Deploying NVIDIA Converged Accelerator

Table of contents

Info

It is recommended to upgrade your BlueField product to the latest software and firmware versions available to benefit from new features and latest bug fixes.

This section assumes that you have installed the BlueField OS BFB on your NVIDIA® Converged Accelerator using any of the following guides:

- Deploying BlueField Software Using BFB from Host
- Deploying BlueField Software Using BFB from BMC
- Deploying BlueField Software Using PXE

NVIDIA® CUDA® (GPU driver) must be installed to use the GPU. For information on how to install CUDA on your Converged Accelerator, refer to NVIDIA CUDA Installation Guide for Linux.

Configuring Operation Mode

After installing the BFB, you may now select the mode you want your NVIDIA Converged Accelerator to operate in.

- Standard (default) – the NVIDIA® BlueField® and the GPU operate separately (GPU is owned by the host)
- BlueField-X – the GPU is exposed to BlueField and is no longer visible on the host (GPU is owned by BlueField)

Note

It is important to know your device name (e.g., mt41686_pciconf0).

MST tool is necessary for this purpose which is installed by default on the DPU.

Run:

```
mst status -v
```

Example output:

```
MST modules:
------------
    MST PCI module is not loaded
    MST PCI configuration module loaded
PCI devices:
------------
DEVICE_TYPE             MST                       PCI       RDMA           NET
NUMA
BlueField2(rev:1)       /dev/mst/mt41686_pciconf0.1   3b:00.1   mlx5_1         net-
ens1f1                  0

BlueField2(rev:1)       /dev/mst/mt41686_pciconf0     3b:00.0   mlx5_0         net-
ens1f0                  0
```

BlueField-X Mode

1. Run the following command from the host:

```
mlxconfig -d /dev/mst/<device-name> s PCI_DOWNSTREAM_PORT_OWNER[4]=0xF
```

2. P erform a BlueField system-level reset for the mlxconfig settings to take effect.

Standard Mode

To return BlueField from BlueField-X mode to Standard mode:

1. Run the following command from the host:

```
mlxconfig -d /dev/mst/<device-name> s PCI_DOWNSTREAM_PORT_OWNER[4]=0x0
```

2. P erform a BlueField system-level reset for the mlxconfig settings to take effect.

Verifying Configured Operational Mode

Use the following command from the host or BlueField:

```
$ sudo mlxconfig -d /dev/mst/<device-name> q PCI_DOWNSTREAM_PORT_OWNER[4]
```

- Example of Standard mode output:

```
Device #1:
----------

[...]

Configurations:                          Next Boot
        PCI_DOWNSTREAM_PORT_OWNER[4]       DEVICE_DEFAULT(0)
```

- Example of BlueField-X mode output:

```
Device #1:
----------
[...]

Configurations:                          Next Boot
        PCI_DOWNSTREAM_PORT_OWNER[4]       EMBEDDED_CPU(15)
```

Verifying GPU Ownership

The following are example outputs for when BlueField is configured to BlueField-X mode.

The GPU is no longer visible from the host:

```
root@host:~# lspci | grep -i nv
None
```

The GPU is now visible from BlueField:

```
ubuntu@bf:~$ lspci | grep -i nv
06:00.0 3D controller: NVIDIA Corporation GA20B8 (rev a1)
```

GPU Firmware

Get GPU Firmware

```
smbpbi: (See SMBPBI spec)

root@bf:~# i2cset -y 3 0x4f 0x5c 0x05 0x08 0x00 0x80 s
root@bf:~# i2cget -y 3 0x4f 0x5c ip 5
5: 0x04 0x05 0x08 0x00 0x5f
root@bf:~# i2cget -y 3 0x4f 0x5d ip 5
5: 0x04 0x39 0x32 0x2e 0x30
root@bf:~#
root@bf:~#
root@bf:~# i2cset -y 3 0x4f 0x5c 0x05 0x08 0x01 0x80 s
root@bf:~# i2cget -y 3 0x4f 0x5c ip 5
5: 0x04 0x05 0x08 0x01 0x5f
root@bf:~# i2cget -y 3 0x4f 0x5d ip 5
5: 0x04 0x30 0x2e 0x36 0x42
root@bf:~# i2cset -y 3 0x4f 0x5c 0x05 0x08 0x02 0x80 s
root@bf:~# i2cget -y 3 0x4f 0x5c ip 5
5: 0x04 0x05 0x08 0x02 0x5f
root@bf:~# i2cget -y 3 0x4f 0x5d ip 5
```

```
5: 0x04 0x2e 0x30 0x30 0x2e
root@bf:~# i2cset -y 3 0x4f 0x5c 0x05 0x08 0x03 0x80 s
root@bf:~# i2cget -y 3 0x4f 0x5c ip 5
5: 0x04 0x05 0x08 0x03 0x5f
root@bf:~# i2cget -y 3 0x4f 0x5d ip 5
5: 0x04 0x30 0x31 0x00 0x00
root@bf:~#

39 32 2e 30 30 2e 36 42 2e 30 30 2e 30 31 00 00     92.00.6B.00.01
```

Updating GPU Firmware

```
root@bf:~# scp root@10.23.201.227:/<path-to-fw-bin>/1004_0230_891__92006B0001-dbg-ota.bin
/tmp/gpu_images/
root@10.23.201.227's password:
1004_0230_891__92006B0001-dbg-ota.bin                                    100%  384KB 384.4KB/s   00:01

root@bf:~# cat /tmp/gpu_images/progress.txt
TaskState="Running"
TaskStatus="OK"
TaskProgress="50"

root@bf:~# cat /tmp/gpu_images/progress.txt
TaskState="Running"
TaskStatus="OK"
TaskProgress="50"

root@bf:~# cat /tmp/gpu_images/progress.txt
TaskState=Frimware update succeeded.
TaskStatus=OK
TaskProgress=100
```