

EMEA DevXchange 2017

Tech Talk: Monitoring SDN, NFV, Software-Defined Data Center and SD Wide-Area-Network Technologies

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Abe Dorr, Principal Software Engineer

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Agenda

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OVERVIEW

2

OUR MISSION

3

CHALLENGES

4

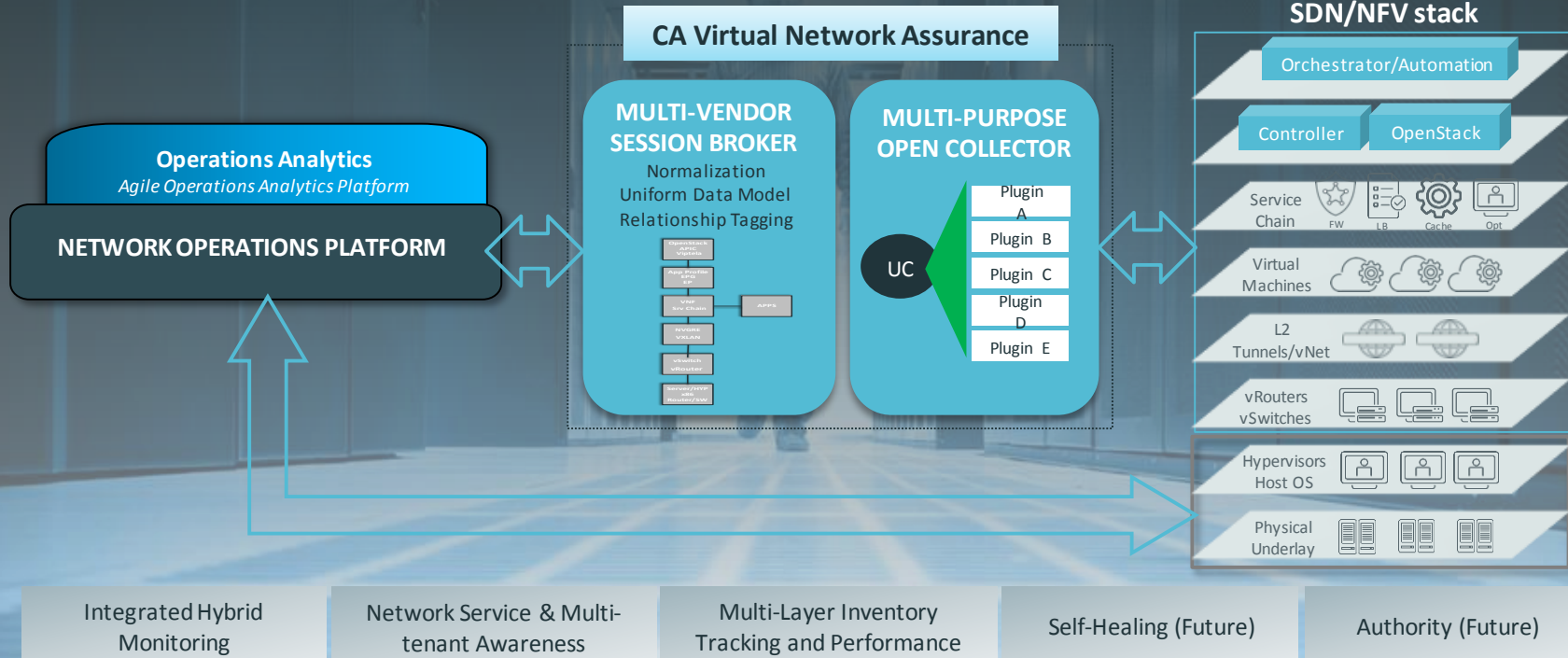
VIRTUAL NETWORK ASSURANCE (VNA)

5

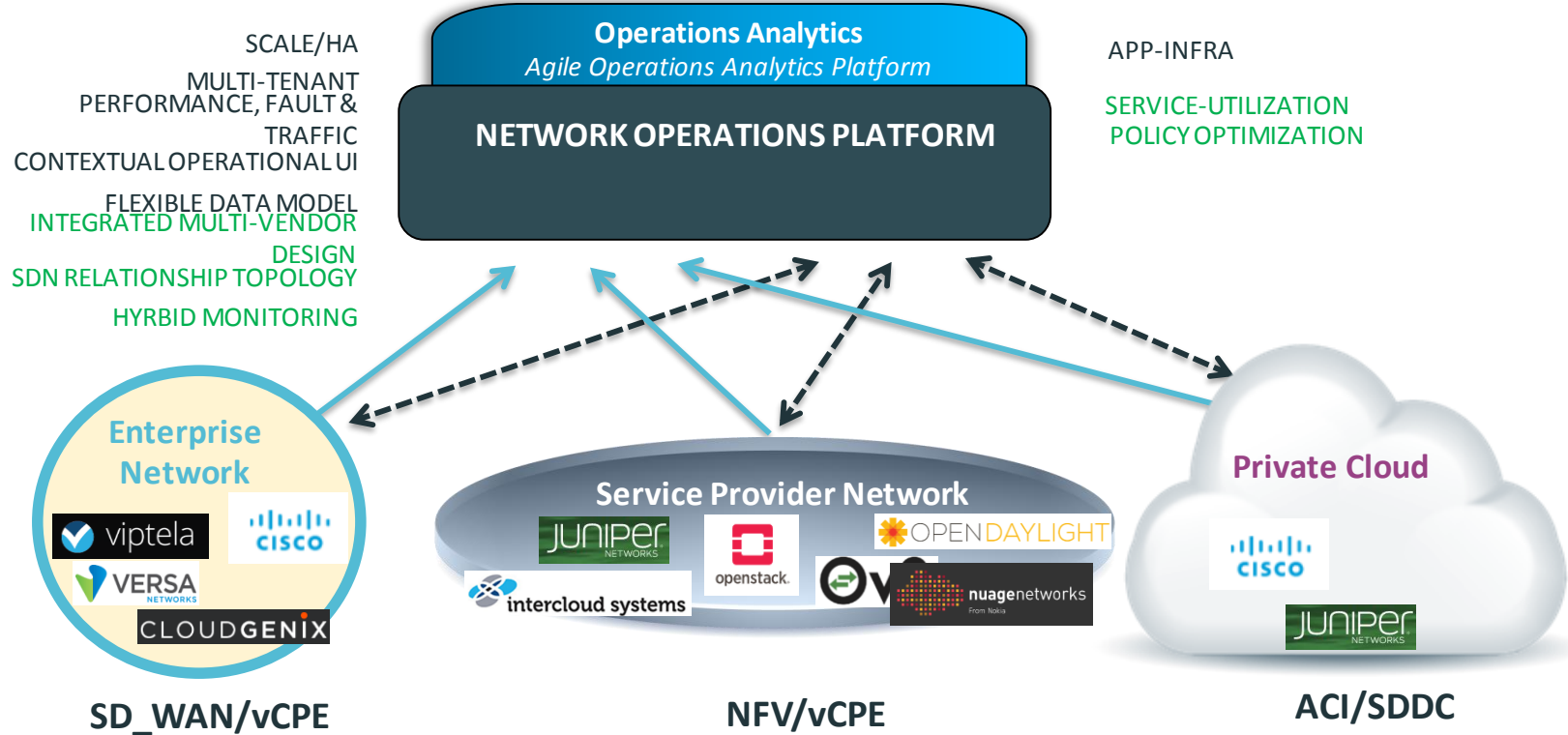
LOOKING AHEAD

CA's Solution to the SDN/NFV Assurance Challenges

CA Virtual Network Assurance is a flexible and scalable solution providing **extended** visibility into the multi-layered SDN/NFV stack and its physical network relationships for improved orchestration and agility.



SDN Performance Monitoring – Pathway to the Cloud



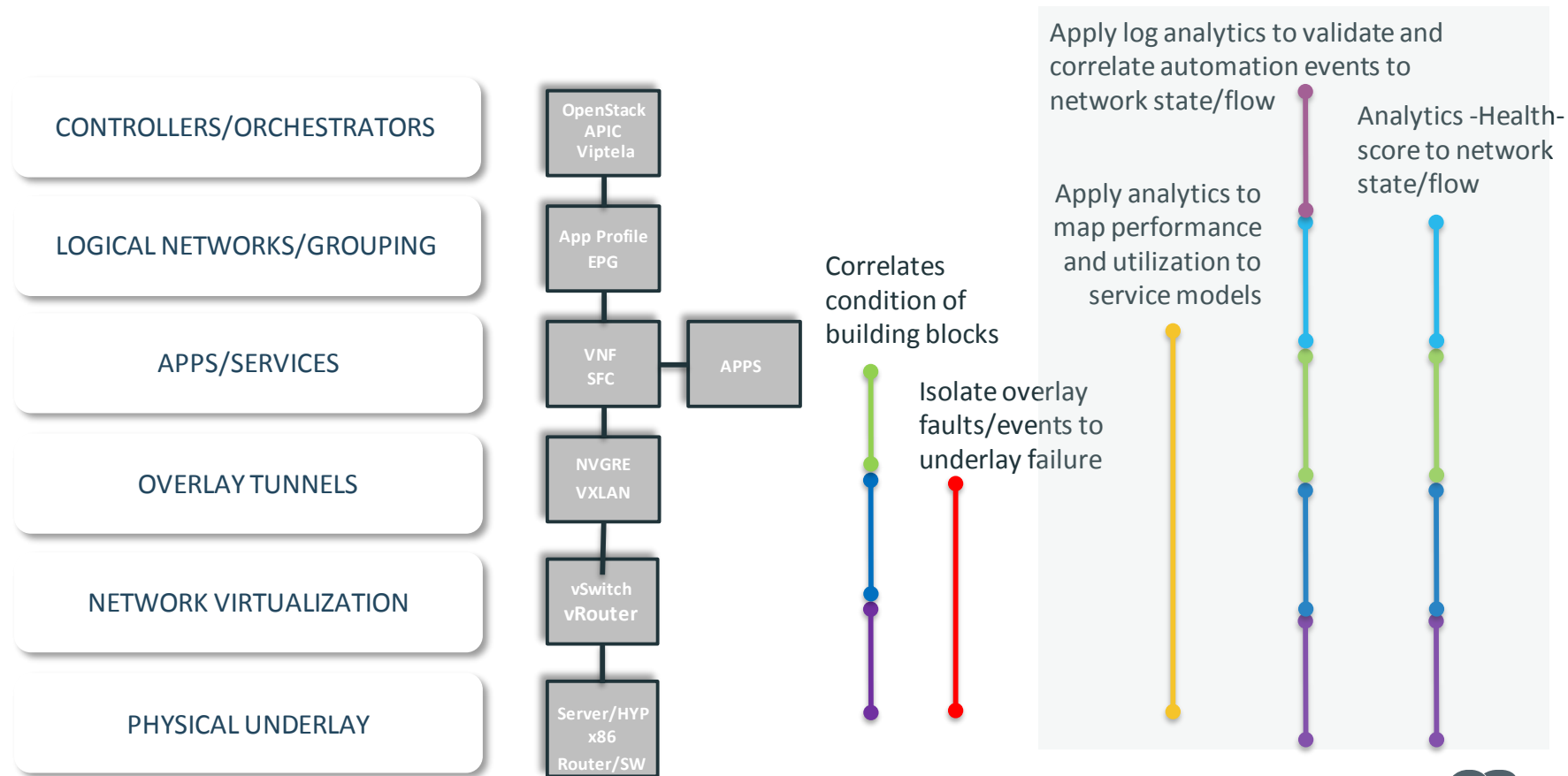
Our Mission

- Extend our monitoring solutions into the SDN space
- Based on an architecture that scales
- Give users data that is relevant and useful

Challenges that We Face

- Many SDN use cases
- Lack of standard APIs
- Monitoring APIs are still maturing
- Multiple technologies work together to accomplish SDN
- Abstractions add additional layers of complexity to the stack

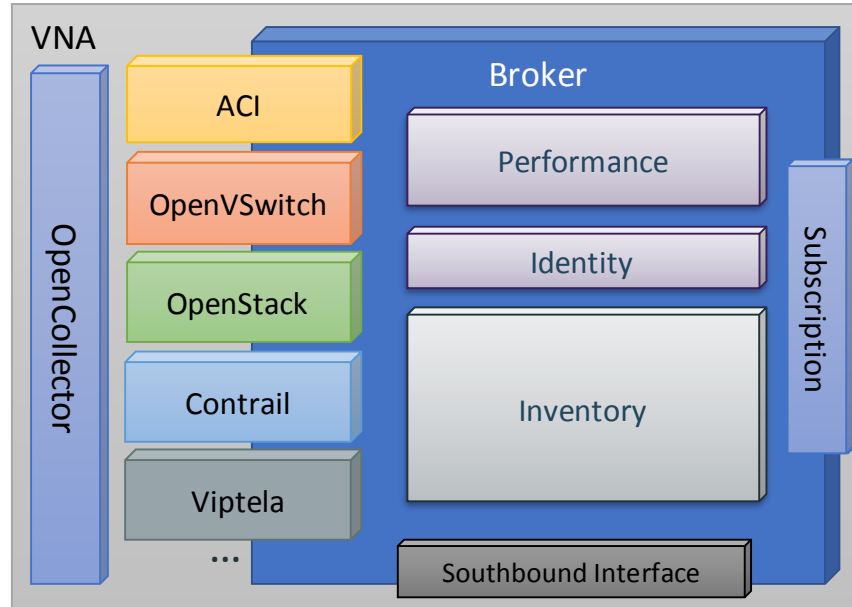
Complex Stack



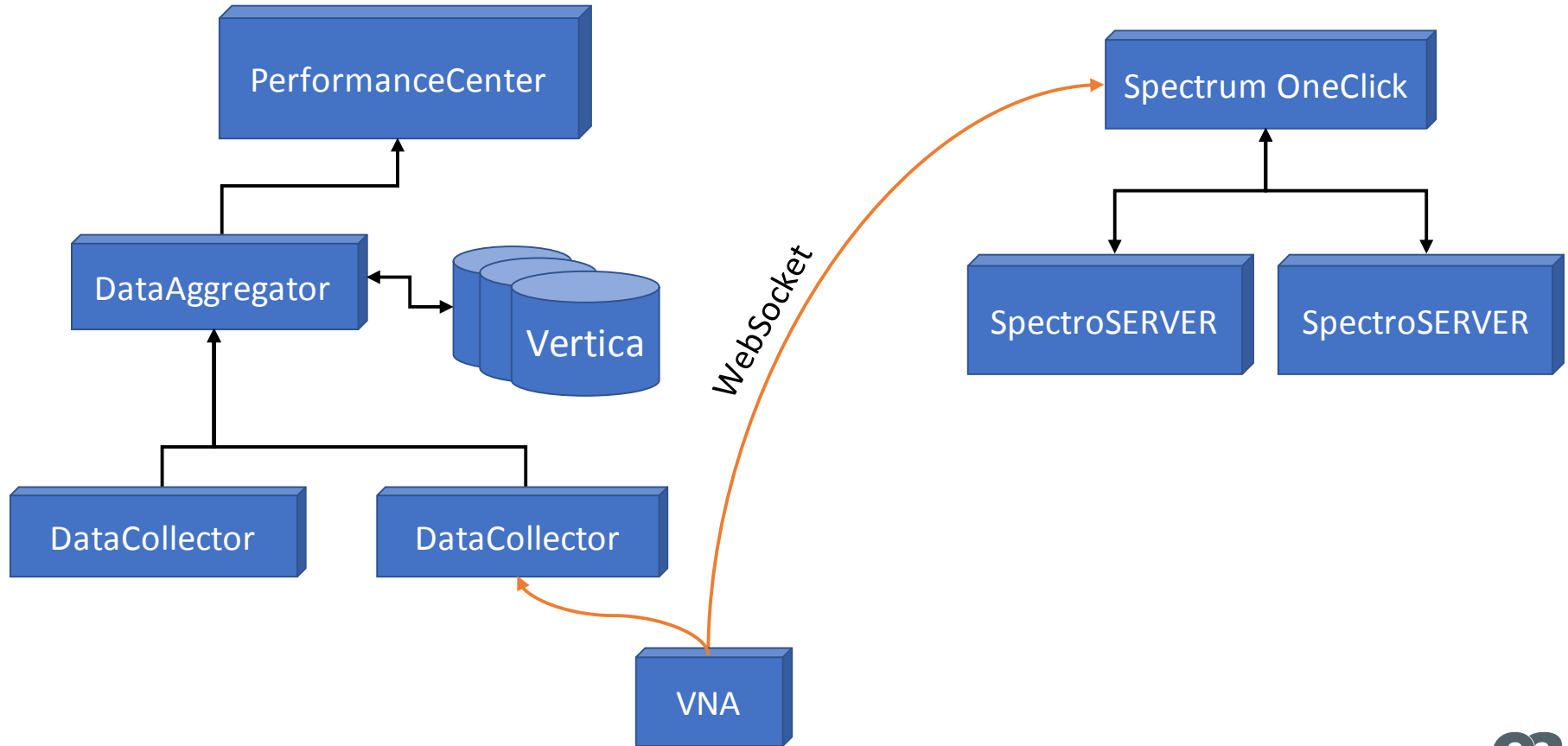
SDN Monitoring with CA Virtual Network Assurance

- Vendor agnostic model of the SDN space
- Relationships to help provide cohesive monitoring
- Northbound API implemented using a pub/sub architecture
- Plugins added to support new technologies

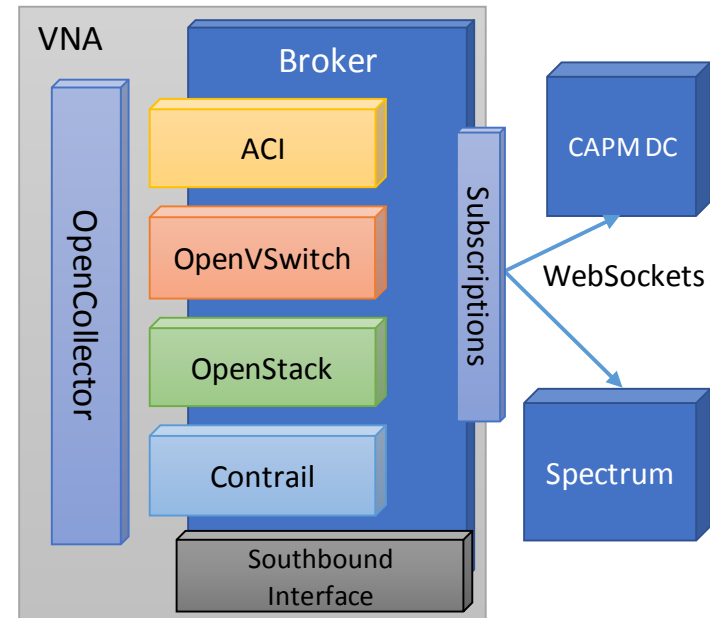
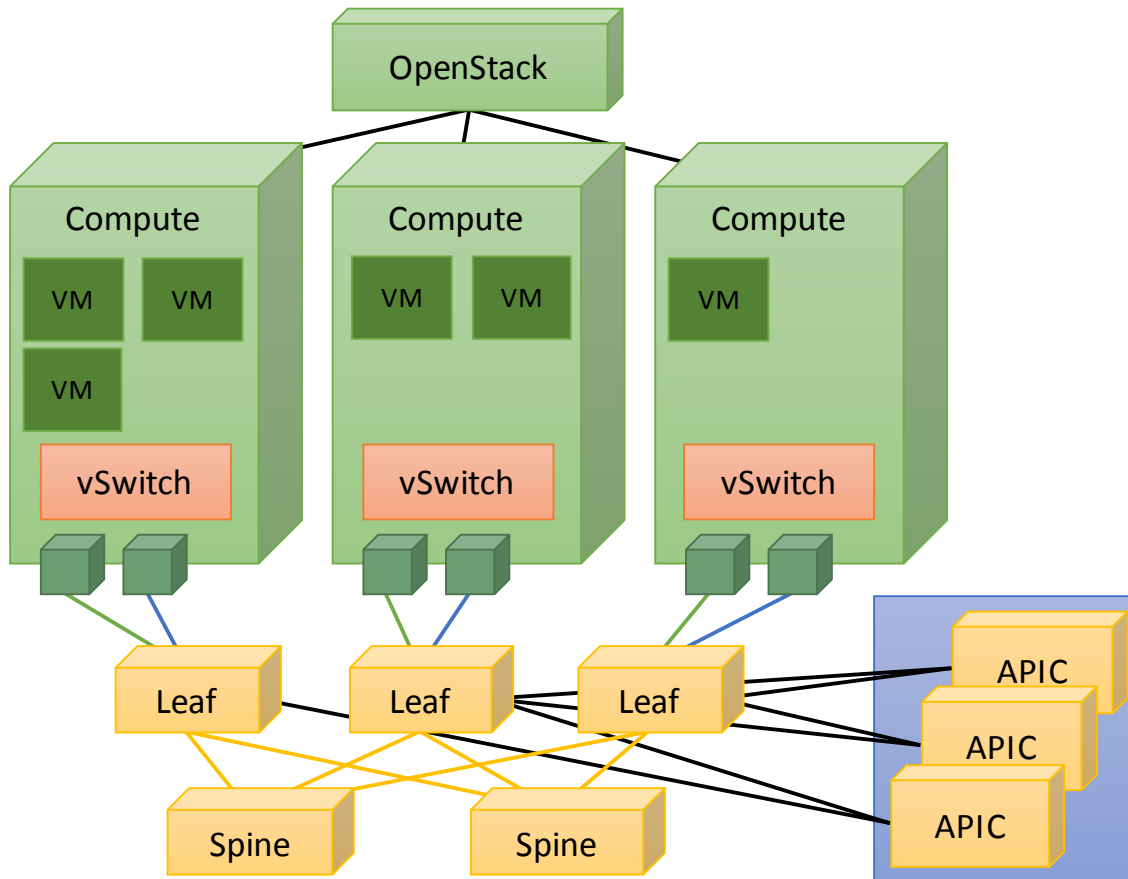
CA VNA Architecture



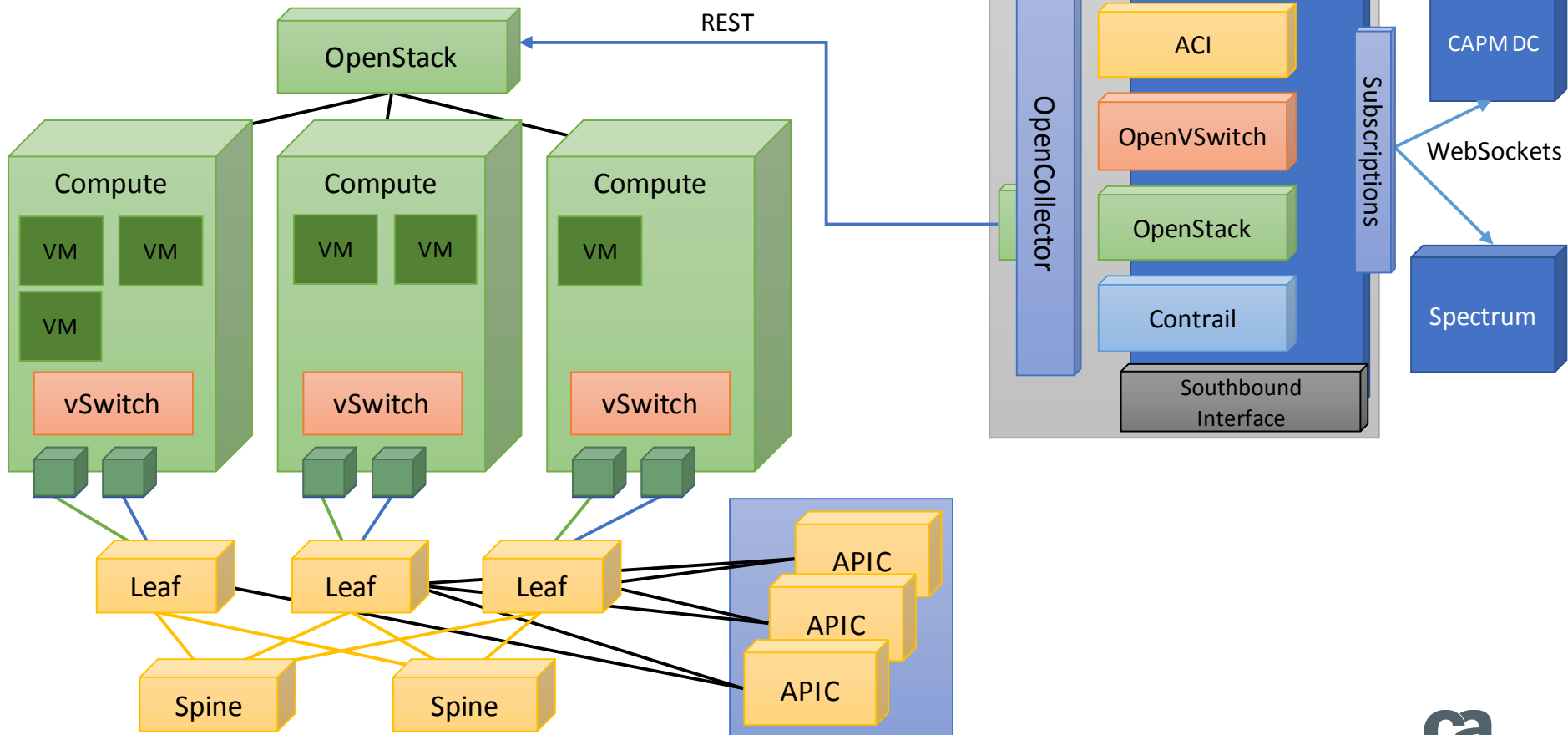
CA VNA Deployment



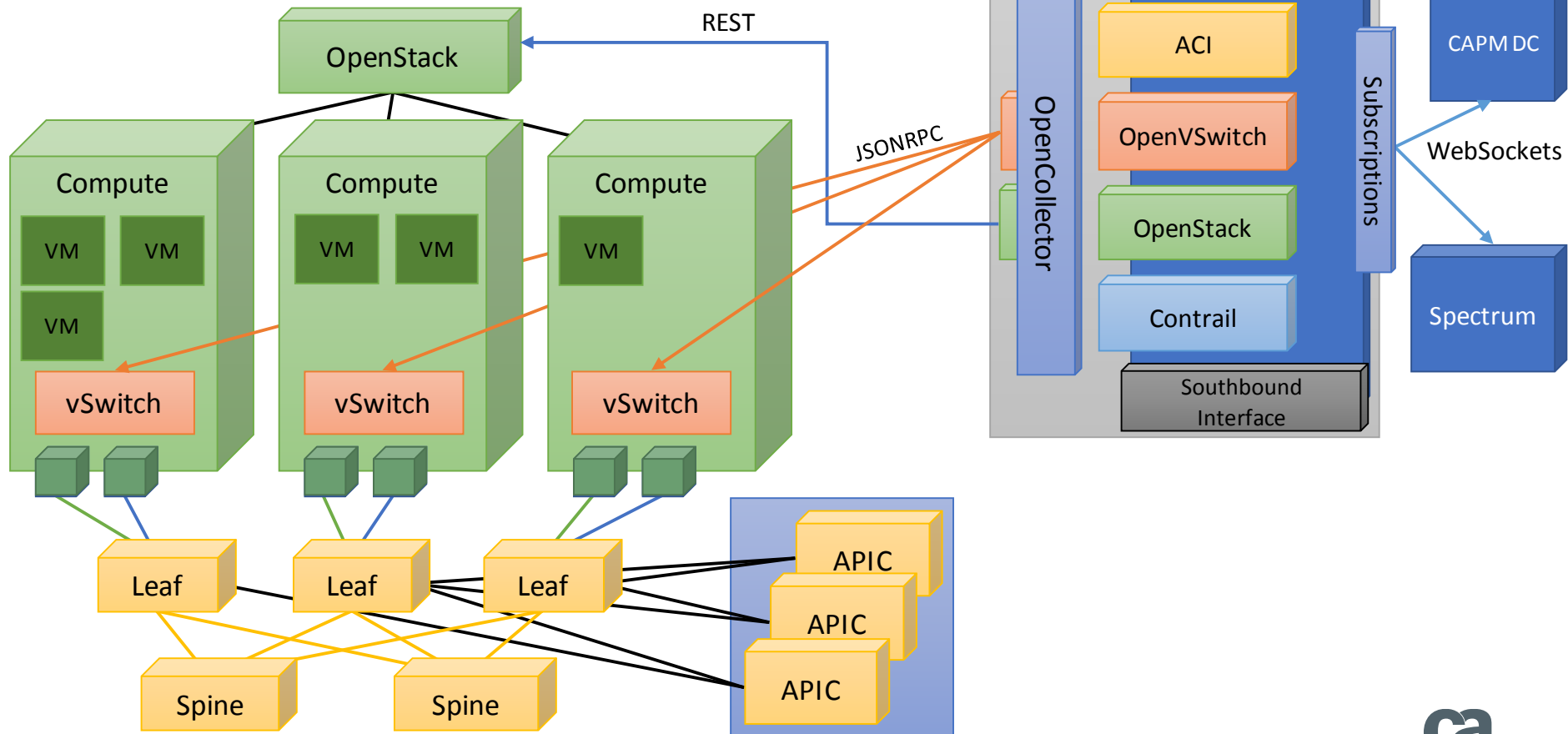
CA VNA Deployment



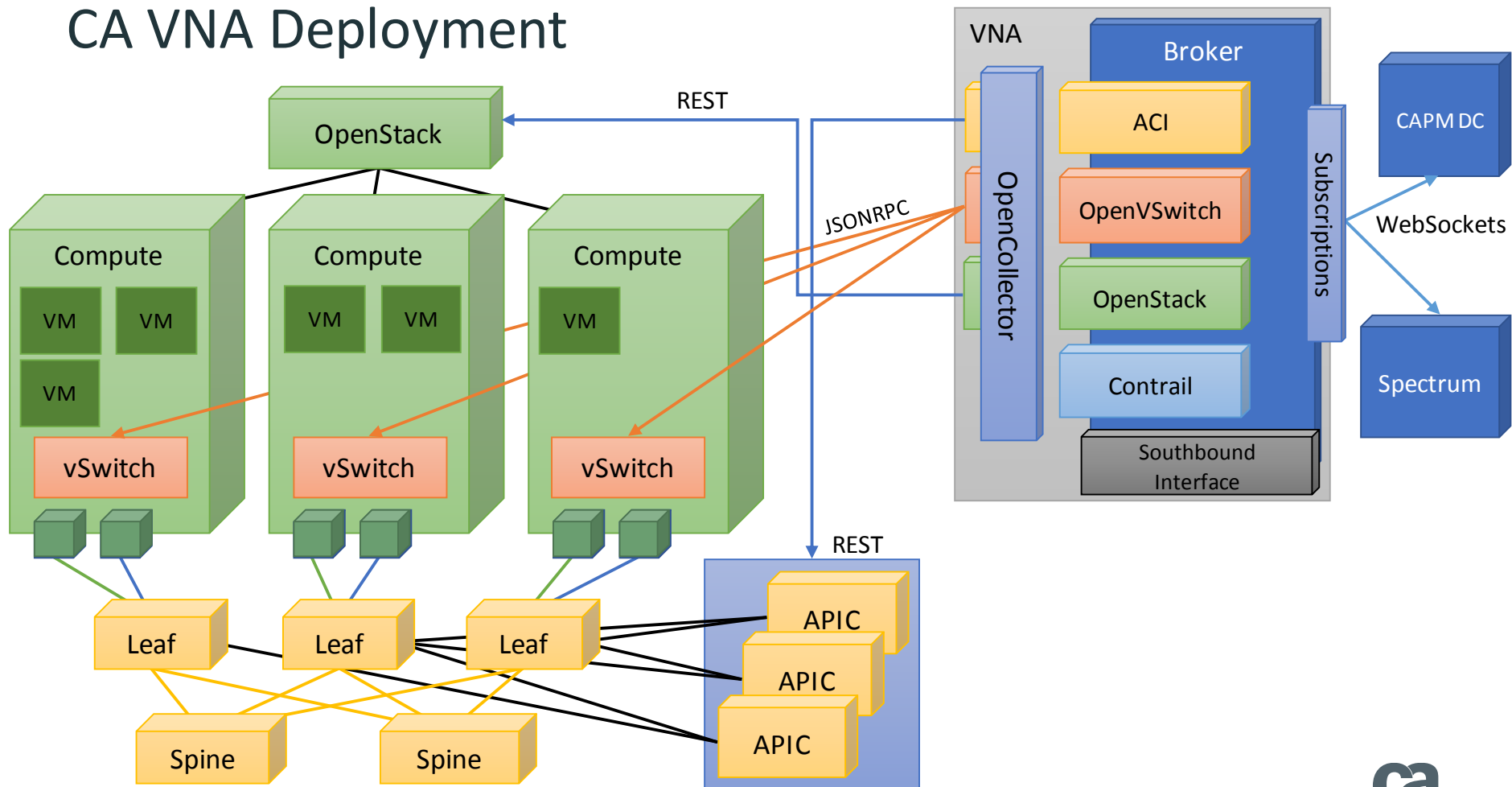
CA VNA Deployment



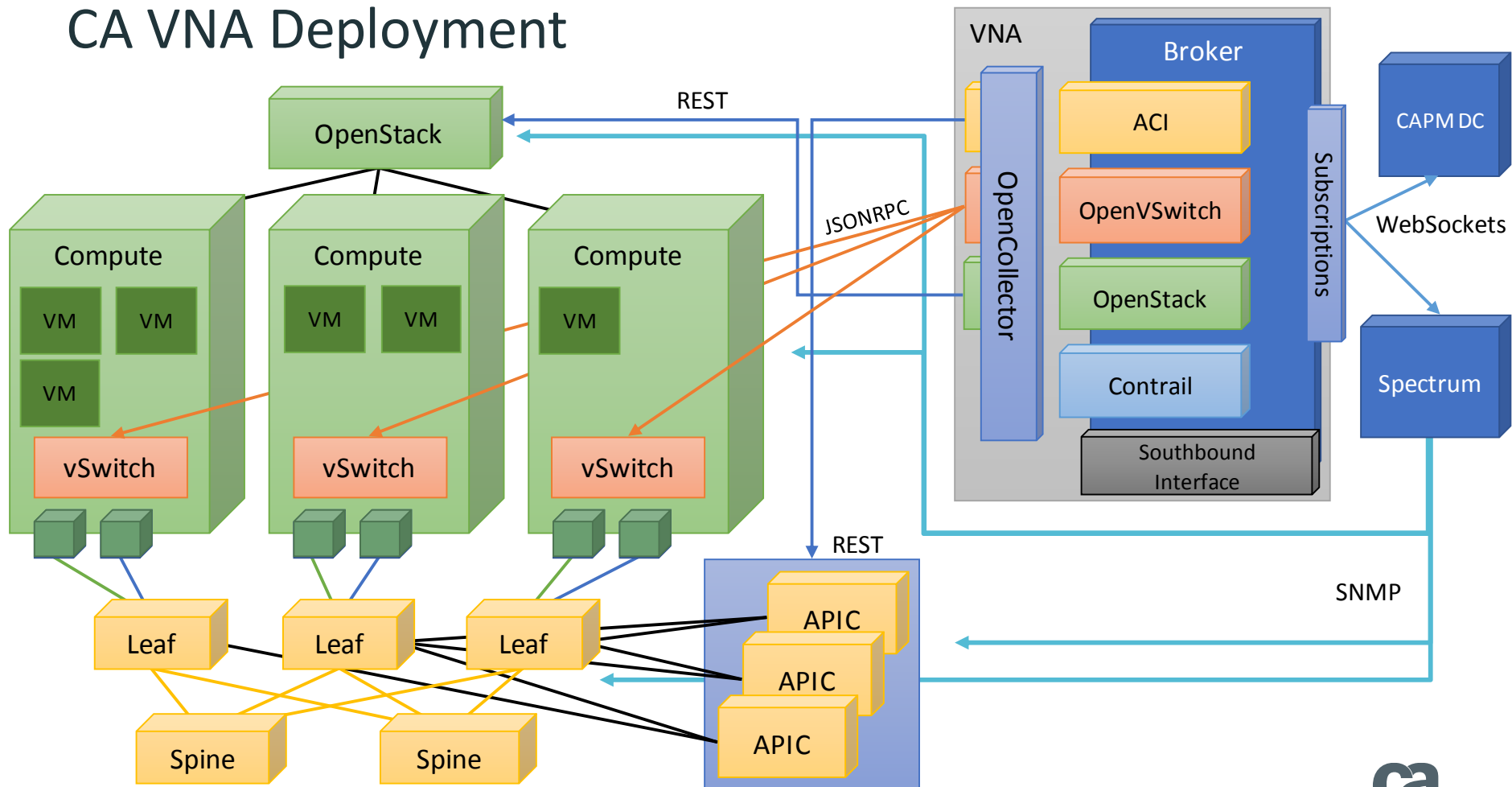
CA VNA Deployment



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CA VNA Deployment

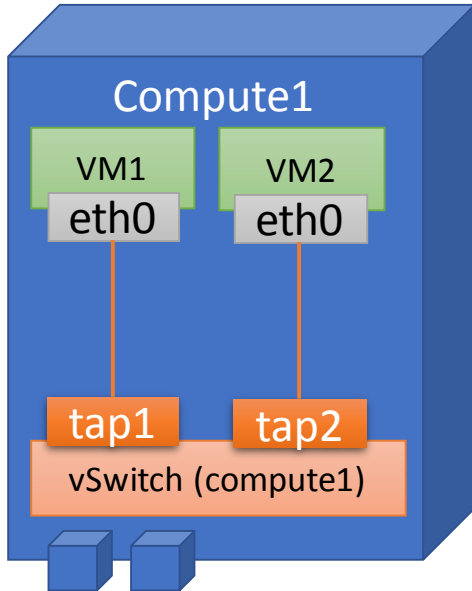


Populating the CA VNA Inventory

A Compute Node

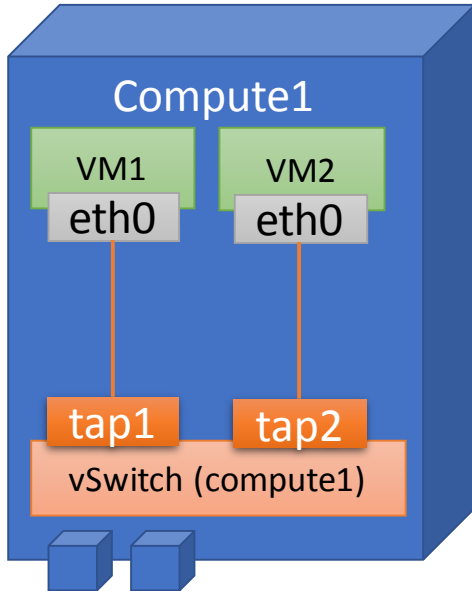
Example Data

VNA Data Model



Populating the CA VNA Inventory

A Compute Node



Example Data

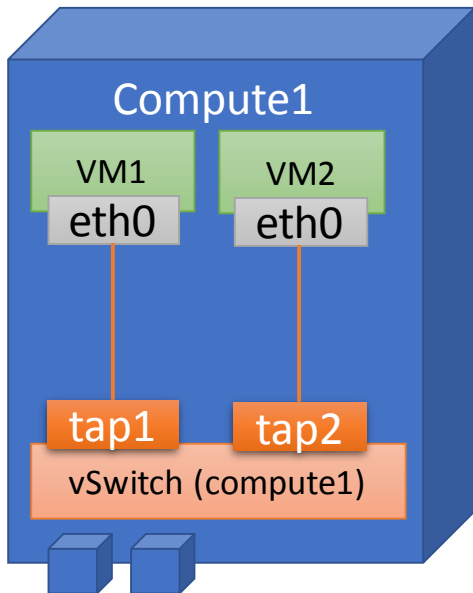
OpenStack: Hypervisors
[{ name: compute1, etc. }]

VNA Data Model

Hypervisor: compute1

Populating the CA VNA Inventory

A Compute Node

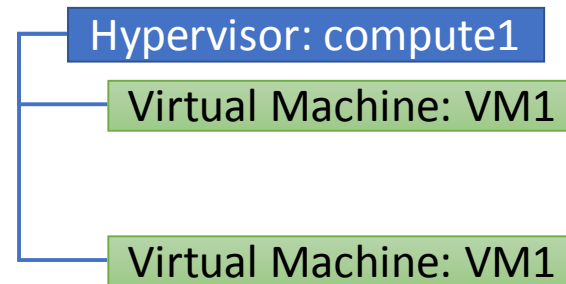


Example Data

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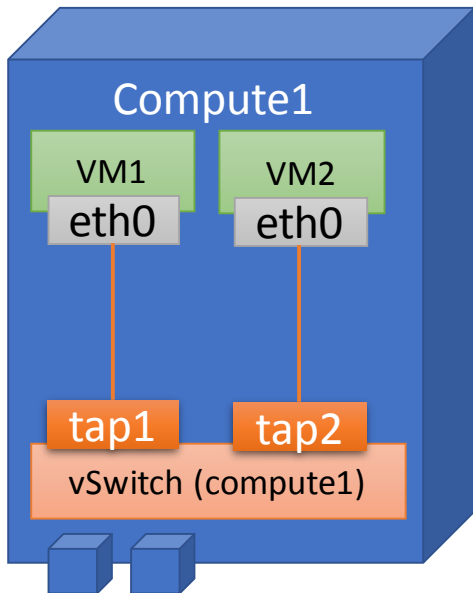
OpenStack: Virtual Machines
[{ name: VM1, host: compute1, etc. },
{ name: VM2, host: compute1, etc. }]

VNA Data Model



Populating the CA VNA Inventory

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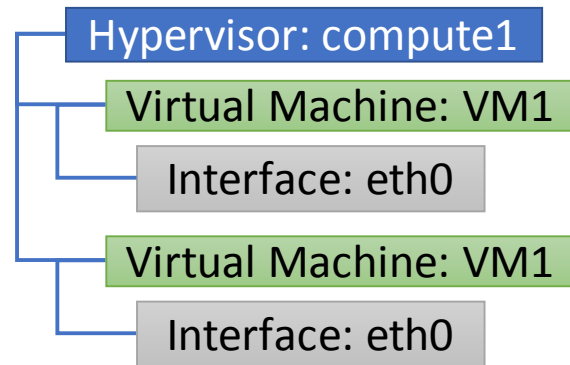
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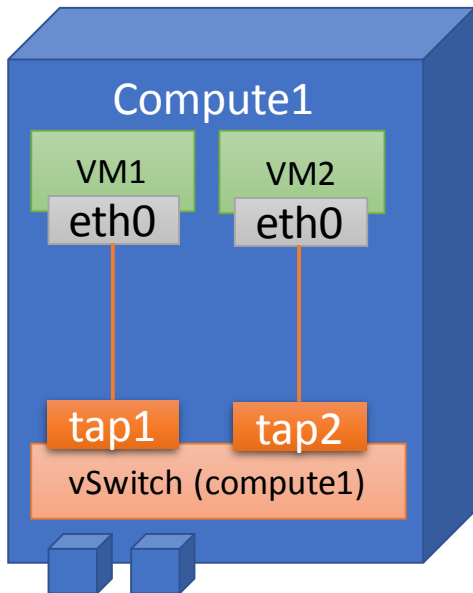
OpenStack: Interfaces
[{ name: eth0, host: VM1, ip: 1.1.1.2, etc. },
{ name: eth0, host: VM2, ip: 1.1.1.3, etc. }]

VNA Data Model



Populating the CA VNA Inventory

A Compute Node



Example Data

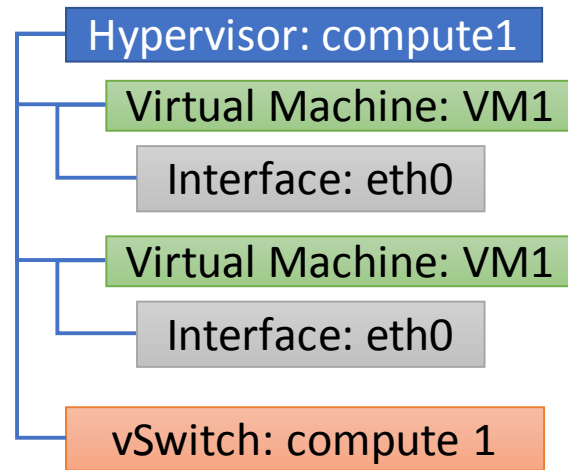
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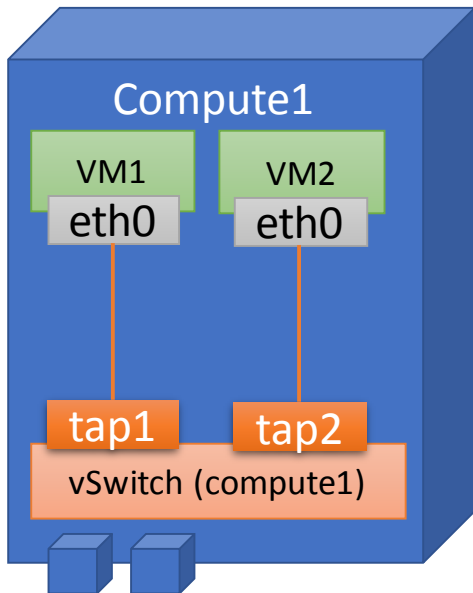
OpenVSwitch: VSwitch
[{ name: compute1, cpu: 12342342, etc. }]

VNA Data Model



Populating the CA VNA Inventory

A Compute Node



Example Data

OpenStack: Hypervisors
[{ name: compute1, etc. }]

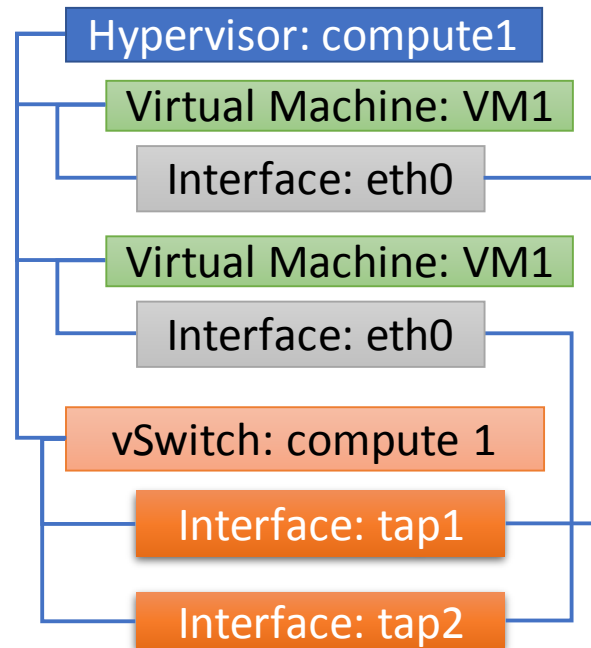
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OpenVSwitch: VSwitch
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OpenVSwitch: VSwitch Interfaces
[{ name: tap1, relIF: 1.1.1.2, etc. },
{ name: tap2, relIF: 1.1.1.3, etc. }]

VNA Data Model



Visualizing CA VNA Data

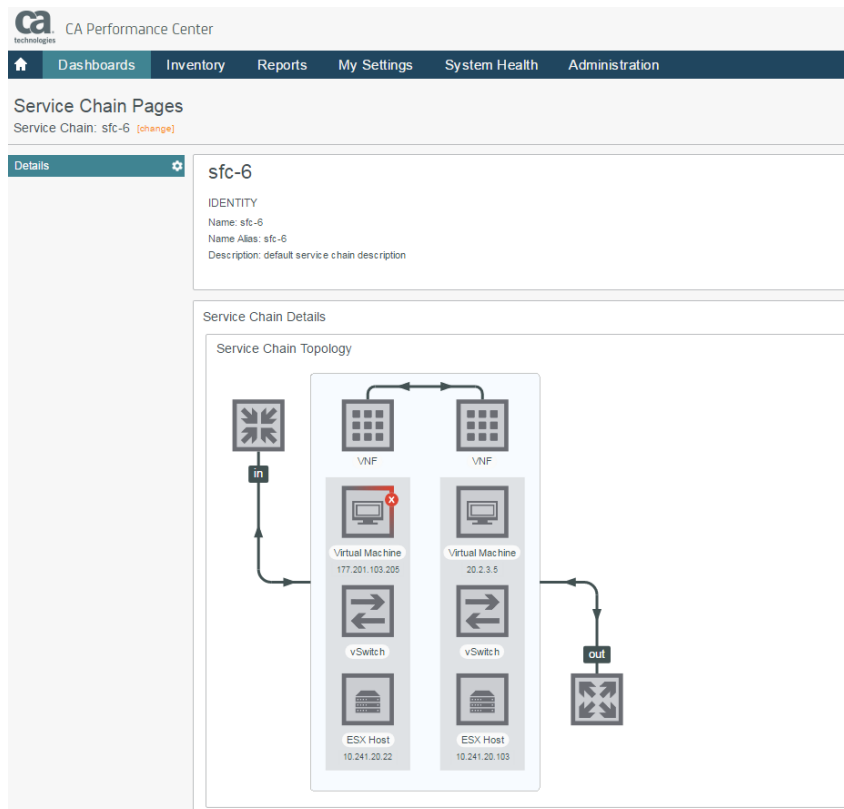
CA VNA Groups

The screenshot displays the CA Performance Center Administration interface. The top navigation bar includes links for Dashboards, Inventory, Reports, My Settings, System Health, and Administration. The main content area is titled 'Manage Groups' and features a tree view on the left under the heading 'Groups'. The tree view lists various categories such as 'All Groups', 'Collections', 'Defined Tenants', 'Inventory', 'Service Provider Global Groups', 'VNA Domains', 'Mock ACI Lab', 'Mock ODIL Lab', 'Compute', 'Technologies', 'Tenants', 'admin', 'development', 'lab access', and 'Networks'. The 'Service Function Chains' item under the 'development' category is highlighted. On the right side of the interface, there are tabs for 'Properties' and 'Items', and a section titled 'Service Chains (2)' with a table listing items like 'access' and 'dev-test'.

Key Features:

- Out of the box groups

SFC & NFV



Key Features:

- Ability to visualize the complete stack (logical to physical)
- Configurable thresholds that control visual alarms
- Tooltips provide metric data to facilitate better troubleshooting

SFC & NFV

The screenshot displays the CA Performance Center web interface. The top navigation bar includes 'Dashboards', 'Inventory', 'Reports', 'My Settings', 'System Health', and 'Administration'. The main content area is titled 'Service Chain Pages' and shows 'Service Chain: sfc-6' with a '[change]' link. A 'Details' sidebar on the left contains a gear icon. The main panel shows the 'sfc-6' service chain details, including its identity (Name: sfc-6, Name Alias: sfc-6, Description: default service chain description). Below this, the 'Service Chain Details' section shows the 'Service Chain Topology' diagram. The diagram illustrates a network flow from an 'in' port through two VNFs (Virtual Network Functions) to two vSwitches, which connect to two ESX Hosts (10.241.20.22 and 10.241.20.103). A tooltip for a 'Virtual Machine' (lab-vm-2268b6) is shown, displaying its address (177.201.103.2) and utilization metrics (CPU: 15.21%, Memory: 100%).

CA Performance Center

Navigation: Dashboards, Inventory, Reports, My Settings, System Health, Administration

Service Chain Pages

Service Chain: sfc-6 [change]

Details

sfc-6

IDENTITY

Name: sfc-6

Name Alias: sfc-6

Description: default service chain description

Service Chain Details

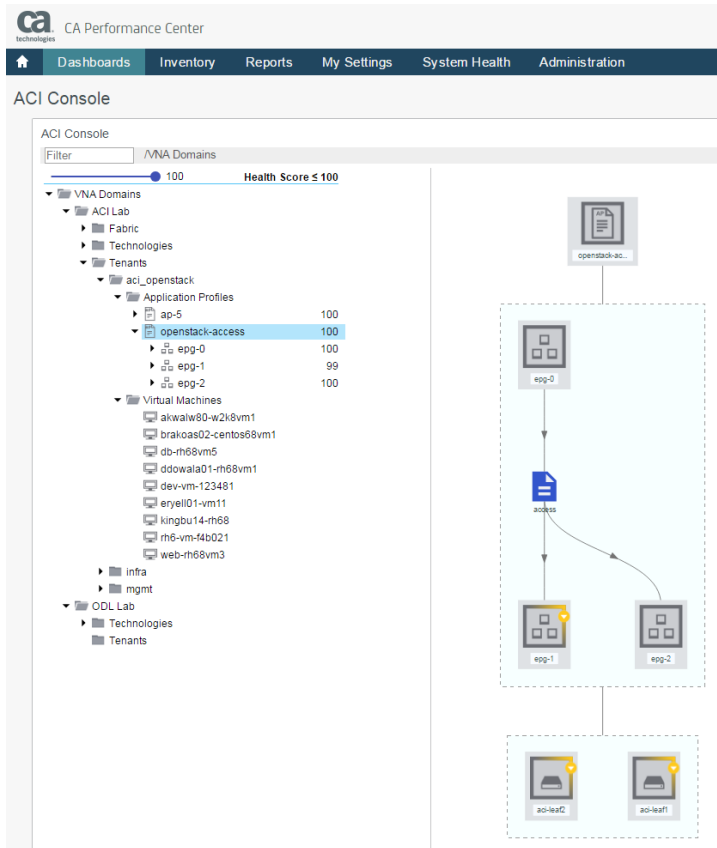
Service Chain Topology

Diagram showing the flow from 'in' through VNFs, vSwitches, and ESX Hosts to 'out'. A tooltip for a Virtual Machine (lab-vm-2268b6) is displayed, showing its address (177.201.103.2) and utilization metrics (CPU Utilization: 15.21%, Memory Utilization: 100%).

Key Features:

- Ability to visualize the complete stack (logical to physical)
- Configurable thresholds that control visual alarms
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SDN in the Data Center (Cisco ACI)



Key Features:

- Easily navigable hierarchy
- Visualize the complete stack (logical to physical)
- Configurable thresholds that control visual alarms
- Visual bread crumbs to help navigate through the hierarchy
- Tooltips provide metric data to facilitate better troubleshooting

SDN in the Data Center (Cisco ACI)

The screenshot displays the CA Performance Center ACI Console. The top navigation bar includes 'Dashboards', 'Inventory', 'Reports', 'My Settings', 'System Health', and 'Administration'. The main content area is titled 'ACI Console' and features a 'Filter' input and a 'VNA Domains' section. A 'Health Score' indicator shows 100. The left sidebar lists a hierarchy: VNA Domains > ACI Lab > Fabric > Technologies > Tenants > aci_openstack > Application Profiles > ap-5 > openstack-access > epg-0, epg-1, and epg-2. The 'epg-2' item is selected, showing its IP addresses: cep-10:12:C1:00:01:49, cep-10:12:C1:00:01:af, and stcep-10:12:C1:00:01:3c-type-silent-host. Below this, a 'Virtual Machines' section lists various VMs like akwala80-w2k8vm1, brakoas02-centos68vm1, db-rh68vm5, ddowala01-rh68vm1, dev-vm-123481, eryell01-vm11, kingbu14-rh68, rh6-vm-f4b021, and web-rh68vm3. The right side of the console shows a network diagram titled 'ACI Health' with a tree structure: openstack-ac... > epg-2 > cep-10:12:C1... > ac-leaf1 and ac-leaf2. The diagram uses icons to represent different components and their connections.

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SDN in the Data Center (Cisco ACI)

The screenshot displays the Cisco ACI Performance Center interface. At the top, there's a navigation bar with tabs: Dashboards, Inventory, Reports, My Settings, System Health, and Administration. Below this, the 'ACI Console' section is active. On the left, a tree view shows the hierarchy: VNA Domains (Health Score ≤ 100) -> ACI Lab -> Fabric -> Technologies -> Tenants -> aci_openstack -> Application Profiles -> ap-5 -> openstack-access -> epg-0, epg-1, epg-2. Under epg-2, several endpoints are listed, including 'step-10:12:C1:00:01:49', 'step-10:12:C1:00:01:af', and 'step-10:12:C1:00:01:3c-type-silent-host'. Below this, a list of Virtual Machines is shown, including 'akwalw80-w2k8vm1', 'brakoas02-centos68vm1', 'db-rh68vm5', 'ddowala01-rh68vm1', 'dev-vm-123481', 'eryell01-vm11', 'kingbu14-rh68', 'rh6-vm-f4b021', and 'web-rh68vm3'. On the right, the 'ACI Health' section shows a visual representation of the network stack, including components like 'epg-2', 'step-10:12...', 'kingbu14-rh6...', 'vSwitch_192...', 'aci-compute3', and 'aci-leaf2'.

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SDN in the Data Center (Cisco ACI)

The screenshot displays the CA Performance Center ACI Console. The top navigation bar includes 'Dashboards', 'Inventory', 'Reports', 'My Settings', 'System Health', and 'Administration'. The main content area is titled 'ACI Console' and features a 'Filter' box and a 'Health Score' indicator (100). The left pane shows a hierarchical tree of VNA Domains, including 'aci-leaf1', 'aci-leaf2', 'aci-leaf3', 'aci-spine1', 'aci-spine2', 'aci-openstack', and 'Virtual Machines'. The right pane shows a visual representation of the network stack, including 'aci-leaf2', 'aci-spine1', 'aci-spine2', and 'aci-openstack'.

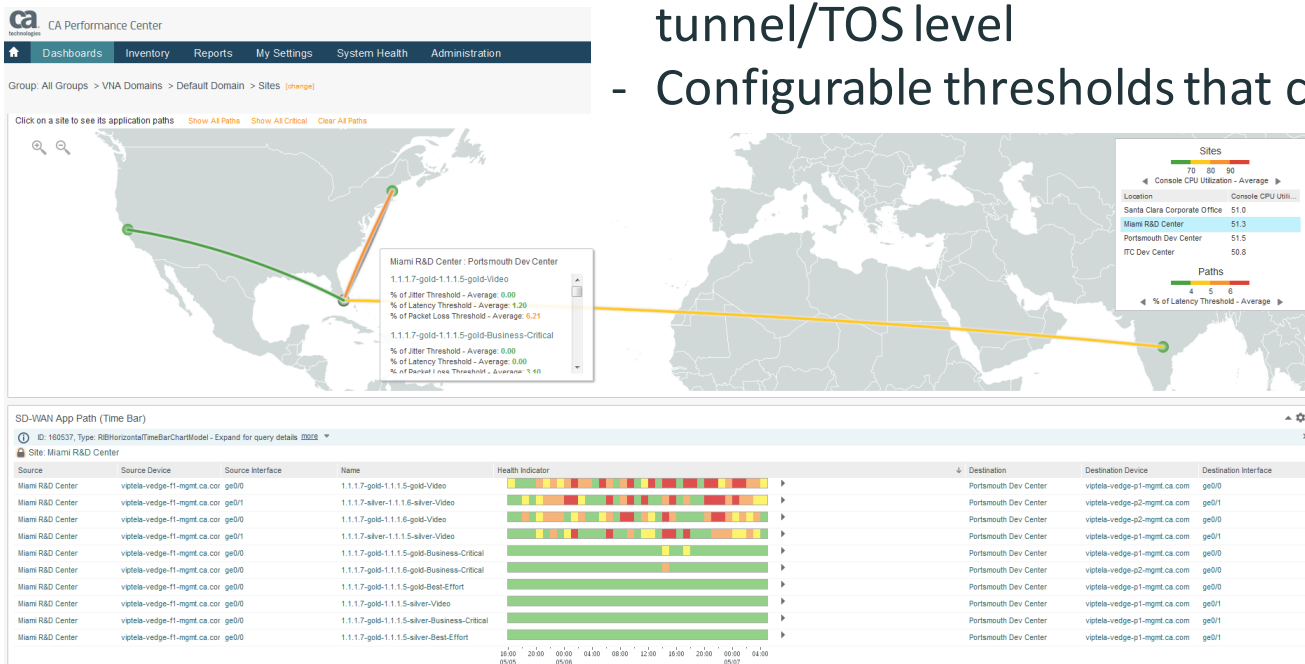
Key Features:

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SD-WAN

Key Features:

- Geographic map
- Interactive dashboards
- Insight into site performance
- Insight into latency, jitter and packet loss at a tunnel/TOS level
- Configurable thresholds that control visual alarms



Looking Ahead...

What Questions Do You Have?

THANK YOU!