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# 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

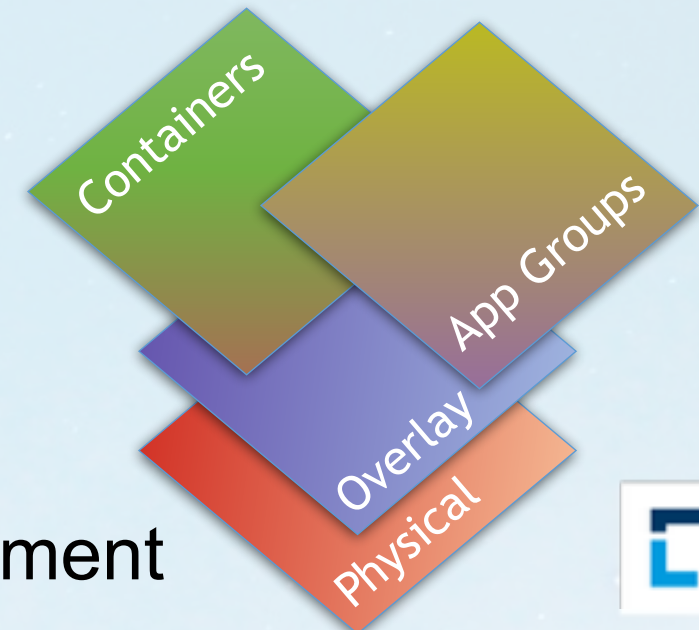
- IPAM
- Gateway
- Firewall
- NAT
- Loadbalancer
- VPN
- DNS



# Evolving Eco-system

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

- Application VM Groups
  - Service Clusters



Multi Layer Network Management



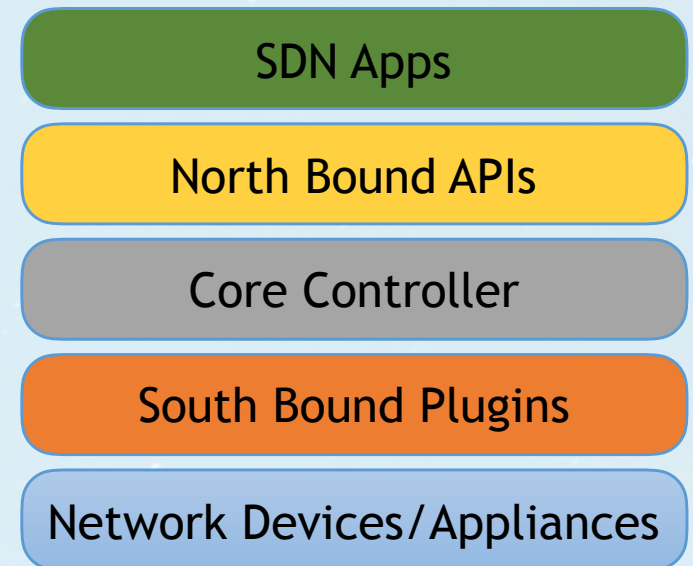
# Software Defined Networking

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

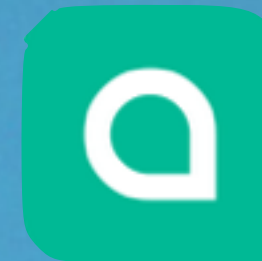


# SDN Controller Architecture

- 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"*

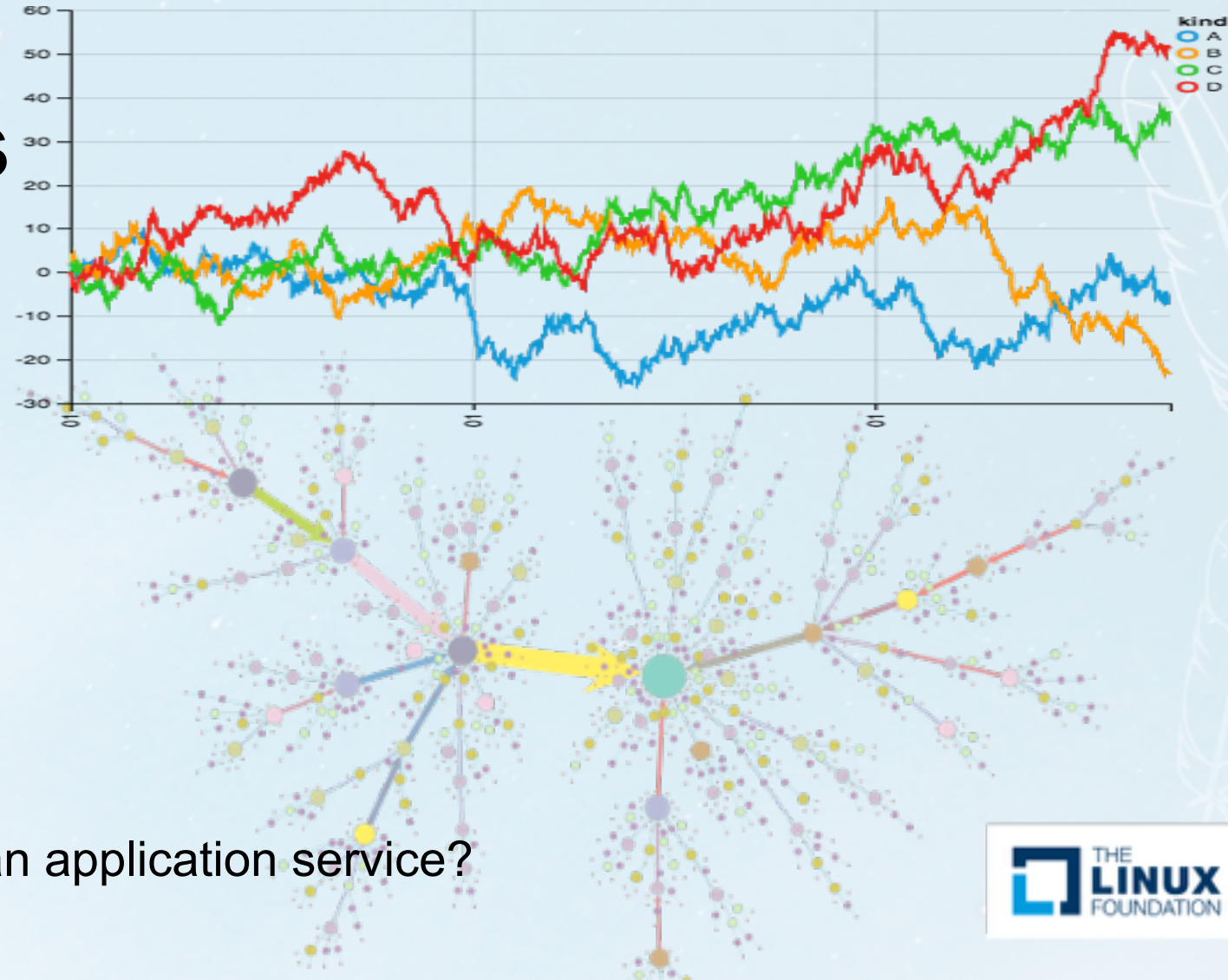
- Intent driven Policy Frameworks
  - Specify Network behaviour as Policy
  - Let the system derive the actions
- React Quickly with minimal intervention
- Example: Dynamic QoS

## 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

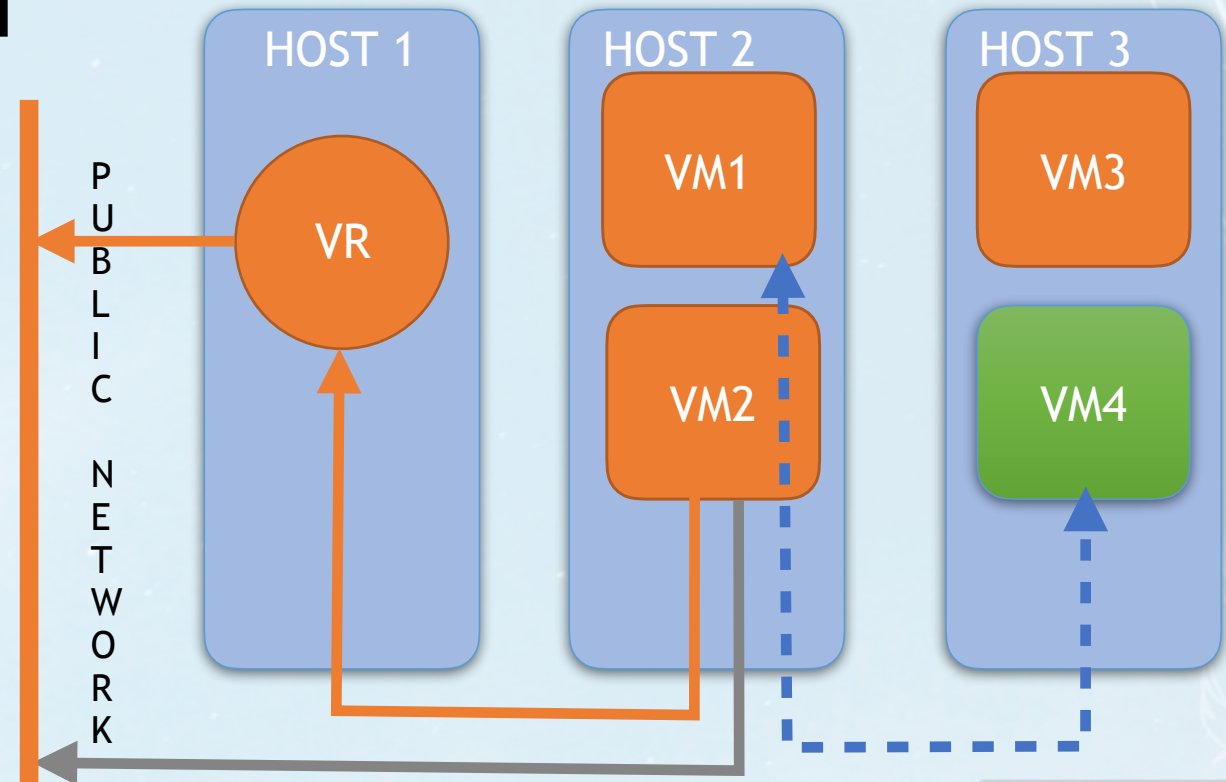
## Open Contrail

- 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

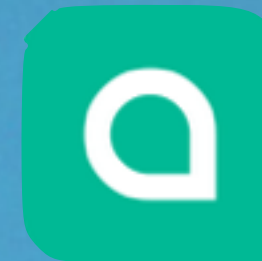


# Going Forward

- Leverage from Successful Communities
- Focus on Integration and Collaboration

Time to catch up!!





**Questions !!**