

Open Source and Network Function Virtualization

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Agenda

- 1. What is NFV?
- 2. Why are telcos investing in NFV?
- 3. Open source for NFV
- 4. Filling in the gaps

1. What is NFV?



What is NFV?

"NFV is a network architecture concept that proposes using IT virtualization related technologies to virtualize entire classes of network node functions into building blocks that may be connected, or chained, together to create communication services"

Wikipedia: http://en.wikipedia.org/wiki/Network_Functions_Virtualization



What is NFV, in simple terms?

Telcos are replacing specialized hardware with VMs running on commodity hardware



2. Why do telcos care?















Fast Cash For Your Slow Modem.

During Hayes Modem Trade-Up Days Now through April 30, 1985

*The promotion is available only through participating dealers in the U.S. and Canada. Please allow 4 to 6 weeks delivery for rebate check. Smartmodem 1200 and Smartmodem 1200B are trademarks of

AnyModen

and telephone charges, now's the time to trade up to the industry leader-Hayes Smartmodem 1200™ (operates with the IBM® PC and many other personal computers, including Macintosh™) and Hayes Smartmodem 1200B™ (plug-in board modem for the IBM PC and compatibles)

Cash saving rebate.* During Hayes Modem Trade-Up Days, bring in your old modem (any speed, any make) to a participating dealer. And Haves will send you a cash rebate when you purchase a new Smartmodem 1200. If your used modem is a Hayes, we'll send you \$50; if it's some other brand, we'll send you \$25. It's that simple.

What's more, we've just reduced the price of Smartmodem 1200 and 1200B, so you'll actually save two ways!

Get on-line with the leader. Don't miss this special opportunity to dramatically increase the

If your old modem is costing you too much in time speed and performance of your communications. While cashing in on some great savings from Hayes, the telecomputing leader.

Film and rolion

Call right away for the name of your nearest participating dealer. And get fast cash for your slow modem.

1-800-255-2550 (In the Continental U.S.). (Call 1-800-447-0890 in Alaska and Hawaii). Remember. Our modem trade-up offer is only

good through April 30th. So call today.



Haves Microcomputer Products, Inc. 5923 Peachtree Industrial Blvd Norcross, Georgia 30092

Circle 2 on the Reader Service card or GO EBB.

ss Machines Corp. @1985 Haves Microcomputer Products. In





Telco services - access

- Dial-up
- ISDN
- ADSL
- Cable

- Fibre optic
- 3G/4G
- Satellite



Telco services - applications

- Voice
- Internet/data
- Live TV/streaming
- VOD
- DVR
- TV Guide

- SMS/MMS
- Games
- VoIP
- Voicemail
- Premium services
- •



Telcos provide more services today than ever before









-

Telco industry more competitive than ever

- Costs dominated by data usage
- Customers expect more data for less
- Demand for new services increasing





The promise of NFV



Increased agility





Reduced CapEx, OpEx





What is a network node function?



Network functions





"Middleboxes"

- Act on data going through the network
- Examples: Load balancer, gateway, IDS, VPN endpoint, NAT, firewall
- Not just telco



Likely areas for virtualization

Application servers: UC, IP Telephony Voice core: CSCF, IBCF, MGCF, softswitches Media plane intensive applications Signaling plane intensive applications Highly likely Policy and charging: PCRF Somewhat likely Subscriber Data Management: HSS, HLR, VLR Neutral NGN and IMS Session Control: SBC, Somewhat unlikely P-CSCF Highly unlikely 3G Mobile core: SGSN, GGSN Enterprise Edge - eSBC, routers CDN networks 4G EPC: SGW, MME, PGW 0% 20% 40% 60% 80% 100%



3. Open Source and NFV



Why Open Source?



Cloud





Private cloud





DevOps and agile development





Open source drives the cloud





The Open Source NFV Platform



Virtual compute





QEMU/KVM





http://wiki.qemu.org



redhat.



libvirt





http://www.libvirt.org



Virtual storage









Ceph





http://www.ceph.com



NFV and Open Source

Virtual network



OPEN VSWITCH

An Open Virtual Switch

DPDK



OpenDaylight



http://www.opendaylight.org




Open vSwitch

OPEN VSWITCH

An Open Virtual Switch



http://www.openvswitch.org



DPDK









Virtual infrastructure management





OpenStack





http://www.openstack.org



All done?



Not quite perfect...





4. Filling the gaps



VNF as a Service



(ETSI #2)



Service Function Chaining





Virtualized Mobile Base Station



- Deterministic latency
- Accelerated dataplane performance
- Federation of multiple clouds
- High performance signal processing
- IPv6 support

(ETSI #4)



Resource reservation





Fault management



Fig. 1: Steps in Fault Management





Open source and NFV

http://opnfv.org http://wiki.opnfv.org





OPNFV Project Scope









Upstream first





Fork-free zone







Red Hat and NFV



Getting the platform





Performance: SR-IOV support





NUMA awareness





Real-time KVM



RHEL7.x Realtime Scheduler Latency Jitter Plot



cyclictest -m -n -N -q -v -p95 -h60 -i 200 -D 1h

DPDK accelerated OVS





RHEL7 – 40G Network Data/Tuned (12 ports/host)

Network Throughput Gbps

RHEL7.x, 12 x 40Gb NICs

TCP_STREAM, 48 x 16KB, Bi-directional





Network Functions Virtualization (NFV) Throughput and Packets/sec @ 64 bytes (RHEL7.x+DPDK)





Red Hat NFV Ecosystem





Thank you!





Bonus slides



Project web sites



KVM





http://wiki.qemu.org



libvirt





http://www.libvirt.org



Ceph





http://www.ceph.com



NFV and Open Source

OpenDaylight



http://www.opendaylight.org



NFV and Open Source

Open vSwitch

OPEN VSWITCH

An Open Virtual Switch



http://www.openvswitch.org



DPDK








OpenStack





http://www.openstack.org





oVirt

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http://www.ovirt.org

NFV and Open Source









http://www.opnfv.org



NFV and Open Source

ETSI NFV ISG



http://www.etsi.org/technologies-clusters/technologies/nfv



SR-IOV certified hardware

Current supported and certified cards are listed at: https://access.redhat.com/articles/1390483

