BullSequana Edge nano

User's Guide

86 A1 75FS 01 - February 2022

Atos

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Preface

This guide contains a quick overview of the BullSequana Edge nano server and the first configuration steps.

Note You are advised to consult the Bull Support Web site for the most up-to-date product information, documentation, firmware updates, software fixes and service offers:
http://support.bull.com

Intended Readers

This guide is intended for users of the BullSequana Edge nano server.

Safety Notices

1. Read these safety instructions carefully.
2. Keep this User's Guide for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.

- The equipment has been exposed to moisture.
- The equipment does not work well, or you cannot get it to work according to the user's manual.
- The equipment has been dropped and damaged.
- The equipment has obvious signs of breakage.

DISCLAIMER: This set of instructions is given according to IEC 704-1. Atos disclaims all responsibility for the accuracy of any statements contained herein.

CAUTION

Follow these simple precautions to protect yourself from harm and the products from damage. To avoid electrical shock, always disconnect the power from your device before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.

CAUTION

For devices that include a battery: Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacture. Discard used batteries according to the manufacturer's instructions.

- Replacement of a battery with an incorrect type that can defeat a safeguard
- Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion.
- Leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas.
- A battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.

Chapter 1. **Overview**

The BullSequana Edge nano server addresses challenging AI workloads with a strengthened design. It runs compute-intensive embedded AI predictive analytics and computer vision applications for edge computing.

The server contains a Nvidia Volta GPU, which enables the inference of complex AI models with lowest possible latency.

Its passive cooling system automatically manages its temperature.

Chapter 2. Hardware specifications

2.1 Technical specifications

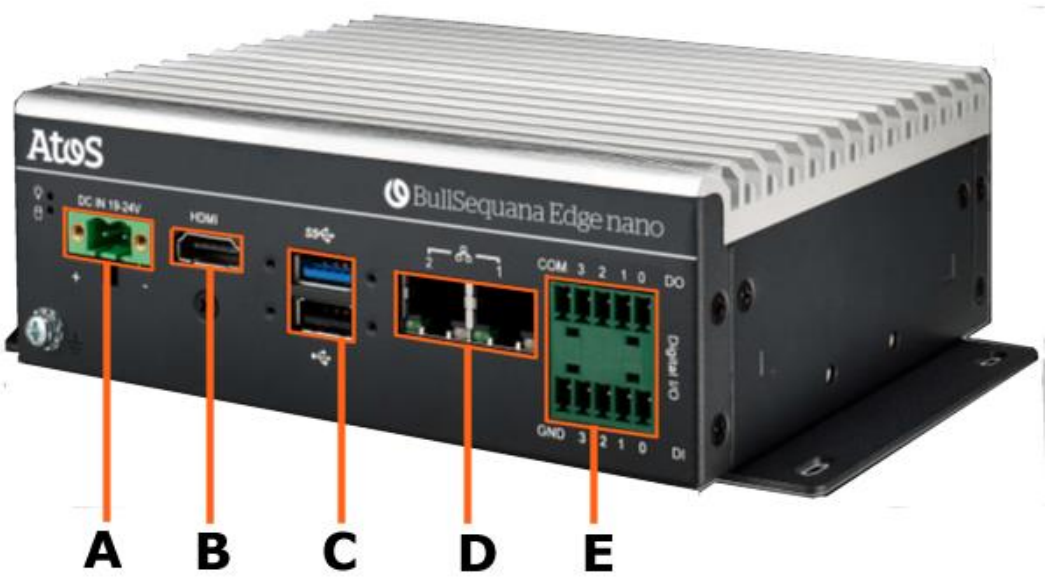
Processors	
CPU	ARM V8.2, 3*dual core
Max frequency	1.9 GHz
Type	Nvidia Carmel
GPU	Nvidia Volta
Capacity	384 CUDA Core 48, Tensor Cores, Performance up to 21 TOPS (INT8)
Max operating frequency	1100 MHz
Architecture	
Chipset	Nvidia Jetson Xavier NX (SOM)
Memory	
Min/Max	8 GB
Type	128-bit LPDDR4x DRAM
Storage	
Base	16 GB of eMMC
Extension	M.2 SATA, 32GB, 64GB or 128GB Micro SD 64GB
Embedded I/O ports	
Network Interface Controller (NIC)	2 x GbE (10/100/1000 Mbps)
System management services	Remote device management on one centralized cloud portal is available as an option through Allxon solution
USB ports	External: 1x USB 2.0, 1x USB 3.0 Internal: 1x USB 2.0, 1x Micro USB
HDMI	Max resolution 3840 x 2160 @ 60Hz
Other ports	
DI/DO	4bit in, 4bit out
COM	1 x RS-232/RS-422/RS-485
Power supply	
Power adaptor	19 - 24 V (1.5 A - 1.18 A)
Power type	Terminal block 2 Pin

I/O continued	
Connectivity	1x MiniPCie 2 ports USB expansion, or 2 ports PoE expansion External router for WIFI, LTE
Mounting options	Standalone DIN rail kit (optional)
Dimension	
Height	52 mm (2.0″)
Width	147 mm (5.7″)
Depth	118 mm (4.6″)
Operational conditions	
Operating temperature	-10°C to +60°C with 0.7 m/s air flow (Max-P ARM mode)
Operating humidity	95% @ 40°C (non-condensing)
Vibration	3 Grms @ 5 − 500 Hz, random, 1 hr/axis
Ecosystem and certifications	
Software ecosystem certifications	OS Linux Ubuntu 18.04 with JetPack
Certification	CE / FCC / BSMI / CCC RED certification applies to the external WIFI or LTE router

2.2 Connectors and LEDs

2.2.1 Connectors

At the front



Mark	Description
A	Power supply 19-24 V
B	HDMI output
C	2 USB port (1xUSB 2.0 and 1xUSB 3.0)
D	2 RJ45 10/100/1000 MBps LAN ports
E	GPIO 4bit in + 4bit out

At the rear

Mark	Description
A	COM port (male) RS232/422/485

2.2.2 LEDs

At the front

Mark	Description
A	Power on
B	Disk access
C	Ethernet up
D	Ethernet link activity

Chapter 3. Initial installation and configuration

The BullSequana Edge nano server is pre-installed with Ubuntu 18.04.

There are two operating modes for the server:

- Connecting a display, using the Ubuntu GUI and treating the server as a desktop computer.
- Using a LAN connection and SSH, once the IP address is known. The default behavior is that of a DHCP client.

The following steps apply to the first mode using the Ubuntu GUI, but the commands will be exactly the same for the second mode that uses an SSH connection.

3.1 Connecting the server

Procedure

1. Connect the keyboard, mouse and display (HDMI connector) to the server.
2. Connect the power supply (19-24V DC) to the server.

   The power supply can either be server AC converter (which can be provided by Atos), or a DIN rail DC power supply (not provided by Atos).
3. Connect the network cable to the server.

   The network cable will be needed to access the server from a host system, for additional software installation.
4. The server boots.

   This takes about 45 seconds.

3.2 Configuring the server for the first time

Procedure

1. Login to the server.

Username	Factory default: admin
Password	Factory default: Yop9e4rPb

Important It is strongly recommended to change the default user password.

2. Configure the keyboard layout.

   The keyboard default layout is QWERTY. This can be changed.

   Example to set a French keyboard:

```
sudo setxkbmap fr
```

3. Configure the power mode.

   The default power mode is 10W 2 Core, which is the lowest power mode. The maximum is 15W 6 Core. This can be changed with the following command:

```
sudo /usr/sbin/nvpmodel –m <power_mode_ID>
```

   power_mode_ID: from 0 to 6. Refer to the following table:

NVPModel clock configuration for Jetson Xavier NX									
Property	Mode								
	15 W	15 W	15 W	10 W	10 W	10 W	20 W	20 W	20 W
Power budget	15 W	15 W	15 W	10 W	10 W	10 W	20 W	20 W	20 W
Mode ID	0	1	2	3	4 (*)	5(*)	6	7	8
Online CPU	2	4	6	2	4	4	2	4	6

(*) Clock speed may differ

4. Configure the IP address.

   The DHCP client is active, the system gets an IP address automatically if there is a DHCP server.

   A SSH server is running.

5. Configure the time zone.

   The default time zone is Asia/Taipei.

Example to set the time zone to Europe/Paris:

```
sudo timedatectl set-timezone Europe/Paris

timedatectl status
```

3.3 Updating the system

Prerequisite

The Ubuntu repositories must be accessible.

Procedure

1. Update the system.

The OS is Ubuntu 18.04 and needs to be updated.

Run the commands:

```
sudo apt update

sudo apt upgrade

sudo apt autoremove
```

2. Remove the unused software.

Only 16 GB of eMMC storage is available for the basic configuration, which is quite small.

Unused software can be removed to create more space following the upgrade.

Example:

```
sudo apt-get remove --purge libreoffice* thunderbird

sudo apt-get clean

sudo apt-get autoremove
```

Chapter 4. Installing Nvidia software

4.1 Prerequisites

- A developer account on http://developer.nvidia.com to obtain packages and documentation.
- A host system, i.e. a dedicated computer with a display, with Ubuntu 18.04 and Nvidia SDK Manager installed.

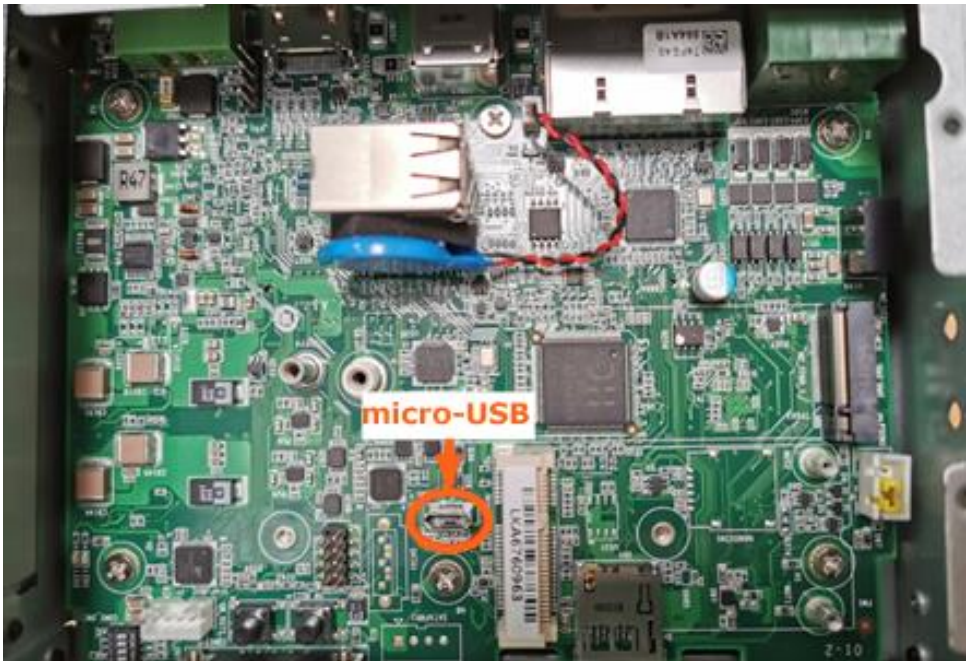
Host system specifications

- CPU : Intel Corei5 recommended
- RAM : 4G
- Storage : 500G
- OS : Ubuntu 18.04
- Monitor x 2
- Keyboard / Mouse
- USB cable
- HDMI cable
- LAN Hub (SDK manager install only)

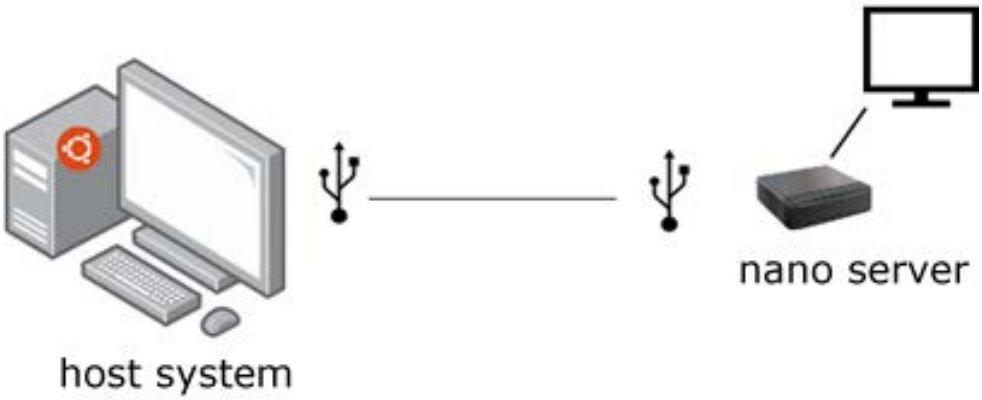
4.2 Preparing the BullSequana Edge nano server

Procedure

1. Unplug the power cable to turn off the BullSequana Edge nano server.
2. Turn the BullSequana Edge nano server upside down.
3. Unscrew the four fixing screws and remove the cover.
4. Locate the internal micro-USB port.



5. Connect the host system to the BullSequana Edge nano server with the USB cable supplied.



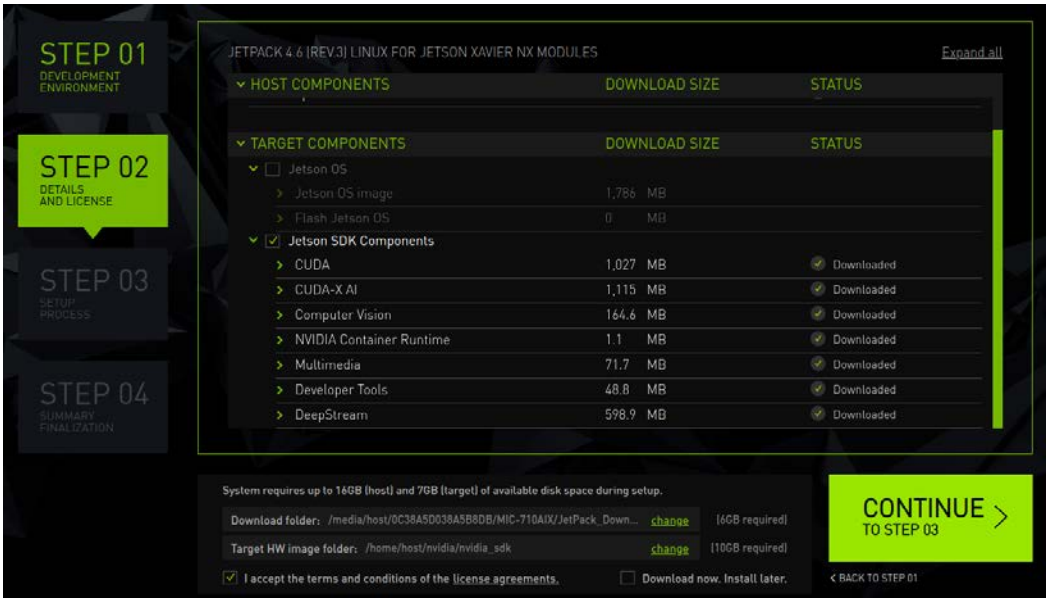
6. Plug the power cable to turn on the BullSequana Edge nano server.

4.3 Installing Nvidia software from the SDK manager

Procedure

1. If not already installed, install Nvidia SDK Manager on the host system
   a. Download Nvidia SDK Manager from https://developer.nvidia.com/nvidia-sdk-manager.
   b. Follow the installation instructions.
2. Start SDK manager on the host system.
3. Login with the Nvidia developer account.
4. STEP 01:
   a. Check that the Jetson Xavier module has been detected.
   b. Select JetPack 4.6 as the target operating system.

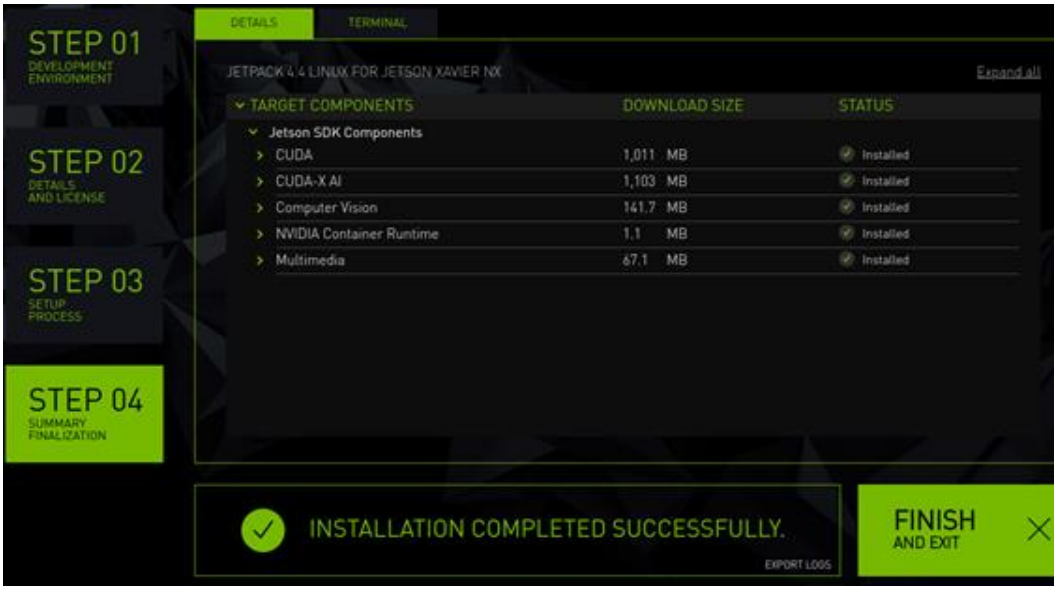
5. STEP 02:
   a. Uncheck the Jetson OS check box.
   b. Click CONTINUE to install



6. STEP 03: The software is installed.

   Installation may take around 30 minutes.

7. STEP 04: The software installation completes.



8. Disconnect the USB cable.
9. Replace the cover.
10. Tighten the four screws to secure the cover in place.

4.4 Checking the installation

Once the installation is done, it is possible to add the jetson-stat component to monitor and control the device.

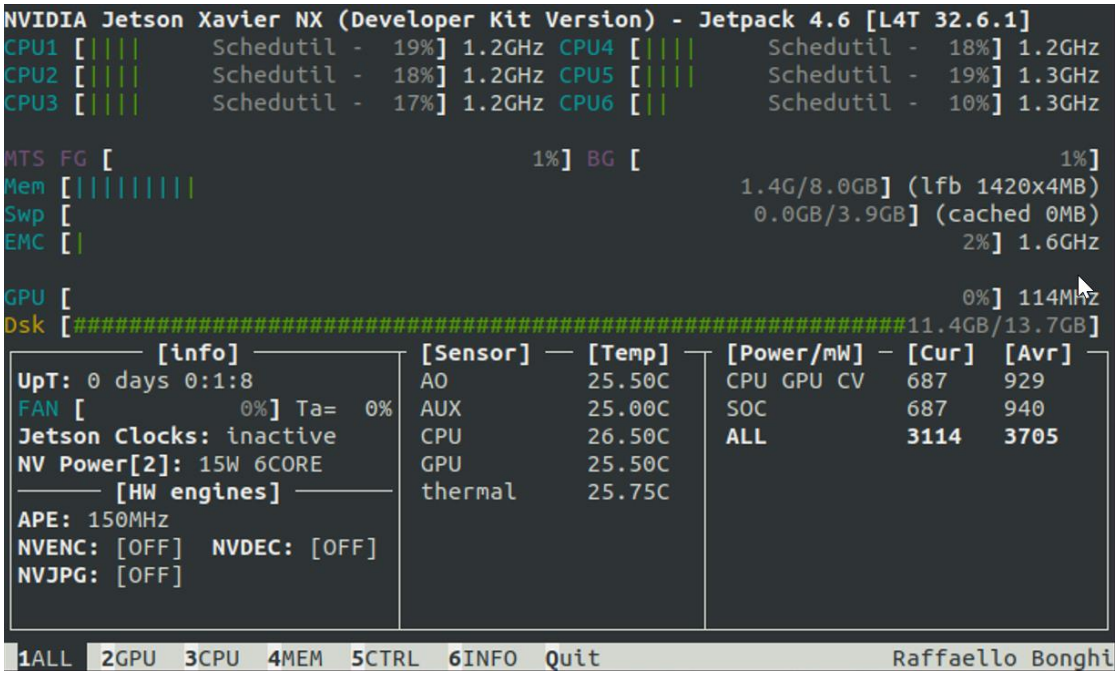
1. From the Bullsequana Edge nano server, launch the following commands:

```
sudo -H pip3 install -U jetson-stats


reboot
```

2. Run the jtop command to check that the software has been installed.

```
jtop
```



4.5 Running an example

The usage of the GPU can be tested with the following command example.

Example using a display

From the BullSequana Edge nano Ubuntu GUI, run:

```
cd /usr/local/cuda-10.2/samples/5_Simulations/nbody

sudo make

./nbody
```

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