Pinpoint – Fault localization (RCA)

• Requirements project
• APIs required per use case, API gap analysis, BP for missing APIs
• Focus on cloud NFV networking
• Extendable to compute and storage
• Reference implementation may be developed
Fault Localization APIs

Fault Localization System
(Set of analysis methods)

User/System

Find root cause(s)
Find correlated failures

Root cause(s)
Correlated failures

Set test
Get test-info

Get info

System OAM tools
- Active tools like ping, trace etc.

Fault/Performance Information sources
- Events
- Alarms
- Statistics
- Logs
- Local fault correlators

Get info

System configuration
- Expected/desired configuration as known by the CMS

Get info

System models
- Layering
- Dependencies
- Topology
- Connectivity
- Policy
System OAM - APIs

- Existing Linux tools – Ping, trace route, etc.
- Existing OPNFV/ OpenStack projects that provide OAM tools
- IETF LIME - Layer Independent OAM Management in the Multi-Layer Environment
Fault/ Performance information sources - APIs

- OpenStack modules – Neutron, Nova, etc.
- OpenStack fault correlator - Ceilometer, Monasca, Vitrage
- External sources – Zabbix, Nagios, etc.

Fault Localization System
(Set of analysis methods)
System configuration - APIs

- Actual configuration – Of both physical and virtual layers
- Expected configuration – Of both physical and virtual layers

Fault Localization System
(Set of analysis methods)

System configuration
- Expected/desired configuration as known by the CMS

Get info
Set config
System models - APIs

- Physical topology – SDN controller NBI, Configuration files, etc.
- Virtual topology – Neutron
Use Cases for analysis

- Physical Switch down
- Switch port down
- Host’s NIC Down
- Damaged host cable (Not disconnected)
- OVS crash
- L2 agent crash
- OVS port down
- Hypervisor crash
- Host restarted
- vNIC crash
- MTU misconfigure
- IP address misconfigure
# Use case analysis - example

<table>
<thead>
<tr>
<th>Root Cause</th>
<th>Symptoms</th>
<th>Required API</th>
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</table>
| 1. Physical Switch down | Management port down  
Neighbor switches port down  
Neighbor hosts port down  
VMs connectivity lost  
Apps connectivity lost | Get physical topology – Find out all existing switches in the domain, connectivity, connection to racks, connection to hosts  
Get virtual topology  
Get mappings: VMs to hosts, Hosts to racks, racks to switch ports, apps to VMs  
Get switch status/ event  
Get switch port status /event  
Get NIC status /event  
Get VMs status /Event  
Activate link OAM tool |
API Analysis - Example

Get physical topology –

- Legacy world –
  - Mtosi is the NBI of the NMS that will provide the topology up to the TOR switch.
  - Tor switch provides Learned Mac addresses via SNMP
  - IPMI manager can provide all the required information about the hosts

- SDN world –
  - SDN controller NBI should provide topology for all SDN switches. ONOS ? ODL ?
  - Learnt MAC addresses ?
  - IPMI manager can provide all the required information about the hosts
THANK YOU
BUILDING A BETTER CONNECTED WORLD

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