Effective SDN for CloudStack

Necessities and Implementation Approaches

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Who is this?

— Playing with Packets for 16 years
— Cisco Routers, Network Processors
— Linux Kernel Networking, TCP stack
— Built SDN Controller for “Other” stack

Accelerite

— Team with core contributions since inception of CloudStack
— Transitioned from Cloud.com, Citrix to Accelerite
— Committed to the Community
Traditional Cloud Network

- Guest Networks
  - L2 Broadcast domain
- Multi-tiered Networks
  - Virtual Private Clouds
- Multi-tenancy
  - VLAN based isolation
  - Overlays
- Security Groups

Network Services

- IPAM
- Gateway
- Firewall
- NAT
- Loadbalancer
- VPN
- DNS
Evolving Eco-system

- Traditional Host Networks
  - Edge Networks, Underlays & Overlays
- Baremetals
  - Physical Networks
- Containers
  - Overlays on top of Isolated networks

Multi Layer Network Management

- Application VM Groups
  - Service Clusters
Software Defined Networking

- Control Plane separation from Data Plane
- Flow based granular control
- Setup Overlays
- Support for variety of Network Appliances
- Simplifies Operational Complexities
SDN Controller Architecture

- North Bound APIs
  - Build Applications
- South Bound Plugins
  - Support various network elements
- Core Controller
  - Framework for Control Plane
SDN is not just “OpenFlow” or “Virtual Switch”

Means Much More Now!
Advanced Services

Distributed Network Services

• Routing
• Firewall
• NAT
• Load balancer (stateless)

Selectively Offload Virtual Router features on to Hosts
Network Automation

“Tell me What you want, not How to do”

• Intent driven Policy Frameworks
  • Specify Network behaviour as Policy
  • Let the system derive the actions

• React Quickly with minimal intervention

• Example: Dynamic QoS

Intent Specification
• Network Resource
• Constraints
• Criteria
• Instructions
Network Analytics

- Network Visibility
  - Topology and Network State
  - Physical/Virtual/User domains
- Failure Analysis
  - Non-disruptive Monitoring
  - Analyze Short duration outages
- Application level analytics
  - What is the average latency of an application service?
Opensource Alternatives

**OpenDaylight**
- Vendor driven
- Mature and Feature rich

**ONOS Project**
- Carrier Grade
- Good Documentation

**Project Calico**
- Built to be Scalable
- Supports Containers & Baremetals

**Open Contrail**
- Depends on vRouter
- Restricted to Xen & KVM
Integration Approach

- Network Offerings
  - Extended with SDN Offload
- Parallel Paths for configuration
  - Multiple Network Elements
  - Distributed FW + VPN on VR
- Unified Automation
Challenges

• Lack of Consolidated Management
  • Consistency of Intent/Policies across SDN controller and CloudStack

• Coalesce Usage Statistics

• Feedback into Orchestration
Going Forward

• Leverage from Successful Communities
• Focus on Integration and Collaboration

Time to catch up!!
Questions !!