思科在OpenStack的雲端技術創新及貢獻

如何利用Cisco ACI快速部署高效能、高透明度和容易排錯的OpenStack網絡平台

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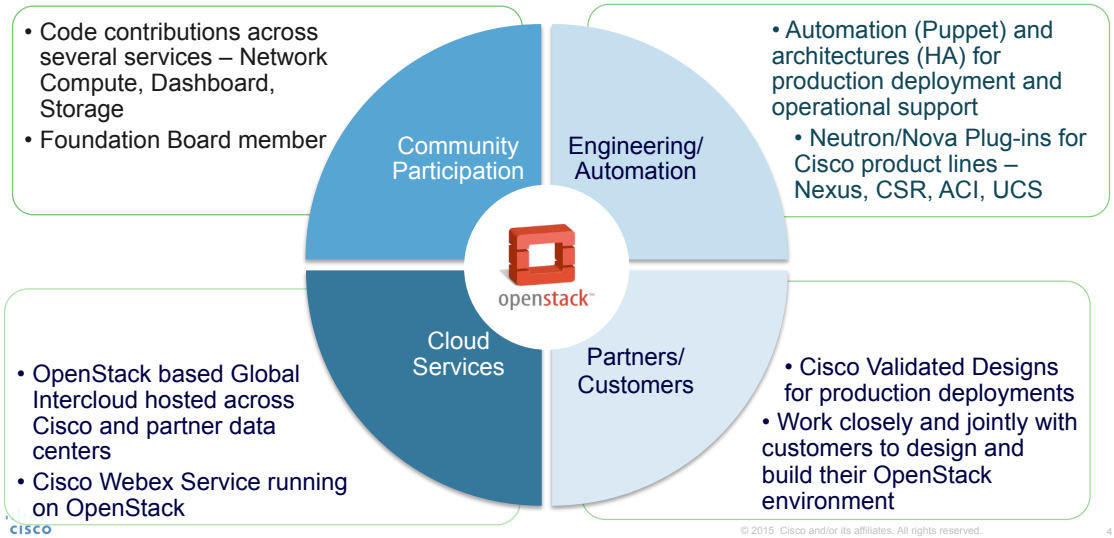
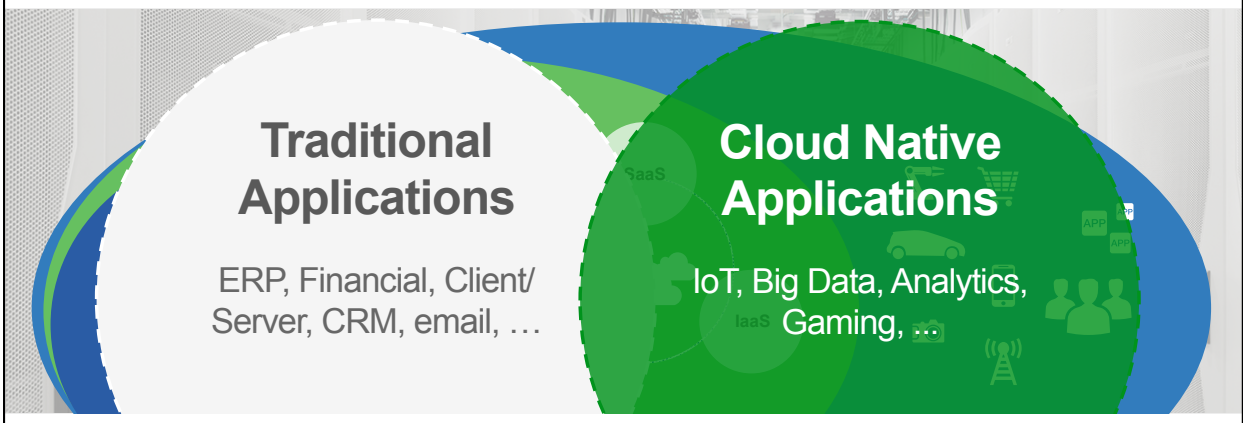
議題

- Cisco's commitment to OpenStack
- A new network model for Cloud Application Deployment
- Benefits of Cisco ACI for OpenStack deployment
- Technical Architecture Overview
- Live Demonstration
- Partner/Customer engagements

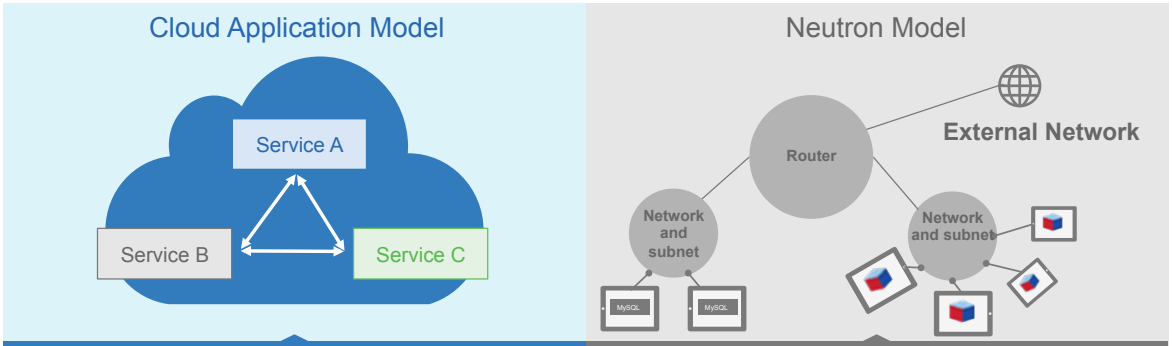
Cisco's Commitment to OpenStack



Applications in the Connected World



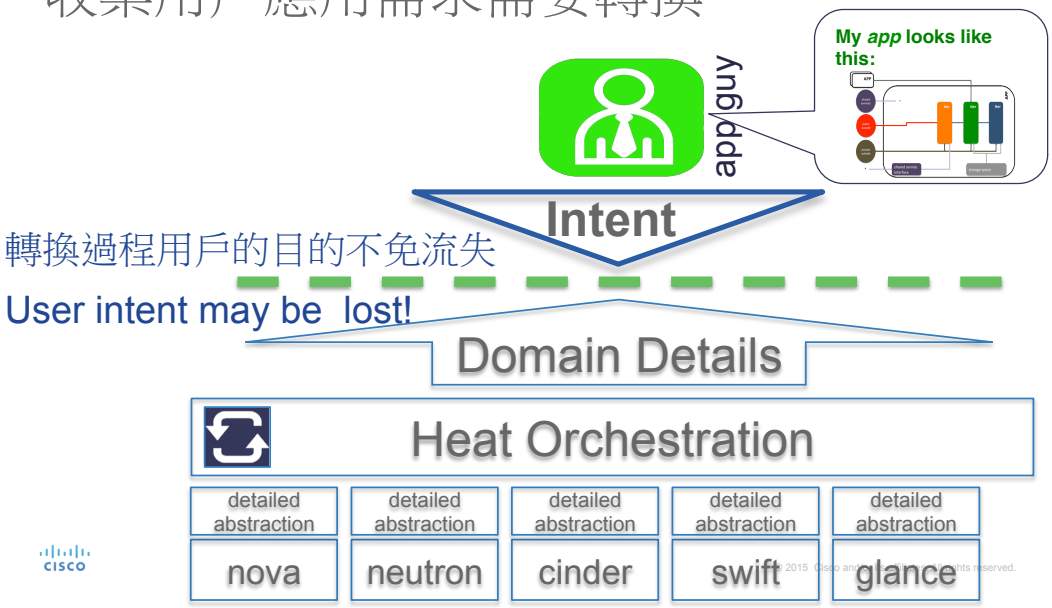
What may be further enhanced with OpenStack Networking Today?



- No broadcast or multicast
- Resilient and fault tolerant
- Scalable tiers
- Built around loosely coupled services
- Does not care about IP addresses

- Layer 2 and broadcast is the base API
- Network, routers, and subnets
- Based on existing networking models
- No concept of dependency mapping or intent

收集用戶應用需求需要轉換



傳統的數據中心網絡部署

Network architect/engineers perform configurations on the network equipment (CLI, GUI)

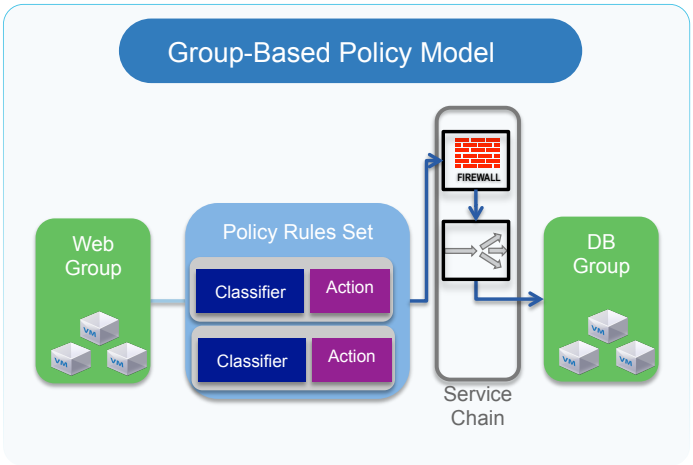
System/Network team translates the requirements into infrastructural specifications

Application owners provide the network requirements of application environment

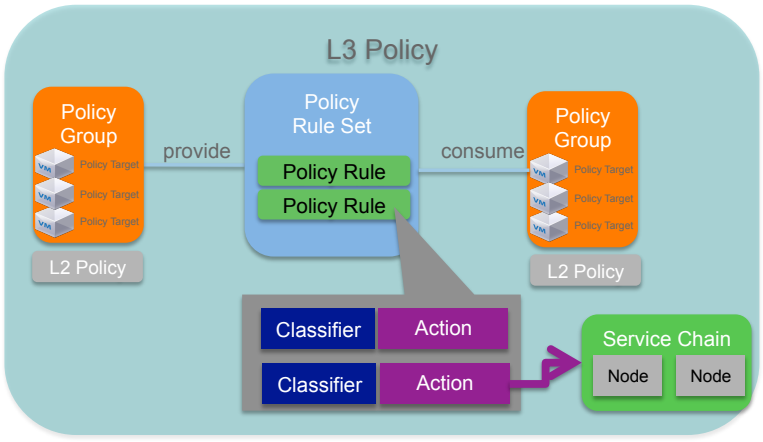
應用速度慢——應用問題? 網絡問題? ——如何快速排错?

Group-Based Policy for OpenStack

- A 100% open source, Apache-licensed
- Interface for capturing application intent, including network service requirements
- Model inspired by APIC but available for any hardware / software platform
- Networking today, plans to cover compute, storage
- Growing number of contributors and ecosystem partners



Group-Based Policy Model



Policy Group: Set of endpoints with the same properties. Often a tier of an application.

Policy RuleSet: Set of Classifier / Actions describing how Policy Groups communicate.

Policy Classifier: Traffic filter including protocol, port and direction.

Policy Action: Behavior to take as a result of a match. Supported actions include “allow” and “redirect”

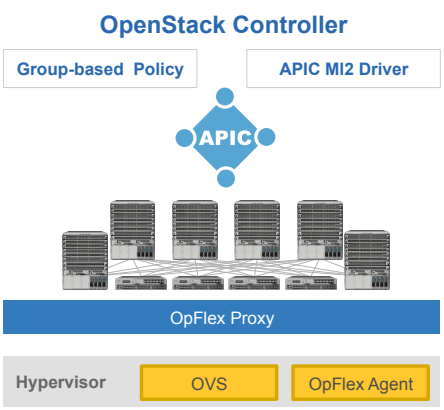
Service Chains: Set of ordered network services between Groups.

L2 Policy: Specifies the boundaries of a switching domain. Broadcast is an optional parameter

L3 Policy: An isolated address space containing L2 Policies / Subnets

ACI + OpenStack – With OpFlex Support

Full Policy Based Network Automation Extended to the Linux Hypervisor



OpFlex for OVS

- Open Source OpFlex agent extends ACI into Linux hypervisor
- OpFlex Proxy exposes new open API in ACI fabric

OpenStack Feature Highlights

- Fully distributed Neutron network functions, including NAT
- Integrated, centrally managed overlay and underlay fabric
- Operational visibility integrating OpenStack, Linux, and APIC
- Choice of virtual network (standard Neutron ML2) or Group-based Policy driven networking

Available Now! Solutions with Major OpenStack Distributions redhat CANONICAL MIRANTIS

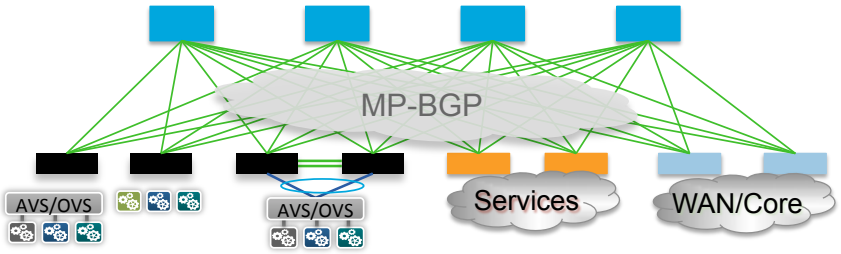
Cisco ACI乃應對數據中心SDN的解決方案
結合先進開放軟體與硬體技術

Rapid Deployment of Applications onto
Networks with Scale, Security and Full Visibility

DC Architecture evolves towards Fabric

- No more spanning Tree
- L3 Routing – Host Based
- High Bandwidth Multi-path enabled
- Eliminate L2 Flooding
- Facilitate Mobility VM

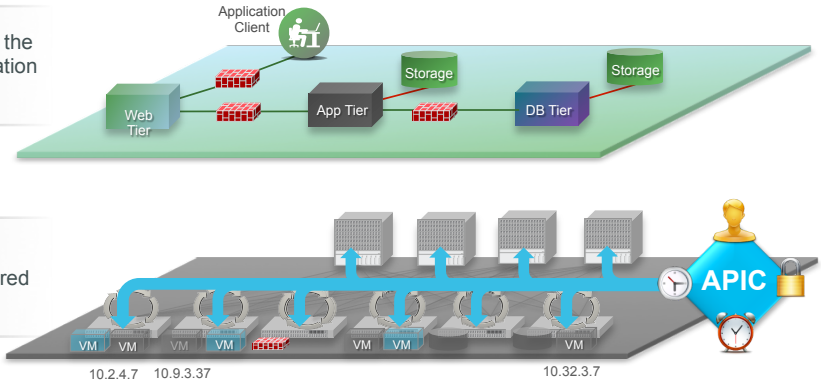
Spine
Leaf
Border Leaf
Services Leaf
Virtual Leaf*



思科ACI提供一個創新的Hybrid部署方案…
A *Policy Driven* Network Provisioning

Application policy model: Defines the application requirements (application network profile)

Policy instantiation: Each device dynamically instantiates the required changes based on the policies



Benefits of OpenStack on ACI

Distributed, Scalable Virtual Networking

- Fully distributed L2, anycast gateway, DHCP, metadata
- Distributed NAT / Floating IP
- Choice of Group Policy or Neutron API

Hardware Performance

- Automatic VXLAN tunnels at top-of-rack
- No wasted CPU cycles for tunneling

Operations and Telemetry

- Troubleshooting across physical and virtual environments
- Health scores, atomic counters, capacity planning per tenant network

Integrated Overlay and Underlay

- Fully managed underlay network through APIC controller
- Ability to connect physical servers and multiple hypervisors to overlay networks

Service Chaining

- Support for L3 or L2 service insertion and chaining
- Device package ecosystem for 3rd party devices or Group-Based Policy service chaining

Secure Multi-tenancy

- Virtual network isolation is maintained even when a hypervisor is compromised

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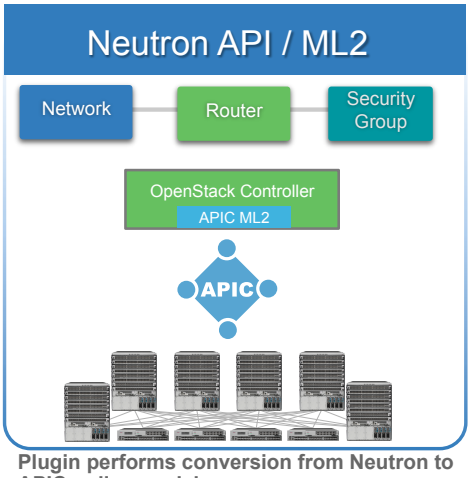
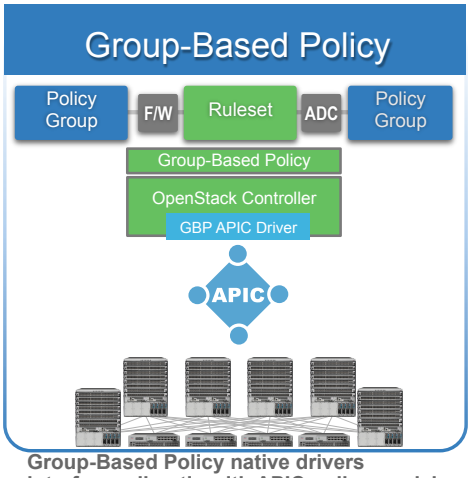
Two OpenStack Plugin Options



Plugin performs conversion from Neutron to APIC policy model



Group-Based Policy native drivers interfaces directly with APIC policy model

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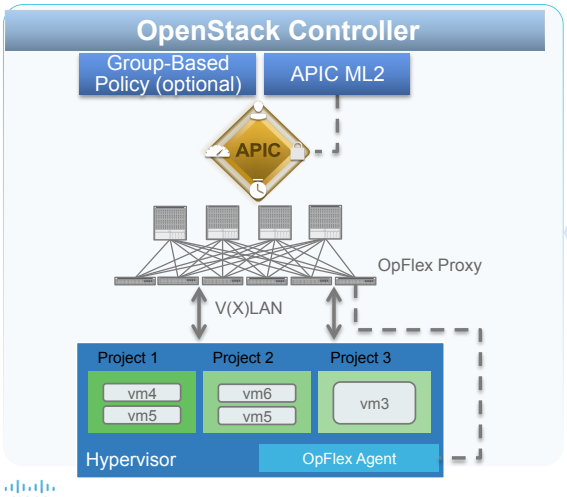
* Only one model is supported in a given OpenStack deployment

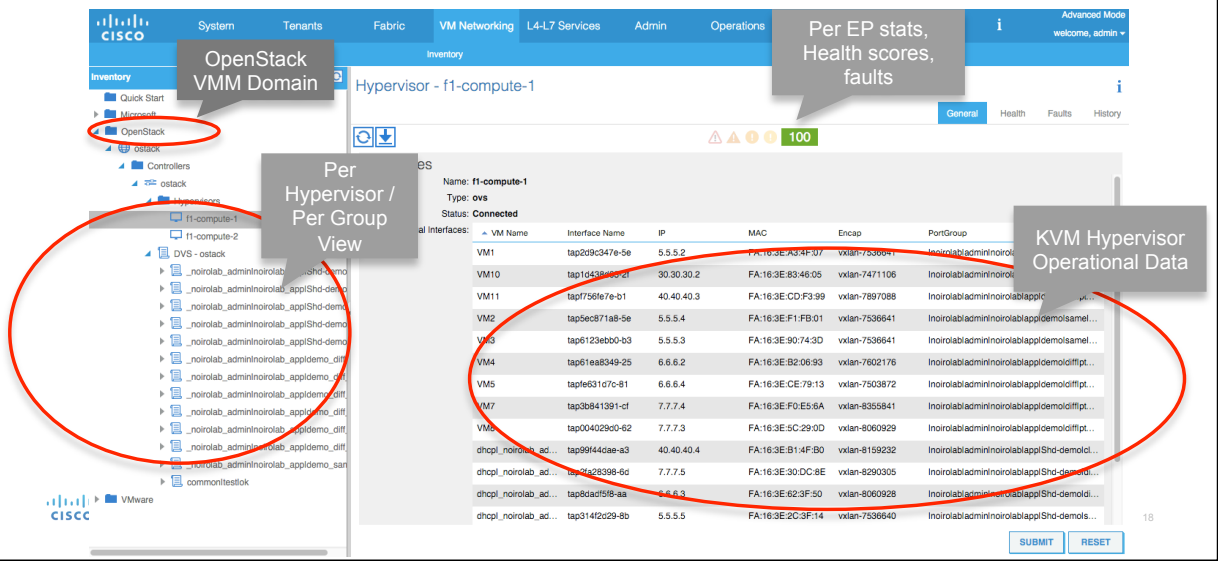
Available NOW: OpFlex Support



OpFlex Offers:

- GBP or APIC ML2
- Operations / Troubleshooting / Visibility
  - Endpoint statistics, health, faults in APIC
- Hypervisor local enforcement security policies
  - Security Groups (ML2 driver) via IP Tables
  - GBP via OpenFlow in Open vSwitch
- Distributed NAT support on each compute node
  - Floating IP
  - sNAT (via hypervisor host IP)
- Distributed Neutron services per compute node
  - L3 / Anycast gateway, metadata, DHCP
- Multiple VRF support

APIC VMM Integration



Useful Information for Further Reading

Architecture Guide;

- http://www.cisco.com/c/en/us/td/docs/switches/datacenter/aci/apic/sw/1-x/OpenStack/b_ACI_with_OpenStack_OpFlex_Architectural_Overview.html

Datasheets:

- http://www.cisco.com/c/en/us/solutions/collateral/data-center-virtualization/OpenStack-at-cisco/datasheet-c78-734181.html
- http://www.cisco.com/c/en/us/solutions/collateral/data-center-virtualization/OpenStack-at-cisco/datasheet-c78-732353.html

Deployment Guides:

- http://www.cisco.com/c/en/us/td/docs/switches/datacenter/aci/apic/sw/1-x/OpenStack/b_ACI_with_OpenStack_OpFlex_Deployment_Guide_for_Red_Hat.html
- http://www.cisco.com/c/en/us/td/docs/switches/datacenter/aci/apic/sw/1-x/OpenStack/b_ACI_with_OpenStack_OpFlex_Deployment_Guide_for_Ubuntu.html