OpenShift/OpenStack experiences @ Proximus

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proximus

- Largest Belgium's telco operator providing fixed lines, mobile, internet & TV services. **Telindus** (ICT Services) and **BICS** are also part of Proximus group

telindus
a Proximus company

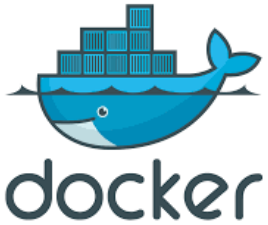
bics

- > 13 000 employees
- 5,8 Billion € revenue in 2016
- Several hundreds of applications with at least 600 running in Websphere/WebLogic/ JBoss
- 3 mains datacenters (one mostly for housing)

Chapter 1 - The story

4 years ago ….

- µservices development started
- 1 µservice – 1 JBoss EAP instance – 1 RHEL VM
  - Resource waste
  - Lot of provisioning required
  - Management activities increasing
  - Shifting to SpringBoot/FatJar
- Could we use Linux containers ?
  - No because not secure enough



2 years ago ….

- SDN Network project starting with OpenStack as main IaaS

- Additional security guarantees given for container workload
  - No process running as root
  - OpenSCAP container scanning
  - PROD vs NON-PROD segregation
  - Image template validation

- RedHat CloudSuite offering
  - Matching our R&R : OpenStack managed by infrastructure team
    OpenShift managed by middleware team
  - Subscriptions also includes Jboss Web Server, RHEL & CloudForms

RED HAT® CLOUD SUITE

proximus

Last year

Project was approved thanks to the following expected returns

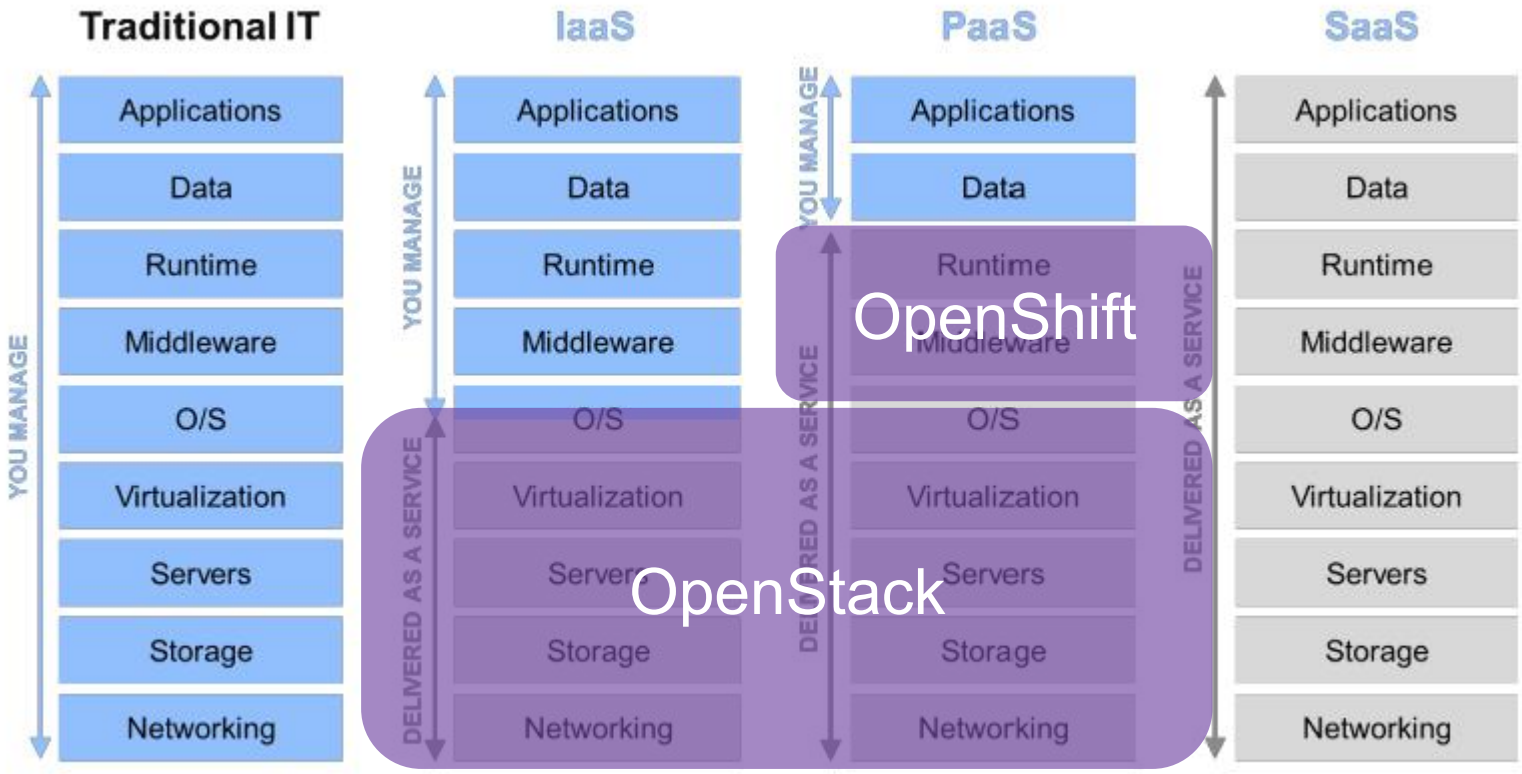
- Provisioning effort savings
- Patching time savings
- Delivery time (weeks->min)
- CI/CD enabler
- DevOps enabler
- More efficient hardware usage
- First time right improvement
- Software stack standardization
- Easy scale in/out
- Ready for Hybrid cloud
- Chargeback model possible
- Easy on-boarding of new technologies

Last year

Why RedHat ?

- Affinity for OS (RHEL) & Java Application Server (JBoss EAP)
- Leader on the Private Cloud market (Forrester 2016 report)
- Stack based on the more commonly used open source components (docker, kubernetes, …)
- Also chosen by other big companies like Bpost
- Ability to combine OpenShift (PaaS) & OpenStack (IaaS)
- Good support from vendor to achieve our targets (experience with Jboss EAP & DataGrid)

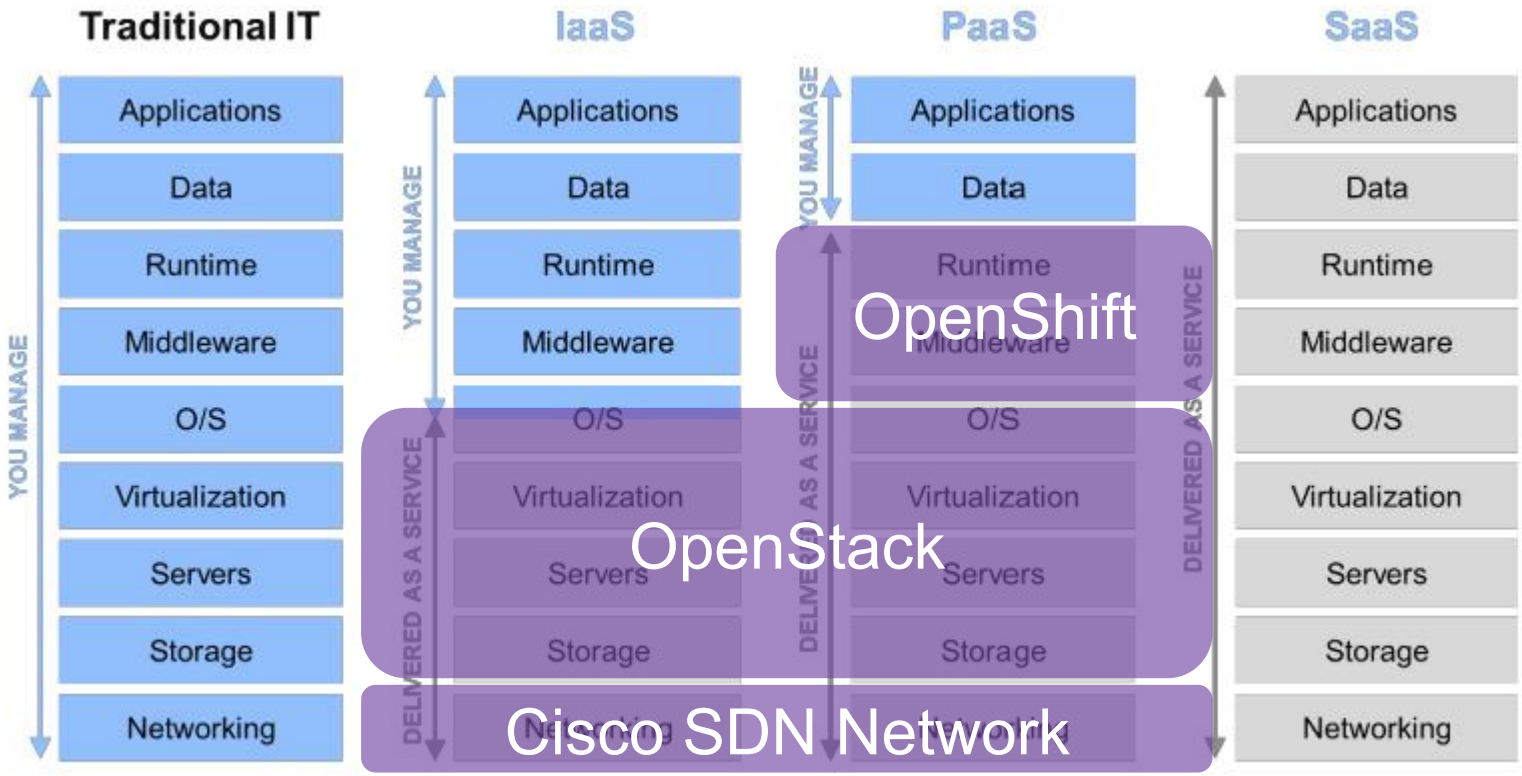
High Level Setup - 2017
OpenShift combined with OpenStack



Source: Microsoft.

What we are going to build this year

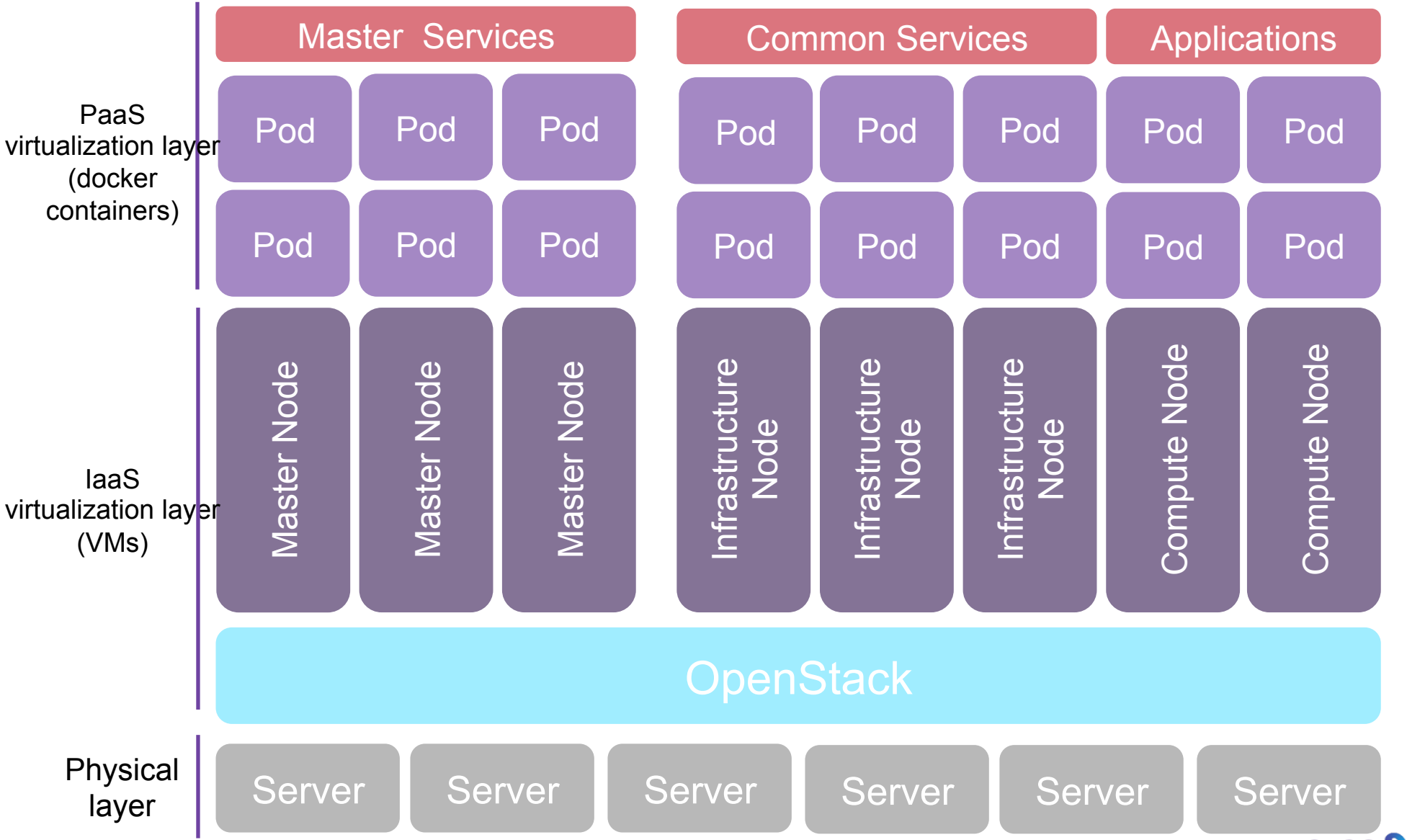
High Level Setup - 2018
OpenShift combined with OpenStack



Source: Microsoft.

Future setup will require full re-install

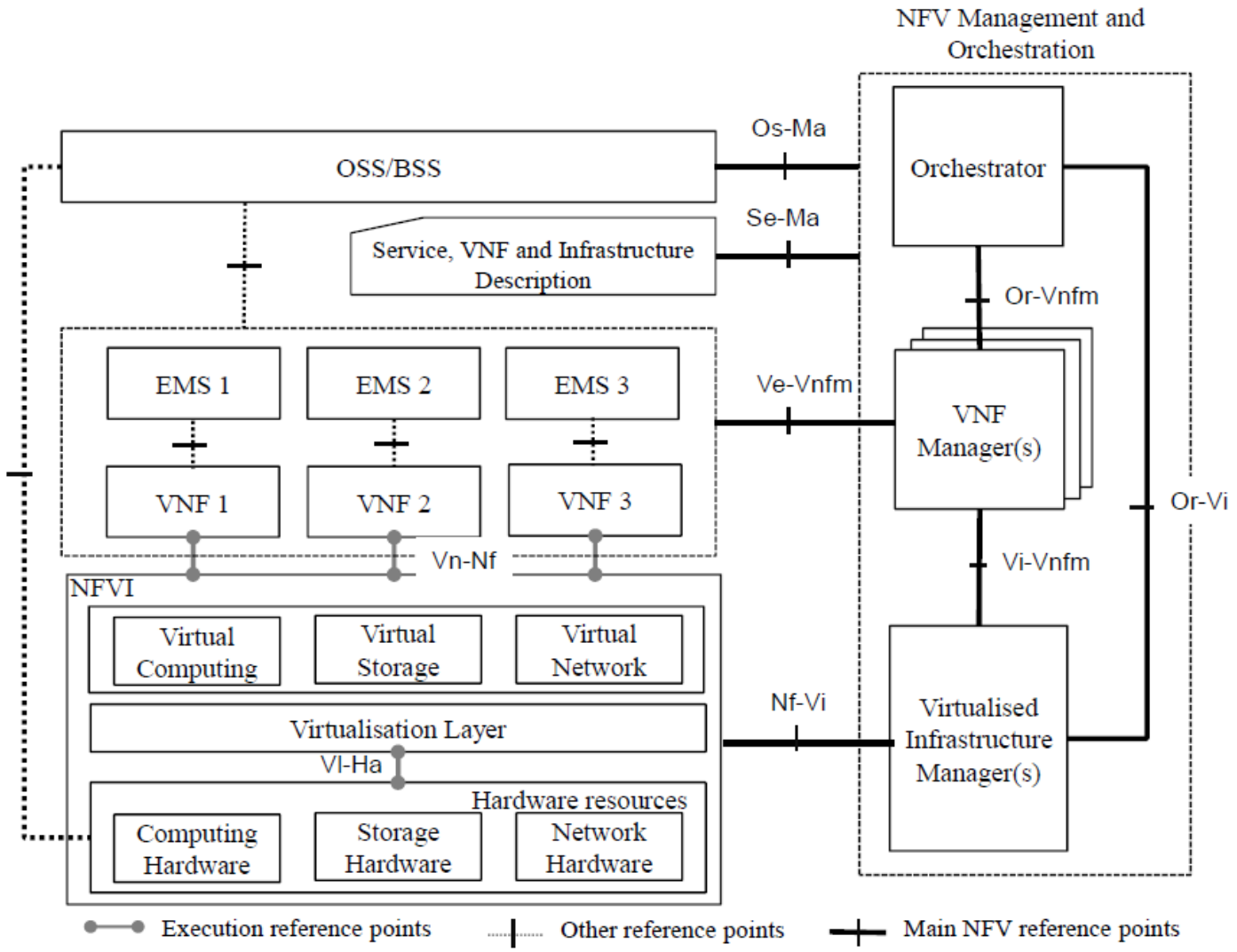
OpenStack VMs – OpenShift nodes/pods



Chapter 2 - OpenStack @Proximus

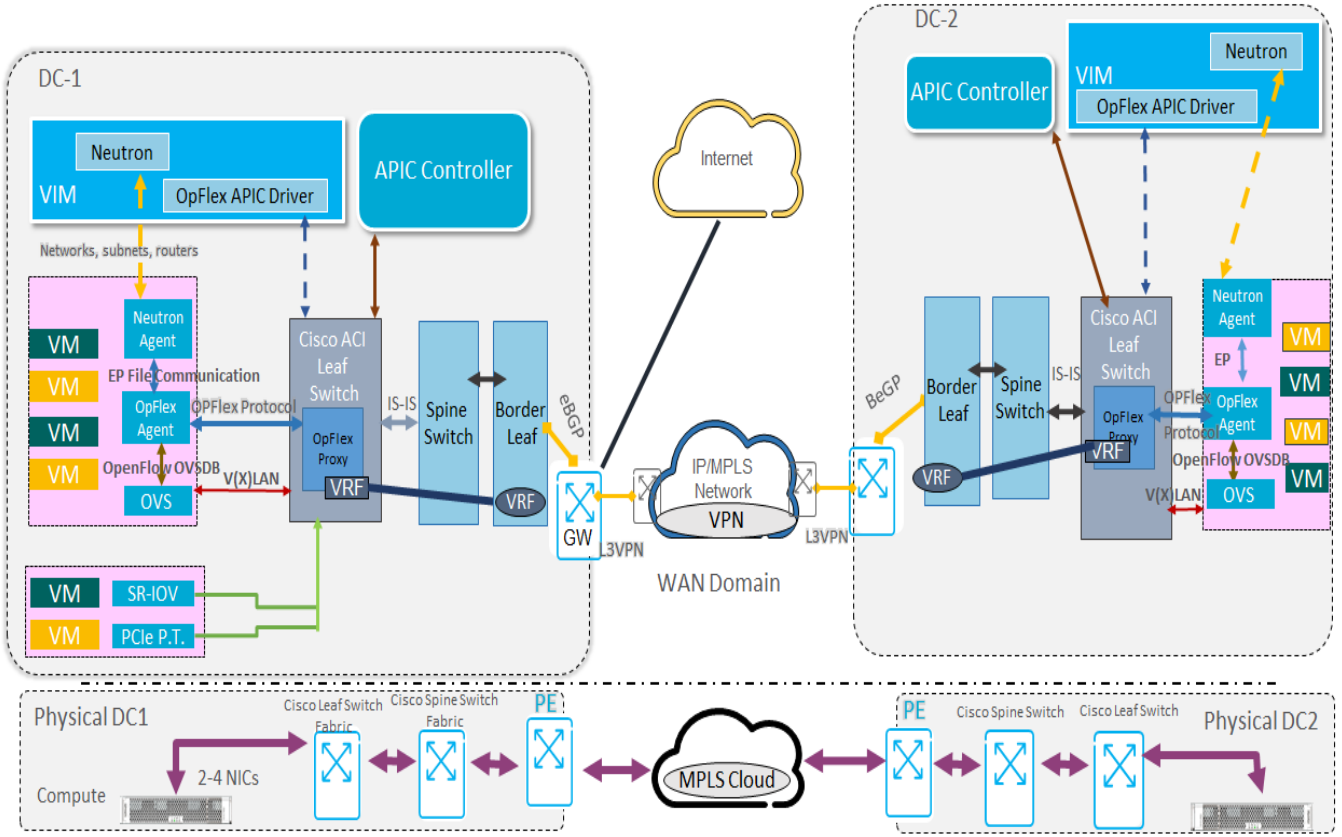
Network modernization project

- Migration to SDN fabrics
  - Internal corporate network
  - Telco network
- Telco Cloud - NFV
  - SDN
  - OpenStack
  - Orchestration



Telco Cloud high-level design

- Cisco ACI leaf-spine network
- RedHat OpenStack
- Neutron is “master”
- VxLAN based
- ACI agents OpFlex<>OpenFlow
- Split datacenters

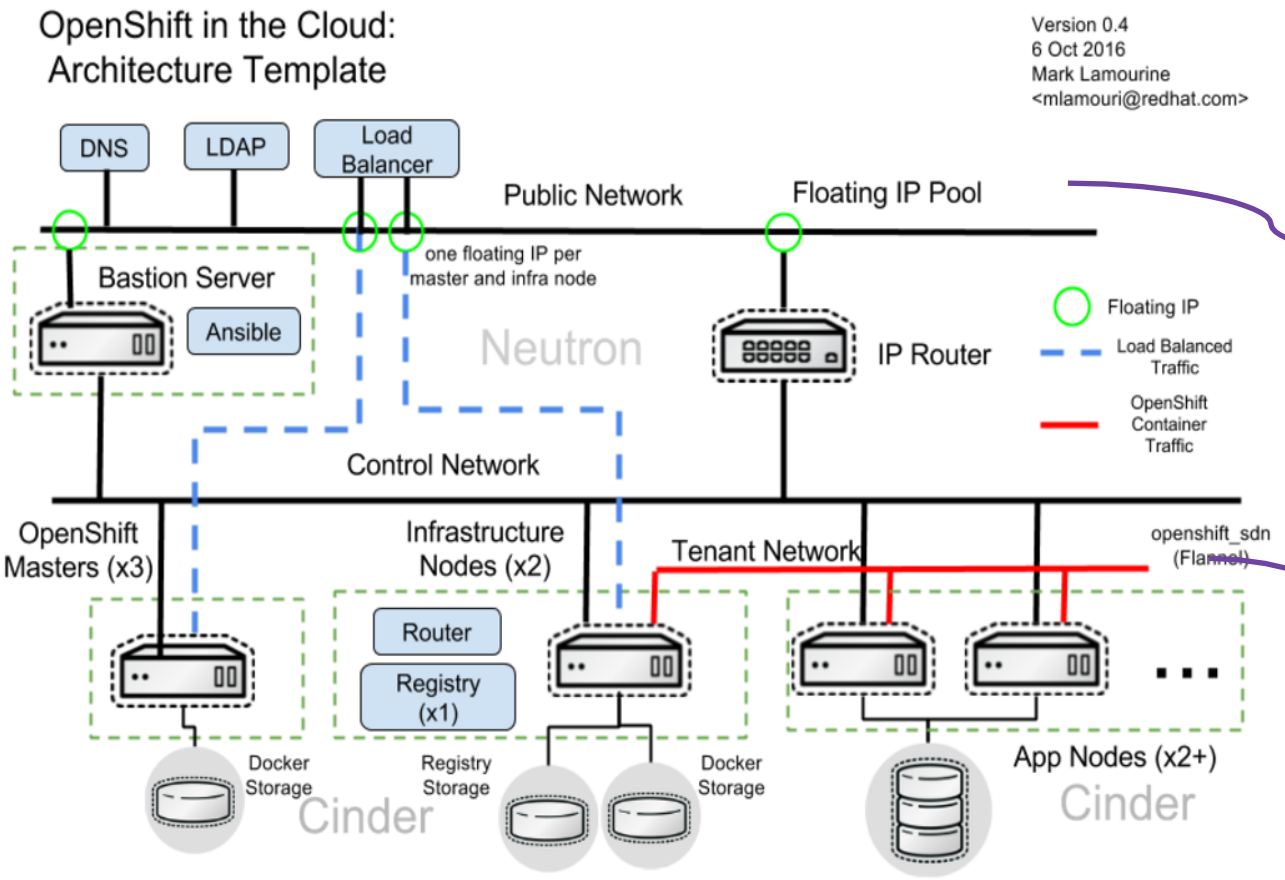


OpenShift IaaS layer – why OpenStack

- Move beyond “only” virtualisation

- Potential for additional services / APIs
  - Network integration, inc. LBaaS, DNSaaS, …
  - Storage integration (Cinder, Swift)
  - Easy, orchestrated setup(s) of OpenShift
  - (auto)scaling and self-healing
  - Databases ?

OCP-on-OSP reference design



NAT – do we need this ?

Double encap – we don't want this

- https://github.com/redhat-openstack/openshift-on-openstack

OCP-on-OSP reference design

Current status

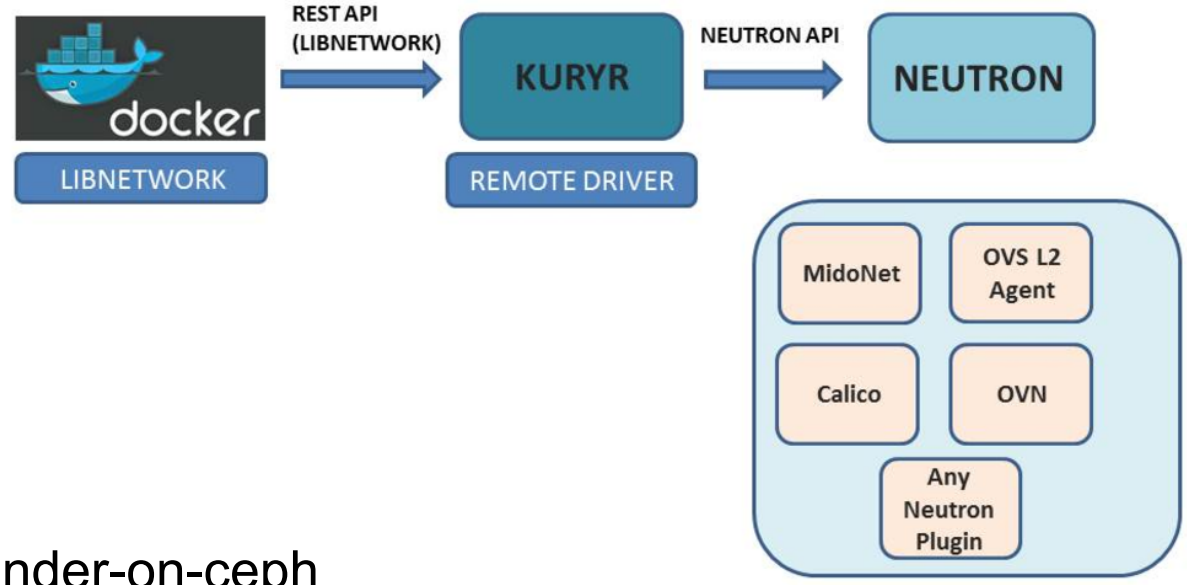
- Uses Heat / Ansible for deployment
- Heat-stack uses OpenStack telemetry services – scaling, healing
- Cinder block storage

…but

- Heat-based deployment EOL (OSP10/OCP3.4)
- … Ansible-installer incomplete

“IaaS” next steps

- Kuryr network integration
  - docker -> Neutron -> ACI
  - https://github.com/openstack/kuryr



- Storage integration
  - Currently cinder-on-ceph and gluster-on-cinder-on-ceph
  - What about Manila, CephFS, … ?

“IaaS” next steps

- Security considerations
  - External firewalls, external loadbalancers ?
  - “Monolithic” or in-tenant ?

- Extend scope – OpenShift for NFV “light”
  - https://builders.intel.com/docs/networkbuilders/enabling_new_features_in_kubernetes_for_NFV.pdf
  - Multi-NIC CNI, SRIOV CNI, core manager..

Chapter 3 - OpenShift @Proximus

Storage

- Started with Cinder and NFS

- Cinder -> No sharing between containers
- NFS -> No dynamic storage provisioning

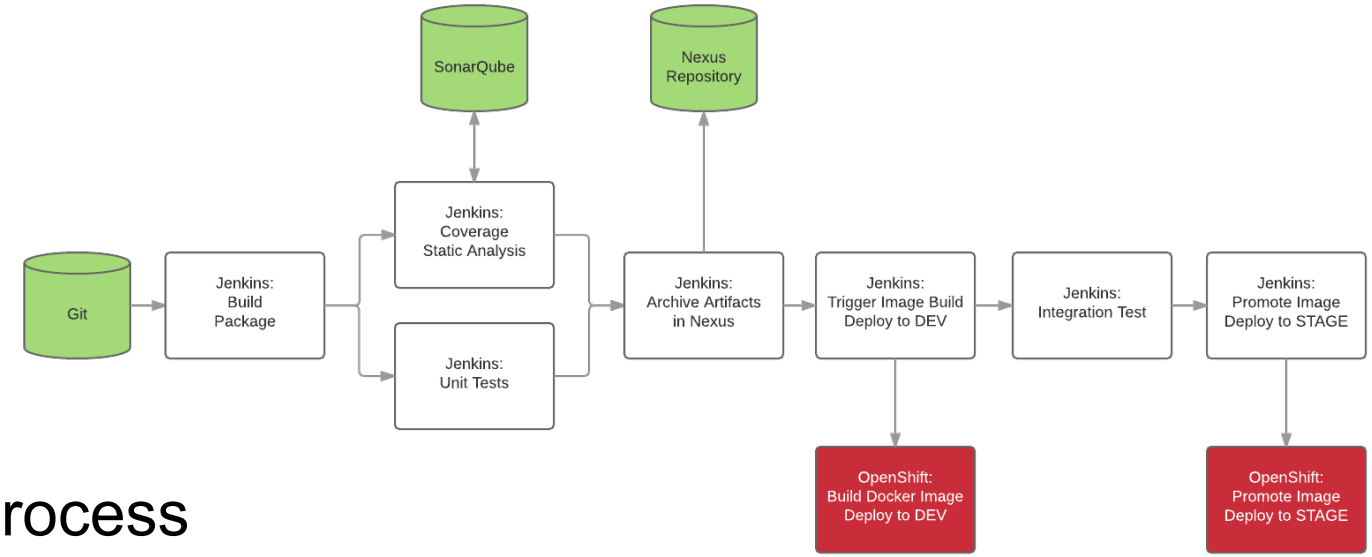
Storage Backend	Dynamic Provisioning	RWO	RWX
Cinder	Y	Y	N
NFS	N	Y	Y
GlusterFS	Y	Y	Y

- Gluster CNS -> provides everything
  - Installation can be challenging
  - « Two days of pain or how I deployed GlusterFS cluster to Kubernetes »

http://blog.lwolf.org/post/how-i-deployed-glusterfs-cluster-to-kubernetes/

CI/CD flows

- OpenShift offers S2I
  - Big images (>2GB JBoss)
- Splitting build/run stage
  - More flexibility
  - Better fit for current build process
- Internal image community



PaaS = Self-Service

- Installing it isn't!
  - Firewalls
  - Subscriptions
  - HEAT templates

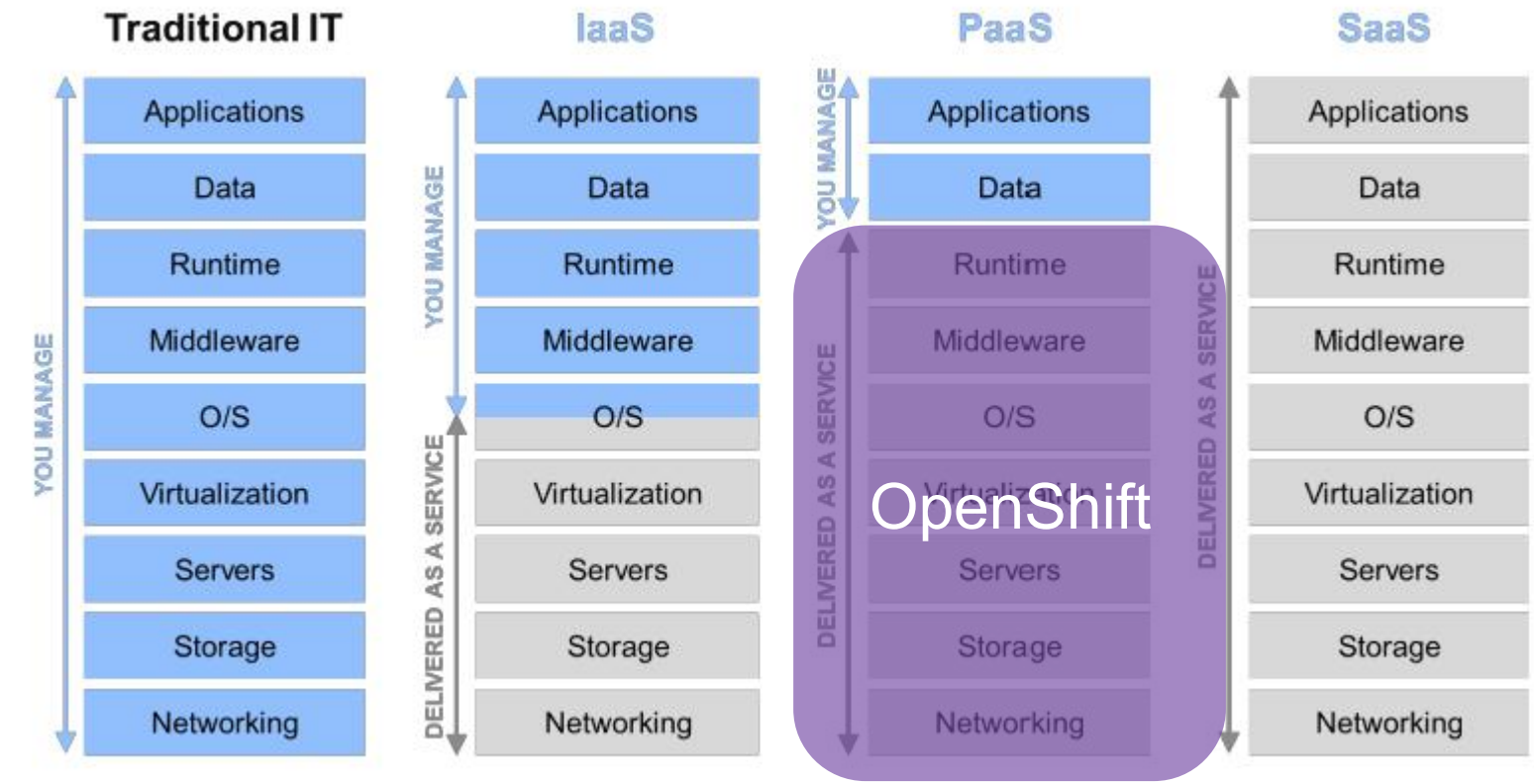
- Involve other teams early (Yes, also security teams!)
  - They can help resolving issues
  - Visibility

- You will encounter resistance

Questions ?

Backup slides

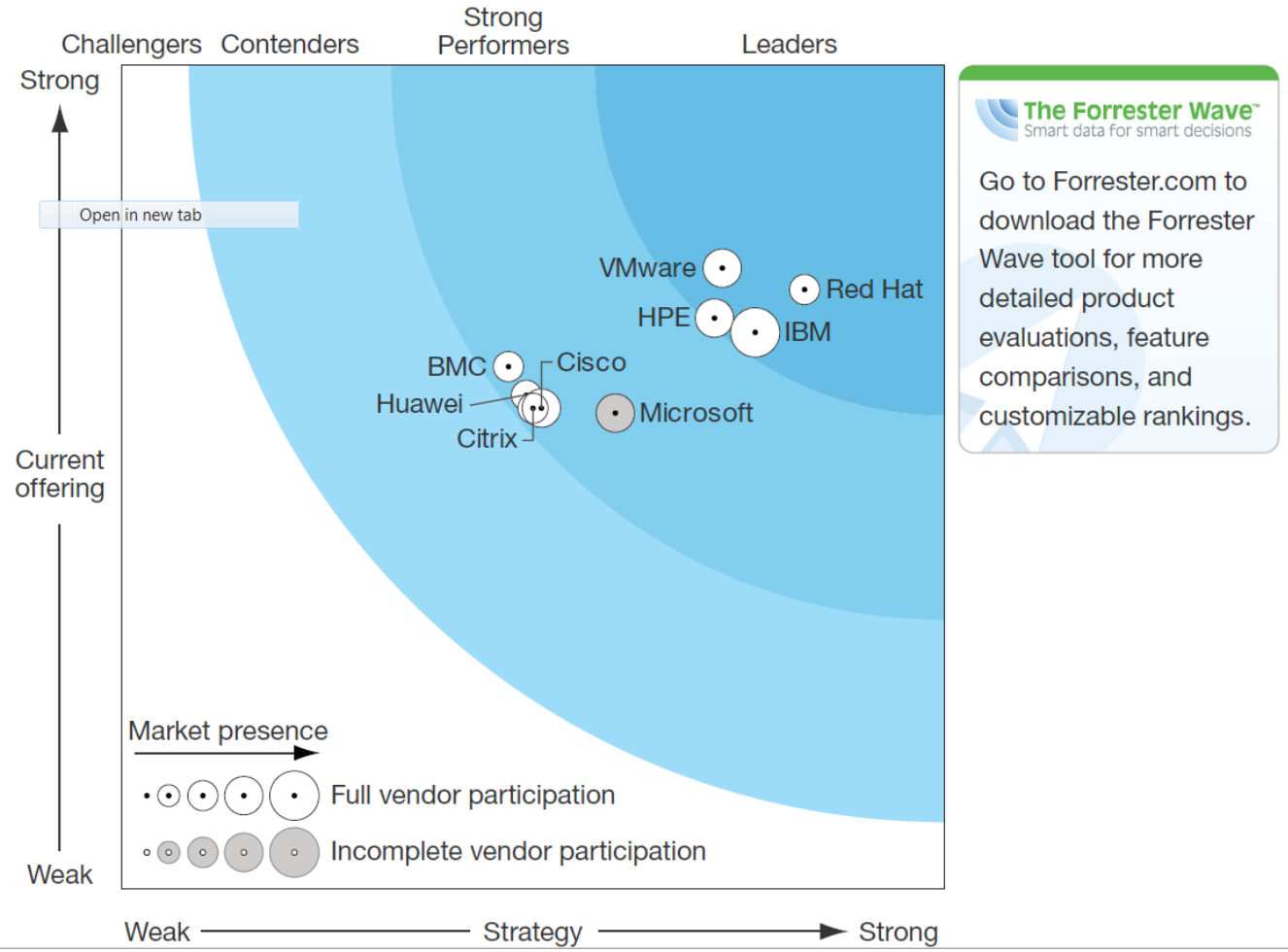
OpenShift



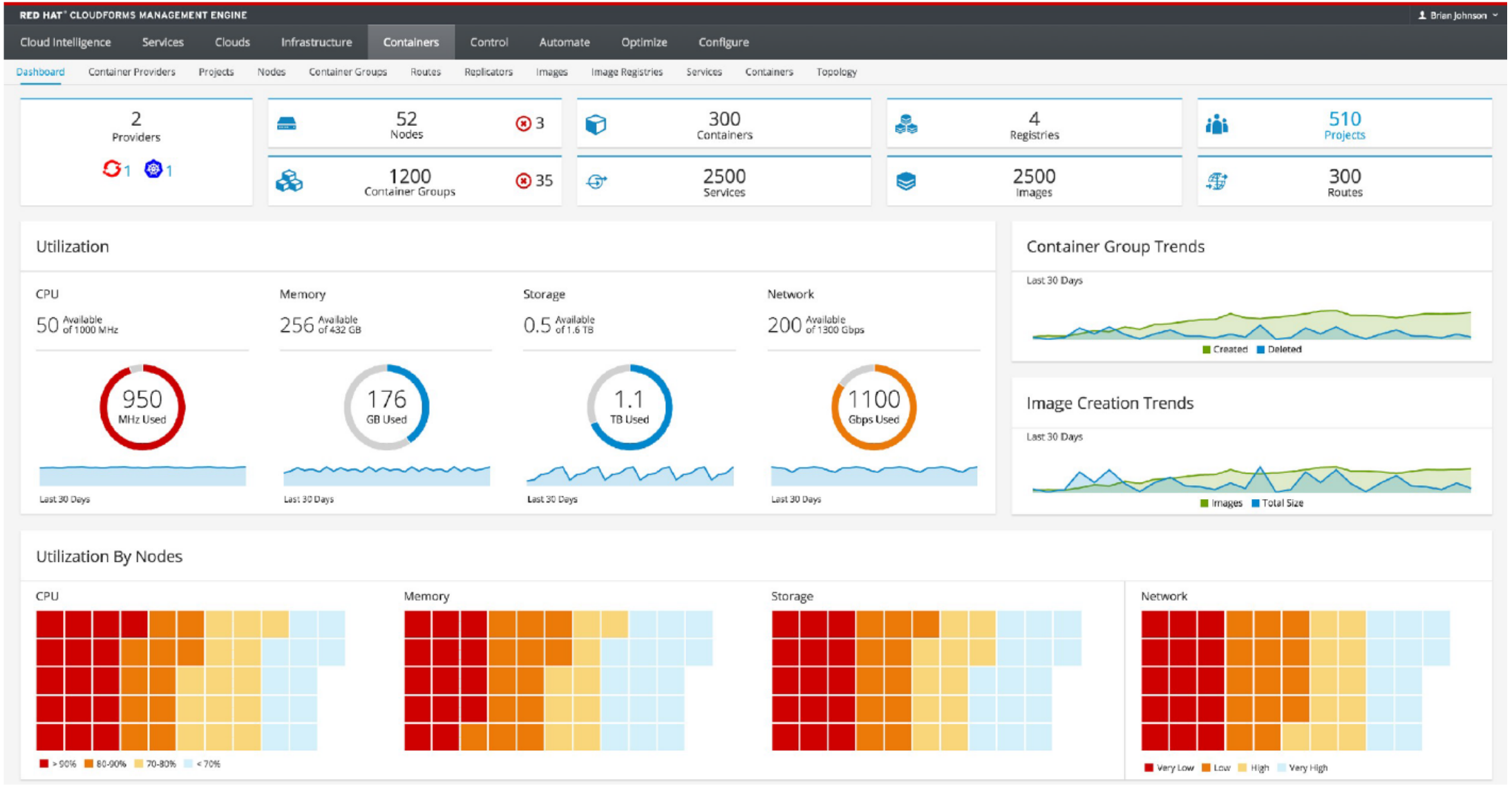
Source: Microsoft.

Forrester – Private Cloud Q1 2016 report

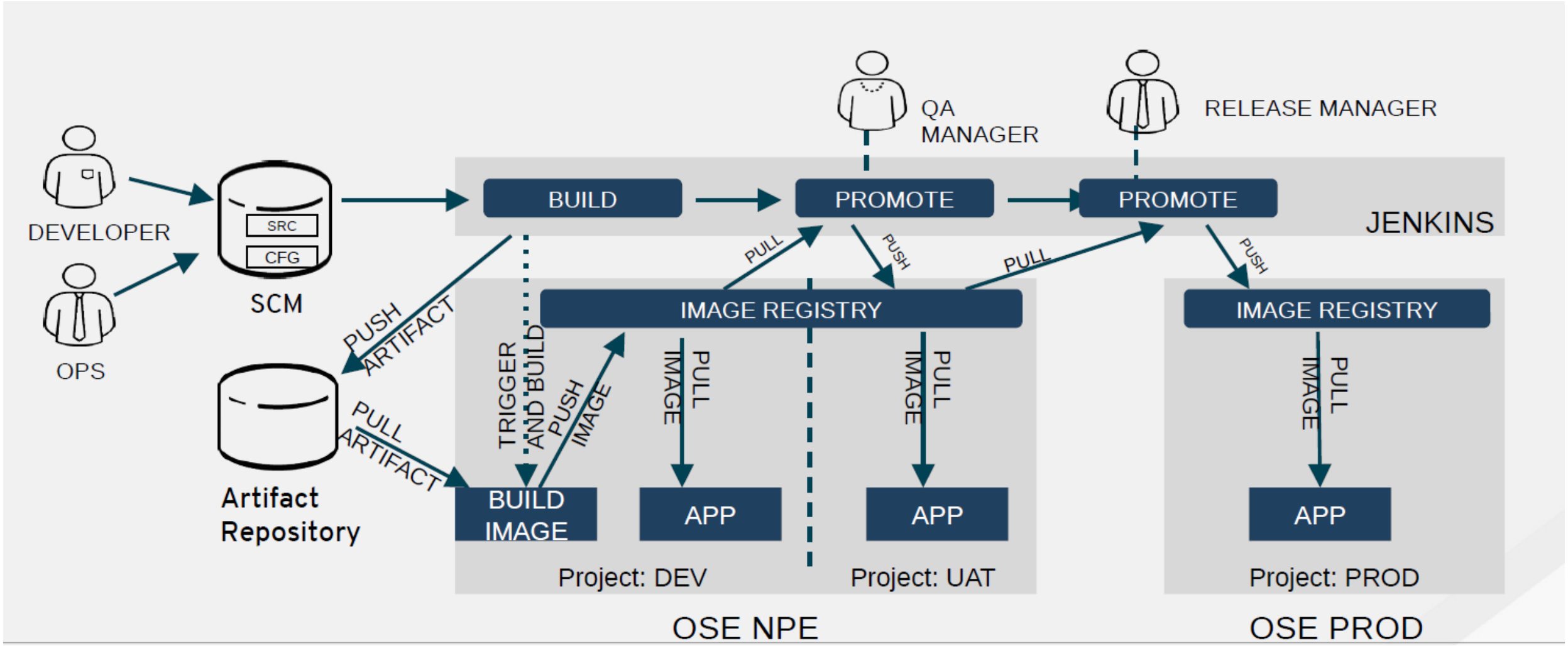
FIGURE 3 Forrester Wave™: Private Cloud Software Suites, Q1 '16



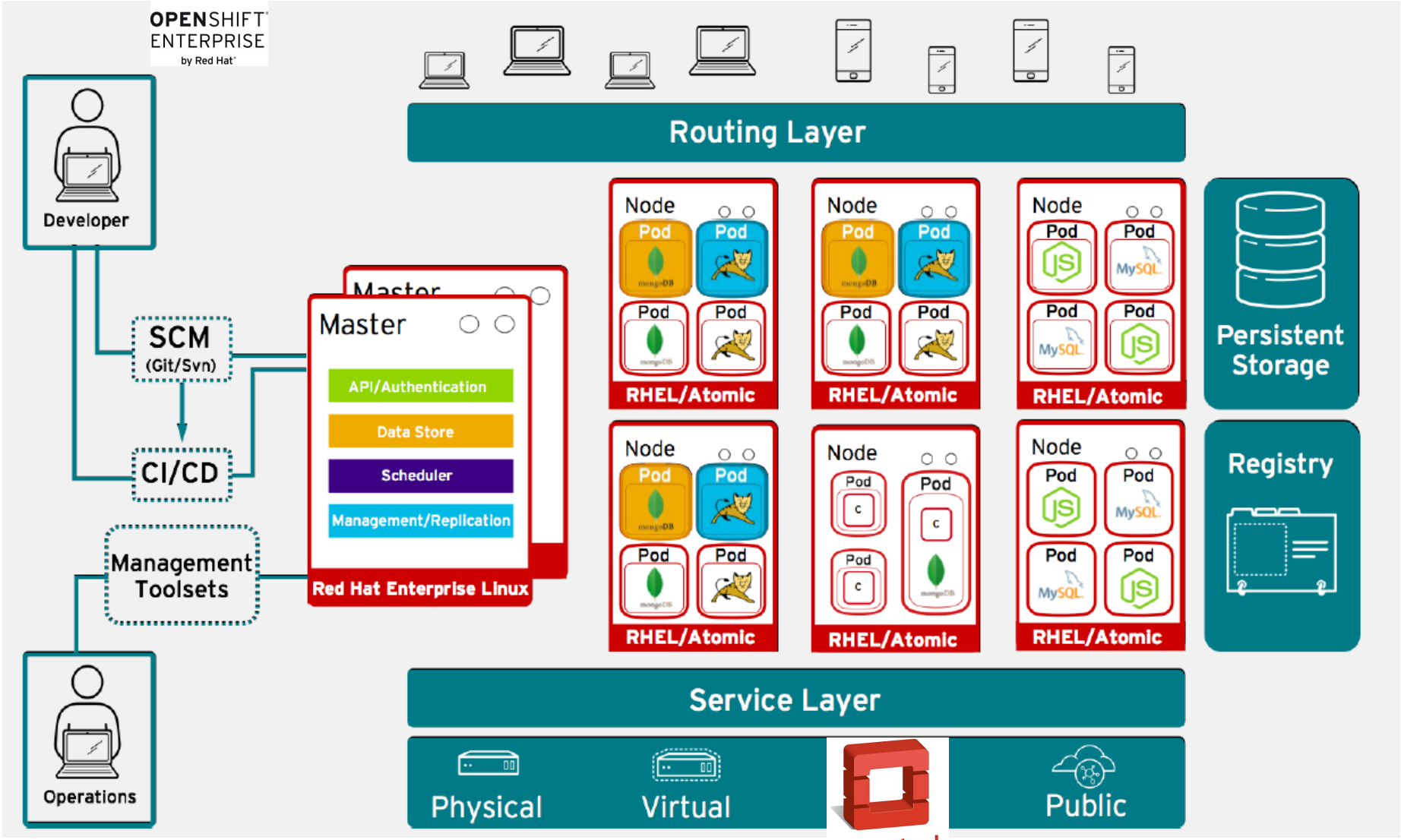
CloudForms


RED HAT® CLOUDFORMS MANAGEMENT ENGINE
Brian Johnson
Cloud Intelligence
Services
Clouds
Infrastructure
Containers
Control
Automate
Optimize
Configure
Dashboard
Container Providers
Projects
Nodes
Container Groups
Routes
Replicators
Images
Image Registries
Services
Containers
Topology
2 Providers
52 Nodes
3
300 Containers
4 Registries
510 Projects
1200 Container Groups
35
2500 Services
2500 Images
300 Routes
Utilization
CPU
50 Available of 1000 MHz
950 MHz Used
Last 30 Days
Memory
256 Available of 432 GB
176 GB Used
Last 30 Days
Storage
0.5 Available of 1.6 TB
1.1 TB Used
Last 30 Days
Network
200 Available of 1300 Gbps
1100 Gbps Used
Last 30 Days
Container Group Trends
Last 30 Days
Created
Deleted
Image Creation Trends
Last 30 Days
Images
Total Size
Utilization By Nodes
CPU
> 90%
80-90%
70-80%
< 70%
Memory
Storage
Network
Very Low
Low
High
Very High

CI/CD Overview



OpenShift (RedHat PaaS) Overview



Build & Deployment process

Code

Build

Deploy