Bandwidth - Powered by Red Hat
Deploying OpenShift Container Platform on Red Hat Virtualization
Jon Benedict (Red Hat), Jason Tower & Jeff Spahr (Bandwidth)
May 2018
AGENDA

Click to add subtitle

- Introduction and background
- Bandwidth - problems to solve!
- Q&A

Assorted demo’s..
INTRODUCTION and BACKGROUND
INTRODUCTIONS

Today’s presenters

- Jason Tower, Senior Systems Engineer, Bandwidth
- Jeff Spahr, Systems Infrastructure Architect, Bandwidth
- Jon Benedict, Consulting Technical Marketing Manager, Red Hat, @CaptainKVM
HOUSEKEEPING
Click to add subtitle

LAPTOPS DOWN
TURN CELL PHONES TO VIBRATE
JUST KIDDING, LET’S HAVE SOME FUN!

EVERYONE TEXT THIS NUMBER:
(Friendly texts only!)

(984) 444-8392
FIRST DEMO!

Bandwidth powered by Red Hat..
WHAT DID WE JUST SEE?

Bandwidth core application - developed, containerized, and run on Red Hat OpenShift Container Platform.

Typically deployed on Red Hat Virtualization - today run in cloud (no VPN!)
OPENSHIFT CONTAINER PLATFORM

Self-Service
Service Catalog
(Language Runtimes, Middleware, Databases)
Build Automation
Deployment Automation
OpenShift Application Lifecycle Management
(CI/CD)

Container Orchestration & Cluster Management
(kubernetes)
Networking
Storage
Registry
Logs & Metrics
Security
Infrastructure Automation & Cockpit

Enterprise Container Host
Container Runtime & Packaging
(Docker)

ANY APPS

RED HAT
OPENSHIFT

ANY INFRASTRUCTURE
Centralized Management of virtualized compute, network, and storage resources using the Open Source KVM Hypervisor

Automated workload management, scalability, and security features for virtualized applications

Engineered to optimize current IT and integrate with future technologies using a RESTful API.

EASY TO OPERATIONALIZE, EASY TO AUTOMATE, EASY ON THE BUDGET, NO VENDOR LOCK-IN
WHAT DOES BANDWIDTH DO?

Bandwidth makes phone calls connect and text messages deliver

BILLIONS
Of messages and voice call minutes delivered over our network monthly

52,000,000
Phone numbers on our network

9.6/10
Average customer satisfaction score

Voice, messaging, & 9-1-1 solutions that transform every industry

The only CPaaS provider in the industry with its own nationwide CLEC network

Choice of how you connect your services through our APIs or carrier network
BANDWIDTH
THE PROBLEMS WE WERE TRYING TO SOLVE

- Provide an abstraction to infrastructure
- Infrastructure automation
- Deployment team autonomy
- Infrastructure as code
- Security
- Deployment strategies
WHY DID WE CHOOSE CONTAINERS?

All of the technical reasons are {fantastic|cool|shiny}, but honestly..

Containers are just an implementation detail for us...

The orchestration tool is the important piece
WHY DID WE CHOOSE OPENShift?

Click to add subtitle

Kubernetes is the leader in container orchestration
Red Hat is a leader in Kubernetes upstream
Vendor support
It fits our ecosystem well
OpenShift fills enterprise gaps that “vanilla” Kubernetes doesn’t
WHY DID WE CHOOSE RED HAT VIRTUALIZATION?

Click to add subtitle

- Fully featured virtualization platform
- Subscription model includes all available features
- Open source
- Feature velocity
- Cost
WHAT DEPLOYMENT OPTIONS DO WE USE?

Click to add subtitle

Red Hat Virtualization
- All master nodes
- All infrastructure nodes
- Many application nodes

Bare metal servers (RHEL)
- Some application nodes

Public Cloud
- Proof of concept deployments
- Rapid or unknown capacity needs
WHY NOT ALL BARE METAL?

Not every environment has the capacity needs for it to make sense

VMs are quick and easy

Bare metal has a procurement lead time

Deployment process is more mature for VMs
HOW SHOULD YOU DEPLOY?

- Use the infrastructure and tools that you’re most comfortable with and that your team has the most maturity around
- Be prepared to adjust that decision as the environment evolves
LESSONS LEARNED (INFRASTRUCTURE)

- Use anti-affinity groups for each node type!
- Watch utilization on application nodes!
- Configure VMs to be highly available
LESSONS LEARNED (APPLICATION)

- Quotas are key to capacity management
- Any authenticated user can create their own project in the lab
- Production requires a ticket to generate a conversation around requirements for quotas, access, etc
- UDP is not a first class citizen...
DEPLOYING OPENSHIFT ON RED HAT VIRTUALIZATION
BALANCE OF OPERATIONS AND AUTOMATION

**Highest density, lowest latency**
- Great for overall performance
- Can be difficult to manage at scale

**Low complexity, ease of operations**
- Ease of automation and management, flexibility
- Significantly less complex than private cloud in deployment and operations

**Highest level of automation**
- Great for distributed workloads
- Can be overkill if only need to support OpenShift and a few other applications
ONE OPERATIONS TEAM CAN MANAGE BOTH

SHARING AND INTEGRATION
OpenShift and Red Hat Virtualization share or integrate with many of the same tools.

COMMON TOOLING
simplifies operations, development, training, and support.
ADDITIONAL SECURITY LAYERS

Red Hat Virtualization adds an additional security layer to containers

- In Red Hat Virtualization, each VM is a “process” that is labeled by SELinux.
- This label is like a boundary enforced by the kernel.
- Restricts VM access to outside resources including the hypervisor and other VMs - and therefore other containers.
- sVirt dynamically labels VM processes, removing administrative burden, enabling policy-driven security.
COMMON TOOLING STREAMLINES OPERATIONS

<table>
<thead>
<tr>
<th>LOGGING &amp; METRICS</th>
<th>RED HAT ANSIBLE Automation</th>
<th>RED HAT CLOUDFORMS</th>
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<tbody>
<tr>
<td>EFK stack to aggregate logs for hosts and applications.</td>
<td>Ansible integration provides fast/repeatable configuration for virtual resources.</td>
<td>Cloudforms integration delivers operational management such as:</td>
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<tr>
<td>• Elasticsearch: an object store to store all logs</td>
<td>• Easily streamline operations, freeing up resources to focus on strategic initiatives</td>
<td>• Automation</td>
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<tr>
<td>• Fluentd: gathers logs and sends to Elasticsearch.</td>
<td>• Single support stack for for virtualization and automation</td>
<td>• Real-time discovery</td>
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<td>• Kibana: A web UI for Elasticsearch</td>
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<td>• Monitoring &amp; alerts</td>
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<td>• Compliance and security policies</td>
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<td>• Chargeback</td>
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<td>• Self-service portal</td>
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EXAMPLE DEPLOYMENT

- RHV-M
- Master Node
- Load Balancer
- Infra Node
- Router
- Registry
- Application Node
- NFS Server
- Web and Console traffic
- RHV Host 1
- RHV Host 2
- RHV Host 3

EXISTING AUTOMATION TOOLSETS
Ansible
CloudForms
REST API

OPERATIONS
SECOND DEMO!

Bandwidth powered by Red Hat.. UPDATED!
Q & A | MORE INFORMATION
MORE INFORMATION

Red Hat Virtualization
https://RedHat.com/RHV

OpenShift Container Platform
https://RedHat.com/OpenShift

Product documentation
https://docs.redhat.com

Bandwidth
https://Bandwidth.com

Reference Architecture (OCP on RHV)
https://tinyurl.com/y78rcq4f