OpenStack @ Cisco

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Our industry is changing

- Customer value is moving up into software and web services
- Virtualization and internet scale is changing data center architectures
- Software-defined networking is evolving
- Our Cloud Computing strategy is evolving along with the industry

“Go where the puck is going to be, not where it’s been”
What is OpenStack?

- OpenStack is open source software for building highly scalable public and private clouds under the Apache License.
- Started in July 2010 - initial contributions from NASA and Rackspace.
- Over 140 companies now participating.
- Target customers: both enterprises and service providers.
- Supports multiple hypervisors, designed for both large and small clouds, and is easily extended.
- Moving to a foundation-led governance model.
OpenStack Community (+140 companies today)
Today’s Architectural Battle

Web Approach
- Small number of large distributed apps
- Scale-out Architecture
- Design for Failure

Enterprise Approach
- Large number of transaction oriented apps
- Vertical scaling
- HA failover model

Open Source Software
Innovation in Cloud Computing
Commercial Software
Open standards require multiple providers, access to code and data, and interoperability of services.

The obvious solution is an open source reference model as the standard.

Potential examples of such would be the OpenStack effort.

-Simon Wardley, CSC

From “A Question of Standards”
OpenStack Community Projects

Core OpenStack

- **Nova**: Compute Service (i.e. EC2)
- **Swift**: Object Store: Massive scale, key-value storage (i.e. S3)
- **Glance**: Image Service: VM disk image store

Incubation Projects:

- Keystone: Identity Service
- Horizon: Admin and User Self-service portal

Community Projects:

- Quantum: Network Service*
- Melange: Network Address Service (IPAM)
- Donabe: container service*
- +++ many many more

*Cisco contributing
Today’s Popular Cloud Computing Platforms

Networking is only used for connectivity.

Cloud APIs are being standardized using a very simplistic network model
Quantum: As a peer to compute and storage

OpenStack is Changing this Model
At public design summit – merged proposals from several vendors

NetworkService
Citrix/Rackspace/Nicira

NetworkServicePOC
NTT/Midokura

NetworkContainers
Cisco

NaaS Core Design
Intel
Quantum: a more capable, multi-tenant, model for virtual data centers
(application specific topologies + network services)
Supports both per-customer virtual network services and hardware-enabled multi-tenant services

OpenStack Cloud Platform
- Bridges the virtual and physical layers

Resource Virtualization/hypervisor Layer
- Creates and manages virtualized compute, storage and networking resources

Physical Resource Layer
- Networking, Storage and Compute resources

Hypervisor: KVM, Xen, ESX - Nexus 1000v + Open vSwitch
Network Virtualization: VLAN, OpenFlow, LISP, VXLAN
“Quantum Architecture” – L2 Network Services
(released Sept 2011 – L3 in progress)

Quantum API

Quantum Service
• L2 network abstraction definition and management
• Device and service attachment framework
• Does NOT do any actual implementation of abstraction

Quantum Plug-in API

Vendor/User Plug-In
• Maps abstraction to implementation on physical network
• Makes all decisions about *how* a network is implemented
• Can provide additional features through API extensions

API Extensions
Cisco Plug-in’s for OpenStack Quantum

Quantum API

Quantum Service

Quantum Plug-in API

Cisco Cloud Networking Plug-In

NX-OS, UCS, Cisco Network Services Mgr (Overdrive), VXLAN, OpenFlow, ...

Cisco Infrastructure Products

Unified Fabric

Unified Network Services

Unified Computing
Work in Progress: Quantum L2/L3
Abstractions for instantiating a virtual data center
Tenants easily create Virtual Cloud Data Centers

Tenant view of private resources

Amazon’s Virtual Private Cloud Model
Status and Development Plan

• Led by CTO Office with support from extended OpenStack@Cisco Team.

• Quantum moving to an OpenStack core project as of Folsom Release.

• Cisco’s Quantum contribution available for download from OpenStack site.

• Current Development
  • Quantum L3 service for Essex Release (April 2012)
  • Cisco specific plugins and drivers (NX-OS, UCS, Palo)
  • Stabilize Nova, Glance, Swift, Keystone for Essex (April 2012)

• Cisco Product Integration
  • Cisco Cloud Portal & Intelligent Automation for Cloud
Cisco Resources for OpenStack

• OpenStack website:
  • http://www.openstack.org

• Quantum resources:
  • Project wiki: http://wiki.openstack.org/Projects/IncubatorApplication/Quantum
  • API Spec: http://wiki.openstack.org/QuantumAPISpec
  • Overview: https://launchpad.net/quantum
  • Source code: https://github.com/openstack/quantum
Questions?