Cluster Monitoring: How do I enable monitoring for the Intel Arria 10 GX FPGA?

How do I enable monitoring for the Intel Arria 10 GX FPGA for Bright Cluster Manager?

Installation

Installing Intel Acceleration Stack

The Intel Acceleration Stack Runtime package needs to be installed on the nodes that have the Programmable Acceleration Card (PAC) installed, since it includes required drivers and tools.

The package can be downloaded from: https://www.intel.com/content/www/us/en/programmable/products/boards_and_kits/dev-kits/altera/acceleration-card-arria-10-gx/getting-started.html (Requires registration)

Chroot inside the image that the nodes with Intel PACs will use:

```
# chroot /cm/images/<image-name>
```

Extract the files:

```
# tar xvf *pv_rte_installer.tar.gz
```

Run setup.sh as root. Make sure network access is available. The installer will try to install some dependencies from EPEL.

```
# setup.sh
```

Everything should be set up automatically. By default, files are installed into ${HOME}/intelrtestack. To be able to use *fpga** commands you'll need to update your environment by sourcing the init file:

```
# source ${HOME}/intelrtestack/init_env.sh
```

Validating Installation

Checking Drivers

Drivers are compiled for your kernel by DKMS during boot. To check the current status run:

dkms status

intel-fpga, 1.1.2-1, 3.10.0-862.2.3.el7.x86_64, x86_64: installed

It is also a good idea to check if the kernel modules are loaded:

lsmod | grep -e intel_fpga -e spi -e altera -e avmmi

Getting some basic information

Simply run:

fpgainfo port

Example output:

Board Management Controller, microcontroller FW version 26889

Last Power Down Cause: POK_CORE

Last Reset Cause: None

//****** PORT ******//

Object Id : 0xEC00000

PCIe s:b:d:f : 0000:5E:00:0

Device Id : 0x09C4

Socket Id : 0x00

Ports Num : 01

Bitstream Id : 0x123000200000185

Bitstream Version : 0x555500030201

Pr Interface Id : 69528db6-eb31-577a-8c36-68f9faa081f6

Accelerator Id : 35f9452b-25c2-434c-93d5-6f8c60db361c

Running a simple "Hello World" application

Go to the "hello_afu" directory:

```
# cd $OPAE_PLATFORM_ROOT/hw/samples/hello_afu
```

The compiled bitstream file can be found under the 'bin' directory. To load it to your FPGA:

```
# fpgaconf bin/hello_afu.gbs
```

This should return no output if everything went fine.

Compile the software:

```
# cd sw
# make
```

Run the application:

```
# ./hello_afu
```

Running Test

AFU DFH REG = 1000010000000000

AFU ID LO = 9722d43375b61c66

AFU ID HI = 850adcc26ceb4b22

AFU NEXT = 00000000

AFU RESERVED = 00000000

Reading Scratch Register (Byte Offset=00000080) = 00000000

MMIO Write to Scratch Register (Byte Offset=00000080) = 123456789abcdef

Reading Scratch Register (Byte Offset=00000080) = 123456789abcdef

Setting Scratch Register (Byte Offset=00000080) = 00000000

Reading Scratch Register (Byte Offset=00000080) = 00000000

This example application writes "123456789abcdef" to a register and reads it back.

Running with Bright Cluster Manager

Bright Cluster Manager software does not interfere with the operation of the Intel Programmable Accelerator Card (PAC) itself. Also no additional steps are required for compatibility. Customers can monitor their Intel PAC using Bright Cluster Manager tools.

For 8.2 it is recommended to have a separate category for the nodes with an Intel PAC, and to enable additional monitoring on those nodes only.

Example

Add a category:

cmsh

category add intel_pac

set softwareimage <softwareimage_with_intel_pac_drivers_installed>

commit

Enable metric collection for category:

cmsh

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monitoring setup

add collection intel_pac

set consolidator default

set script /cm/local/apps/cmd/scripts/metrics/sample_fpga_intel.py

nodeexecutionfilters

add category intel_pac

commit

Add nodes to category:

cmsh

device use <device_name>

set category intel_pac

commit

And monitoring should start on the nodes.

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