

Rocket

Project Name: Rocket

- Proposed name for the project: Rocket
- Proposed name for repository: Rocket

Project description:

With the development of 5G and MEC, especially the emergence of AI, applications of high throughput, complex business and other new services which demand rapid compute capability, combined with the limited datacenter space conditions, it urgently requires the computing, network and storage acceleration abilities, like offloading compute capability from CPUs to certain hardware accelerators, and so on.

Nowadays, the acceleration products provided by the manufacturers are various and have different characteristics. If accelerators will be applied in the NFV architecture, the following factors should be taken into consideration:

- 1, Performance improvement effects that should be achieved
- 2, Power consumption caused by accelerators, servers, switches, cooling, and so on.
- 3, Servers scale to deploy certain VNF.
- 4, Price of Accelerators.
- 5, Acceleration points, including VNFs and VNF's function to be accelerated.
- 6, Accelerator type which is suitable for certain VNF
- 7, Designing common API between VNF and NFVI, so that VNFs could use hardware accelerators capability without being aware of accelerators manufacturer differences.
- 8, Testing method of accelerators and effects of acceleration.
- 9, CPU+GPU + FPGA edge cloud resource pool architecture designing in the future.
- 10, Whole acceleration architecture and accelerator specification.
- 11, Unified management of various accelerators by VIM.

All the problems above and potential ones need to be discussed and solved, and that is why the Rocket project is going to be proposed.

Rocket project will focus on the solutions which can solve the problems above, especially a reference design on common API of accelerators, with which VNFs could use the accelerators with screening manufacturer differences to meet the urgent requirements of performance and power.

Objectives:

- 1) Requirements analysis for VNFs' acceleration
 - Analyze and conclude the acceleration requirements of VNFs
 - Analyze which functions of VNFs are suitable to offload to hardware and how.
 - Start with OVS offload and vEPC GTP function offload, and explore how to offload those functions with common APIs. After that, explore methods of offloading more VNFs and more functions and expand the common APIs.
- 2) Accelerators common API design
 - Design a common API between VNF and NFVI for acceleration in order to screen the manufacturer differences. The common API is marked by a red circle as shown in the following figures 1 and 2. That is to say, no matter which vendor is providing the accelerator, the third party manufacturers' VNFs could use accelerators to accelerate certain functions through the common API. The common API mainly includes signaling, control and data messages. Rocket project is focusing implement code of the common API, and integration of the API.

Scope:

- The project will focus on VNFs how to use accelerators regardless of different providers to meet hardware-accelerated requirements.
- Scope includes VNF,NFVI,VIM,MANO
- The scope excludes developing VNFs, Apps or accelerators.

Testability:

- Testing methodologies will be extended with use cases specific to the VNF's accelerated scenario, which will be described in the documentation of Accelerator testing specification.

Documentation:

- Requirements analysis for VNFs' accelerations
- The common API design and implement code
- Accelerator technology specification
- Accelerator testing specification

Dependencies:

- **Related OPNFV project: Edge cloud**
 - Cooperate with Edge cloud project in acceleration use cases. Integrate the acceleration project into Edge cloud scenarios, and take Edge cloud requirements as one of the inputs of Rocket project. Test acceleration scenarios in Edge cloud to verify the effectiveness of the Rocket project that includes common API, and so on.
- **OpenStack**
 - Cooperate with OpenStack community especially the Cyborg project to explore more on unified management to accelerators for NFV. And integrate Cyborg into OPNFV acceleration scenarios.
- **ONAP**
 - Cooperate with ONAP to realize the orchestration of acceleration scenarios and global orchestration. Define features of accelerators and take that as parameters into VNFD.
- **Akraino**
 - Cooperate with Akraino to realize the edge computing scenarios using accelerators, and take Akraino requirements as one of the inputs of Rocket project.
- **Kubernetes**
 - Cooperate with Kubernetes to explore the acceleration requirements of VNFs which are based on containers, and take kubernetes requirements as one of the inputs of Rocket project.

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Planned deliverables (Outputs):

- Requirements for VNFs' accelerations
- The common API design and implement code
- Accelerator technology specification
- Test cases of accelerators

Proposed Release Schedule:

- First release in H release(if possible)

Related discussion links and slides

<https://wiki.opnfv.org/display/EVNT/Fraser+Plugfest+Schedule>

Key Project Facts

Project Name: Rocket

Repo name: Rocket

Lifecycle State: Incubation

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Jira Project Name: Same as Project name

Jira Project Prefix: Rocket

Mailing list tag [Should match Jira Project Prefix]

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