

Cloud Transformation Reflections on NFV challenges

Ljubiša Crnadak

Solution Manager Cloud Core Solution Sales, CEE&Nordic Region

Cloudification Beyond Virtualization







How does IT practice Cloudification?









Only show single external IP address to remote node

Only show single external



8

Only show single external

IP address to remote node



9



Only show single external

IP address to remote node



10

Global traffic distribution via LB







How should Telecom practice Cloudification?

Telecom Use Case of Resource On-demand



Data

Capacity

Voice

Capacity

•Capacity of resource pool is automatically •Scale out as traffic grows Scale in as traffic decreases re-allocated between PS and CS in earthquake •Rapidly recycle and reuse resources Scale in for data traffic Voice •Fully automated scaling Scale out for voice traffic Capacity Data Capacity Earthquake Peak Peak Peak **Natural Disaster Case Thailand Case**

















 Resource utilization is only 50% as standby node is idle before becoming active.





- Resource utilization is only 50% as standby node is idle before becoming active.
- Both active and standby fail because of COTS failure.





- Resource utilization is only 50% as standby node is idle before becoming active.
- Both active and standby fail because of COTS failure.





- Resource utilization is only 50% as standby node is idle before becoming active.
- Both active and standby fail because of COTS failure.





Traffic cannot be re-balanced quickly after scale out



22



Traffic cannot be re-balanced quickly after scale out

23



Traffic cannot be re-balanced quickly after scale out





Call Traffic











NFV need to ensure Carrier-grade Availability and Elasticity



VNF with 3-Tiers Cloudified Architecture







Call traffic can be switched over to healthy VM quickly (~second) and no call loss.

Cloudified Architecture (scale out)





After scaling out, existing call traffic is re-balanced very quickly (~seconds)





Flow Control Objective: Avoid system collapse because of traffic storm or unusual traffic.

vCPU Load is not accurate for flow control in NFV



- If traffic control is only based on CPU load:
- Not Accurate: traffic is not balanced among VMs.
- Overestimate: Cause false flow control
- Underestimate: Do not control traffic after overload. Cannot handle signal storm in Telecom.





Enhance HA via COTS Agnostic Overload Control Mechanism: Queue Flow Control





- Under 1.5 times overload, ITU-T G.543 require that access success rate should reach 90%. Non-Cloudified architecture cannot meet this requirement.
- After 2.8 times overload, Huawei IMS access success rate still reaches 90%.

Proactive Recovery rather than Reactive Dealing with Fail





- More than 50% network fault due to partially unhealthy behavior (delay, jitter, packet loss, packet corrupted, etc.)
- Harder fault detection and recovery in layered cloud system

KPI-based Partially Unhealthy Detection and Auto-Healing



Real time Monitoring of KPI, Proactive Recovery Service





VNF and VNFC semi-health detection and healing based on KPI



Guaranteed Carrier-grade Availability via Application



	Top N Failure and Deal Ways						
	Application Abnormal terminated	Network Qos descending	Single server failure	Single hard disk failure	DC failure	Cloud OS overhead	Guest OS Hang/Crash
App Layer	Others takes over the failed one	Swap traffic to another virtual Network plane	Others takes over the failed one's traffic	Read/write Data from redundancy disk	Cross-DC redundancy	NONE	Others take over the failed one
Cloud OS	NONE	NONE	Re-Spawn VM	NONE	Re-Spawn VM (normal DC)	VM migration to other DC	Reset VM
Hardware	NONE	NONE	Isolated	Isolated	Manual check	NONE	NONE





- 1+1 Redundancy, Non-distributed architecture
- Data and service are coupled
- Centralized Database
- Resource reservation for Redundancy
- Low resource utilization efficiency

- Don't rebalance after scale out
- Auto-Scale in with Call Lose







Cloudification

- All-Active, Distributed architecture
- Data and service are de-coupled
- De-centralized Database
- Resource On-demand
- Maximize resource utilization
- Auto-Scale with no any Call Lose
- Fault automatic detection and diagnosis, auto-healing based on service KPI



CloudEPC Example



TARGET ARCHITECTURE OF CLOUDEPC

Current



Future



Huawei CloudEPC VNF Architecture





VNF Deployment Approach

Command Way (Manually, Low Efficiency)



#setup network
Ifconfig eth0 0.0.0.0
brctl addbr br0
brctl addif eth0
#setup storage
qemu-img create -f qcow2 /vdisk.img 10G
#Create VM
virt-install \
 -n mylinux \
 --description " VM with RHEL 6" \
 --os-type=Linux \
 --os-variant=rhel6 \
 --ram=2048 \
 --vcpus=2 \

#Upload VNF --disk path=/vdisk.img \ **Openstack As a Tool** (Semi-Automatic NFV)





Huawei Openstack+MANO Batch,Automatic,Dynamic NFV)



NS Descriptor





Huawei NFV Architecture: Comply with NFV and Keep Openness



MANO (VIM + NFVO + VNFM)

NFVO

- NFVO manage network service lifecycle
- (EPC, IMS, VOLTE...)
- NSD: NS descriptor, a set of files that describes the VNF topology and resource requirements during the lifecycle of the NS

VNFM (S-VNFM/G-VNFM)

- VNFM manage VNF lifecycle
- (vUSN, vUGW, vCSCF...)

VNFD: VNF descriptor, a set of files that describes the VM topology and resource requirements during the ifecycle of the VNF

VIM

 Manage physical resources lifecycle Create VM , delete VM Collect hardware alarm info.



CloudEPC On Board with MANO



MWC 2017 – NFV Solution: Best Technology Enabler



Huawei Rotating CEO Eric Xu: Video Powers New Growth

On February 28, 2017, Huawei Rotating CEO, Eric Xu gave a keynote themed "Video Powers New Growth" at Mobile World Congress 2017. He pointed out, "Content and video are redefining the telecom industry. For telcos, video is not really a matter of choice. It's clear now that video is becoming a new basic service. It's a matter of fact, and it will open the doors to huge growth potential. Operators have no choice but to succeed in video."



Huawei Wins 'Outstanding Contribution for LTE Evolution to 5G' Award at MWC 2017

Huawei's NFV Solution Awarded Best Technology Enabler at MWC 2017



Huawei's AAU Solution Awarded Best Mobile Infrastructure at MWC 2017



Huawei X Labs brings you future experiences at GSMA Innovation City



Thank you

Copyright©2017 Huawei Technologies Co., Ltd. All Rights Reserved.

The information in this document may contain predictive statements including, without limitation, statements regarding the future financial and operating results, future product portfolio, new technology, etc. There are a number of factors that could cause actual results and developments to differ materially from those expressed or implied in the predictive statements. Therefore, such information is provided for reference purpose only and constitutes neither an offer nor an acceptance. Huawei may change the information at any time without notice.

