Open Source Cloud Technology for Enterprise Computing

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ECC Conference
Marist College, June 14-16 2015
Open Hybrid Cloud
THE ROLE OF IT IS CHANGING
From service provider to strategic partner

TRADITIONAL IT

- IT providing services on traditional infrastructure

HYBRID IT

IT is:

- providing services on traditional infrastructure
- providing services on private cloud
- brokering services from public clouds
- consuming services from public clouds
FIRST CLOUDS BUILT ON RED HAT

TOP PUBLIC CLOUDS

• 80% Apps running on Linux
• Open source
• On demand “unlimited scalability”
• Multi-tenancy
• High density computing

TOP PUBLIC CLOUDS RELY ON RED HAT
OPEN CLOUD CHARACTERISTICS

- OPEN SOURCE
  - You choose your economics, not your vendor
  - Avoid lock-in

- VIABLE INDEPENDENT
  COMMUNITY

- OPEN STANDARDS
  - Open standards at every level of the stack
  - Access to greater innovation

- FREEDOM TO USE IP
  - Able to be deployed without patent restrictions

- CHOICE OF
  INFRASTRUCTURE
  - Deploy to any infrastructure you choose
  - One that’s right for you, not your vendor

- OPEN APIs
  - Extensible APIs for open interoperability

- PORTABILITY
  - Application portability across private and public clouds
GET STARTED WITH PRIVATE CLOUD TODAY

PLATFORM-AS-A-SERVICE
- Agile
- Framework and Language Choice
- Developer Productivity

OpenShift Enterprise by Red Hat

CLOUD MANAGEMENT
- Self-Service
- Orchestration
- Interoperability

Red Hat CloudForms

INFRASTRUCTURE-AS-A-SERVICE
- Massive Scalability
- On Demand
- Increased Efficiency

Red Hat OpenStack

VIRTUALIZATION
- Secure
- Cost Effective
- High Performance

Red Hat Enterprise Virtualization
RED HAT LEADS THROUGH OPEN INNOVATION

100,000+ PROJECTS

- Apache Project
- Gnome
- OpenJDK
- OpenStack
- Linux Kernel

- fedora
- JBoss Community
- oVirt
- Gluster Community
- RDO
- OpenShift
- Origin

- RED HAT ENTERPRISE LINUX
- RED HAT JBOSS MIDDLEWARE
- RED HAT ENTERPRISE VIRTUALIZATION
- RED HAT STORAGE
- RED HAT OPENSTACK
- OPENSHIFT by Red Hat
WHAT IS OPENSTACK?

- An open source virtualization platform to deliver public and private IaaS clouds
- Building blocks for creating public / private clouds
- Massive scale
- Horizontally scalable services
- Illusion of infinite resources
- Rapid provisioning / tear down of resources
- Modular services with well defined APIs
- Being led by the same folks doing the actual coding
- Rapid development, evolution, innovation
TRADITIONAL VIRTUALIZATION VS CLOUD
TRADITIONAL VIRTUALIZATION VS CLOUD

http://www.wallsongline.net/cats-animals-grass-kittens/
http://www.earthtimes.org/climate/no-hiding-cattle-methane-culprits/401/
OPENSTACK ARCHITECTURE

- Modular architecture
- Designed to easily scale out
- Based on (growing) set of core services
OPENSTACK CORE PROJECTS
COMPUTE (NOVA)

Core compute service comprised of:

- Compute Nodes – hypervisors that run virtual machines
- Supports multiple hypervisors: **KVM** (Xen, LXC, Hyper-V, ESX)
- Distributed controllers that handle scheduling, API calls, etc
- Native OpenStack API and Amazon EC2 compatible API
OPENSTACK CORE PROJECTS
IMAGE SERVICE (GLANCE)

- Stores and retrieves disk images (virtual machine templates)
- Supports Raw, QCOW (VMDK, VHD, ISO, OVF & AMI/AKI)
- Backend storage: Filesystem, Swift, Amazon S3
OPENSTACK CORE PROJECTS
OBJECT STORAGE (SWIFT)

- Object Storage service
- Modeled after Amazon's S3 service
- Provides simple service for storing and retrieving arbitrary data
- Native API and S3 compatible API
OPENSTACK CORE PROJECTS
NETWORKING (NEUTRON / FORMERLY QUANTUM)

- Network Service
  - Provides framework for Software Defined Network (SDN)
- Plugin architecture
  - Allows integration of hardware and software based network solutions
- Block Storage (Volume) Service
- Provides block storage for virtual machines (persistent disks)
- Similar to Amazon EBS service
- Plugin architecture for vendor extensions
  - eg. NetApp driver for Cinder
OPENSTACK CORE PROJECTS
IDENTITY (KEYSTONE)

- Identity Service
- Common authorization framework
- Manages users, tenants and roles
- Pluggable backends (SQL, PAM, LDAP, etc)
**OPENSTACK CORE PROJECTS**
**DASHBOARD (HORIZON)**

- Simple dashboard
- Provides self service UI for end-users
- Basic cloud administrator functions
  - Define users, tenants and quotas
  - No infrastructure management
OPENSTACK INCUBATING PROJECTS
METERING (CEILOMETER)

- Provides simple self service UI for end-users
- Basic cloud administrator functions
  - Define users, tenants and quotas
  - No infrastructure management
OPENSTACK INCUBATING PROJECTS
ORCHESTRATION (HEAT)

OpenStack Orchestration (HEAT)

- Dashboard
- Provides simple self service UI for end-users
- Basic cloud administrator functions
  - Define users, tenants and quotas
  - No infrastructure management
OPENSTACK DEMO

- DASHBOARD (Horizon)
  - COMPUTE (Nova)
  - BLOCK STORAGE (Cinder)
  - NETWORKING (Quantum)
  - IMAGE SERVICE (Glance)
  - OBJECT STORE (Swift)

- IDENTITY SERVICE (Keystone)
Software Disrupts Business

Retail
- Amazon
- Alibaba

Finance
- Square
- Apple Pay

Media
- Netflix
- Spotify

Transportation
- Uber
- Lyft
IT Must Evolve to Stay Ahead of Demands

**Development Process**
- Waterfall
- Agile
- DevOps

**Application Architecture**
- Monolithic
- N-Tier
- Microservices

**Deployment & Packaging**
- Physical Servers
- Virtual Servers
- Containers

**Application Infrastructure**
- Datacenter
- Hosted
- Cloud
Expedite Innovation To Market

Accelerate Application Development

Increase Operational Efficiency

Enable DevOps
Community Powered Innovation
OpenShift Online

- Over 100% User & Application Growth YoY
- Over 2.3 M Applications Created
- Over 1 Billion Requests Per Day
- Over 200 Add-ons & Quickstarts
- 3 Week Release Cycle
OpenShift Enterprise

Read more at: openshift.com/customers
OpenShift Architecture

- Standard containers API
- Web-scale container orchestration & management
- Container-optimized OS
- Largest selection of supported application runtimes & services
- Robust tools and UX for Development & Operations
- Industry standard, web scale distributed application platform
OpenShift Application Services

- From Red Hat
- From ISV Partners
- From the Community
Benefits for Developers

- Access a broad selection of application components
- Deploy application environments on-demand
- Leverage your choice of interface & integrate with existing tools
- Automate application deployments, builds and source-to-image
- Enable collaboration across users, teams & projects
Benefits for IT Operations

- Deploy a secure, enterprise-grade container-based application platform
- Enable application developers while improving operational efficiency & infrastructure utilization
- Utilize advanced scheduling and automated placement with regions and zones for HA
- Leverage powerful declarative management for application services
- Manage user & team access and integrate with enterprise authentication systems
OpenShift Commons

An interactive community for all OpenShift PaaS Users, Customers, Contributors, Partners, Service Providers and Developers to share ideas, code, best practices, and experiences.

More at http://commons.openshift.org/
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OpenShift Demo

https://www.openshift.com/
Open Source Cloud Technology: Bringing It All Together