September 20, 2018
NTT Advanced Technology Corporation

A World First! Operation of FPGA circuit resource management using OpenStack demonstrated for the first time.
- Making high-speed NFV virtualization environments possible -

NTT Advanced Technology Corporation (NTT-AT, headquartered in Kawasaki-shi, Kanagawa, Japan; President and CEO George Kimura), recognizing the enormous potential for accelerator[1] technology that boosts computation speed, is the first to demonstrate the operation of FPGA[2] circuit resource management in an OpenStack[3] environment.

Enabling the FPGA program to be managed using OpenStack, this technology will speed up the application of FPGA accelerators to virtualization environments, thereby further enhancing environment functionality.

The operation of this technology will be demonstrated at Intel® FPGA Technology Day 2018, which will be held on Friday, September 21, 2018 at Hotel Gajoen Tokyo.
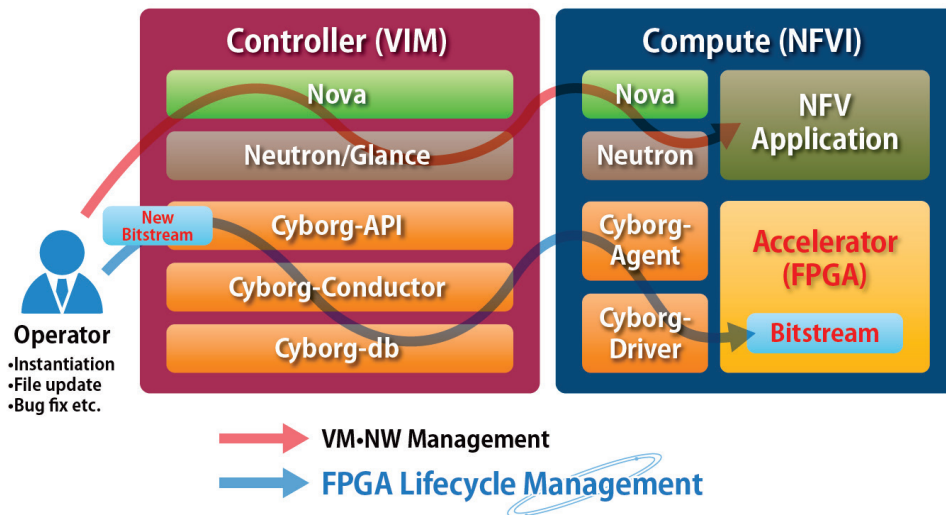
■ Background

Lately, the application of FPGA accelerators to virtualization environments, such as NFV[4], to boost their speed, has been the target of intensive study. In addition, the introduction of OpenStack to manage virtualization environments is advancing rapidly. OpenStack Cyborg (Rocky), which manages the lifecycle of FPGA accelerators using OpenStack, was officially released on August 30, 2018, leading to more accelerators being introduced into virtualization environments.

Considering this development and recognizing the tremendous potential for FPGA, NTT-AT confirmed the feasibility of FPGA program management by demonstrating the management of the lifecycle of an OPAE[5] compliant FPGA board using Cyborg. This demonstration of the actual operation of lifecycle management is a world first (according to NTT-AT's survey).

Enabling the FPGA program to be managed using OpenStack, this technology will speed up the application of FPGA accelerators to virtualization environments, thereby further enhancing environment functionality.

■ Outline of the operation demonstration

[Cloud FPGA lifecycle management using OpenStack Cyborg]

■ Main features

• Manages FPGA using official OpenStack components.

⇨ The world's first demonstration of the operation of OpenStack Rocky + an OPAE compliant FPGA board

• Implements an FPGA common control interface using OPAE.

⇨ FPGA resources are recognized from OpenStack.

• Provides an NFV acceleration management platform.

⇨ The technology is used in carriers' AFaaS/FPGAaaS.

• Creates the potential for implementing FPGA circuits as virtual machines.

⇨ An architecture that manages FPGA circuits in a manner similar to managing virtual machines will be developed.

■ Future prospects

Enabling FPGA circuits to be managed in a manner similar to managing virtual machines, FPGA circuit resource management using OpenStack is expected to accelerate software implementation of FPGA and facilitate use of FPGA in virtualization environments. NTT-AT will press ahead with using this technology to speed up the introduction of accelerators in virtualization environments, develop applications that use accelerators, and construct virtualization environment platforms using OpenStack.

■ Information about a related exhibition

The operation of this technology will be demonstrated at Intel® FPGA Technology Day 2018, which will be held on Friday, September 21, 2018 at Hotel Gajoen Tokyo.

For details about this exhibition, visit:

http://www.ntt-at.co.jp/eventseminar/event/2018/detail/e_20180921/

*1: Accelerator

⇨ Hardware and software intended to increase the processing speed of a computer.

*2: FPGA (Field Programmable Gate Array)

⇨ A type of PLD (programmable logic device) that makes it possible for an LSI designer to program and modify its logical circuit in the field.

*3: OpenStack
　　⇨ A set of software programs used to construct a cloud computing platform.
*4: NFV (Network Functions Virtualization)
　　⇨ The functions of communication devices for controlling a network that are implemented in software and run on a virtual OS in a general-purpose server.
*5: OPAE (Open Programmable Acceleration Engine)
　　⇨ A software programming layer that provides a consistent API across multiple FPGA generations or platforms.

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