

Acceleration Management (BoF)

1. Research Motivation

1.1 What is acceleration?

NFV Acceleration deals with both hardware and software accelerations. It is provided by NFVI to meet some specific performance requirement of VNFs, which can be done by hardware, software or any combination thereof. At present, the core of accelerating technology is to find the appropriate design way of AAL(acceleration abstraction layer).

1.2 Why do we need acceleration in NFV?

We can consider this problem in three aspects:

- 1) We can consider this problem in three aspects;
- 2) We concern about the best performance per processor core/cost/watt/square foot, whatever the absolute performance metric is;
- 3) We want to reach maximum theoretical performance level.

1.3 What is acceleration management?

Because the type of NFV acceleration deployment varies from an integrated deployment to a disaggregated deployment.

In order to accommodate the possibility of a disaggregated deployment, we use acceleration management to ensure higher-level orchestration capabilities, utilization monitoring, and customer SLAs are supported.

1.4 Acceleration use case

1) Compute Acceleration? IFA 001: Page 14-24?

Page	Title	NFV Components	MANO	Accelerator
14-15	IPSec tunnels termination VNFC	VNFC, VNFD, VIM, Orchestrator	Nf-Vi -Instantiation and VNFD, VIM	look-aside, in-line, fast path, software
15-16	Next Generation Fire Wall (NGFW) Acceleration	NFVI, Software Architecture, Performance and Security	Local or remote API	NFVI Fast Path, In-Line, and Look-Aside Accelerators
16-19	Virtual Base Station (VBS) L1 Acceleration	VNF/VNFC, VIM, Compute Nodes, Networking Nodes, HWA Nodes	VBS VNF , Operating configurations, Orchestrator and VIM , VNF Manager and or VNF EMS	Two options: 1. In-Line; 2. Look Aside accelerator
19-21	Virtual Acceleration Interface for VNFs	NFVI, MANO, Software Architecture, Performance and Security	Match VNF's accelerator's requirements with NFVI's accelerator capabilities	Crypto -Public key and Symmetric Key, IPsec Protocol Accelerator, etc.
22-23	Transcoding	VNF/VNFC, VIM, NFVO, VNFM	Requirements of VNFM and NFVO, VNFD, VIM	Look-aside, In-line, Fast Path or Optimized SW Path
24	Deep Packet Inspection	VNF/VNFC, VIM, NFVO, VNFM	Some functions listed in the table	Look-Aside, Fast-Path, etc.

2) Network Acceleration? IFA 001: Page 24-34?

Page	Title	NFV Components	MANO	Accelerator
25	Load Balancing and NAT	Compute Node, including an intelligent NIC with offload capability	Managing the vSwitch through a local API is required. This acceleration is transparent to the VNFs.	NFVI Fast Path, In-Line, and Look-Aside Accelerators
26-29	NFVI Virtual Networking Offload	VNF, VIM, Compute Node, Network Node, Storage Node, HWA Node	Items of MANO related aspects	Fast Path; based on OF based packet processor
30-33	NFVI Secure Overlay Offload	VNF, VIM, Compute Node, Network Node, Storage Node, HWA Node	Items of MANO related aspects	Fast Path; based on OF based packet processor
33-34	Dynamic Optimization of Packet Flow Routing	VNF, VIM, Infrastructure Network including Network Controller	The VIM requests the Network Controller to provide a logical switch dedicated to the VNF	Physical switches, virtual switches and other accelerator devices

3) Storage Acceleration? IFA 001: Page 35-36?

P a g e	Title	NFV Components	MANO	Accelerator
35	NVMe™ Over Fabric Enabled Acceleration	VNF/VNFC/VNFD ,VIM,Compute Node,Storage Node/Virtual Storage	VNFD,VIM	In-Line Accelerator
36	High Performance Persistent Memory on Compute Node	Compute Node ,VNF Manager ,VIM , Orchestrator	VIM and Orchestrator need to know about available capacity, location and mode of access of persistent memory. VIM has to maintain usage count.	Optimized Store

1.5 Acceleration Management

In order to accommodate the possibility of a disaggregated deployment, we use acceleration management to ensure higher-level orchestration capabilities, utilization monitoring, and customer SLAs are supported.

2. Problem Statement

2.1 The description and issuance of acceleration requirement

1) Two kinds of technical route:

Technical Route	Pros	Cons	Maturity level
Specify the model and release requirements for specific hardware/software,such as EPA /HPA ,etc.	Simple, easy to operate	It binds specific hardware/software to form chimneys, and is not conducive to platform generalization and resource pooling in consequence	It has been applied in practice
Specify acceleration management function as well as performance index requirements, such as items described in IFA004.	Evolve the decoupling ability of appliance and platform independently	It relies on virtualised acceleration technology, and requires a third party or additional mechanisms to establish correlation matching knowledge of requirements description and platform characteristics	It has not been actually applied

2) A hybrid version of two technical routes is currently included in IFA011

3) Related ONAP module include?VNF Modeling?VNF SDK?SDC?Mcloud

2.2 The discovery and monitoring of resource capability

1) Two kinds of solutions:

Solution Name	Pros	Cons
Openstack Nova	It is applicable to instruction set expansion, DPDK and other computing nodes' internal hardware and software platform acceleration managementability, there are mature application cases	It is suitable for all types of acceleration capability discovery and state monitoring; It can be combined with Nova or complete the discovery and monitoring of computing nodes' internal hardware and software platform acceleration management ability independently.
External resource scheduling– OpenstackCyborg	It cannot be applied to external acceleration capability management, and can not be applied to programmable acceleration capability management	Newcomer of OpenStack main version, the features /performance/stability need validation; Supported accelerationchip types are limited and end-to-end application case validation is not implemented.

2) Related ONAP module include?Mcloud?A&AI?DCAE

2.3 Matching & scheduling of demand and capability

1) Concrete description way

Accurate matching? Optimal matching?

2) Abstract description way

Establishment, maintenance and application of knowledge database

3) Related ONAP module include: OOF?Policy

3. Proposals

3.1 Form an interest group

- Anybody interested in joining the thread? Please contact Lei Huang, email address: 18350830036@163.com
- We can form an interest group under usecase/architecture teams identify a target usecase and develop a joint plan for C+ release.

3.2 Determine service scenarios

3.3 Confirm version plan