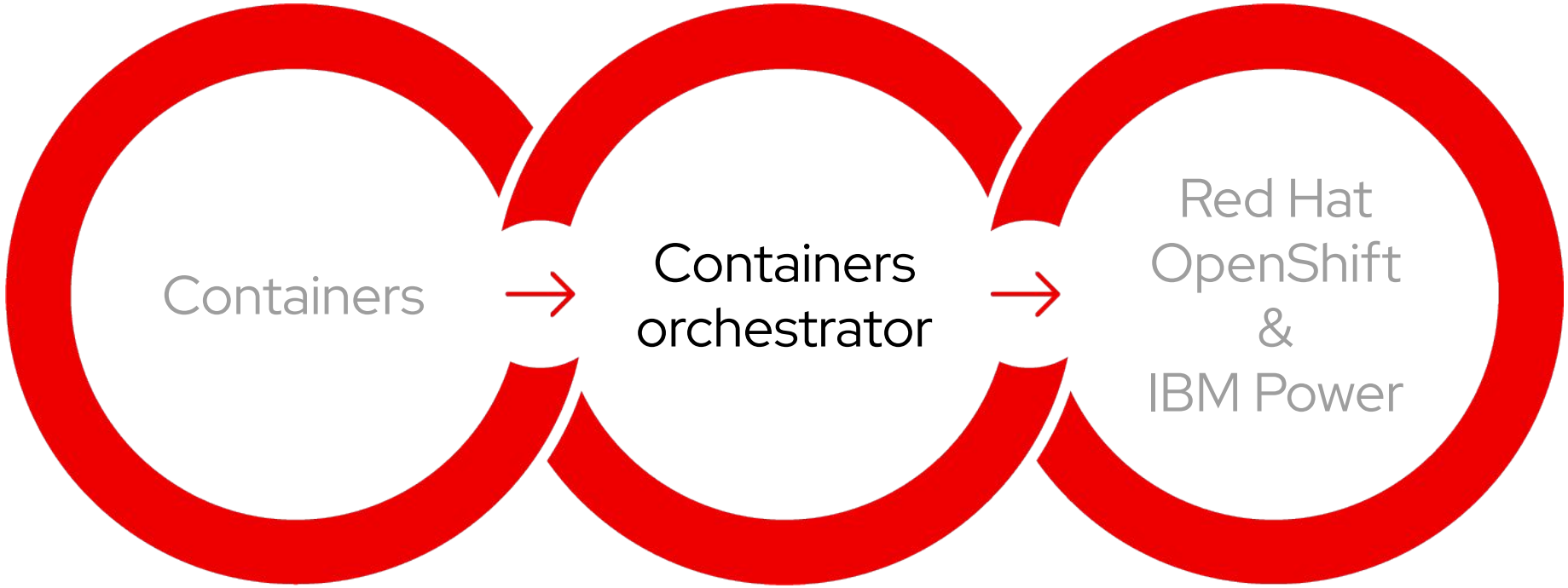


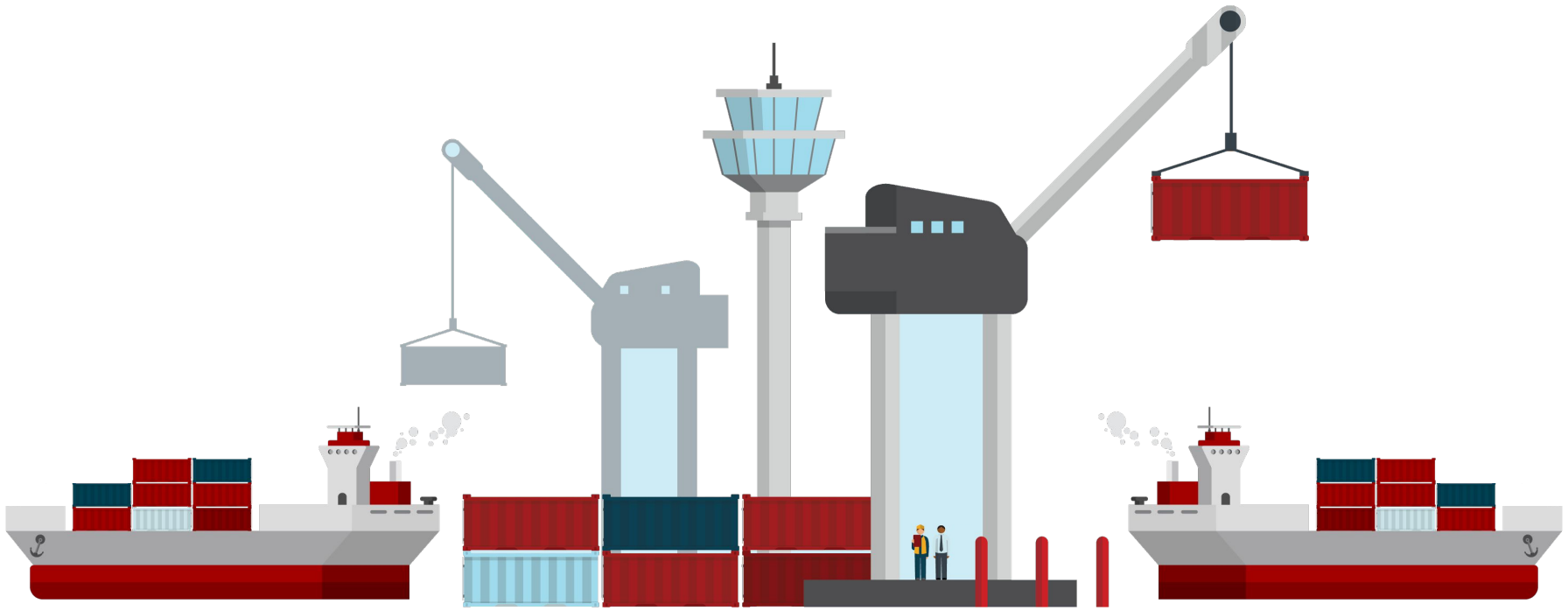
DEMO 2

Run a container instance and verify its isolation

What we'll discuss

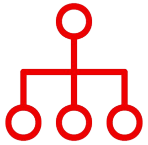


How to manage containers at scale ?



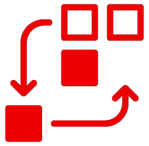
How to manage containers at scale ?

Service discovery



Load balancing

Storage orchestration



Automated rollouts and rollbacks

Self-healing

Secret and configuration management

How to manage containers at scale ?

Use a containers *orchestrator*

kubernetes

Kubernetes objects

Entities representing the state of the orchestrator


Pod : unit of computing (group of one or more containers)


Deployment : set of identical Pods (replicas of the same app)


Service : way to expose Pods over the network


PersistentVolume : unit of storage (“disk” that is usable by a Pod)


ConfigMap : way to set configurations in Pods


Secret : way to store confidential data (ex. connection strings)

Anatomy of a Kubernetes object

Represented as a YAML file

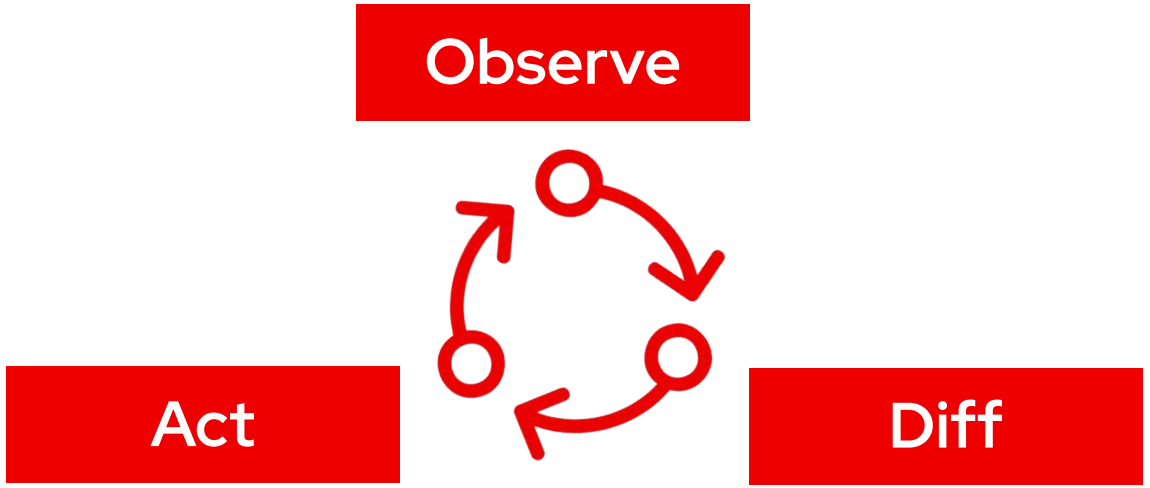
```yaml
apiVersion: v1
kind: Pod
metadata:
  name: demo-pod
  labels:
    app: demo-pod
spec:
  containers:
    - name: demo-container
      image: quay.io/…/demo-container:latest
       ports:
         - containerPort: 8000
```

Reconciliation / Control loop

A core Kubernetes concept

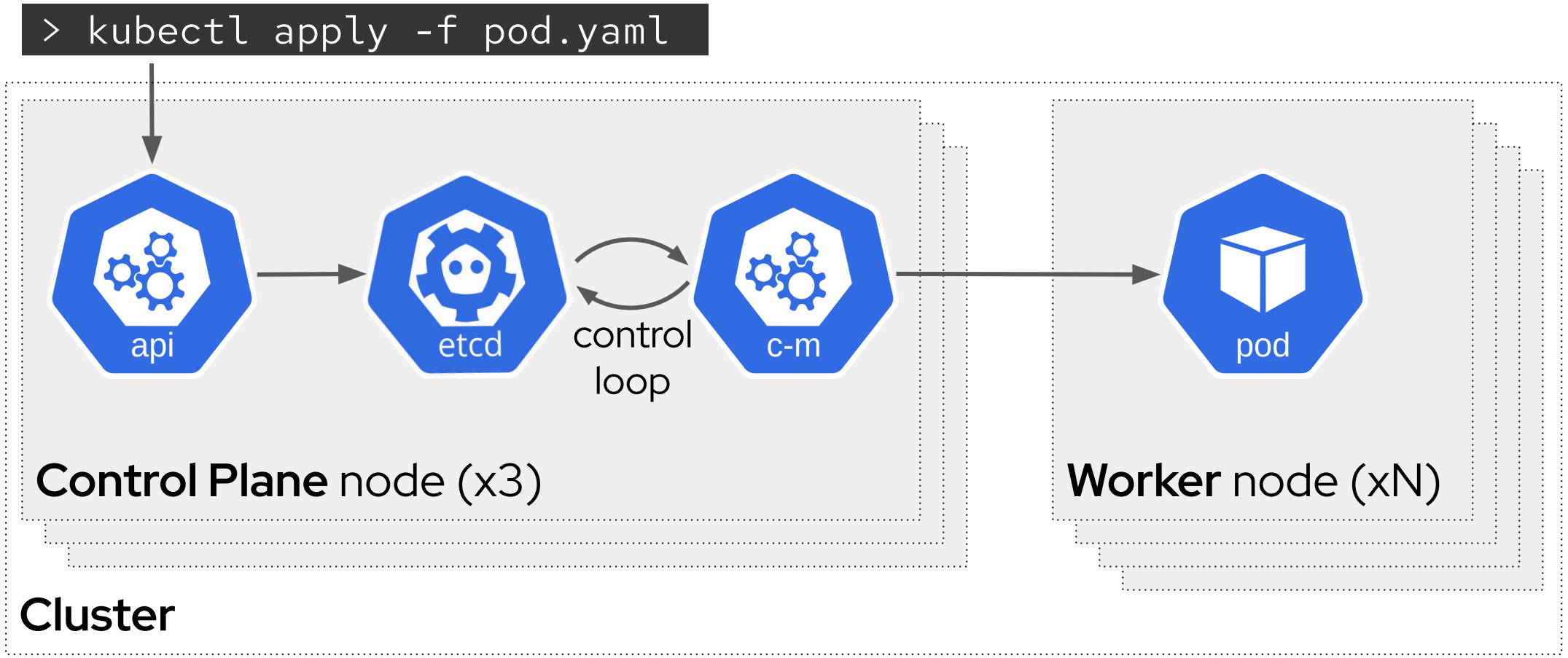
Kubernetes is based on the concept of a **declarative specification of the desired state**

and the **use of reconciliation loops** to **drive the actual state toward the desired state**



Kubernetes architecture

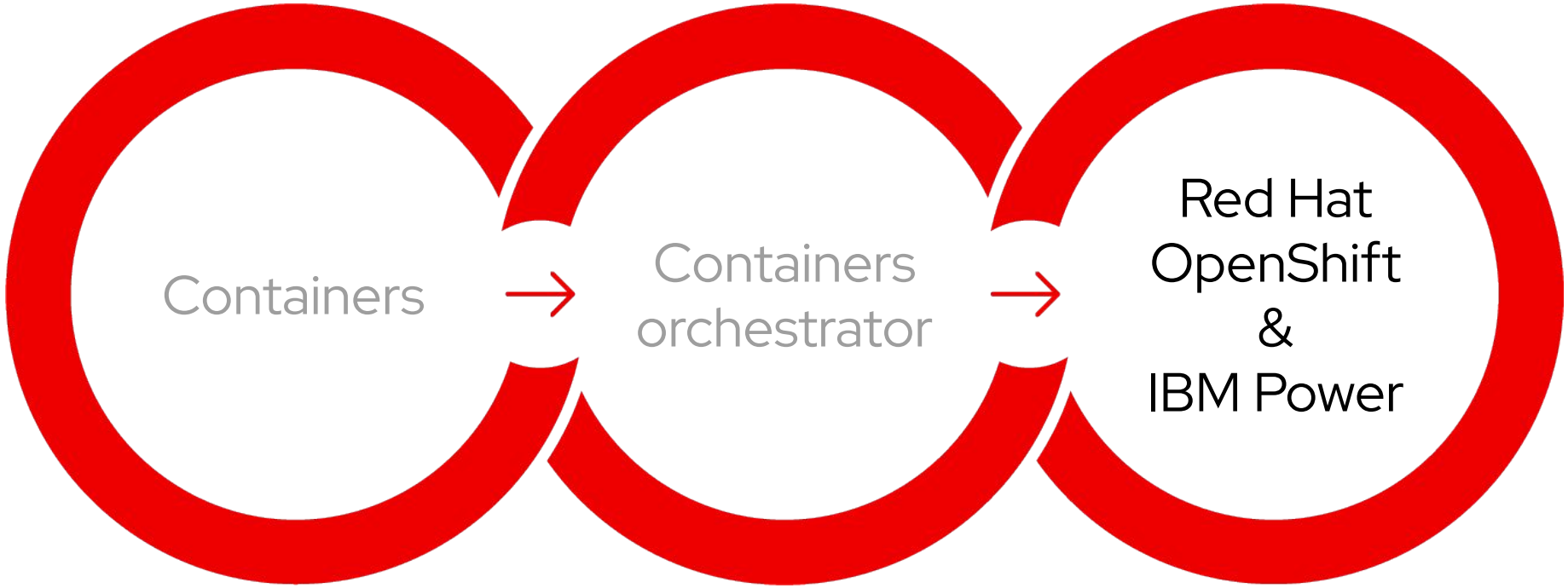
Simplified view



DEMO 3

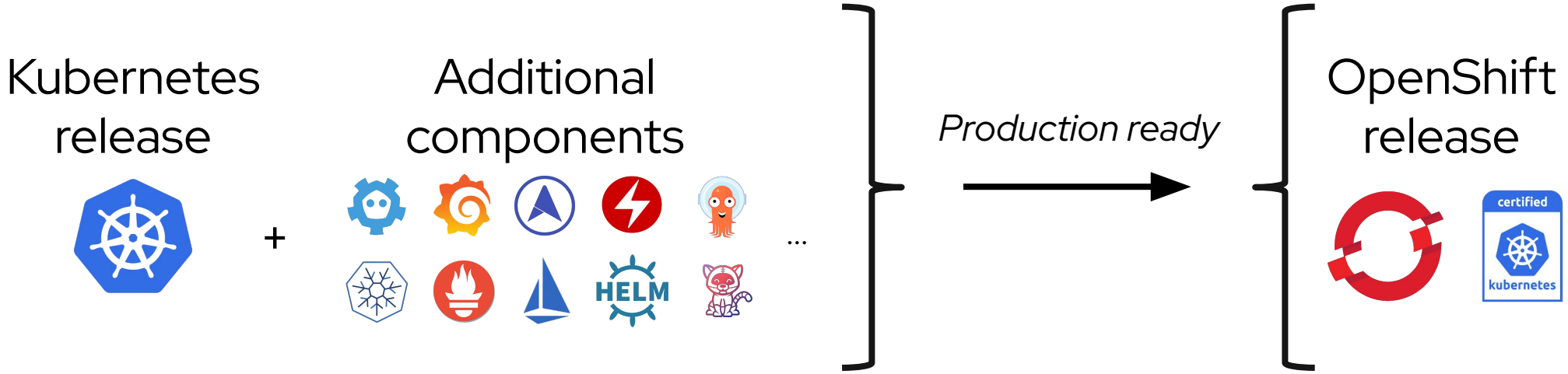
Run a Pod on Kubernetes

What we'll discuss



OpenShift Container Platform

Trusted, comprehensive, and consistent platform to develop, modernize, and deploy applications at scale



Red Hat is a leading Kubernetes contributor since day 1, and a major contributor to most CNCF projects

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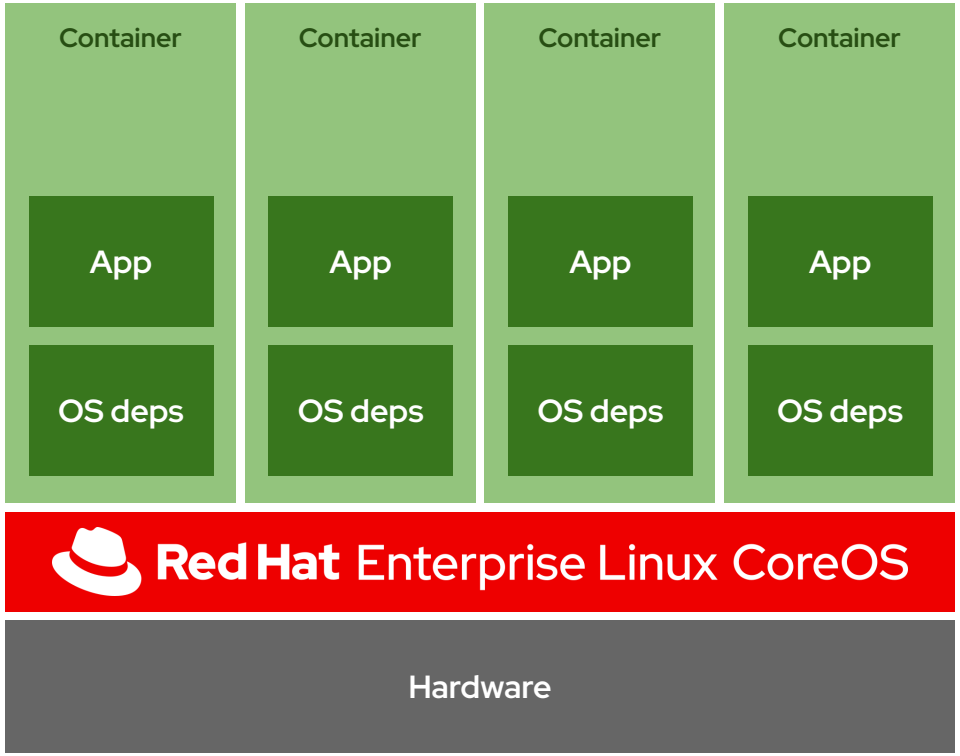
Red Hat Enterprise Linux CoreOS

The default operating system for the OCP cluster nodes



Based on **RHEL**

Controlled **immutability**

Container-centric

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OpenShift on IBM Power

Securely build new OpenShift apps adjacent to data on AIX, IBM i

- **Incremental modernization**: value delivered as you go
- **Performance and scalability**: leveraging the POWER processors
- **Enhanced security**: hardware-based encryption, secure boot, and memory isolation capabilities
- **Reliability and availability**: redundant components, error correction and dynamic resource allocation
- **AI capabilities**: integrated accelerators

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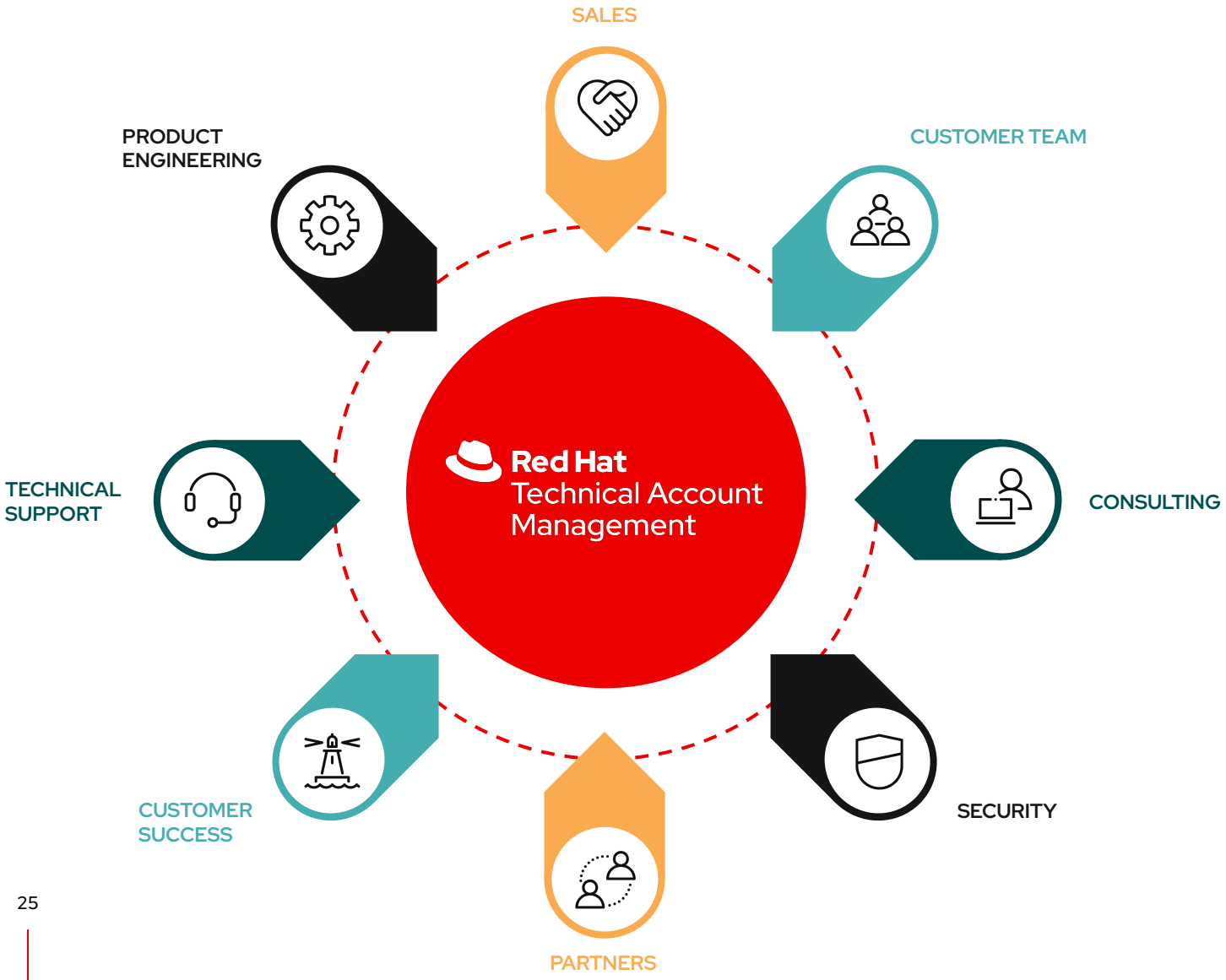
DEMO 4

OpenShift console overview

What are Red Hat TAMs



Red Hat *Technical Account Managers* are technical advisors for customers and partners that need help planning and deploying their Red Hat solution successfully.

TAMs serve as a consistent **single point of contact** for customers as their technology needs evolve.

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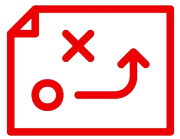
An overview of the tasks a TAM does



Plan

- Best practices
- Supportability assessments
- Product enhancements
- Early beta access
- Life-cycle planning

Assist

- Strategic cases
- Critical situation management
- Customized notifications
- Supportability checks
- Multi-vendor collaboration

Connect

- Regular sync up calls
- Customer Portal private community
- On-site visits and Service Reviews
- Proactive case analysis
- Webinars, Events and Workshops

Thank you

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