VIRTUALISED NETWORK FUNCTIONS
SI & VALIDATION PROGRAM AACHEN

ANDREAS KEMPER
SOLUTION ARCHITECT
VNF VALIDATION @ EDD

› **Why?**
  – Motivation & Drivers
  – Certification vs. Validation

› **What?**
  – Coverage & Scoping
  – Vertical vs. Horizontal

› **How?**
  – From VNF to E2E

› **Outcome**

› **Standardization ???**
EXTENSIVE PORTFOLIO OF VIRTUAL NETWORK FUNCTIONS

- IoT
- MVNO
- Communication
- Distributed Mobile Broadband
- vCPE
- Enterprise
- Mobile broadband EPC
- Virtual IMS
- Virtual UDM
- vEPG
- vSAPC
- vCSCF
- vMSP
- vHLR
- vHSS
- vMMEM
- vSASN
- vSBG
- vDCS
- vIPWX
- vMSS
- vSGSN
- vWMG
- vMTAS
- vEME
- vEVR
- vXXX
CERTIFICATION VS. VALIDATION

Native solution

Certification incl. Assurance (Vertical)

Validation incl. Assurance (Vertical)

VNF TaaS

100% Test Coverage

Application

Hardware

100% Guaranteed and repeatable

100% Guaranteed and repeatable

100% Functionality guaranteed

VNF

ECEE

E//-/Partner Hardware

Partner Hardware

VNF

VNF

VNF

ECEE

VMware

3PP Cloud System

3PP Cloud Certified 3PP HW

ECEE Certified 3PP HW or Ericsson HW

VMware

VMware

VMWare Certified 3PP HW

Vertical SI separate activity

100% Functionality guaranteed

Scenarios not addressed in product roadmap
### TaaS SERVICE PACKAGES

**Fundamental VNF SI & Validation Service Package**
- Categories
  - Instantiation
  - IP & Networking
  - Functional
  - Recovery
  - Basic Security (login and OS Hardening)

**O&M Service Package**
- **(optional)**
- Categories
  - Operational & Maintenance
    - Configuration-, Fault and Performance Management, Health Checks
  - Maintainability
    - (Backup & Restore, Cloud Resource audit)

**Performance Assessment Service Package**
- **(optional)**
- Categories:
  - Characteristics (capacity and KPIs)
  - Redundancy (interface redundancy and system functions)
  - Robustness (interface robustness and platform robustness)
  - Stability (traffic and overload)

**Life Cycle Management**
- **(optional)**
- Categories
  - VNF updates, Correction Packages, EPs
  - NVF-Infrastructure upgrades
  - VIM updates or even SWAPs
  - EM, VNF-M, NFV-O updates

**Charging Service Package**
- **(optional)**
- Categories
  - Online charging
  - Offline charging

**Security Audit Service Package**
- **(optional)**
- Categories:
  - NVFI Hardening
  - VIM Hardening
  - …

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Testing and no commitment to fix issues. (only if the issue is replicable in the certified solution – SW fault)

Testing and fixing issues in (2-) 3 SW drops

Process in place today in Aachen.
TOL – TEST OBJECTIVE LIST

Contains following groups of test cases

1.) Selected functional use cases that proof that all inter-VNF communication works as expected and according to ETSI & 3GPP standards (this includes indirectly inter VM communication of a VNF)

2.) Typical cloud use cases, as deployment, decommissioning, scaling, back-up, … which includes also most of previously mentioned mandatory vSphere test cases

3.) Robustness and resilience use cases, e.g. link break, switch failure, etc.

New

4.) Merged with selected network setup test cases from vIMS
5.) Merged with selected network setup test cases from vEPC
6.) “Advanced” cloud test cases as e.g. additional mandatory + optional test cases from VMware Ready for NVF certification

What will be next?

7.) Alignment and addition of **OPNFV** test cases started. Consolidation co-driven with INTEL of work done within Yardstick, FuncTest, Pharos, … testing / certification projects
### TOL EXAMPLE

#### UC DESCRIPTIONS: [https://ericsson-internal.eicsson.com/sites/Vee](https://ericsson-internal.eicsson.com/sites/Vee)

<table>
<thead>
<tr>
<th>Chapter #</th>
<th>Demo Cases</th>
<th>Description</th>
<th>Prior</th>
<th>Tester</th>
<th>Date</th>
<th>eTCK / HP</th>
<th>Latest UV Ye</th>
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<tbody>
<tr>
<td>3</td>
<td>Feature / Interface verification</td>
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<td>3.1</td>
<td>Basic Scenarios</td>
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<td>3.1.1</td>
<td>Initial Registration</td>
<td>Register ORIG.ONE_user</td>
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<td>30/11/2015</td>
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<td>3.1.2</td>
<td>Chat 1:1 Non-store and forward - Orig</td>
<td>B1_ORIG.ONE_user</td>
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<td>3.1.3</td>
<td>Chat 1:1 Non-store and forward - Term</td>
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<td>3.1.4</td>
<td>Chat 1:1 store and forward - Orig</td>
<td>B2_ORIG.ONE_user</td>
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<td>Run</td>
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<td>3.1.5</td>
<td>Group Chat-OFF</td>
<td>Group Chat_OFF.ORIG.ONE_user</td>
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<td>3.1.6</td>
<td>Group Chat-OF</td>
<td>Group Chat 3 Sub</td>
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<td>3.1.7</td>
<td>Group Chat-TIP</td>
<td>Group Chat_TIP.ORIG.ONE_user</td>
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<td>3.1.8</td>
<td>File Transfer FTP -&gt; Orig</td>
<td>B1_FTP.ORIG.ONE_user</td>
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<td>File Transfer FTP -&gt; Term</td>
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<td>File Transfer -&gt; Orig</td>
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<td>3.1.11</td>
<td>File Transfer -&gt; Term</td>
<td>File Transfer.TERM.ONE_user</td>
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<td>Run</td>
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<td>3.1.12</td>
<td>Verify IMAP access and stored messages (CMS)</td>
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<td>3.1.13</td>
<td>Check SIGTRAN scfp associations get established from osf blade (PSMGR)</td>
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<td>3.2</td>
<td>Backup and Restore</td>
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<td>3.2.1</td>
<td>Create Backup - to be checked</td>
<td>Create backup of System data</td>
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<td>3.2.2</td>
<td>Restore Backup - to be checked</td>
<td>Restore a backup (Requires reboot of Cluster)</td>
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<td>3.2.3</td>
<td>Delete Backup - to be checked</td>
<td>Delete an existing Backup</td>
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<td>Operation and Maintenance</td>
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</table>
VoLTE, WiFi-CALLING + MSP POC “CLOUD IN A BOX”

HP c7000 with 9x Gen9 blades
VIRTUALISED VOLTE E2E TESTING

END2END VIRus TOOL

END2END VIRTUAL CORE

Performance measurements
Dimensioning & collocation
WAY OF WORKING

› Week 1: High Level Design (HLD)
  – Confirm VNFs in focus / to start with
  – Dimensioning of cloud infrastructure

› Weeks 2-5: Low Level Design (LLD)
  – Ordering & build of E-Block hardware + site surveys
  – Start in parallel with Low Level Design (LLD)

› Weeks 6-7: Site Activities / OVF Preparation
  – Delivery & integration E-Block into data center
  – Prepare customized VNFs according to LLD

› Weeks 8-9: Configuration & Integration
  – Prepare virtualized networking & deploy VNFs
  – Integrate & configure VNFs in VoLTE network