DevCon #7

$ ./BaremetalasCode.py

Infra composable

Decembre 2018

Hewlett Packard Enterprise

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$ ./agenda

Infra-as-code

dans une Infra Hybride

dans Infra Composable

Docker sur VM ou BM ?

Synergy Openshift scale-up & down

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IaC dans une Infra Hybride

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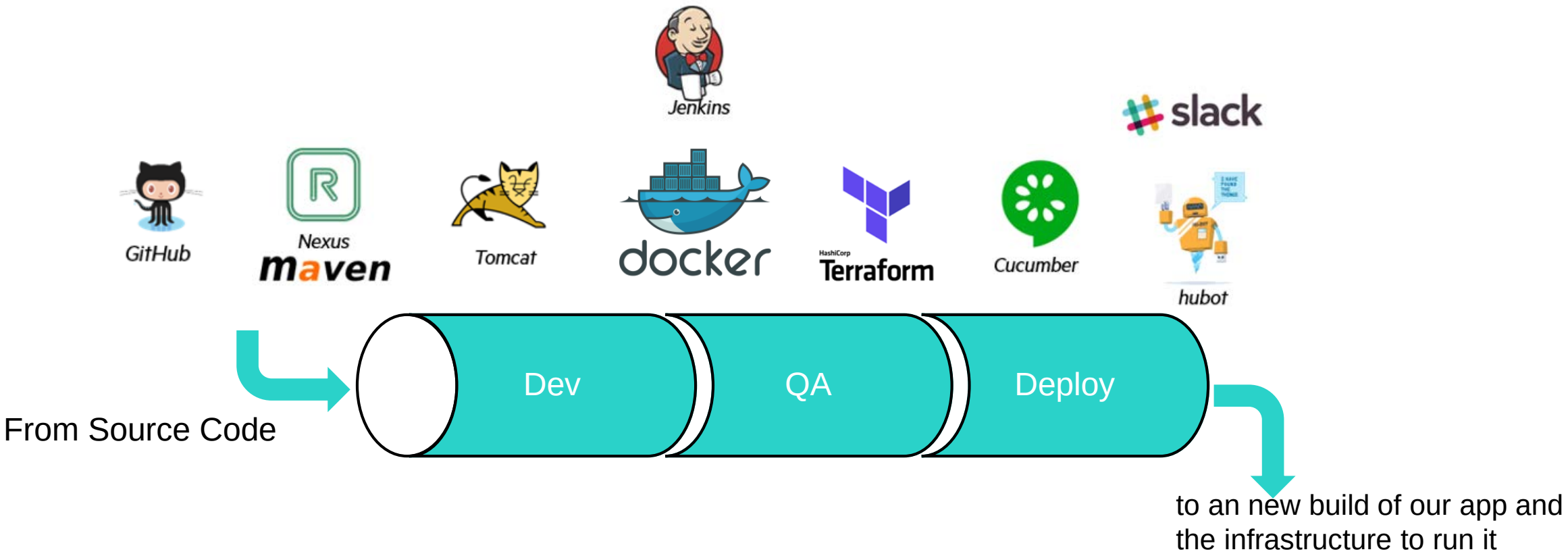
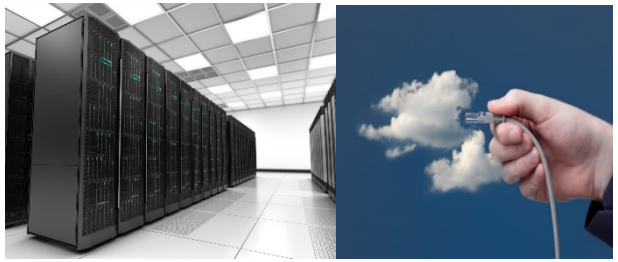
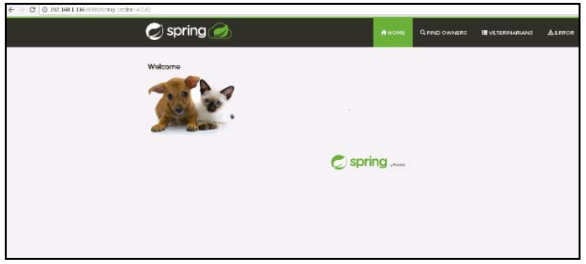
An example of DevOps Pipeline in action



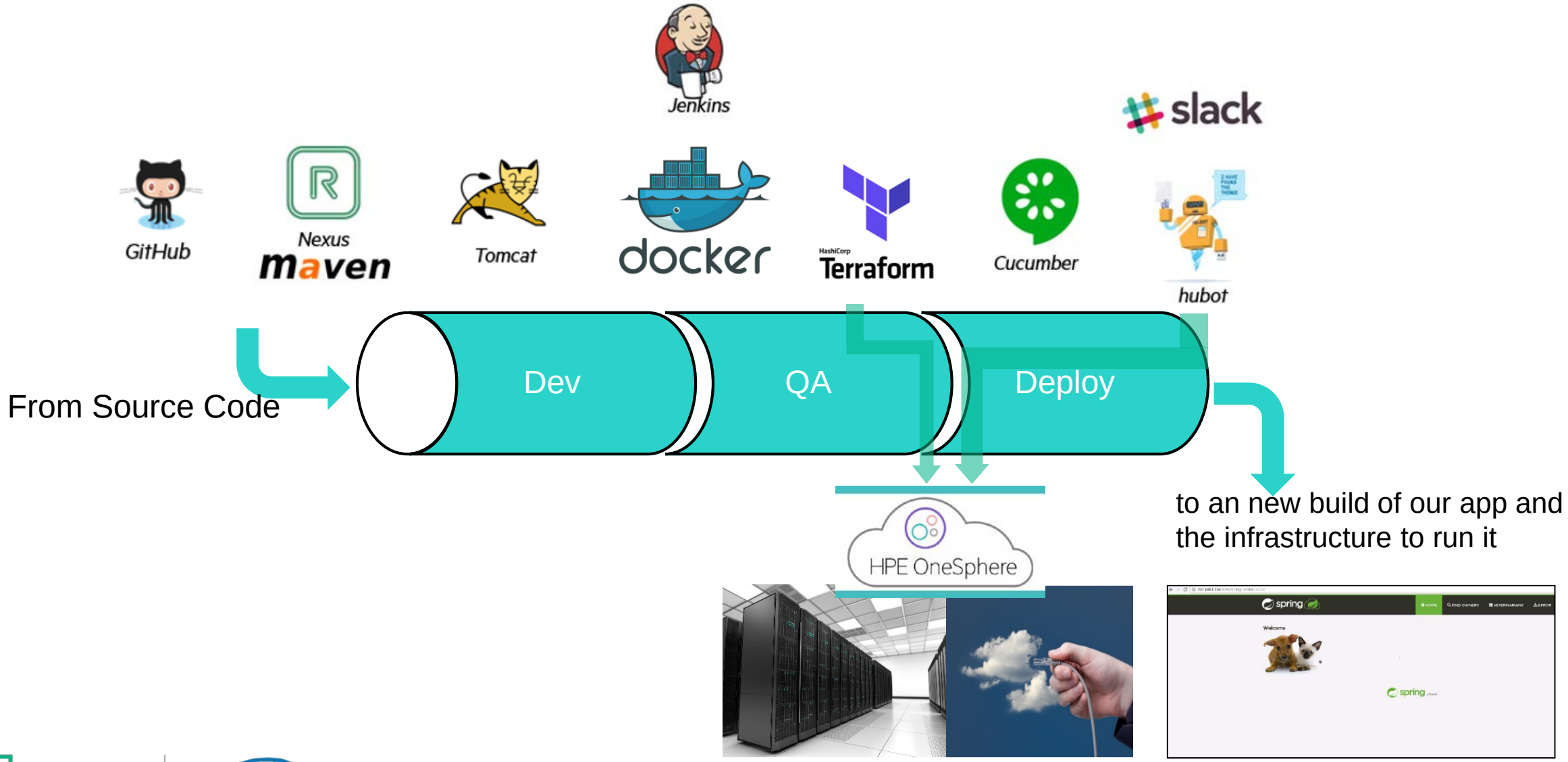


Hybrid Infrastructure



Pet Clinic

An example of DevOps Pipeline in action



Application Sources (PetClinic)

GitHub

Developer changes application source code and issue a Pull Request

1

Application Sources (PetClinic)

Jenkins Server automatic build procedure starts

2

GitHub

Jenkins Server

slack

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Application Sources (PetClinic)

GitHub

Jenkins Server

3 Team Slack channel notified

slack

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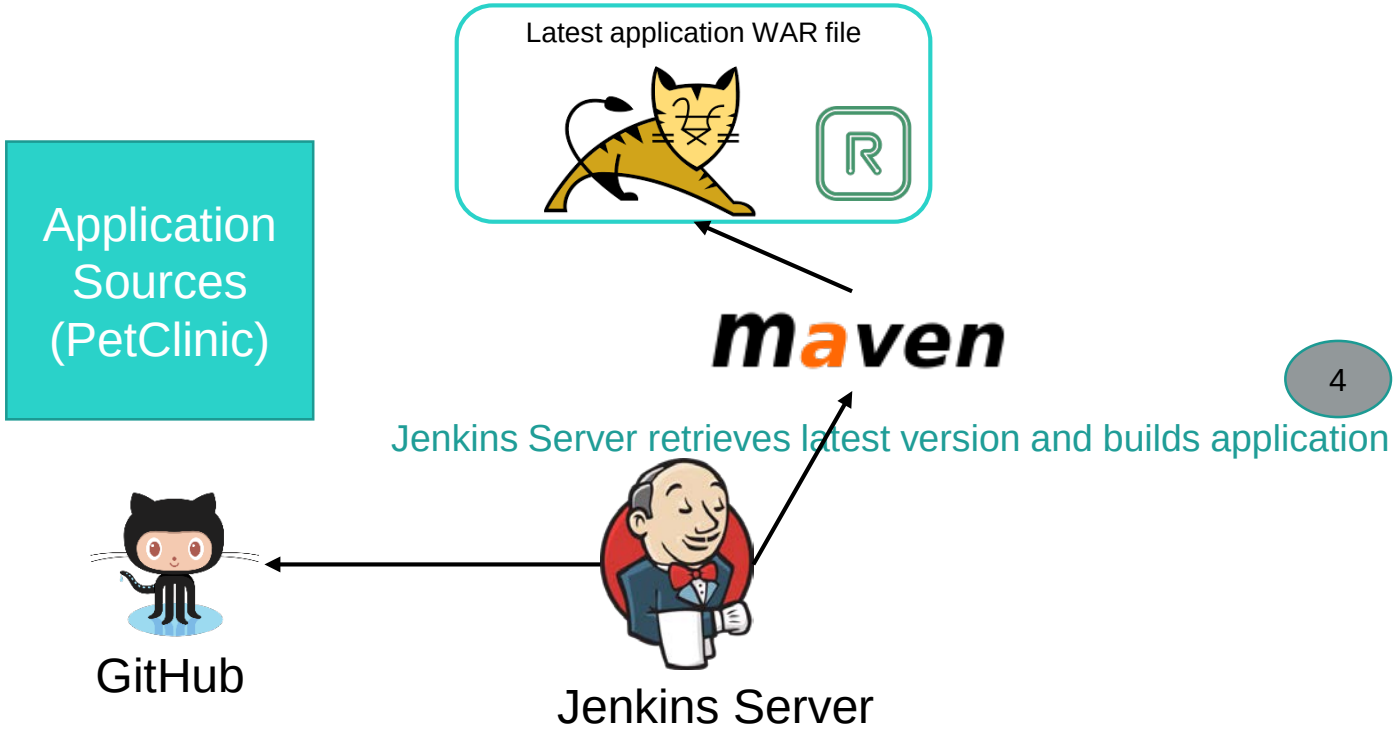

slack

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Latest application WAR file

Application Sources (PetClinic)

GitHub

Jenkins Server

5 Team Slack channel notified

slack

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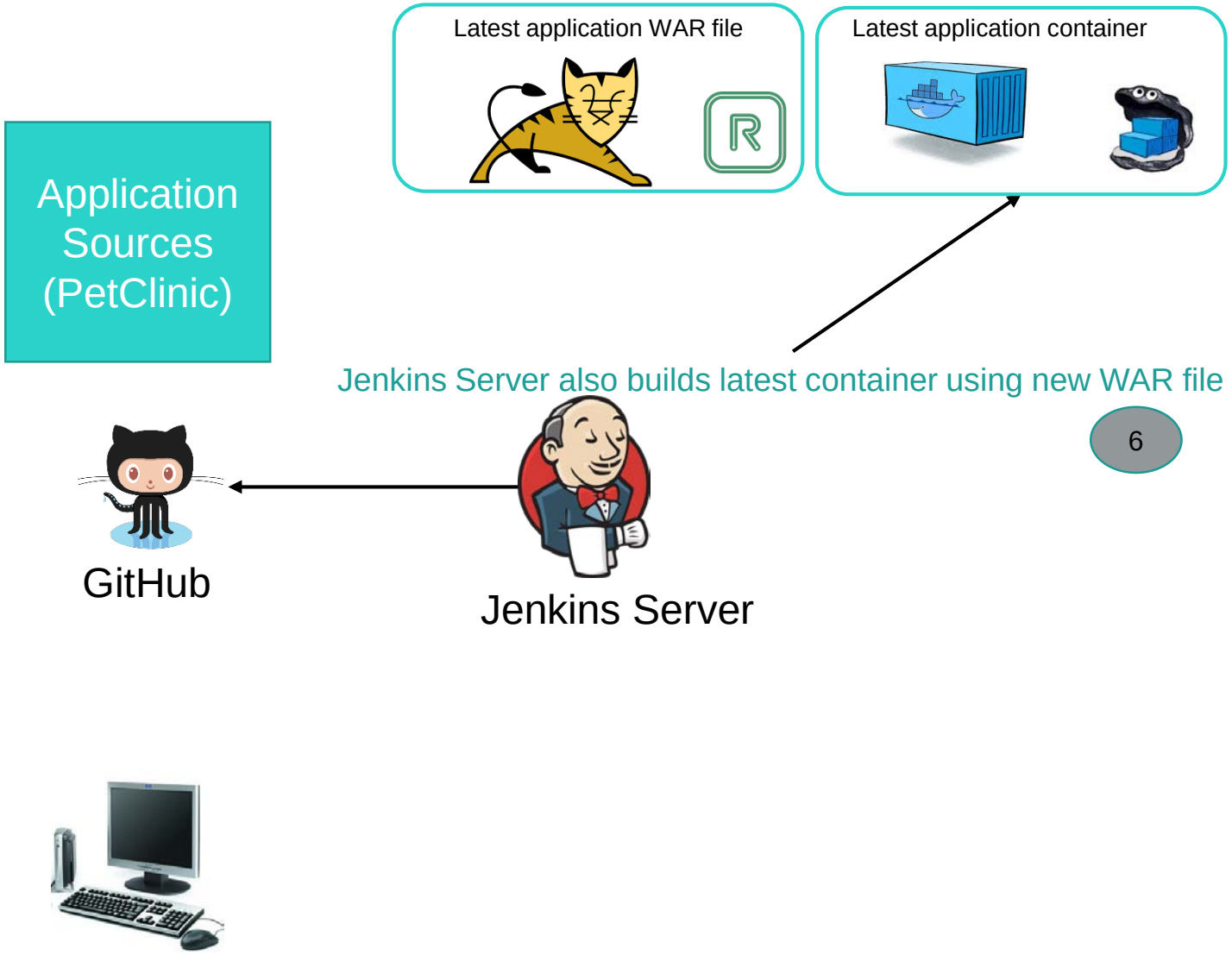
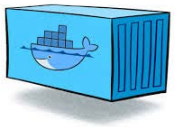

Latest application WAR file
Latest application container
Application Sources (PetClinic)
Jenkins Server also builds latest container using new WAR file
6
GitHub
Jenkins Server

Latest application WAR file

Latest application container



Application Sources (PetClinic)

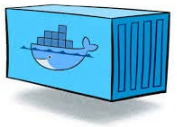
GitHub

Jenkins Server

7 Team Slack channel notified

Latest application WAR file

Latest application container



Application Sources (PetClinic)

GitHub

Jenkins Server

HashiCorp Terraform

8

Jenkins Server initiates deployment of infrastructure for PetClinic

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Application Sources (PetClinic)

Latest application WAR file

Latest application container

Latest application contai

GitHub

Jenkins Server

Terraform

9a

Use terraform instructions to deploy:

- Kubernetes Cluster in AWS
- or Kubernetes Cluster on Premise
- or Kubernetes on bare-metal
- Pull latest app container
- start app

slack

HPE OneSphere API

HPE Composable API

AWS API

Kubernetes on Synergy

Kubernetes on VMware

Kubernetes on AWS

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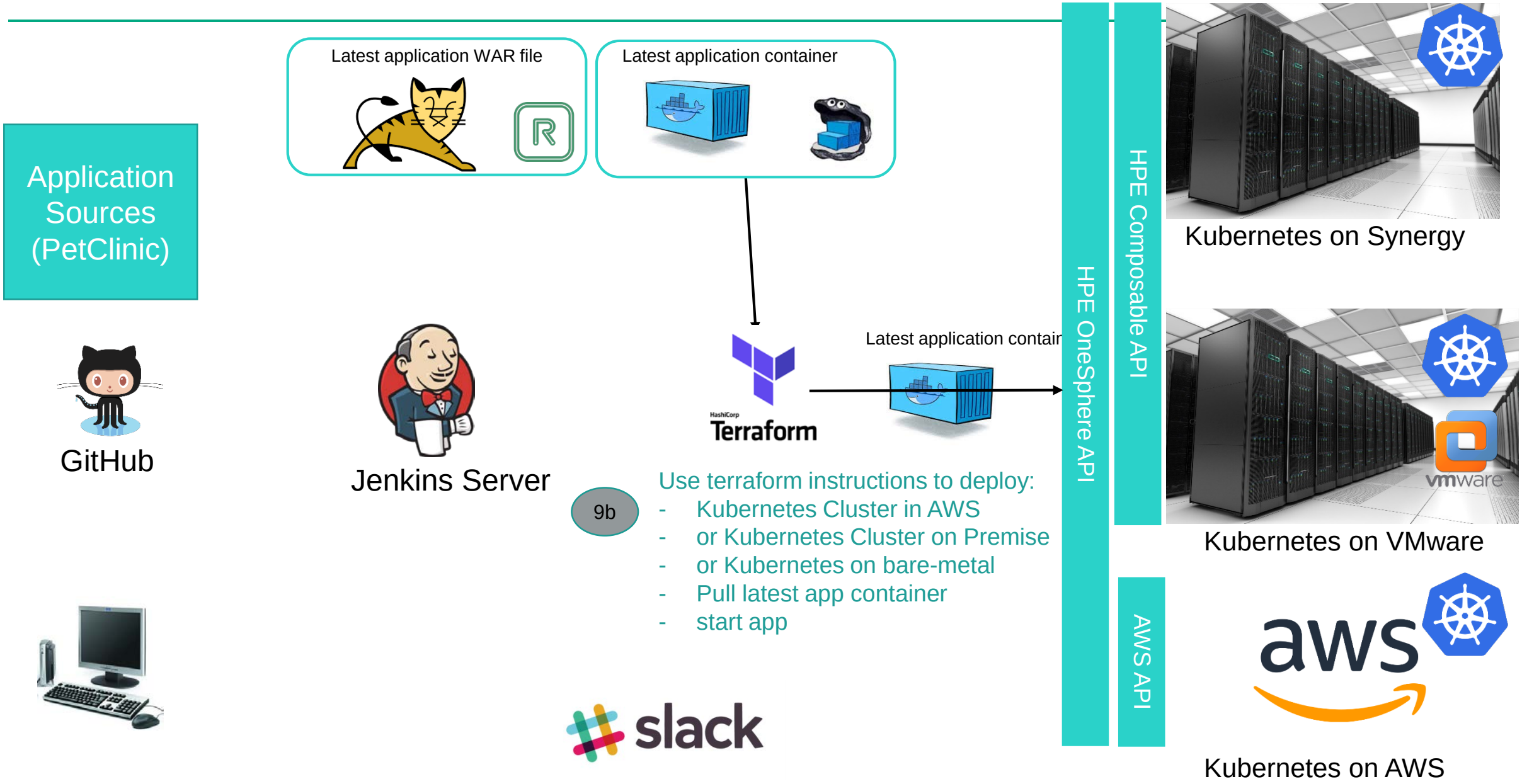

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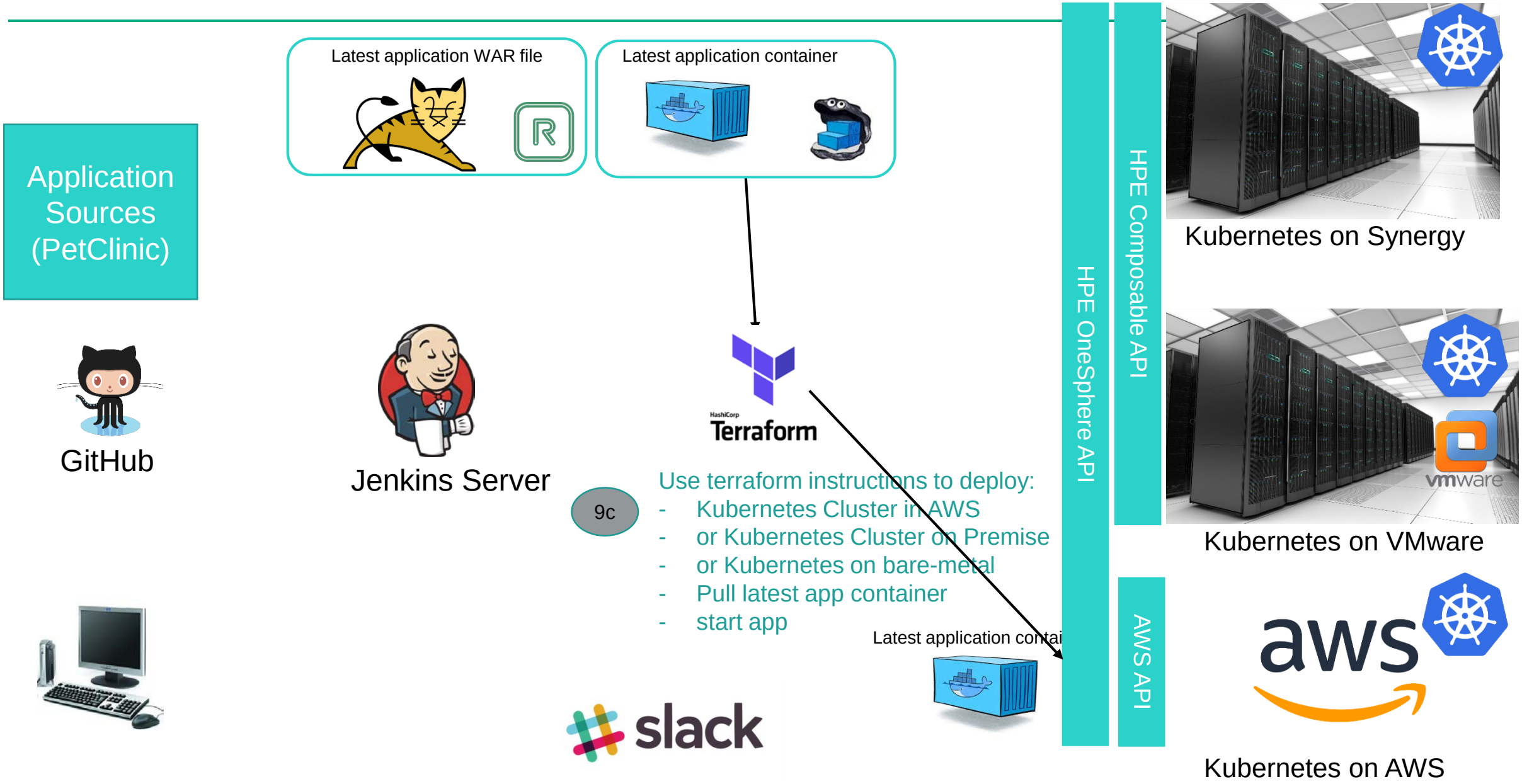
Application Sources (PetClinic)
Latest application WAR file
Latest application container
GitHub
Jenkins Server
HashiCorp Terraform
9c
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Latest application contai
slack
HPE OneSphere API
HPE Composable API
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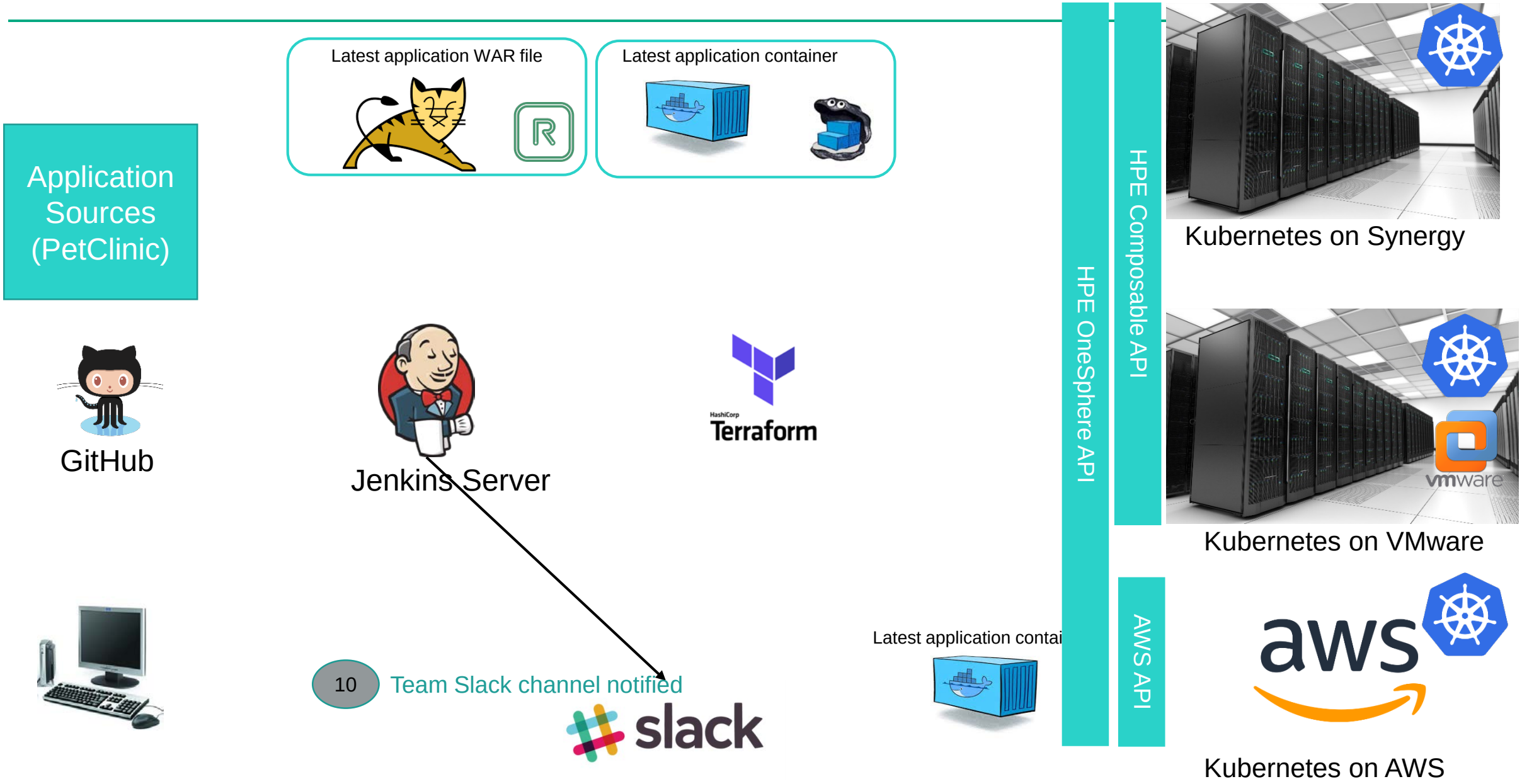
Kubernetes on VMware
vmware
aws
Kubernetes on AWS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GitHub
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Terraform
HPE OneSphere API
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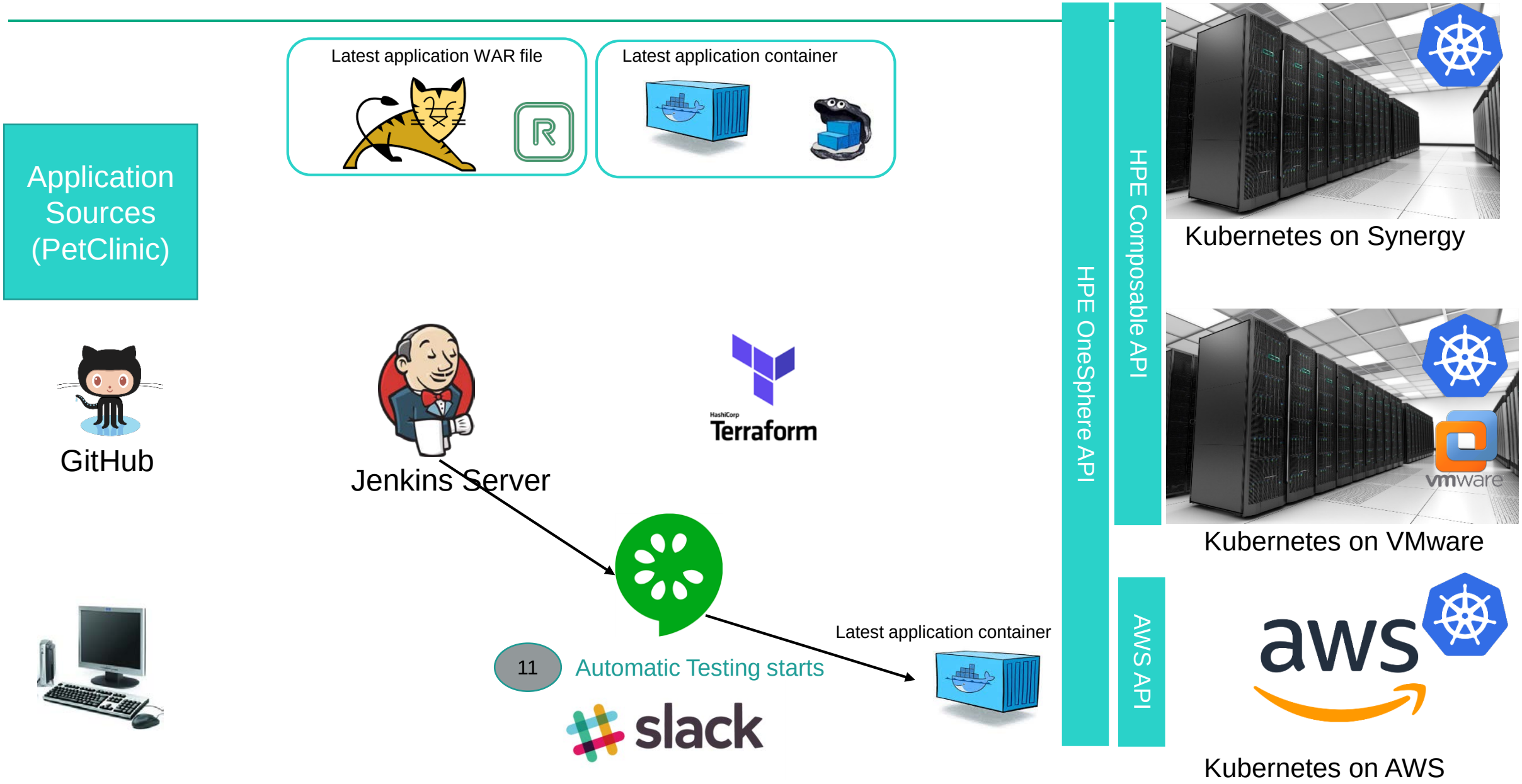
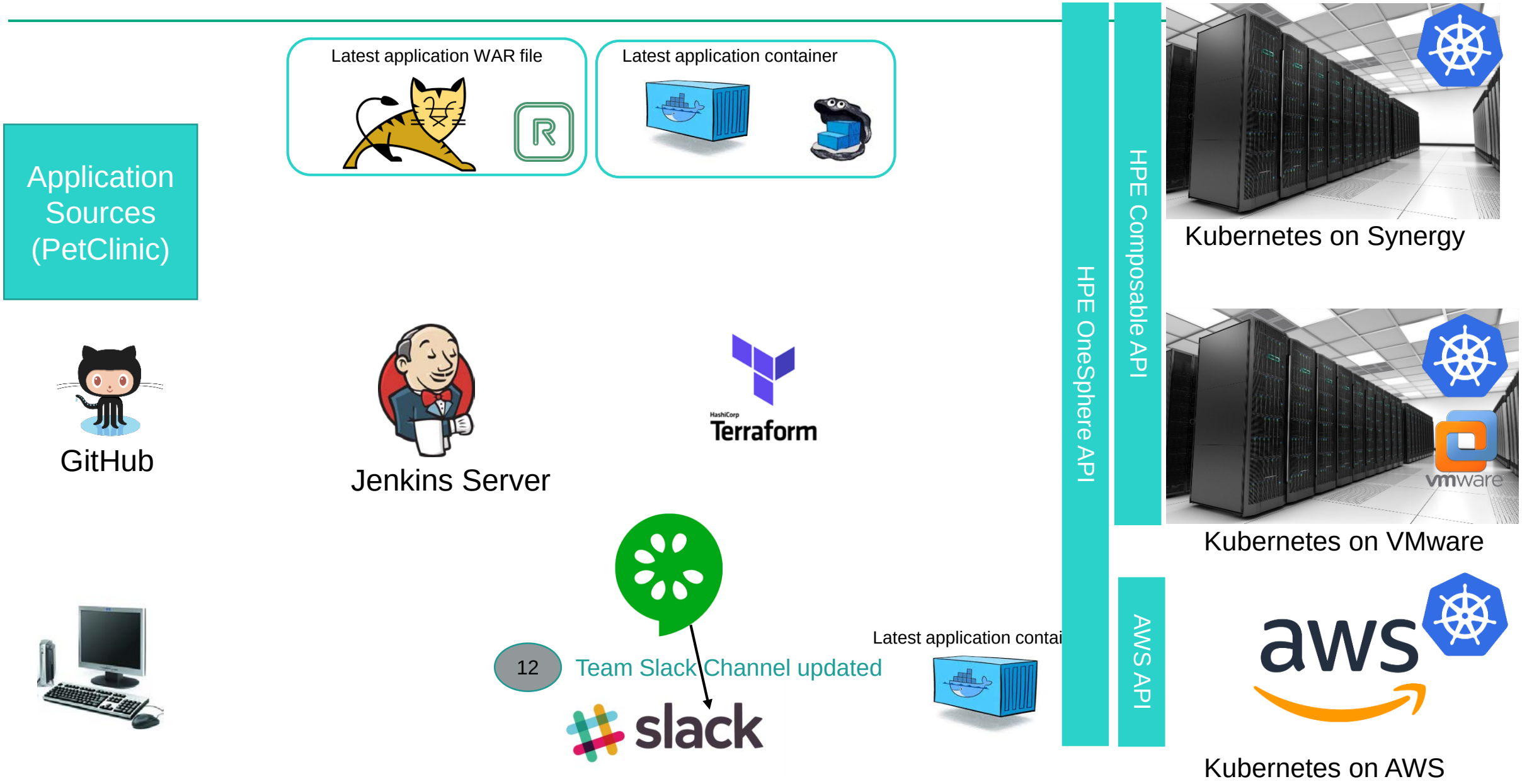
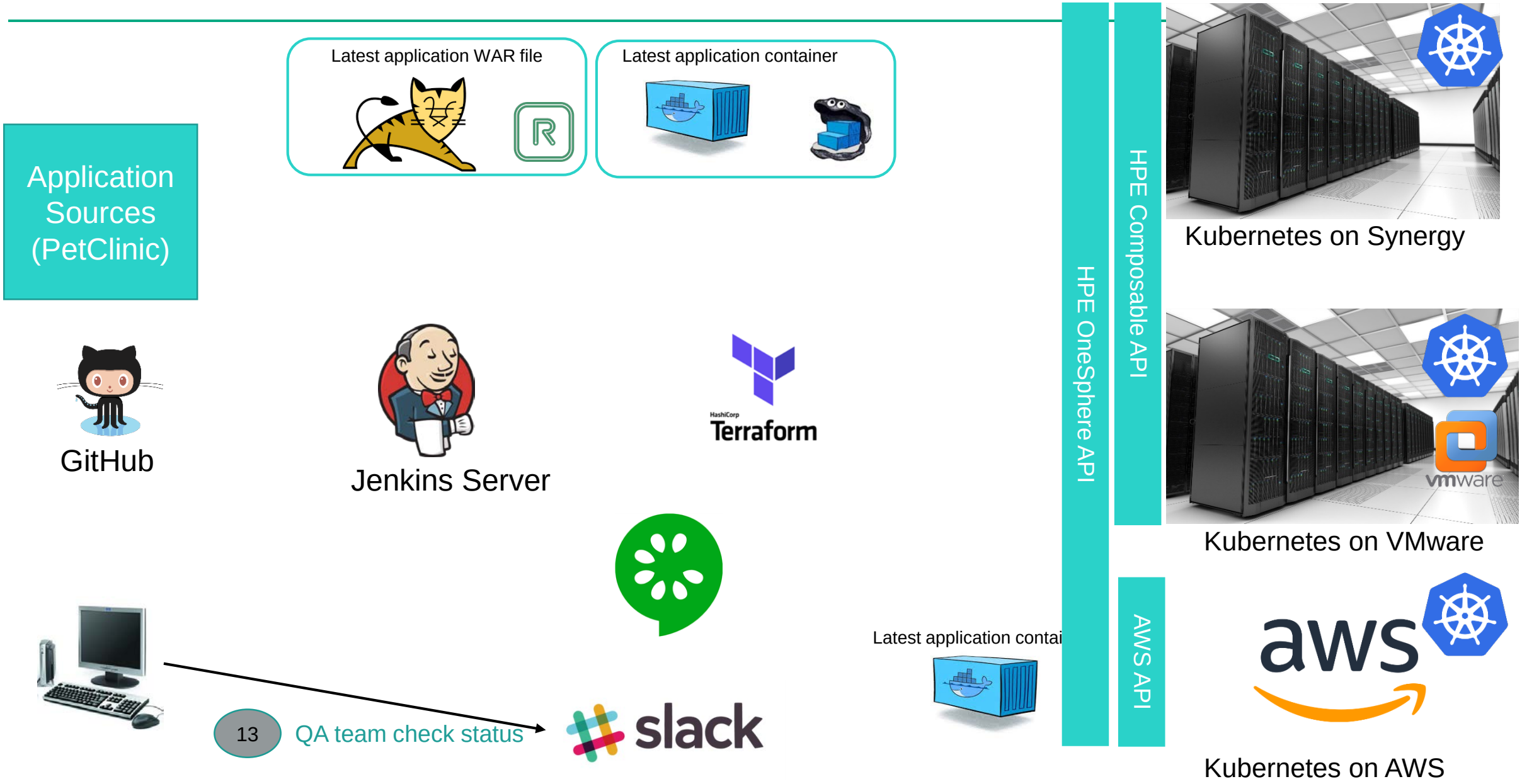
vmware
AWS API
aws
Kubernetes on AWS
Latest application contai
10
Team Slack channel notified
slack


Application Sources (PetClinic)
Latest application WAR file
Latest application container
GitHub
Jenkins Server
HashiCorp
Terraform
11
Automatic Testing starts
slack
Latest application container
HPE OneSphere API
HPE Composable API
AWS API
Kubernetes on Synergy
vmware
Kubernetes on VMware
aws
Kubernetes on AWS


Application Sources (PetClinic)
Latest application WAR file
Latest application container
GitHub
Jenkins Server
HashiCorp
Terraform
12
Team Slack Channel updated
slack
Latest application contai
HPE OneSphere API
HPE Composable API
AWS API
Kubernetes on Synergy
vmware
Kubernetes on VMware
aws
Kubernetes on AWS


Application Sources (PetClinic)
Latest application WAR file
Latest application container
GitHub
Jenkins Server
HashiCorp
Terraform
13
QA team check status
slack
Latest application contai
HPE OneSphere API
HPE Composable API
AWS API
Kubernetes on Synergy
Kubernetes on VMware
vmware
aws
Kubernetes on AWS

Application Sources (PetClinic)

Latest application WAR file

Latest application container

GitHub

Jenkins Server

Terraform

HPE OneSphere API

HPE Composable API

AWS API

Kubernetes on Synergy

Kubernetes on VMware

Kubernetes on AWS

Latest application contai

slack

LoB Manager uses bot to query infrastructure

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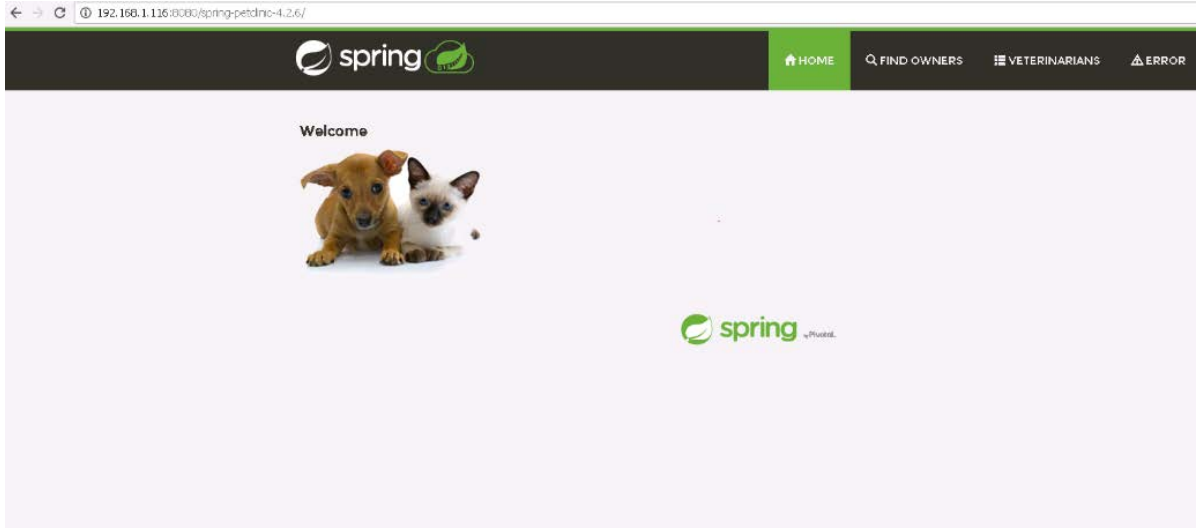
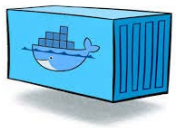


16 Additional manual testing

Latest application contai



HPE OneSphere API

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Kubernetes on Synergy

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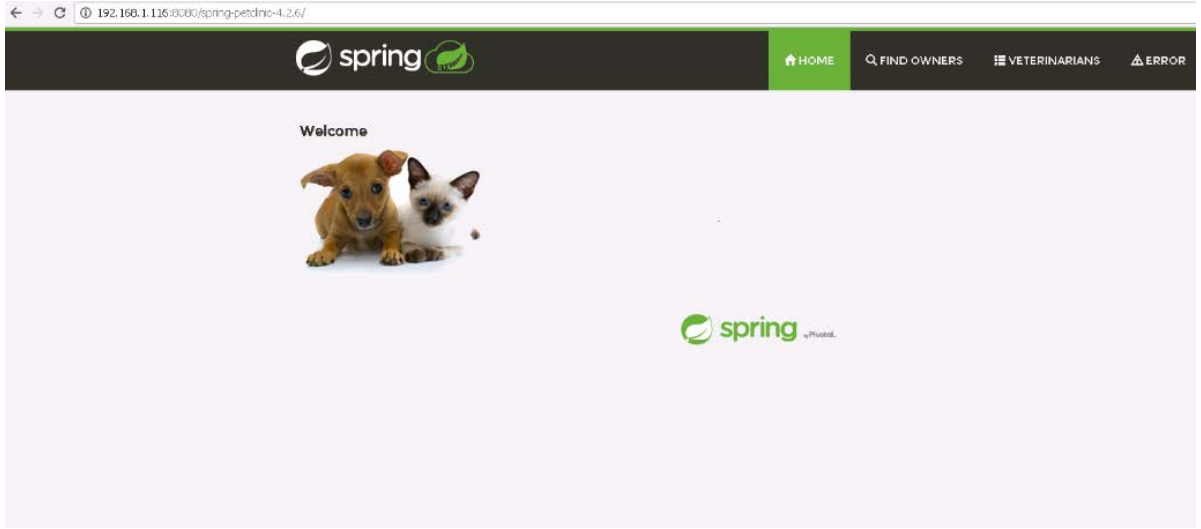
AWS API

Kubernetes on AWS

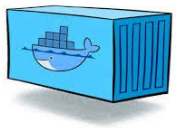


17

Team Slack channel notified

slack

Latest application contai



HPE OneSphere API

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Kubernetes on VMware

aws

Kubernetes on AWS

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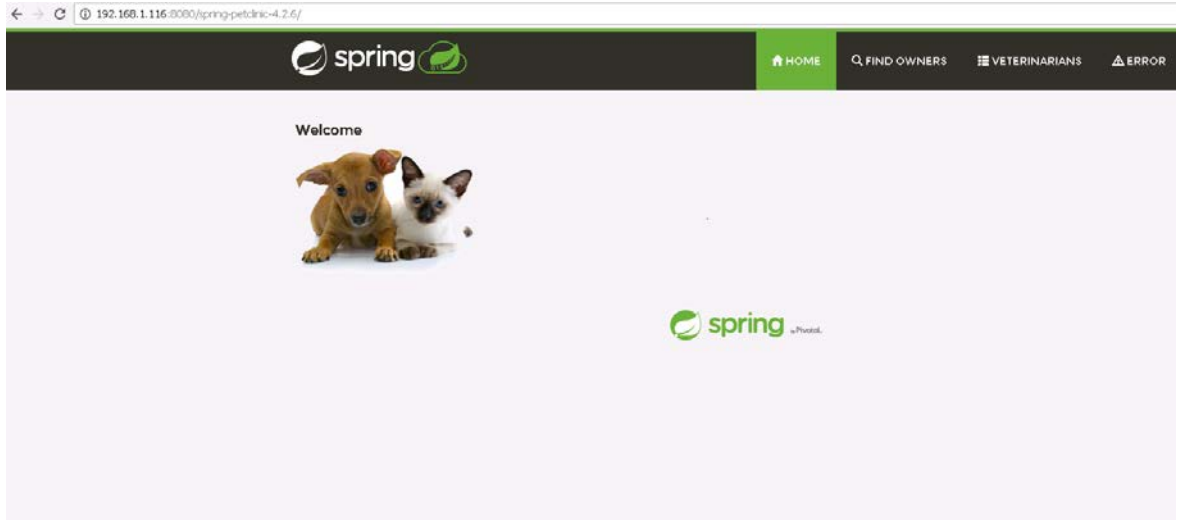
Application Sources (PetClinic)



18 Owner check discussion

slack

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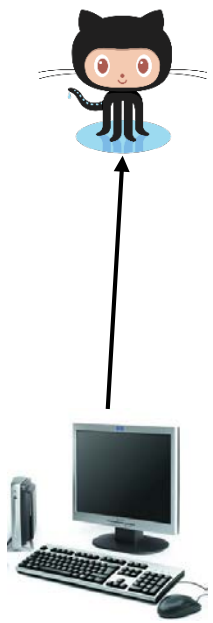
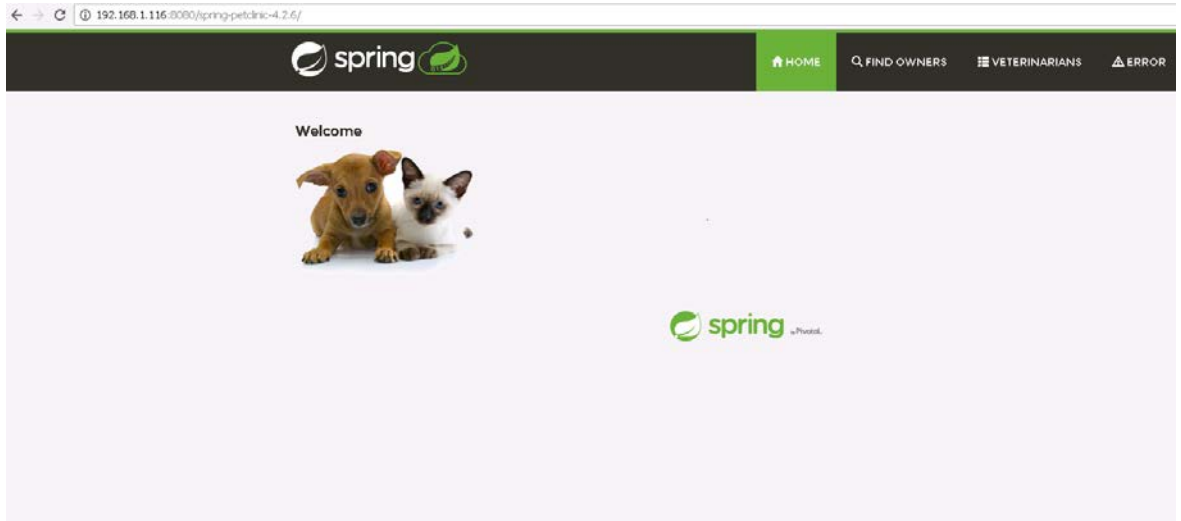
Application Sources (PetClinic)





19 Owner approves Pull Request (or doesn't)

Docker sur VM vs BM

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Impact sur le cout ?

Impact sur le cout ?

Pour une puissance équivalente, on passe de 50 nodes VM à 6 nodes BM

1 node VM

Monitoring sysdig	Security GuardiCore	Analytics Prometheus Grafana	Service Mgmt NGINX
Orchestration kubernetes			Service Discovery Consul
Runtime docker			Key Mgmt Vault
Virtualization vmware			Secure Registry JFrog Artifactory
Specific Compute NVIDIA	Cloud Native Storage	Cloud Native Network	Automation Provisionning puppet labs

1 node VM

+ Management
+ Sécurité
+ Réseau
+ Stockage

€ per node

Exemple de prod 50 nodes

- 12 vCPU
- 64 GB de RAM /
- 2 TB de disque
- NIC de 1 Gbps

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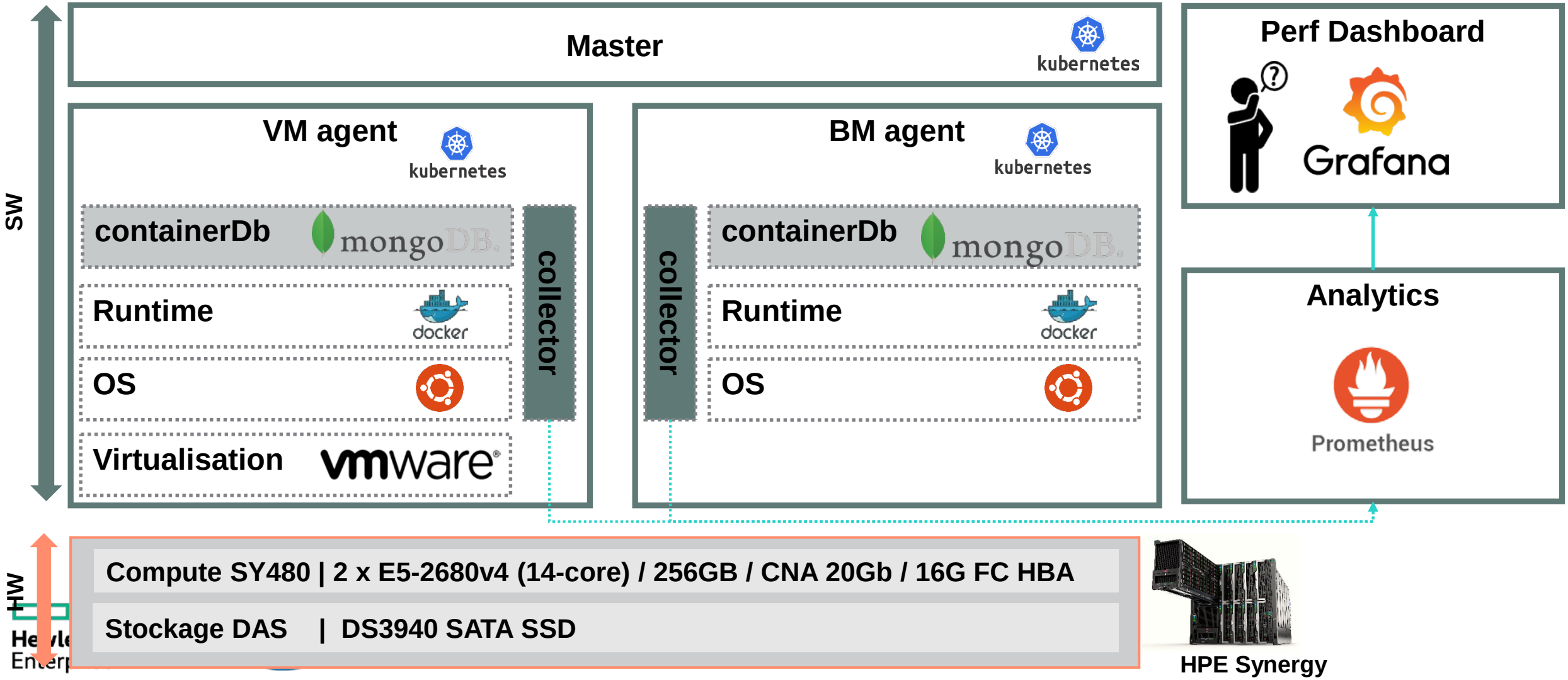
Impact sur la perf?

Impact sur la performance ?



mongo-bench sur VM vs BM

$ python benchrun.py -f testcases/simple_insert.js -t 5 10 20 --host 10.3.88.156 --port 27017

x4 better perf on BM vs VM on Document Operations

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Infra Composable

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Infrastructure Composable principles

HPEOVServerProfile -name myVSAN01 -template VSAN ocker-GPU

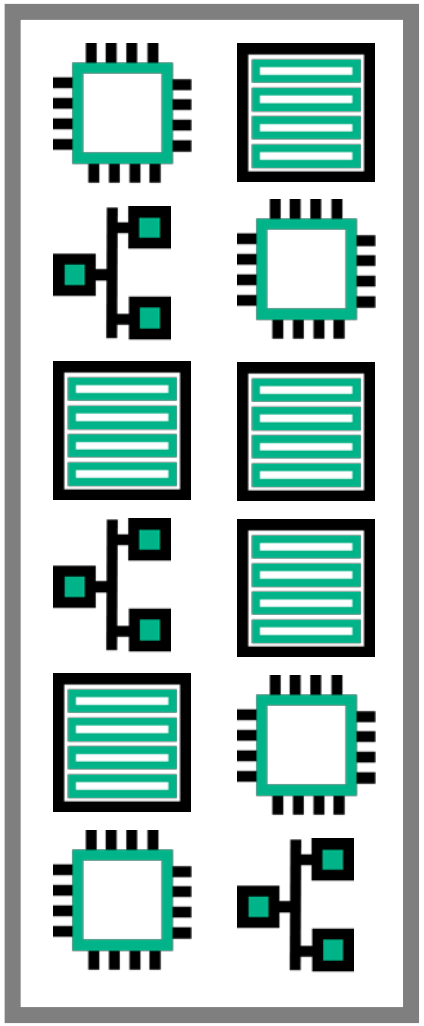
"Create a new Cassandra cluster"

"Scale-up the database"

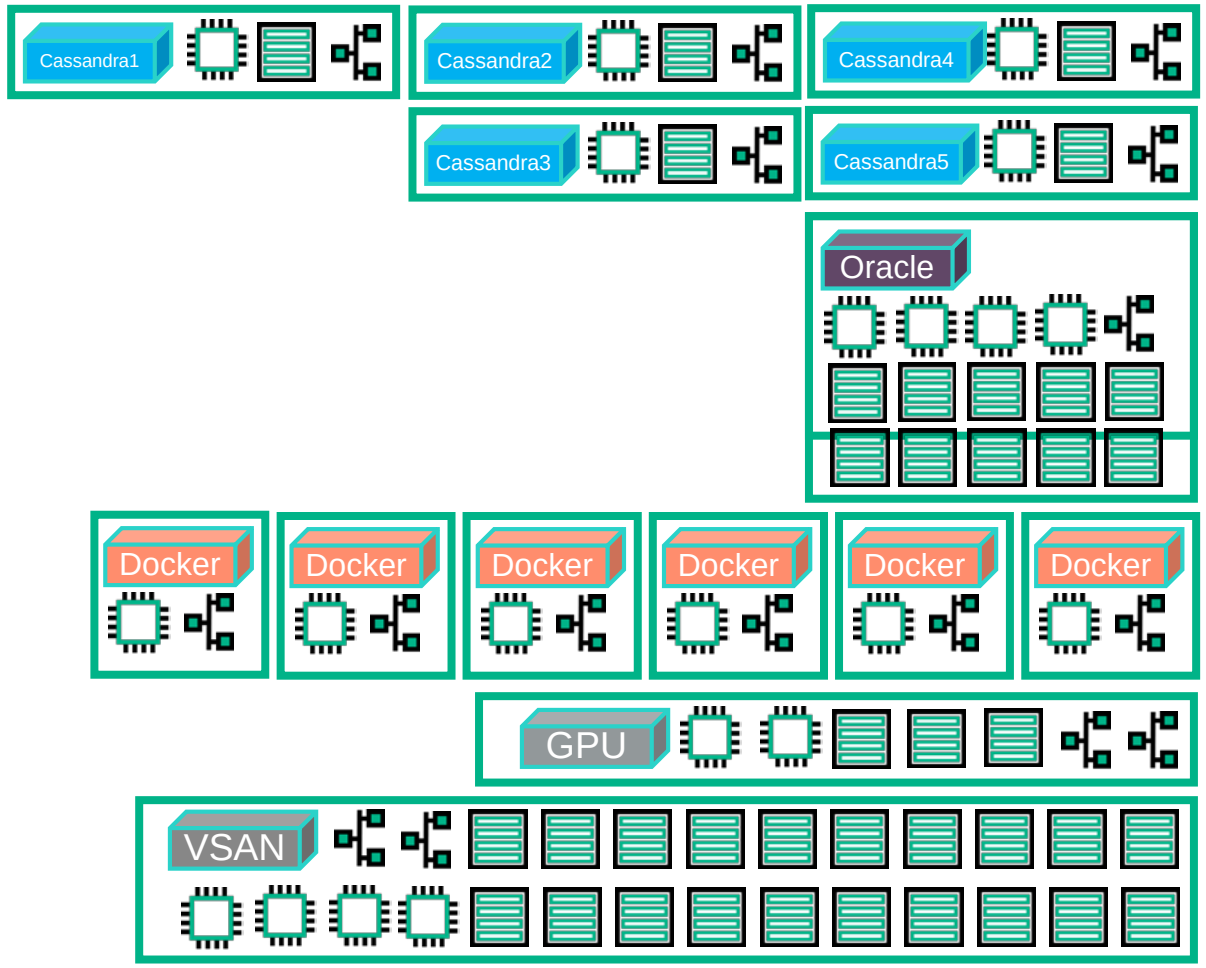
"Scale-in/out Docker worker"

"Now with Docker GPU"

"and grow VSAN cluster"



Fluid Resource Pools



Compute

Storage (DAS, SDS, SAN)

Network Fabrics (Eth, FC, FCoE)

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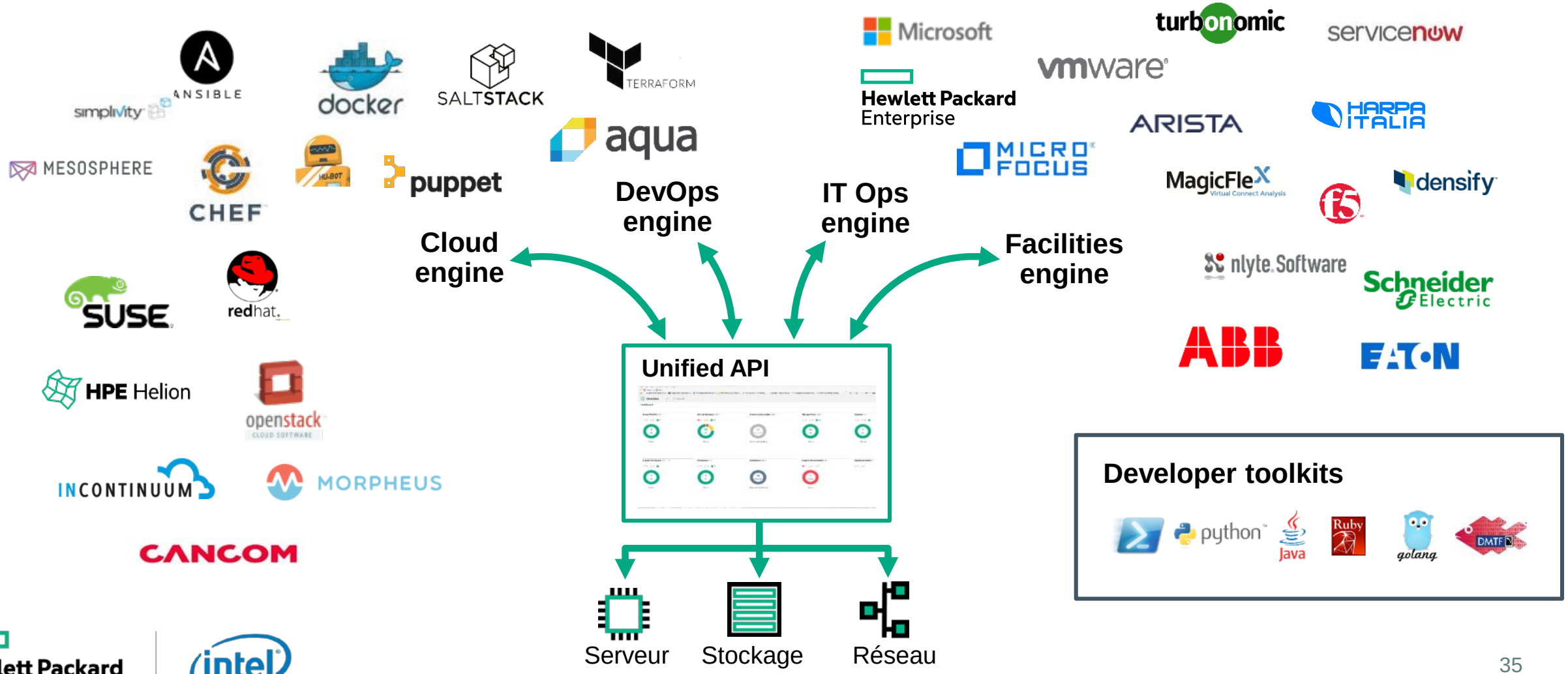
Ecosystème Infrastructure Composable HPE



Composable fabric

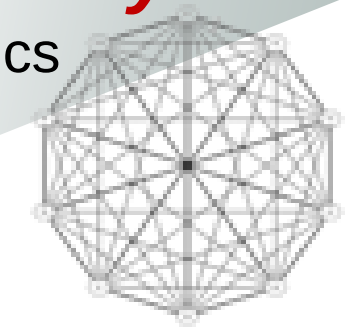
In a Nutshell

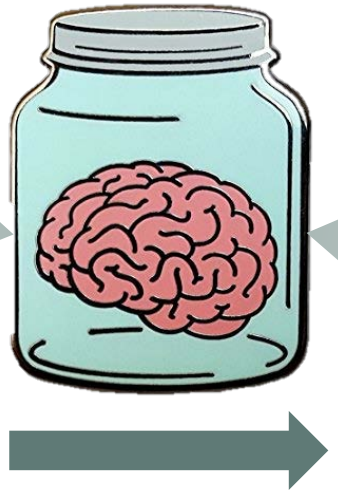
API-Driven

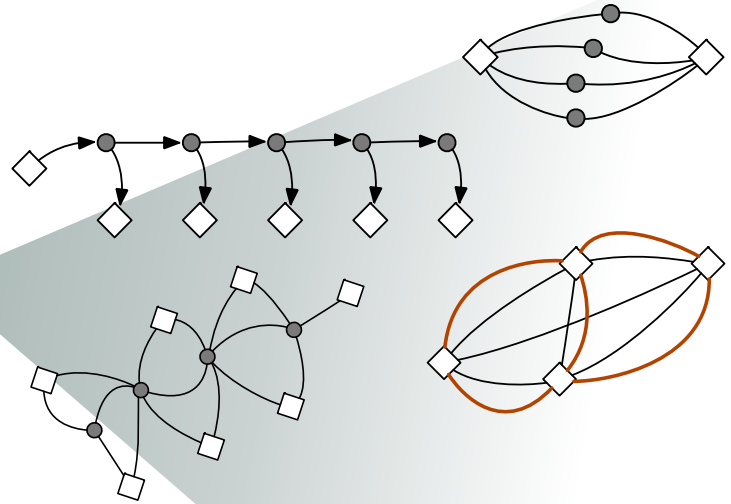
Workload Definitions

High-Diversity

HW/SW Fabrics

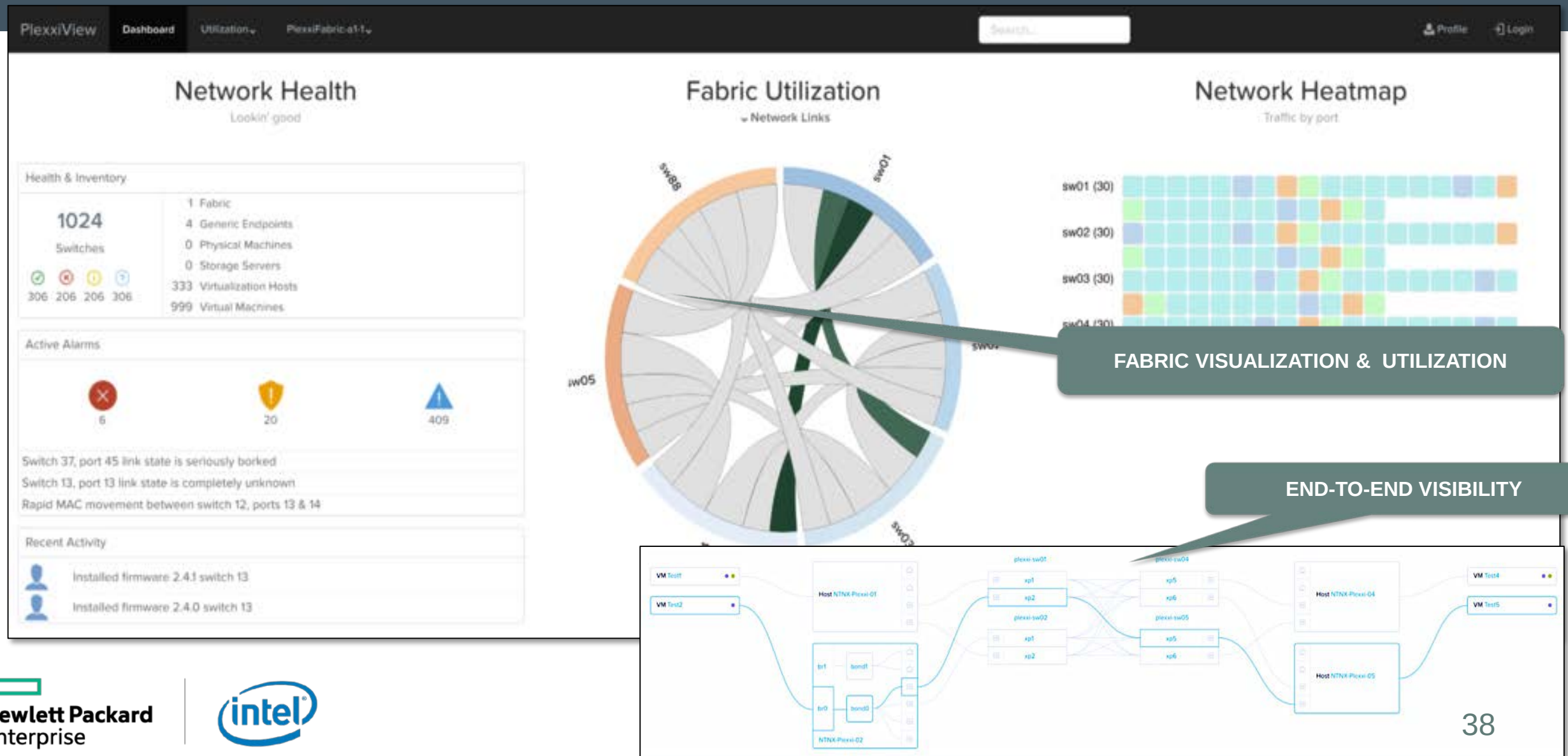






Workload-Specific Forwarding Topologies

API-driven



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Create a new project with bandwidth or latency constraints :

https://www.youtube.com/watch?v=gzYg5mBiCS0

You (the developer) add label “plexxi: adjacent” in your app template

App build -> Scheduler will do placement on nodes connected to nearby switches with the most available network fabric connectivity!

```
        ],
        "replicas": 5,
        "selector": {
            "name": "${NAME}"
        },
        "template": {
            "metadata": {
                "name": "${NAME}",
                "labels": {
                    "app": "${NAME}",
                    "name": "${NAME}",
                    "plexxi": "adjacent"
                }
            },
```

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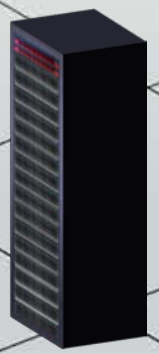
COMPOSABLE FABRIC



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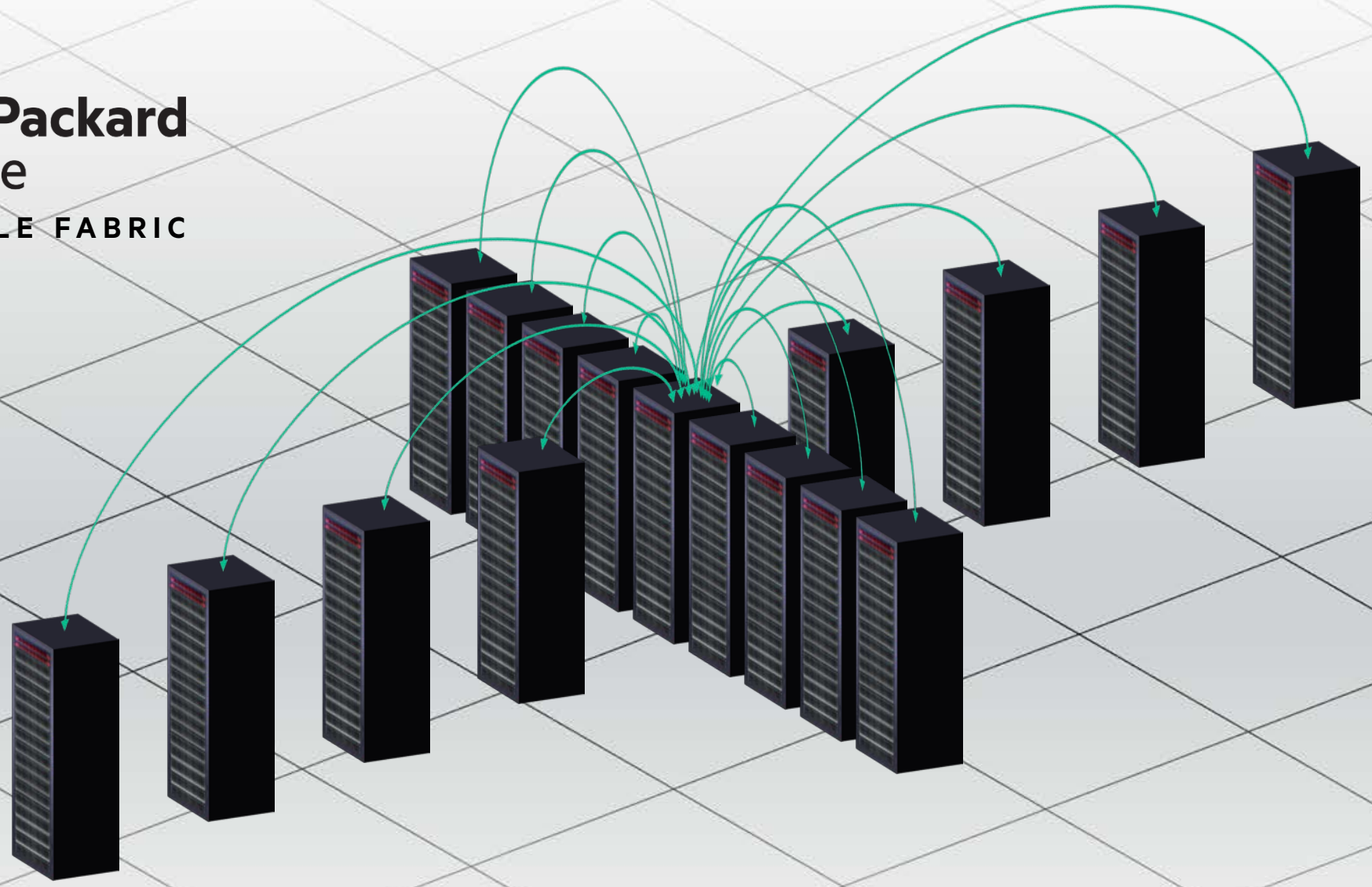

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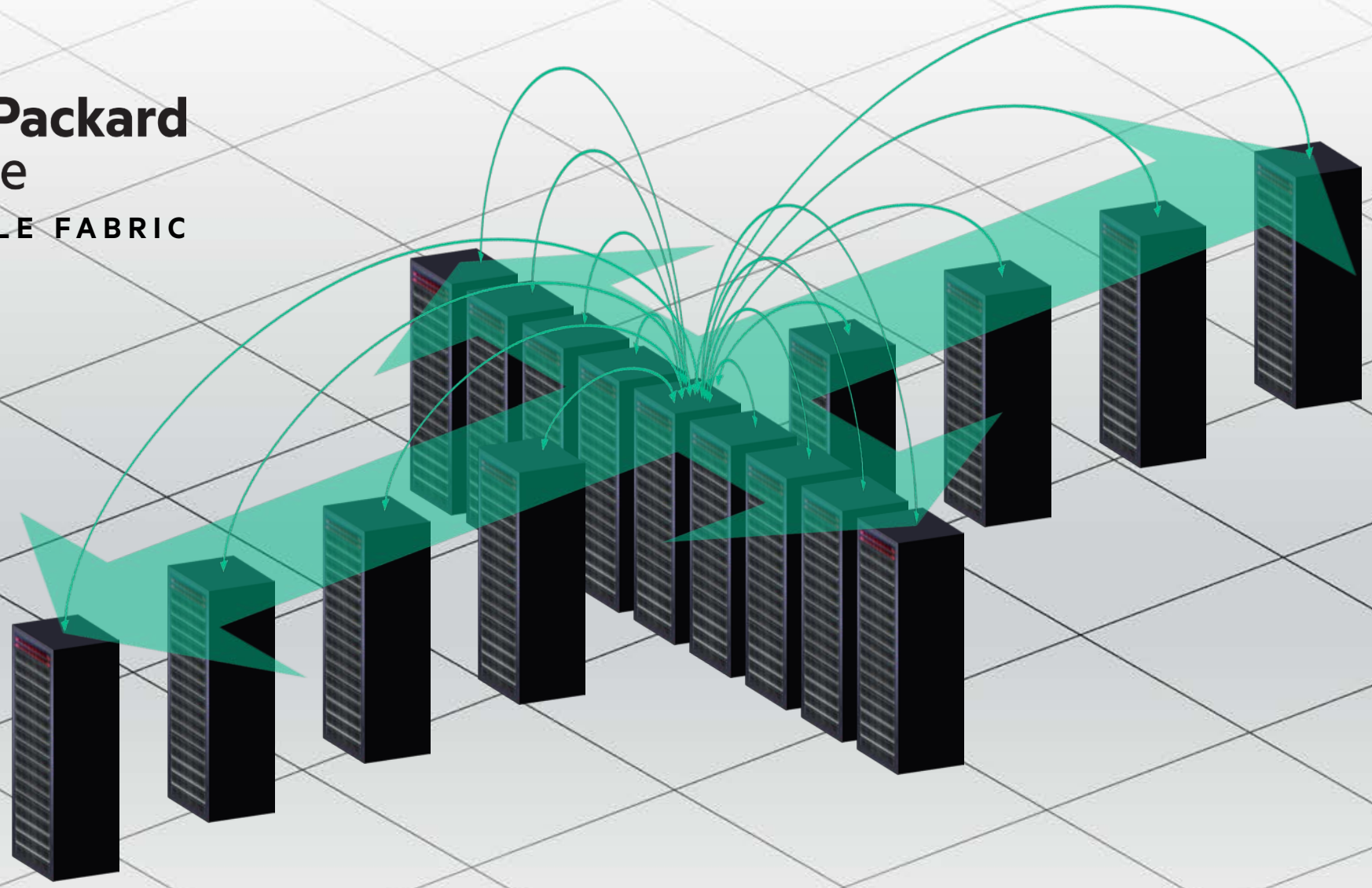
COMPOSABLE FABRIC



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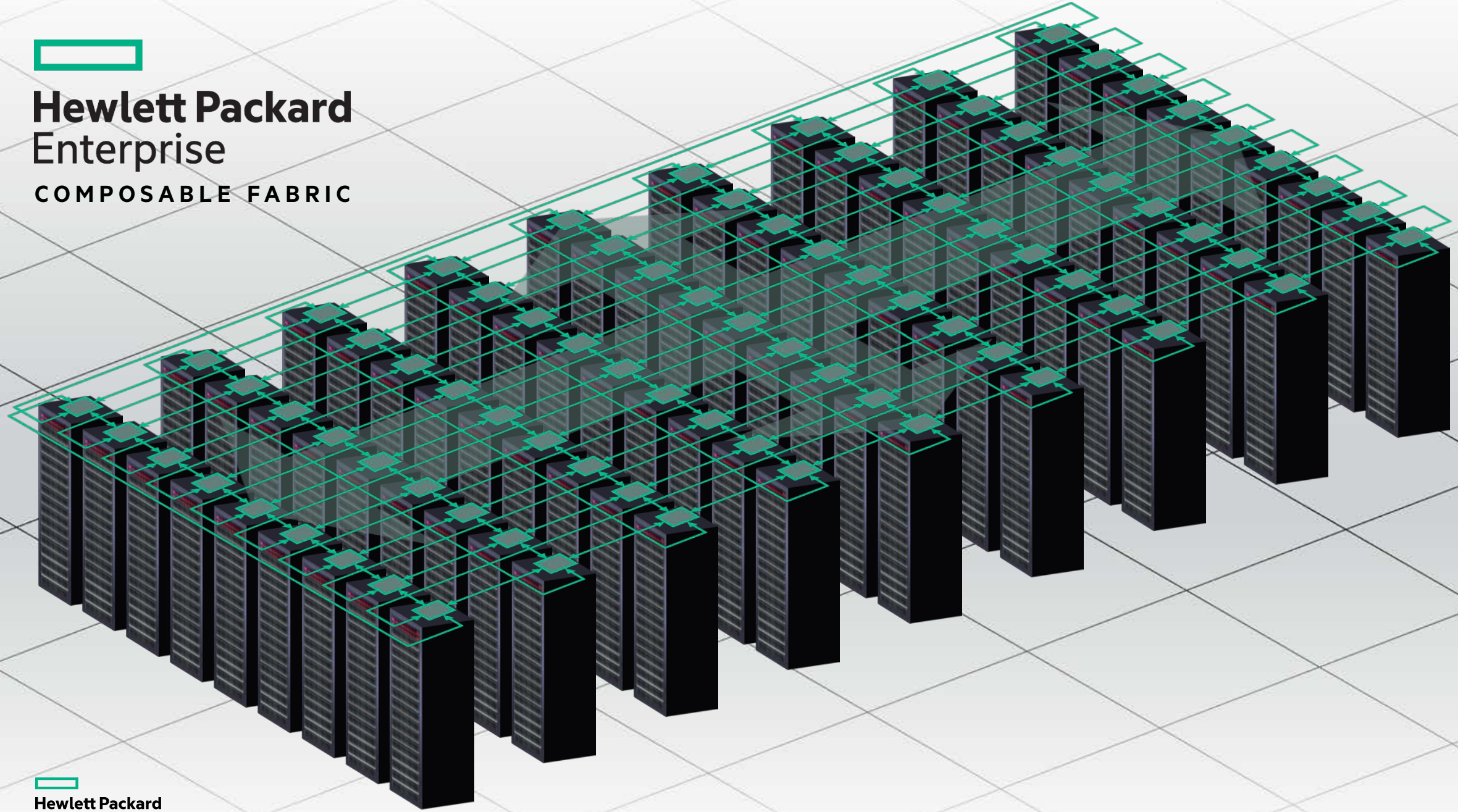

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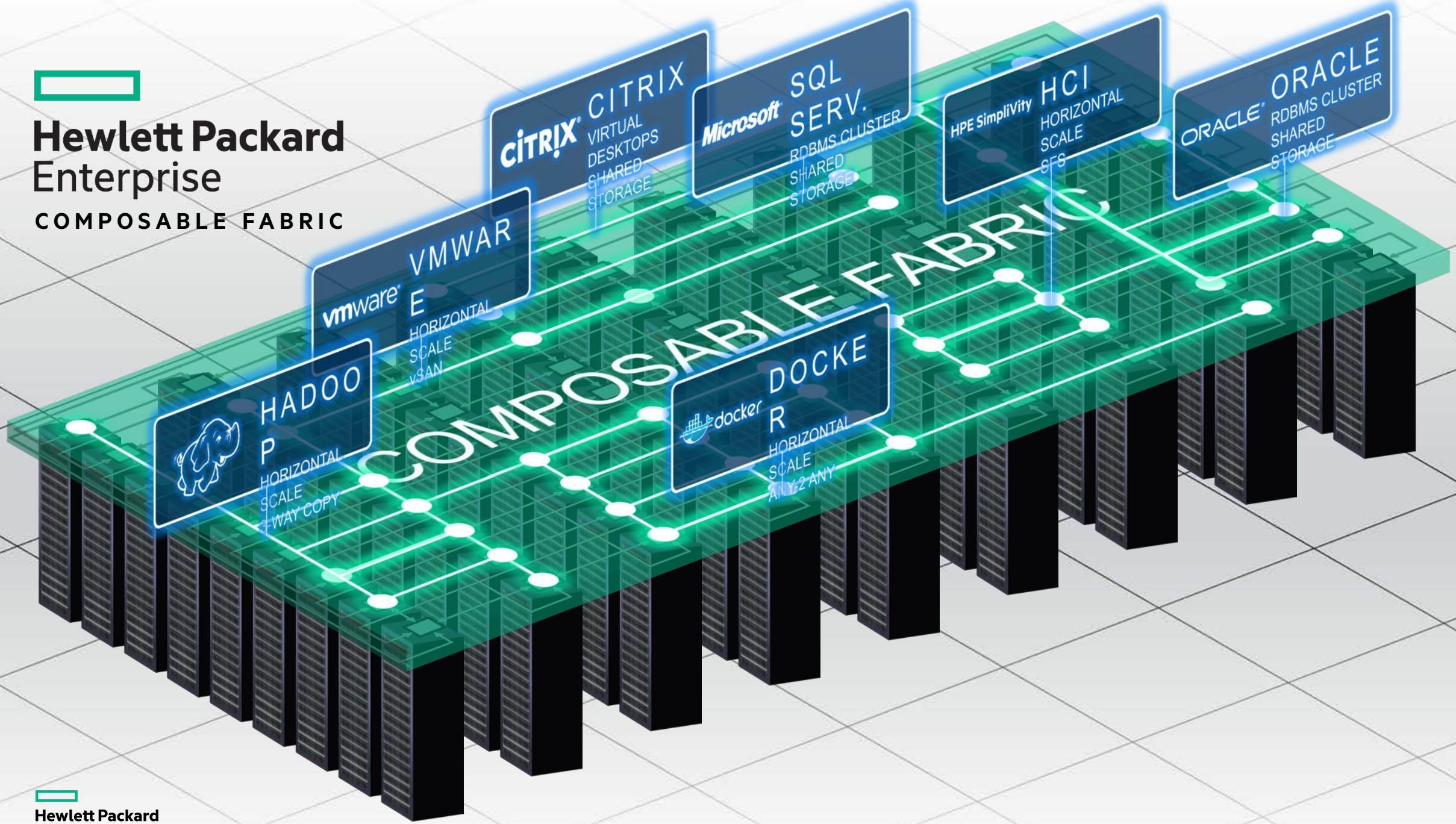

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Composable storage

HPE Storage Docker Volume plugin

```
---
version: "3"
services:
  myservice:
    image: myorg/myimage
  volumes:
    - myvol1:/data
volumes:
  myvol1:
    driver: nimble
    driver_opts:
      description: "My Description"
      sizeInGiB: "500"
      encryption: "true"
      limitIOPS: "1000"
      perfPolicy: "My Policy"
      protectionTemplate: "my-prot-1"
```

docker

kubernetes

MESOS

	Parameters
	description: "My Description" destroyOnRm: "true"
	perfPolicy: "SQL Server" limitIOPS: "32000" limitMBPS: "512"
SSD	pool: "allflash" folder: "My Tenant"
	protectionTemplate: "local-cloud"
	encryption: "true" fsOwner: "8192:500" fsMode: "0755"
	thick: "true" sizeInGiB: "4000"
	dedupe: "true"
	cloneOf: "MyDockerVol1" snapshot: "MySnapshot" createSnapshot: "true"
Legacy → Docker	importVol: "MyNimbleVol1" importVolAsClone: "MyNimbleVol1" snapshot: "MySnapshot"

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HPE Kube Storage Controller

```yaml
---
kind: StorageClass
apiVersion: storage.k8s.io/v1
metadata:
 name: my-storage-class
provisioner: hpe.com/nimble
parameters:
  description: "My Description"
  encryption: "true"
  limitIOPS: "1000"
  perfPolicy: "My Policy"
  protectionTemplate: "my-prot-1"

---
kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: my-pvc
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 500Gi
  storageClassName: my-storage-class
```

docker

kubernetes

MESOS

	Parameters
	description: "My Description" destroyOnRm: "true"
	perfPolicy: "SQL Server" limitIOPS: "32000" limitMBPS: "512"
SSD	pool: "allflash" folder: "My Tenant"
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Legacy → Docker	importVol: "MyNimbleVol1" importVolAsClone: "MyNimbleVol1" snapshot: "MySnapshot"

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HPE Storage DVDI Integration

```
{
 "id": "myjob-1",
 "cpus": 0.5,
 "mem": 32,
 "volumes": [
  {
   "containerPath": "data",
   "external": {
    "name": "myvol1",
    "provider": "dvdi",
    "options": {
     "dvdi/sizeInGiB": "500",
     "dvdi/description": "My Description",
     "dvdi/driver": "nimble"
    }
   },
   "mode": "RW"
  }
 ],
 "container": {
 "type": "MESOS",
  "mesos": {
   "type": "DOCKER",
   "image": "myorg/myimage"
  }
 }
}
```

docker

kubernetes

MESOS

	Parameters
	description: "My Description" destroyOnRm: "true"
	perfPolicy: "SQL Server" limitIOPS: "32000" limitMBPS: "512"
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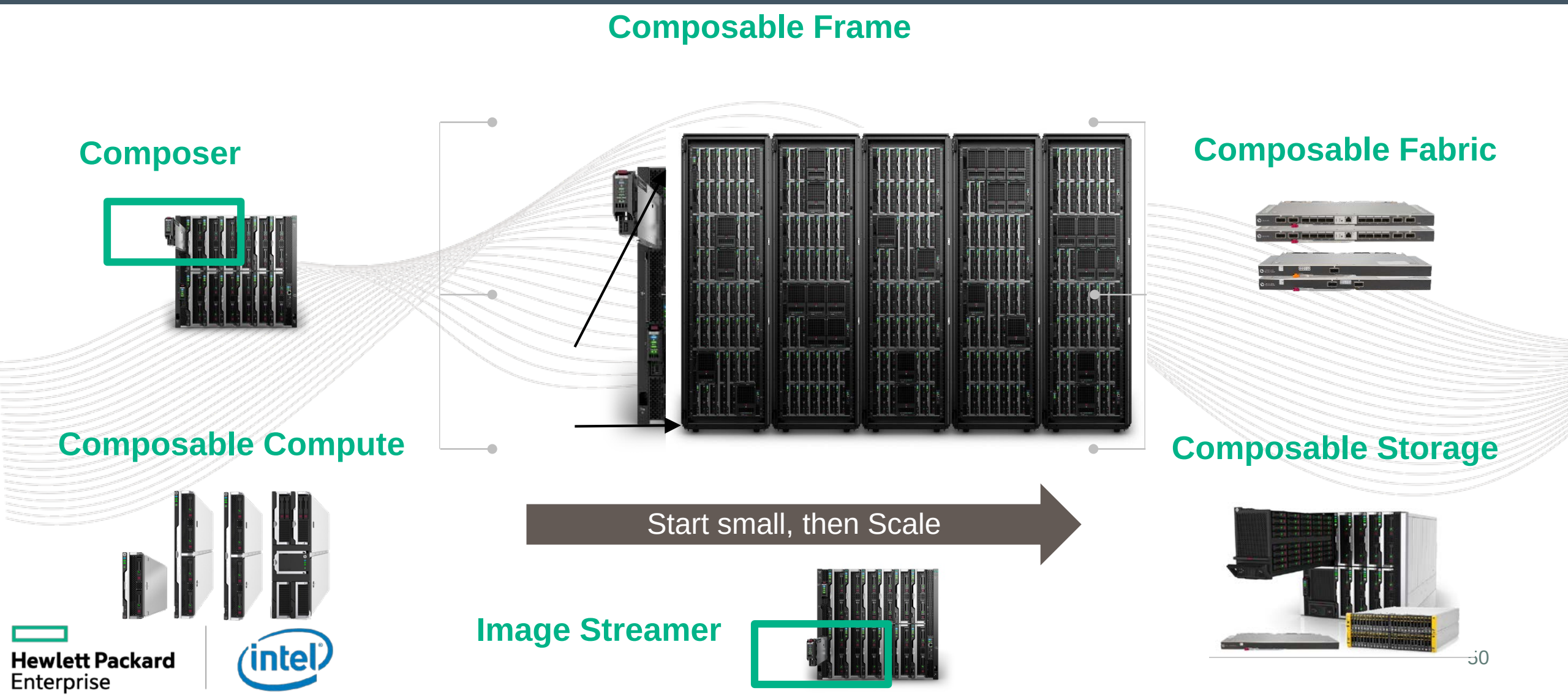
HPE Synergy

HPE Synergy: la 1ère Infrastructure Composable du marché



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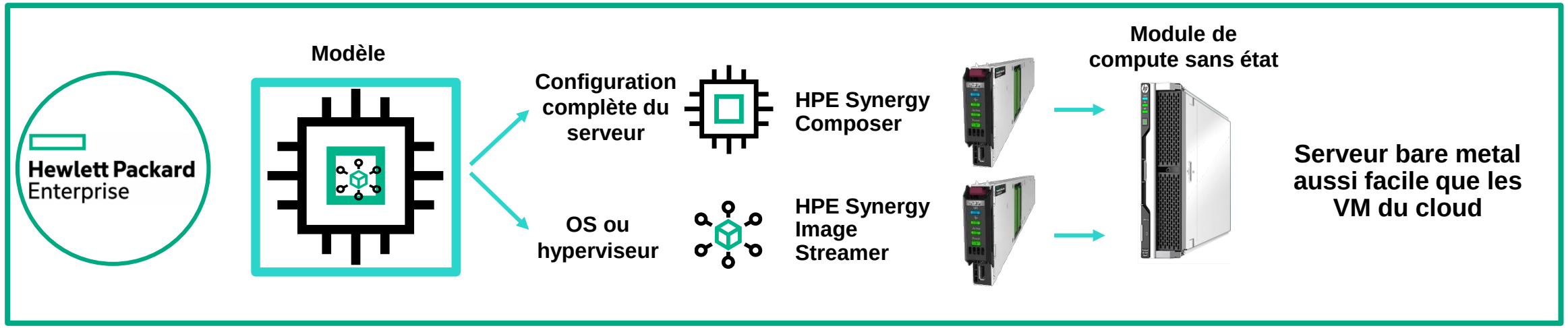
Gérer les serveurs physiques aussi facilement que les VMs



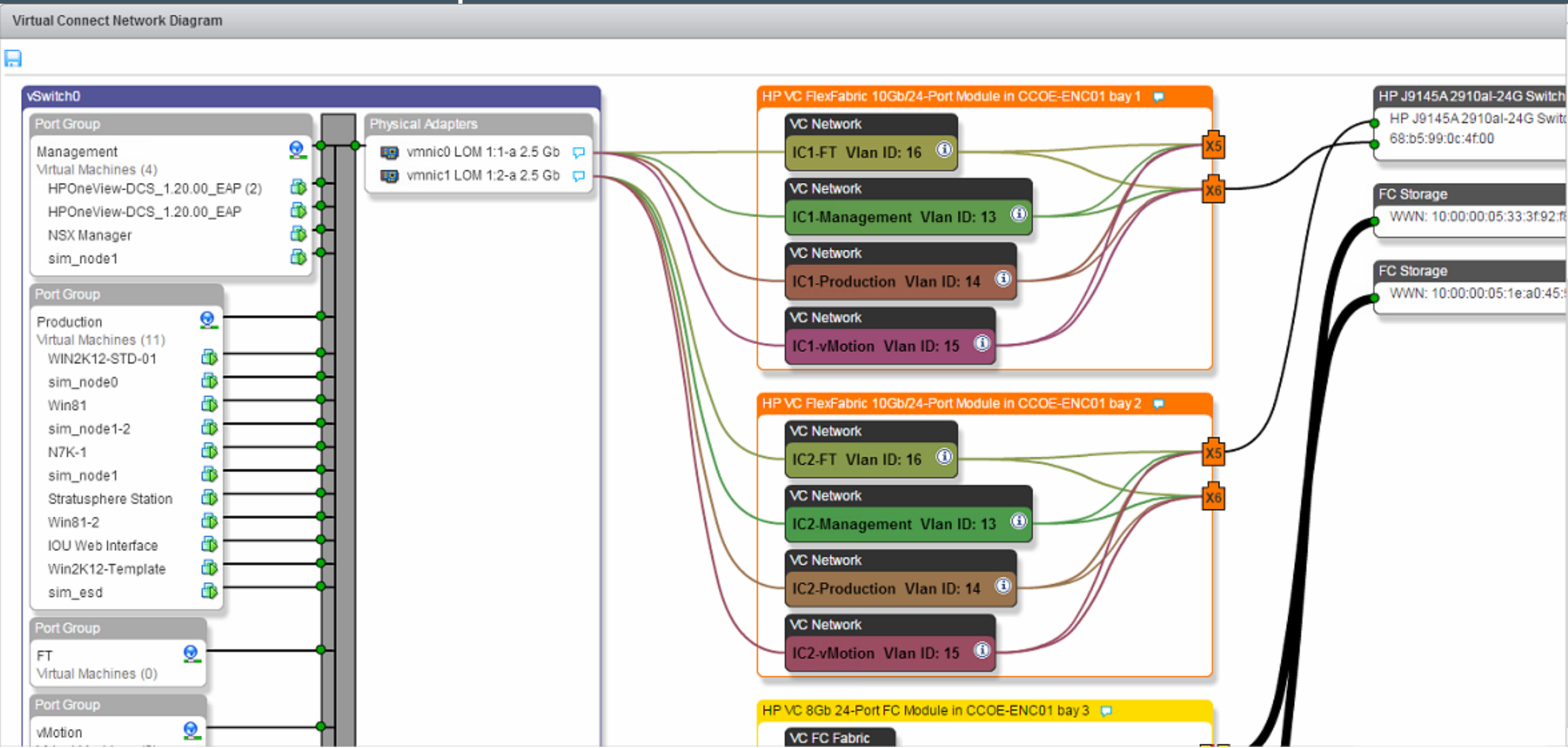
Opération Machine Physique

- Créer le modèle de profil avec l'OS
- Activer le profile sur le compute module
- Mettre à jour le server profile
- Désactiver le server profile
- Déplacer le server profile
- Détruire le server profile

- Créer le modèle de VM avec l'OS
- Déployer le modèle sur une VM
- Mettre à jour la VM
- Suspendre la VM
- Déplacer la VM
- Supprimer la VM

Equivalent Machine Virtuelle

Gérer les interfaces reseaux des serveurs physiques aussi facilement que celle des VMs



HPE Synergy Storage Module (external Storage)

Composable storage > Software defined storage

Beth Prof1 | Local Storage

OneView

Local Storage Edit

Integrated controller in RAID mode

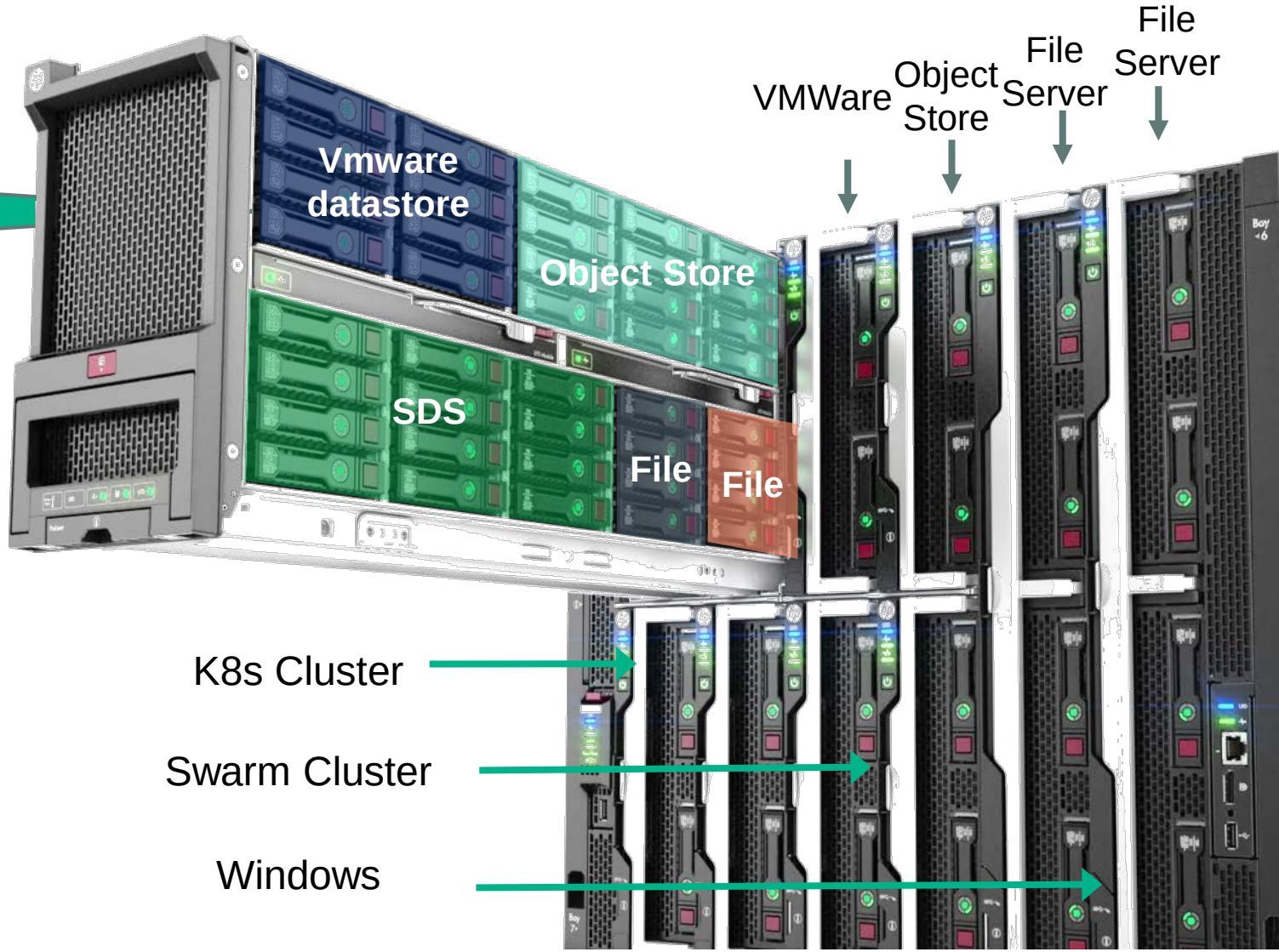
Initialization of internal storage will occur on next assignment to server hardware.

Logical Drive	Name	RAID Level	Number of Drives	Drive Technology
1	Recovery volume	RAID6	6	SATA SSD
pending	Local Spare drive	RAID1	2	SATA SSD

PCI slot 1 controller in RAID mode

Initialization of internal storage will occur on next assignment to server hardware.

Logical Drive	Name	RAID Level	Number of Drives	Drive Capacity
1	Secret database	RAID 1	3	1 TB
2	Data volume 1	RAID 5	8	3 TB
pending	Data volume 2	RAID 5	5	500 GB



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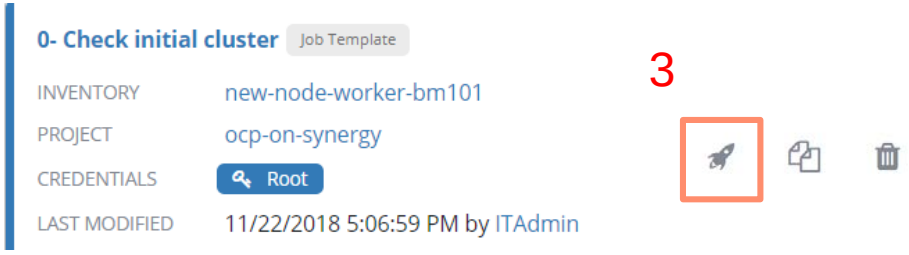
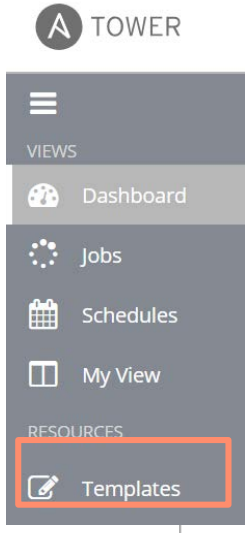
Scaling Openshift worker node with Ansible with Synergy Compute node

1.1 Ansible Tower
Initial Openshift Components

1

3





2

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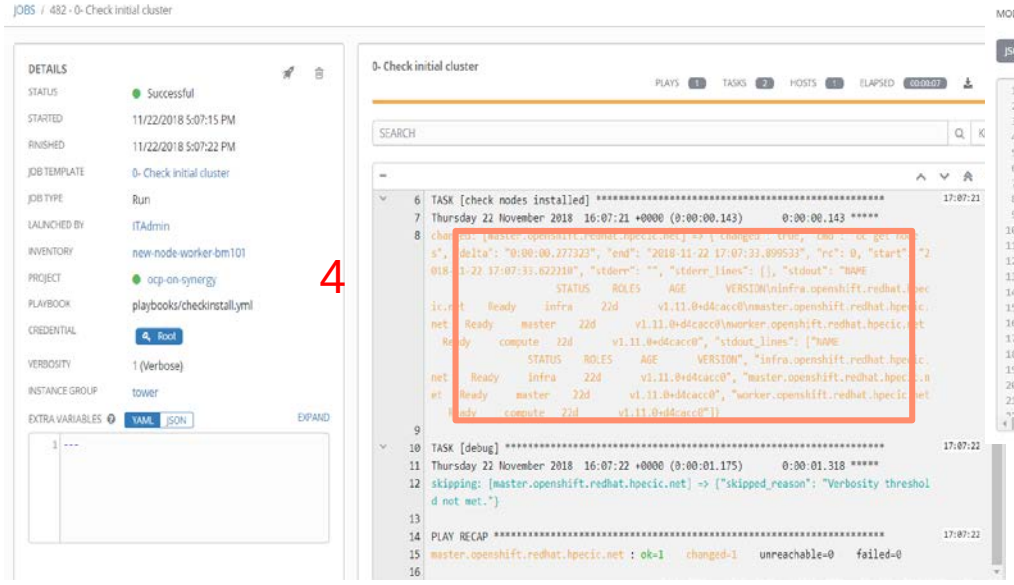

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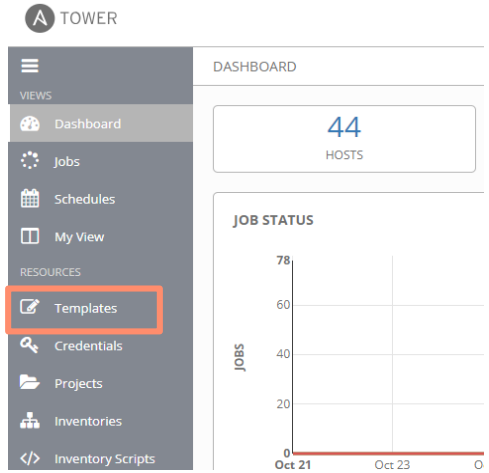
1.2 Deploy new worker node



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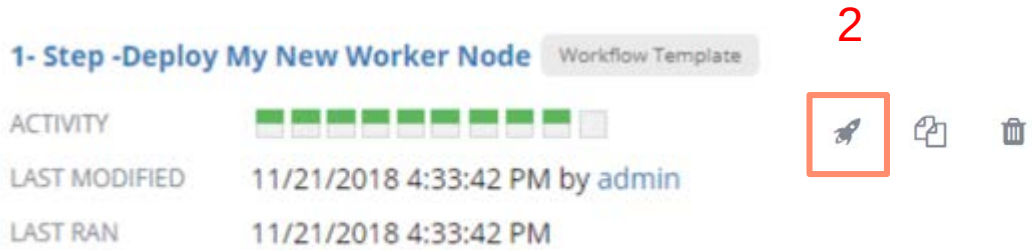

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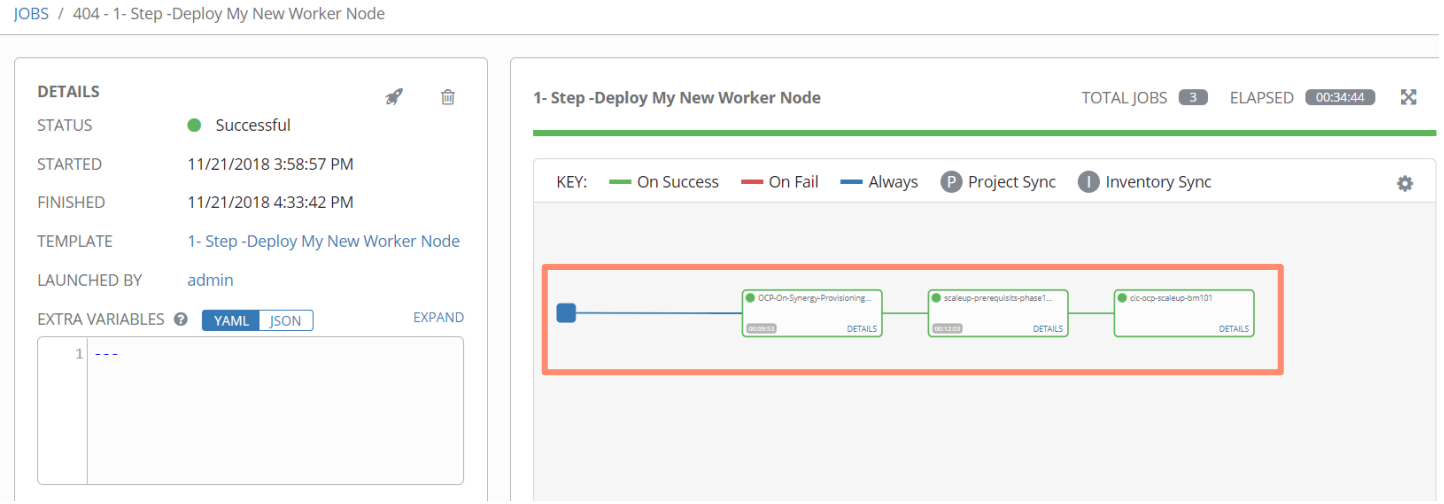
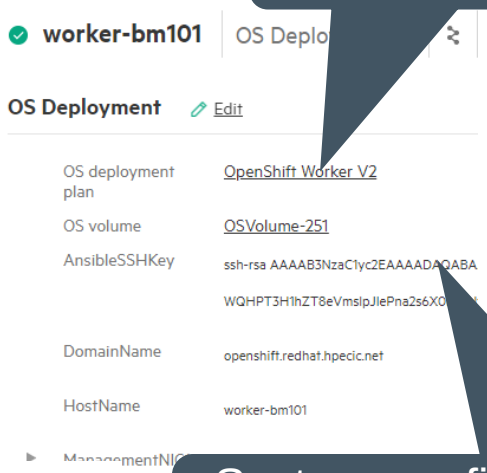


3

Automating RHOCP deployment on Synergy

OS Image to Deploy



System configuration settings

RED HAT ANSIBLE Tower

Initiates workflow

Initiates OS deployment plan

Configures boot image

Deploy OpenShift

Ansible Playbooks
Deploy Red Hat OpenShift Container Platform workers.

Red Hat Ansible Tower
Workflow runs playbooks to deploy Red Hat OpenShift Container Platform on HPE Synergy using Ansible Modules for HPE OneView

HPE OneView
Server profile template identifies the networks, storage, and deployment plan
Sets personalization parameters
Provisions physical infrastructure

HPE Synergy Image Streamer
Creates Red Hat Enterprise Linux 7.5 bootable OS
Personalizes OS and prepares for Red Hat OpenShift Container Platform per deployment plan

HPE Synergy Compute and Storage
Compute node boots directly into a customized running OS ready for Red Hat OpenShift Container Platform deployment

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1.3 Provision the node on Oneview

JOBS / 404 - 1- Step -Deploy My New Worker Node

DETAILS

STATUS Successful

STARTED 11/21/2018 3:58:57 PM

FINISHED 11/21/2018 4:33:42 PM

TEMPLATE 1- Step -Deploy My New Worker Node

LAUNCHED BY admin

EXTRA VARIABLES YAML JSON EXPAND

1- Step -Deploy My New Worker Node TOTAL JOBS 3 ELAPSED 00:34:44

KEY: On Success On Fail Always Project Sync Inventory Sync

1

2

all 1.32 KB

3

```
---
#master_deployment_plan: "HPE-RHEL7.4-OpenShiftMaster"
worker_deployment_plan: "OpenShift Worker V2"
#worker_deployment_plan: "HPE-RHEL7.4-OpenShiftWorker"
#cns_deployment_plan: "HPE-RHEL7.4-OpenShiftCNS"
#infra_deployment_plan: "HPE-RHEL7.4-OCP-Infra"
#lbnfs_deployment_plan: "HPE-RHEL7.4-OpenShiftLBNFS"
#master_server_profile_template: "OCP-Master"
worker_server_profile_template: "OpenShift Worker V2"
#worker_server_profile_template: "OCP-Worker"
#cns_server_profile_template: "OCP-CNS-Node"
#lbnfs_server_profile_template: "OCP-LB-NFS"
#infra_server_profile_template: "OCP-Infra"
deployment_plan: "{{ worker_deployment_plan }}"
server_profile_template: "{{ worker_server_profile_template }}"
## ocp
```

4

SERVERS

Server Profiles

Server Profile Templates

Server Profiles 5 All statuses All labels All resources

+ Create profile

Name

Cassandra

HPE Synergy - NVIDIA Tesla M6 for VDI1

HPE_Synergy2

Synergy cluster firmware demo1

worker-bm101

worker-bm101 Overview

General > Edit

Description	worker-bm101 with OpenShift Worker V2
Server profile template	Openshift Worker V2
Server hardware	Pod2_Rack15_Frame2, bay 1 sfo01m01esx04
Server hardware type	SY 480 Gen9 (FC)
Enclosure group	Pod2_Rack15_EG
Affinity	Device bay
Server power	On
Serial number (v)	VCGMRTF07P
UUID (v)	48b0429c-7f50-41aa-9fee-8afb02b147e1
iSCSI initiator name (v)	iqn.2015-02.com.hpe:oneview-vcgmrtf07r

General >

Description	*not set*
Server profile description	*not set*
Server hardware type	SY 480 Gen9 (FC)
Enclosure group	Pod2_Rack15_EG
Affinity	Device bay
Connections	3
SAN volume attachments	*managed manually*
Logical drives	0
Logical JBODs	0
Firmware baseline	*managed manually*

5

Image Streamer Search

Deployment Plans 19 All statuses

+ Create deployment plan

Name

OpenShift Worker V2 General

General

Plan Attributes Edit

6

OS build plan OS Build RHEL Openshift Worker V2

Custom attributes Name Type Vi

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1.4 Configure the node

1

Dashboard
Jobs
Schedules
My View
RESOURCES
Templates

JOBS 254

SEARCH

KEY

416 - 1- Step -Deploy My New Worker Node Workflow Job

2

STARTED 11/21/2018 6:38:42 PM

LAUNCHED BY ITAdmin

TOTAL JOBS 3 ELAPSED 00:34:44

STATUS Successful

STARTED 11/21/2018 3:58:57 PM

FINISHED 11/21/2018 4:33:42 PM

TEMPLATE 1- Step -Deploy My New Worker Node

LAUNCHED BY admin

EXTRA VARIABLES YAML JSON EXPAND

```
1 ---
```

KEY: On Success On Fail Always Project Sync Inventory Sync

3

OCP-On-Synergy-Provisioning... DETAILS

scaleup-prerequisits-phase1... DETAILS

cic-ocp-scaleup-bm101 DETAILS

JOBS / 419 - scaleup-prerequisits-phase1-BM101

4

DETAILS

STATUS Running

STARTED 11/21/2018 6:48:33 PM

FINISHED Not Finished

JOB TEMPLATE scaleup-prerequisits-phase1-BM101

JOB TYPE Run

INVENTORY new-node-worker-bm101

PROJECT Scale-up

REVISION 6a4eab2

PLAYBOOK prerequisites_scaleup.yml

CREDENTIAL Root

LIMIT worker-bm101.openshift.redhat.hpecic.net

VERBOSITY 5 (WinRM Debug)

INSTANCE GROUP tower

EXTRA VARIABLES YAML JSON EXPAND

```
1 ---
```

scaleup-prerequisits-phase1-BM101

PLAYS TASKS HOSTS ELAPSED

JOB IS STILL RUNNING

```
1  Identity added: /tmp/awx_419_lXiLvv/credential_2 (/tmp/awx_419_lXiLvv/credential_2)
2  ansible-playbook 2.7.1
3    config file = /etc/ansible/ansible.cfg
4    configured module search path = [u'/root/oneview-ansible/library']
5    ansible python module location = /usr/lib/python2.7/site-packages/ansible
6    executable location = /usr/bin/ansible-playbook
7    python version = 2.7.5 (default, Sep 12 2018, 05:31:16) [GCC 4.8.5 20150623 (Red Hat 4.8.5-36)]
8  Using /etc/ansible/ansible.cfg as config file
9  setting up inventory plugins
10 Set default localhost to localhost
11 Parsed /tmp/awx_419_lXiLvv/tmpKylvsF inventory source with script plugin
12 Loading callback plugin awx_display of type stdout, v2.0 from /var/lib/awx/venv/awx/lib/python2.7/site-packages/awx/lib/awx_
   display_callback/module.pyc
15 2 plays in prerequisites_scaleup.yml
16
17 PLAY [Install Prerequisites on the new node] ********************************** 18:48:37
18
19 TASK [Gathering Facts] ******************************************************** 18:48:37
20 task path: /var/lib/awx/projects/_19__scale_up/prerequisites_scaleup.yml:12
21 <10.6.37.101> ESTABLISH SSH CONNECTION FOR USER: root
22 <10.6.37.101> SSH: ansible.cfg set ssh args: (-C)(-o)(ControlMaster=auto)(-o)(ControlPersist=60s)
```

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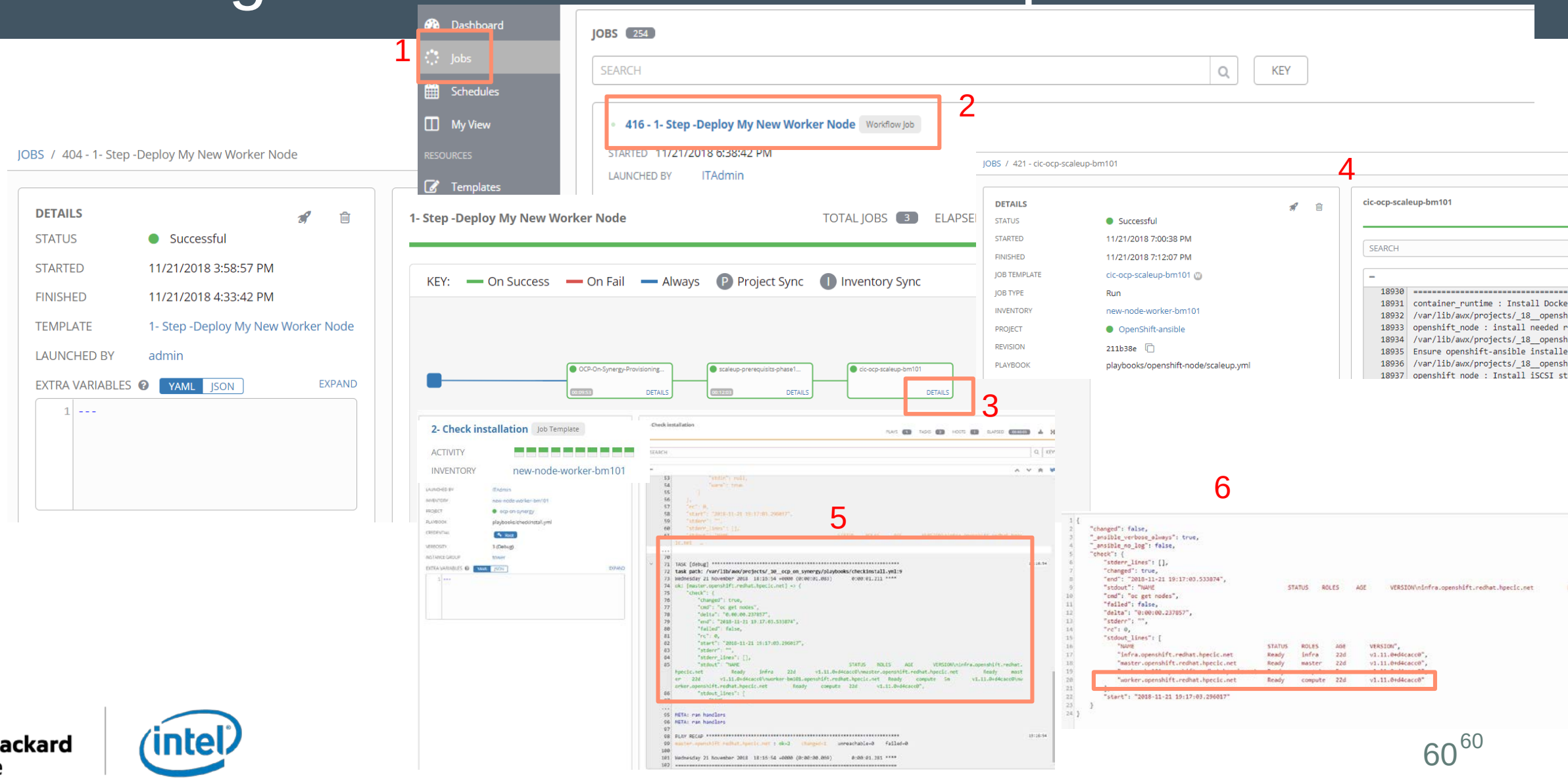
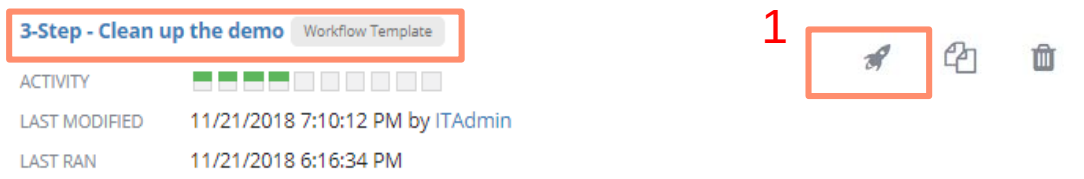
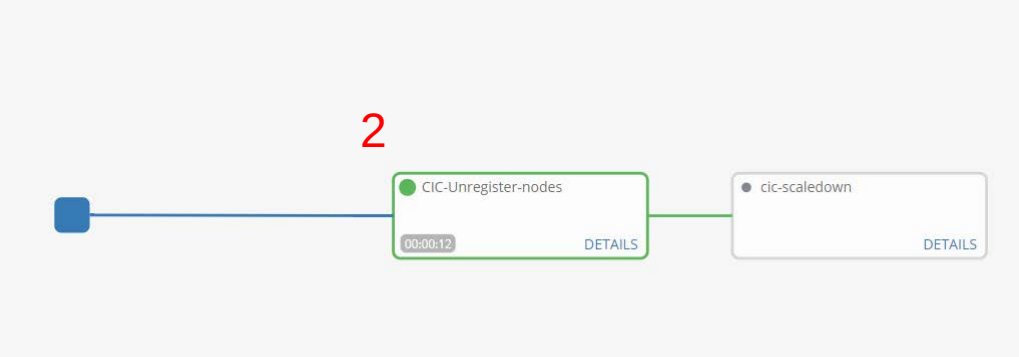
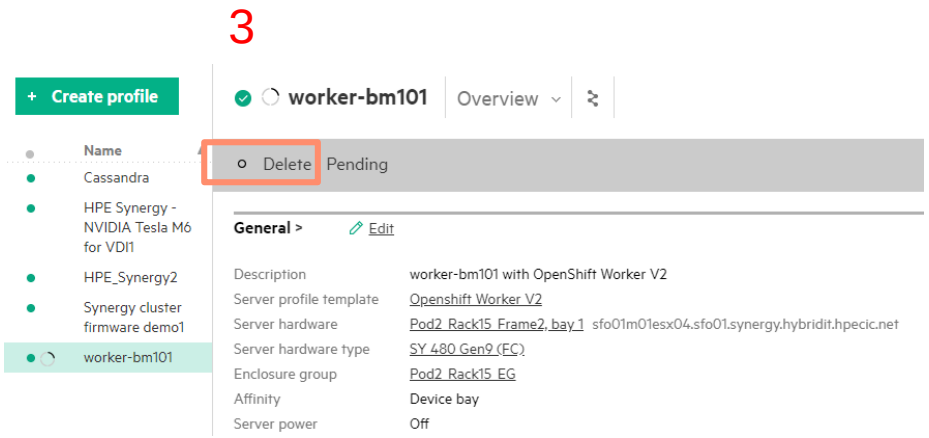
1.5 integration of the node into Openshift



2. Remove the node







HPE Developer Community Program

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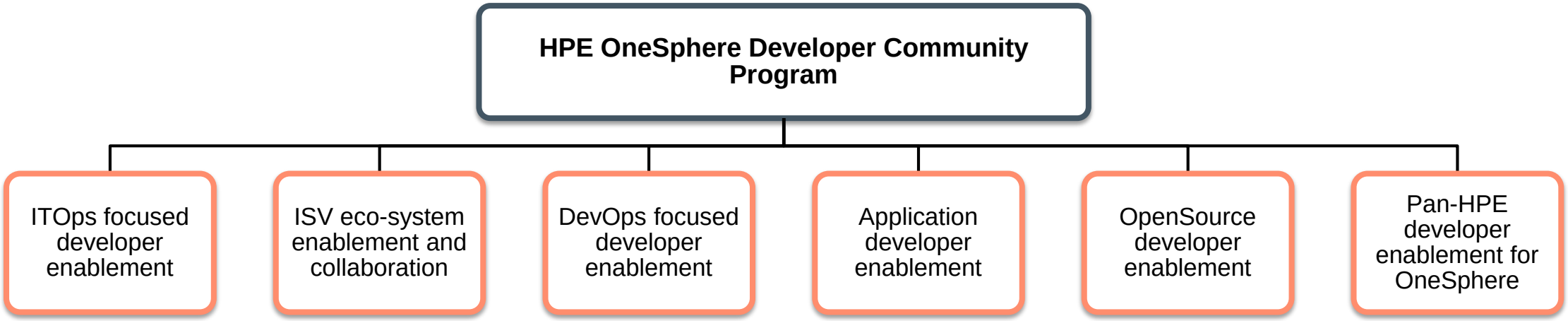
High level Community Framework



High level Pan-HPE framework

HPE DeveloperONE

ONE Developer Program

- Sub Communities (Ex. Dev/Ops, Cloud, Analytics, Operations, Infrastructure, Open Source Open Compute, Open Network, SDN)
- Key HPE Platforms (OneView, Synergy, OneSphere, Nimble, Simplivity, Aruba etc)
- Community Outreach & Events
- Community Analytics and Incentives

ONE Developer Portal

- SDKs, On-Demand Services; API Management
- Developer Communities, On-Demand Training
- Blogs

ONE Developer Marketplace

- SDN Security and QoS applications
- HPE OneView and Software-defined Infrastructure Integrations
- Tools integration from developers

Thank you

HPE DEV

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