Verification of NFV Services : Problem Statement and Challenges

draft-irtf-nfvrg-service-verification-00

M-K. Shin, ETRI, K. Nam, Friesty
S. Pack, KU, S. Lee, ETRI
R. Krishnan, Dell, T. Kim, LG U+

NFVRG Meeting@IETF94, Yokohama, Japan

Overview

- NFV relocates network functions from dedicated hardware appliances to generic servers, so they can run in software. However, incomplete and/or inconsistent configuration of VNF and FGs (aka, service chain) may lead to verification issues.
- This draft discusses properties to be checked on NFV services. Also, we present challenging issues related to verification in NFV environments.

Table of Contents

Changes since IETF93

- Adopted as a RG document
- Address all the comments from last meeting
  - New sections added
    - Implementation examples (section 3)
      - NS policy conflict with NFVI policy
    - Gap analysis of relevant works in open source projects (e.g., OPNFV, ODL, etc.) (section 6)
- And many editorial updates

Example - NS policy conflict with NFVI policy

Another target of NFV verification is conflict of NS policies against global network policy, called NFVI policy.

<Example conflict case #1>
- o NS policy of NS_A (composed of VNF_A and VNF_B)
  - Resource constraints: 3 CPU core for VNF_A and 2 CPU core for VNF_B
  - Affinity rule between VNF_A and VNF_B
- o NFVI policy
  - No more than 4 CPU cores per physical host
- o Conflict case
  - The NS policy cannot be met within the NFVI policy

<Example conflict case #2>
- o NS policy of NS_B (composed of VNF_A and VNF_B)
  - Affinity rule between VNF_A and VNF_B
- o NFVI policy
  - Place VM whose outbound traffic is larger than 100Mbps at POP_A
  - Place VM whose outbound traffic is smaller than 100Mbps at POP_B
- o Conflict case
  - If VNF_A and VNF_B generate traffic in 150Mbps and 50Mbps, respectively,
  - VNF_A and VNF_B need to be placed at POP_A and POP_B, respectively according to the NFVI policy
  - But it will violate the affinity rule given in the NS policy

Example - NS policy conflict with NFVI policy

<Example conflict case #3>
o NS policy of NS_C (composed of VNF_A and VNF_B)
  - Resource constraints: VNF_A and VNF_B exist in the same POP
  - Auto-scaling policy: if VNF_A has more than 300K CPS, scale-out
o NFVI policy
  - No more than 10 VMs per physical host in POP_A
o Conflict case
  - If CPS of VNF_A in POP_A gets more than 300K CPS,
  - and if there is no such physical host in the POP_A whose VMs are smaller than 10,
  - VNF_A need to be scaled-out to other POP than POP_A according to the NFVI policy
  - But it will violate the NS policy

Next step

- We are now implementing verification services for vEPCs and reflect them in next revision as more specific examples.
  - Add more specific verification services for vCPE and vFW, as well as vEPC (or publish them in a separate document)
- We'll identify gaps in the implementation and/or existing open sources and suggest ways to fill those gaps.