Agenda

• Virtual Tenant Network (VTN) in ODL
  • VTN models
  • Service Chaining
  • OpenStack integration

• Demo
Service Chaining with Virtual Tenant Network
OpenDaylight Virtual Tenant Network (VTN) Project

VTN Coordinator:
- Provides VTN API (Northbound)
- Builds VTN models using OpenDaylight API
- Controls multiple SDN controllers

VTN Manager:
- Enables multi tenant
- End-to-end dynamic path control
VTN (Virtual Tenant Network)

- Network virtualization for multi-tenant, traffic isolation, abstraction of physical network
## VTN Models

<table>
<thead>
<tr>
<th>Policy Target</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTN</td>
<td>logical representation of virtual network</td>
</tr>
<tr>
<td>vBridge</td>
<td>logical representation of L2 switch function</td>
</tr>
<tr>
<td>vRouter</td>
<td>logical representation of L3 router function</td>
</tr>
<tr>
<td>vTerminal</td>
<td>Logical representation of virtual node that is connected to an interface mapped to a physical port</td>
</tr>
<tr>
<td>vTunnel</td>
<td>logical representation of Tunnel (consists of vTEPs and vBypass(es))</td>
</tr>
<tr>
<td>vTEP</td>
<td>logical representation of Tunnel End Point (TEP)</td>
</tr>
<tr>
<td>vBypass</td>
<td>logical representation of connectivity between controlled networks</td>
</tr>
<tr>
<td>Interface</td>
<td>representation of end point on the virtual node (VM, servers, appliance, vBridge, vRouter, etc)</td>
</tr>
</tbody>
</table>

**Virtual node (vNode)**

**Virtual Interface**

#ODSummit
Intent based actions

• Define matching conditions (12 tuples)
• Apply intent and actions

Traffic → VTN

- Redirect (Eg. Service Chaining)
- Drop (Eg. ACL)
- Forward (Eg. To destination Port)
- Mark (Eg. QoS)
Traffic redirection

Intent

Redirect traffic

VTN Model

```
vtn Tenant1
{
  vbridge vBridge1
  {
    flow-filter in
    {
      sequence-number 1
      {
        match flow-list match-list-a
        action redirect
        redirect-destination vTerminal1 interface if1
      }
    }
  }
}
```

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Service Chaining on VTN

ODL Controller

VTN #1
Server-A
Server-B
WAN Optimizer
FW
LB

VTN #2
Server-C
Server-D
DDoS
FW

Server-A
Server-B
Server-C
Server-D
WAN Optimizer
DDoS
FW
LB

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OpenStack and VTN
OpenStack and VTN

OpenStack

- Neutron
  - ML2 Plug-in

Applications

- GUI
- App
- Service Chain Policy

ODL

- Neutron Interface
- VTN Coordinator
- VTN Manager
- MD-SAL
- OVSDB
- OpenFlow

OVS

Switch

#ODSummit
OpenStack and VTN: Automatic mapping

- OpenStack
  - Neutron
    - ML2 Plug-in
  - Neutron Interface
  - VTN Coordinator
  - VTN Manager
  - MD-SAL
  - OVSDB
  - OpenFlow

- Applications
  - GUI
  - App
  - Service Chain Policy

- ODL

- OVS
  - Switch

- FW VM

Create FW as VM

Network -> VTN subnet -> vBridge port -> interface port mapping

Ready for service!
OpenStack and VTN: service chaining

OpenStack
- Neutron
  - ML2 Plug-in

Applications
- GUI
- Service Chain Policy
- App

ODL
- Neutron Interface
- VTN Coordinator
- VTN Manager
- MD-SAL
- OVSDB
- OpenFlow

Flow xyz needs to go through FW
match condition: filter = xyz action: redirect to FW

Match condition & action

FW VM
OVS Switch Switch OVS

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Demo Features

• Seamless integration with OpenStack
• Ability to insert service functions dynamically
• Not require NSH capability, work with OpenFlow switches
• Ability to visualize end-to-end flows
Overview

host1 to host3

Virtual Tenant Network

host1

host2

host3

Service-function1

Service-function2

ODL Controller

OpenStack Node

OpenStack Node

Adding 200 ms delay.
Overview

Configure Traffic Redirection

[Match Condition]
SRC IP: host1
DST IP: host3

[Action]
Redirect to “service function1”

Virtual

ODL Controller
Configure Traffic Redirection

Physical

Adding 200 ms delay.
Overview

Configure Traffic Redirection

[Match Condition]
SRC IP: host1
DST IP: host3

[Action]
Redirect to “service function1”

Virtual bridge

Virtual terminals

Service-function1

Service-function2

host1

host2

host3

OpenFlow

ODL Controller

Add 200 ms delay.

Adding 200 ms delay.

OpenStack Node

OpenStack Node

OpenStack Node

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Configure Traffic Redirection

[Match Condition]
SRC IP: host1
DST IP: host3

[Action]
Redirect to “service function1”

Overview

Virtual bridge

Virtual terminals

Service-function1

Service-function2

host1

host2

host3

ODL Controller

OpenStack Node

OpenFlow

Adding 200 ms delay.
Demo Software Components

• OpenDaylight Lithium
  • odl-vtn-manager-rest enabled
  • odl-vtn-manager-neutron enabled
  • VTN Coordinator
• GUI for VTN Coordinator
• OpenStack Juno
Deployment

OpenStack (Control Node)
- Neutron
- ML2 Plug-in

OpenStack (Compute Node)
- OVS

OpenDaylight
- Neutron Interface
- VTN Coordinator
- VTN Manager
- MD-SAL
- OVSDB
- OpenFlow

Applications
- GUI
- Service Chain Policy

Demo Operation

Hosts:
- host1
- host2
- host3

OpenFlow switches
What to expect from VTN in Beryllium?

- Integration with the SFC project
- Provide VTN visualization and configuration support in DLUX
Thank You

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