Demonstration high availability vEPC and SDN controlled Service Chain
Outline

• PoC Overview

• PoC Goals Status Report

• PoC Scenario Report
PoC Overview – I

There is multiple vendors in this POC. COTS servers are provided by HP, and SR-IOV network adapters from Intel are integrated in COTS servers. vEPC, vTC, MANO are provided by Huawei. vVAS is provided by Trend.
The PoC is based on NFV and SDN. Both OVS and SR-IOV are used in vEPC which is based on NFV, and SDN network is used in Service Chaining. All of these VNFs are integrated in the same CloudOS, and managed by the same NFV Orchestrator.
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• PoC Scenario Report
PoC Goals Status Report

- PoC Project Goal #1: This PoC will demonstrate vEPC based on NFV and Service Chaining based on SDN to verify compatibility of these two technologies. Also OVS and SR-IOV technology will be used by vEPC.

- PoC Project Goal #2: This PoC will verify that legacy EPC elements can be implemented by Network Function Virtualization. vEPC has the equivalent functions of legacy EPC and possesses the advantages of NFV elements at the same time, such as fast deployment, scalability, high reliability.

- PoC Project Goal #3: This PoC will verify that Dynamic Service Chaining will be possible by using vVAS and SDN. Flexible Service Chaining policy definition will be verified.
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Flexible Service Chaining Policy Definition

There are three Service Chaining policies: local static policy, pre-define policy and dynamic policy.

- Local static policy is configured on vTC. Rules in the policy is bound to Service Chain ID. Traffic flows will be forwarded to vVAS when they match policy successfully.
- Pre-define policy is configured by PCRF, and the policy itself is configured on vTC. vTC will get pre-define policy name over Gx interface when service traffic matches the policy successfully.
- Dynamic policy is configured by PCRF, and rules in policy are associated with Service Chain ID. Policy and Service Chain ID will be sent to vTC when subscriber is online.

Value-added service can be done based on subscriber or type of service. Subscribers who subscribe to 3rd party value-added service can sign Service Chaining policy. When these Subscribers initial traffic, value-added service will be applied if traffic match policy. And value-added service can be also applied for some particular service types, once these service types are initialled, value-added service will be applied.
PoC Scenario Report - Scenario 6 – II

ServiceChain ID

URL Filtering

Trend Micro Deep Edge Security Event

URL Blocked

Deep Edge blocked access to this website because URL Filtering security restricts the URL category.

Event Details

URL: [www.schu.com/v]

Category: [救灾]

If you believe this URL was blocked in error, please contact your IT staff to resolve this issue.

Trend Micro Deep Edge (DeepEdgePAT)
Reliability (VM level and Host level)

For VM failure test, procedures are listed here:
- Attach one real UE (datacard or cellphone) to the system, and access to the internet, such as watch a video on www.youku.com.
- Simulate some subscribers by the simulator.
- Discover the VM which serves the real UE.
- Reboot the VM.
- Video is playing without any interruption. And no subscriber will be lost.
- When the VM completes reboot, video is still in playing.

For Host power off test, procedures are listed here:
- Attach one real UE (datacard or cellphone) to the system, and access to the internet, such as watch a video on www.youku.com.
- Simulate some subscribers by the simulator.
- Discover the Host which serves the real UE.
- Power off the Host.
- Video is in playing without any interruption. And no subscriber will be lost.
### PoC Scenario Report - Scenario 5 – II

#### Before VM power off

<table>
<thead>
<tr>
<th>User Number</th>
<th>VM State</th>
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<tbody>
<tr>
<td>Before VM power off</td>
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#### After VM power off

<table>
<thead>
<tr>
<th>User Number</th>
<th>VM State</th>
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<tr>
<td>After VM power off</td>
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#### VM power on

<table>
<thead>
<tr>
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vEPC VM auto scaling based on resource in SR-IOV network

The threshold of automatic scaling is determined by system load. System load is reported by VNF to MANO, and MANO initiates scaling operation according to pre-defined policy.

A Simulator will be used to generate and remove sessions by simulating eNB and UEs. First of all, the policy for scale in/out should be defined on MANO. Then, the simulator is used to generate service traffic. MANO will query the system load periodically. MANO will ask for one new VM when it detects that the system load exceeds the threshold defined in the policy. At last, CloudOS will create one new VM requested by MANO.

Compared with traditional embedded hardware, COTS server does not have proprietary hardware acceleration facilities, such as, chips for DPI or user plane forwarding. So SR-IOV is the key technology to improve performance (latency, throughput) in NFV environment. We use SR-IOV technology in vEPC, traffic will be sent from virtual NIC to physical NIC without passing through OVS in CloudOS. When equipped with SR-IOV technology, vEPC exhibits good performance. However, SR-IOV may also cause inconvenience to flexible deployment.
PoC Scenario Report - Scenario 4 – II

Before Scale out

Scaling

After Scale out

NFV Orchestrator

System Load

Before Scale out

Scaling

After Scale out

The result is as follows:

PoC3: WORKLOAD: %
NETCODE = 0 Operation Success.

THE RESULT IS AS FOLLOWS:

PoC3: WORKLOAD: %
NETCODE = 0 Operation Success.

The result is as follows:

PoC3: WORKLOAD: %
NETCODE = 0 Operation Success.

The result is as follows:

PoC3: WORKLOAD: %
NETCODE = 0 Operation Success.
THANK YOU

www.huawei.com

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