DGX Spark User Guide

NVIDIA Corporation

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Release Notes

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This guide is also available for download as a PDF.

Chapter 1. Overview

The DGX Spark is NVIDIA's compact AI computer designed for developers, data scientists, and AI researchers who need powerful computing capabilities for AI development and deployment.

Chapter 2. Getting Started

2.1. DGX Spark Release Notes

This section provides release notes for the DGX Spark, including information about new features, known issues, and software version updates.

2.1.1. Current Software Versions

The following table shows the current version information for the DGX Spark software stack.

Component	Version
NVIDIA DGX OS	7.4.0
NVIDIA GPU Driver	580.126.09
NVIDIA CUDA Toolkit	13.0.2
Canonical Kernel	6.17-1008.8

Note

These release versions apply only to the DGX Spark Founders Edition. GB10-based partner systems may not receive updates at the same time.

2.1.1.1 February 2026 Release

2.1.1.1.1 Fixed Issues

- **Improved Performance with Multiple Sparks** - Addressed performance regression noted by some users with multiple connected Sparks after updating to DGX OS 7.4.0.

2.1.1.2 January 2026 Release

2.1.1.2.1 What's New

- **Power Management** - Added hot plug support for the ConnectX-7 network adapter, saving up to 18W of power when the adapter is not in use.

- **Bluetooth Audio Support** - Support for Bluetooth audio devices, including headphones and headsets, is now available.
- **Additional Security Controls** - WiFi and Bluetooth can now be disabled in the Unified Extensible Firmware Interface (UEFI) for environments requiring additional security.

2.1.1.2.2 Fixed Issues

- **Improved Monitor Support** - Better compatibility with TVs and monitors, including multi-monitor configurations and the use of non-native resolutions and refresh rates.
- **Improved Peripheral Setup** - Smoother and more complete Out of Box Experience (OOBE) navigation.

2.1.1.3 November 2025 Release

2.1.1.3.1 What's New

- **New DGX OS kernel** - The operating system now incorporates the Ubuntu 6.14 Hardware Enablement (HWE) kernel stack. The new kernel brings ongoing performance gains, enhanced stability, broader hardware compatibility, and the latest security updates for a more secure operating environment.
- **JupyterLab updated to latest CUDA and PyTorch** - Updated JupyterLab to CUDA 13.0.2 and the latest PyTorch version, enabling users to work with updated frameworks immediately without extra downloads.

2.1.1.3.2 Fixed Issues

- **Improved memory reporting in DGX Dashboard** - Addressed the issue with memory reporting differences with unified memory architecture; readout now consistent with CUDA guidance for unified memory systems. See https://nvidia.custhelp.com/app/answers/detail/a_id/5728.
- **Image Generation in JupyterLab** - Resolved the inability to generate images in Stable Diffusion XL Playbook example. Users can now run end-to-end example workflow inside JupyterLab.
- **Improved Peripheral Interoperability** - Better compatibility with USB-C devices, monitors, Bluetooth peripherals, and Wi-Fi access points.
- **Improved recovery image reliability** - The recovery image now installs correctly on macOS and also when multiple external USB-C drives are connected.
- **Keyboard accessibility improvements** - Smoother and more complete OOBE navigation, including the ability to complete entire system setup process using only keyboard.

2.1.2. Known Issues

For an updated list of known issues, see *Known Issues*.

2.2. Known Issues

This topic provides a summary of known issues with DGX Spark systems.

2.2.1. Use the supplied power adapter for optimal performance

For optimal performance, use the supplied power adapter with the DGX Spark system. Using a different adapter may reduce performance, prevent boot, or cause unexpected shutdowns.

2.2.2. `nvidia-smi` reports "Memory-Usage: Not Supported"

On iGPU platforms, `nvidia-smi` will display "Memory-Usage: Not Supported" even though per-process GPU memory is listed. This is expected because iGPUs do not have dedicated framebuffer memory.

2.2.3. CUDA Support on DGX Spark

The CUDA version on your DGX Spark device has been verified to work with your system hardware at the time of software update release. The latest features and performance improvements are available through NVIDIA NGC containers (for example, PyTorch, vLLM, and TensorRT-LLM).

2.2.4. Guidance for reporting memory resources with unified memory architecture

NVIDIA is actively working with third-party ecosystem partners to bring their software to DGX Spark. For example, we have provided direction on implementing memory management on systems based on a unified memory architecture (UMA) to help ensure accurate reporting of available resources.

DGX Spark systems use a unified memory architecture (UMA), where the GPU shares system memory (DRAM) with the CPU and other compute engines. This design reduces latency and allows larger amounts of memory to be used for GPU workloads. On UMA systems, the CPU can dynamically manage DRAM contents, including freeing up memory by swapping pages between DRAM and the system's SWAP area. However, the `cudaMemGetInfo` API does not account for memory that could potentially be reclaimed from SWAP. As a result, the memory size reported by `cudaMemGetInfo` may be smaller than the actual allocatable memory, since the CPU may be able to release additional DRAM pages by moving them to SWAP.

To more accurately estimate the amount of allocatable device memory on DGX Spark platforms, CUDA application developers should consider the possibility of DRAM reclamation via SWAP and not rely solely on the values returned by *cudaMemGetInfo*. The following provides an example implementation using C standard libraries:

```
#include <stdio.h>

int getAvailableMemory(long *availableMemoryKb, long *freeSwapKb) {
    FILE *meminfoFile = NULL;
    char lineBuffer[256];
    long hugeTlbTotalPages = -1;
    long hugeTlbFreePages = -1;
    long hugeTlbPageSize = -1;
```

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```
    if (availableMemoryKb == NULL || freeSwapKb == NULL) {
        return 1;
    }

    meminfoFile = fopen("/proc/meminfo", "r");
    if (meminfoFile == NULL) {
        return 1;
    }

    *availableMemoryKb = -1;
    *freeSwapKb = -1;

    while (fgets(lineBuffer, sizeof(lineBuffer), meminfoFile)) {
        long value;

        if (sscanf(lineBuffer, "MemAvailable: %ld kB", &value) == 1) {
            *availableMemoryKb = value;
        } else if (sscanf(lineBuffer, "SwapFree: %ld kB", &value) == 1) {
            *freeSwapKb = value;
        } else if (sscanf(lineBuffer, "HugePages_Total: %ld", &value) == 1) {
            hugeTlbTotalPages = value;
        } else if (sscanf(lineBuffer, "HugePages_Free: %ld", &value) == 1) {
            hugeTlbFreePages = value;
        } else if (sscanf(lineBuffer, "Hugepagesize: %ld kB", &value) == 1) {
            hugeTlbPageSize = value;
        }

        if (*availableMemoryKb != -1 &&
            *freeSwapKb != -1 &&
            hugeTlbTotalPages != -1 &&
            hugeTlbFreePages != -1 &&
            hugeTlbPageSize != -1) {
            break;
        }
    }

    fclose(meminfoFile);

    if (hugeTlbTotalPages != 0 && hugeTlbTotalPages != -1) {
        *availableMemoryKb = hugeTlbFreePages * hugeTlbPageSize;

        // Hugetlbfs pages are not swappable.
        *freeSwapKb = 0;
    }

    return 0;
}
```

As a workaround for debugging purposes, you can flush the buffer cache manually with the following command:

```
sudo sh -c 'sync; echo 3 > /proc/sys/vm/drop_caches'
```

After flushing the cache, restart your application.

2.2.5. Attached HDMI display goes into deep sleep mode after an extended period of inactivity and does not wake

In some cases, after a long period of inactivity, the attached HDMI display might go into a deep sleep mode and not wake up when you press a key or move the mouse. If this happens, press a physical button on the monitor to wake it up.

2.3. Hardware Overview

Powered by the NVIDIA Grace Blackwell architecture, DGX Spark enables developers, researchers, and data scientists to prototype, deploy, and fine-tune large AI models on their desktop. This section provides information about the hardware components and specifications.

2.3.1. System Overview

The DGX Spark features:

- NVIDIA Grace Blackwell architecture with integrated GPU and CPU
- 20-core Arm processor with high-performance cores
- 128 GB unified system memory
- Compact desktop form factor
- Advanced connectivity including Wi-Fi 7, 10 GbE, and ConnectX-7
- Support for AI models up to 200 billion parameters (or 405B for dual-Spark configuration)

2.3.1.1 Component Descriptions

The DGX Spark includes the following components:

Table 1: Component Specifications

Component	Specification
GPU	NVIDIA Blackwell Architecture with 5th Generation Tensor Cores, 4th Generation RT Cores
CPU	20-core Arm processor (10 Cortex-X925 + 10 Cortex-A725)
Memory	128 GB LPDDR5x unified system memory, 256-bit interface, 4266 MHz, 273 GB/s bandwidth
Storage	1 TB or 4 TB NVMe M.2 with self-encryption
Network	1x RJ-45 (10 GbE), ConnectX-7 Smart NIC, Wi-Fi 7, Bluetooth 5.4
Connectivity	4x USB Type-C, 1x HDMI 2.1a, HDMI multichannel audio
Video Processing	1x NVENC, 1x NVDEC

2.3.2. Physical Specifications

2.3.2.1 Form Factor

- **Chassis Type**: Small form factor (SFF)
- **Dimensions**: 150 mm (L) x 150 mm (W) x 50.5 mm (H)
- **Weight**: 1.2 kg (2.6 lbs)

2.3.2.2 Environmental Requirements

Table 2: Environmental Specifications

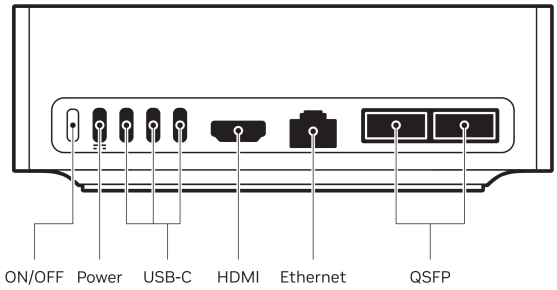
Specification	Value
Ideal Operating Temperature	5°C to 30°C (41°F to 86°F)
Operating Humidity	10% to 90% (non-condensing)
Operating Altitude	Up to 3,000 meters (9,843 feet)

2.3.3. Connectivity and I/O

2.3.3.1 Rear Panel

- Power button
- 4x USB Type-C (one for power delivery)
- 1x HDMI 2.1a display connector

- 1x RJ-45 Ethernet connector (10 GbE)
- 2x QSFP Network connectors (ConnectX-7)



2.3.4. Performance Specifications

2.3.4.1 Compute Performance

- **AI Compute**: Up to 1,000 TOPS (trillion operations per second) inference and up to 1 PFLOP (petaFLOP) at FP4 precision with sparsity
- **CUDA Cores**: 6,144
- **Copy Engines**: 2 (enables simultaneous data transfers to and from GPU memory, improving throughput for AI workloads)
- **CPU Performance**: 20 cores (10 Cortex-X925 + 10 Cortex-A725)
- **Memory Bandwidth**: 273 GB/s
- **Memory Channels**: 16 channels (256 bit) LPDDR5X 8533

2.3.4.2 AI/ML Capabilities

- **Model Support**: AI models up to 200 billion parameters
- **Tensor Performance**: 5th Generation Tensor Cores with FP4 support
- **Framework Support**: PyTorch, TRT-LLM, and other AI frameworks
- **Use Cases**: Inference, deployment, and fine-tuning of large language models

2.3.5. Power and Thermal Management

2.3.5.1 Power Requirements

- **Power Supply**: 240W external power supply (included)
  - GB10 SOC Thermal Design Power (TDP) is 140W
  - 100W is available for other system components (ConnectX-7, Wi-Fi, SSD, USB-C, etc.)
- **Usage Requirement**: Use of the provided 240W power supply is required for optimal performance. Using a different or lower-rated power supply may result in reduced system performance, failure to boot, or unexpected shutdowns.
- **Input Voltage**: Standard AC power input

2.3.5.2 Thermal Management

- **Cooling Solution**: Integrated thermal management system
- **Form Factor**: Compact design optimized for desktop placement
- **Ideal Operating Temperature**: 5°C to 30°C (41°F to 86°F)

2.4. Initial Setup - First Boot

This guide walks you through setting up your DGX Spark for the first time. You'll choose how to access your system during the initial setup, and run the first-time setup utility to configure everything. The access method you choose is only for completing the initial setup - after setup is complete, you can access your DGX Spark any way you like: locally with a monitor and keyboard, over the local network from another computer, or a mix of both.

2.4.1. What You'll Do

This setup process includes:

- Choosing how to access the system during initial setup (with a display, or as a network appliance)
- Preparing your system and connections
- Running the first-time setup utility to configure your system

2.4.2. Choose how to access your system during initial setup

To complete the initial setup, you'll need to access your DGX Spark. You can do this in one of two ways:

With a Display (Local Setup)

- Connect keyboard and mouse via USB or Bluetooth
- Connect a display to work directly on the system
- Follow the setup wizard on screen

Over the Network (as a Network Appliance)

- Access the system over your local network from another computer
- Use another computer to complete setup via web browser
- No Spark display or keyboard required for the setup process

> **Note**
>
> This choice is only about how you'll complete the initial setup process. After setup is finished, you can access your DGX Spark however you prefer. You're not locked into your original choice.

2.4.3. Get Ready

Important

The DGX Spark device starts up immediately when power is applied. Please attach all peripherals (display, keyboard, mouse, network, etc.) before connecting the power supply.

Before starting, ensure you have:

- A fast, reliable internet connection (Wi-Fi or Ethernet) to download required updates during the initial setup process. Connections using captive portals (such as hotel or airport Wi-Fi) or those prone to disconnections (like phone hotspots) are not recommended. If you do not have access to a stable connection, consider downloading the system recovery media and using *System Recovery* to install the latest software for your DGX Spark.
- For Local Setup: A display, keyboard, and mouse connected (or available using Bluetooth).
- For Network Setup: A computer on the same network to access the setup interface.
- Power connected to the system (the system will start automatically when power is applied).

Note

Display Troubleshooting: Some displays may have trouble with Spark out of the box. If you are connecting over USB-C/DisplayPort and there is no display, try using HDMI instead.

Note

If you plan to use a wired network connection, plug in the network cable before starting the installation. This helps avoid connection issues later in the process.

2.4.4. Run the First-Time Setup

The first-time setup utility will guide you through:

- Powering on and initializing the system
- Selecting your preferred setup mode
- Downloading and installing critical updates
- Completing your initial configuration

Warning

Critical: Do not shut down or reboot the system during the update process. The installation cannot be interrupted once the download begins, and powering down during updates can cause system damage.

2.4.4.1 Getting Started

The way you start the installation depends on your chosen access method:

With a Display (Local Setup)

1. Power on the system
2. The first-time setup utility will start automatically on the connected display
3. Use your wired keyboard and mouse (already connected) to navigate
4. If a keyboard or mouse is not detected, you will be prompted to put your Bluetooth devices in pairing mode:

   USB devices can be plugged in at any time and should start working, even if detected improperly. Bluetooth devices can be put into pairing mode and will generally still pair while on the "Get Started" screen (exception - keyboards that require a passcode to type in won't work on this screen). Once you click on "Get Started," Bluetooth pairing stops, so you will have to power cycle to try again.
5. Follow the on-screen prompts to complete the setup process

Over the Network (as a Network Appliance)

1. Power on the system. This creates a Wi-Fi hotspot that you will use to connect to the system and continue the setup process. The SSID and password for the Wi-Fi hotspot are printed on a sticker attached to the Quick Start Guide included with your DGX Spark's packaging
2. From another computer, connect to the Spark's Wi-Fi hotspot using the SSID and password provided on the Quick Start Guide. A captive portal page will open in the default web browser on your computer. If it does not open automatically, use your browser to navigate to the Spark's system setup page listed on the Quick Start Guide.
3. Follow the on-screen prompts to continue the setup process.

   When the DGX Spark joins your home network, its Wi-Fi hotspot will turn off and your computer will reconnect to the device through your Wi-Fi network to resume the setup process. If you are not able to connect to the DGX Spark after it joins your home network, you must connect a display/keyboard/mouse to continue.

> **Note**
>
> It may take as long as 10 minutes for the DGX Spark to install all of it's updates and join your home network.

2.4.4.2 What to Expect During Setup

The first-time setup utility will guide you through several configuration steps. Simply follow the on-screen prompts to complete each step.

Setup Process Steps:

1. **Language and Time Zone Selection**

   Choose your preferred language and time zone settings for the system. Note that the input fields will filter as you type.
2. **Keyboard Layout Selection** (Local Setup only)

   Select your keyboard layout (e.g. US keyboard vs. Russian keyboard). This screen only appears when using a display during setup.

3. **Terms and Conditions**

   Review and accept the terms and conditions to continue with the installation.

4. **User Account Creation**

   Create your username and password for system access.

5. **Information Sharing Settings** (Optional)

   Configure analytics and crash reporting preferences. You can skip this step if desired.

6. **Wi-Fi Network Selection**

   Select your Wi-Fi network. This step is automatically skipped if an Ethernet cable that is providing internet access is connected.

7. **Wi-Fi Password**

   Enter the password for your selected Wi-Fi network.

8. **Joining Wi-Fi Network**

   The system connects to your Wi-Fi network and tears down the access point. Your computer will automatically reconnect to your default network.

   Note

   Network Connection Issues:

   - If your computer automatically reconnects to the same network as the Spark, the installation should continue seamlessly
   - If not, you'll need to connect your computer to the same network as the Spark while the setup app is waiting for the network setup process to complete
   - If the setup fails, you must connect a display/keyboard/mouse to continue
   - The modal instructs you to try to reconnect to the Spark's hotspot and try again. This will work if the Spark actually failed to join the network (e.g. wrong password) versus your laptop can't communicate with the Spark
   - If you DO NOT see the hotspot available when this error modal appears, that means the Spark did join the network but your laptop can't communicate with it. This could be because:
     - Device isolation
     - You failed to join the same network as your Spark
     - mDNS does not work on your network due to its configuration (e.g. a complex corporate network)

9. **Software Download and Installation**

   After connecting to the network, the system will automatically download and install the full software image. This process can take some time, and the system may reboot more than once before it's complete. If you are setting up over the network from another computer, you will not be able to access the device during this time. The process may continue for up to 10 minutes after the interface shows that the device is rebooting to finish the setup

> **Warning**
>
> **Do not shut down or reboot the system during this process.** The installation cannot be interrupted once the download begins.

10. **Installation Complete**

    The device will reboot automatically when installation is complete, and you can then use it normally.

2.4.5. Next Steps

Congratulations! Your DGX Spark is now ready to use. Here are the recommended ways to access and start working with your system:

Access Your System

- **Locally**: Use your DGX Spark like any desktop computer with a monitor, keyboard, and mouse
- **Over the Network**: Connect to your DGX Spark from another computer on the same network using the NVIDIA Sync tool (see *NVIDIA Sync*), SSH, or remote desktop
- **Mix Both**: Use whatever access method fits your current workflow - you can switch freely between local and network access
- **Dashboard Access**: Use the built-in DGX Dashboard for system monitoring, updates, and JupyterLab access. See *DGX Dashboard* for more information

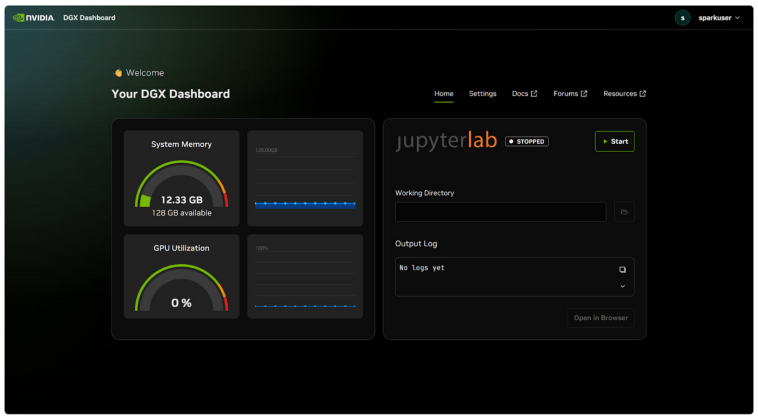


Fig. 1: The DGX Dashboard provides an intuitive interface for system monitoring and development

Additional Resources

- Visit the NVIDIA Spark Developer Portal at https://build.nvidia.com/spark for the latest guides, tutorials, and updates
- Refer to *DGX Spark Release Notes* for the latest software updates and features
- See *Known Issues* for troubleshooting common problems

Your DGX Spark is now ready to power your AI development and deployment workflows!

2.5. System Configuration and Operation

Configuring and operating your DGX Spark effectively is key to delivering consistent results across AI/ML workflows. This section provides an overview of the platform, recommended UEFI settings, clustering procedures, and foundational security guidance to help you deploy, manage, and scale with confidence.

2.5.1. System Overview

Powered by the NVIDIA Grace Blackwell architecture, DGX Spark enables developers, researchers, and data scientists to prototype, deploy, and fine-tune large AI models on their desktop.

2.5.1.1 Flexible Access and Usage

The DGX Spark is designed for maximum flexibility in how you access and use it. You can seamlessly switch between different access methods based on your needs:

- **Local Access**: Connect a keyboard, mouse, and monitor to work directly on the system
- **Network Access**: Access your system from another computer on the same network using SSH, NVIDIA Sync, or remote desktop tools
- **Hybrid Usage**: Mix and match access methods - work locally one day and over the network the next, or even simultaneously

All access methods are fully supported and equally capable. Your DGX Spark adapts to your workflow, whether you're working at your desk with a monitor or accessing it remotely as a network appliance on the same network.

2.5.1.2 Key Capabilities

Your DGX Spark enables you to:

- **Run Inference**: Deploy models for real-time AI applications
- **Develop AI Models**: Train and fine-tune models with up to 200 billion parameters
- **Process Data**: Handle large datasets with high-performance computing
- **Experiment Freely**: Test new ideas without cloud computing costs
- **Scale Workloads**: Connect multiple systems for larger projects

2.5.1.3 System Architecture

The DGX Spark is built on NVIDIA's Grace Blackwell architecture, providing:

- **Unified Memory**: 128 GB of high-bandwidth memory for large models
- **High-Performance Computing**: 20-core ARM64-based processor with integrated GPU
- **Advanced Connectivity**: Wi-Fi 7, 10 GbE, CX7 NIC, and multiple I/O options
- **Compact Form Factor**: 150mm x 150mm x 50.5mm desktop design

For detailed hardware specifications, see *Hardware Overview*.

2.5.1.4 Software

Your system comes pre-configured with:

- **NVIDIA DGX OS**: Optimized operating system for AI workloads
- **Development Tools**: CUDA, cuDNN, and NVIDIA's development ecosystem
- **Container Support**: Docker and NVIDIA Container Runtime for easy deployment
- **NGC Integration**: Access to NVIDIA's container registry

For detailed software information, see *Software*.

2.5.1.5 Getting Started

To begin using your DGX Spark:

1. **Initial Setup**: Follow the *Initial Setup - First Boot* to configure your system
2. **Explore Examples**: Try sample workloads to understand capabilities
3. **Configure Development Environment**: Set up your preferred tools and frameworks
4. **Start Building**: Begin your AI development projects

> **Note**
>
> For the most up-to-date tutorials and examples, visit https://build.nvidia.com/spark. This site is regularly updated with new content and serves as the primary resource for practical guides and use cases.

2.5.2. UEFI Settings

This topic provides guidance on accessing and configuring the UEFI settings for the DGX Spark system. While there are no Spark-specific features that require UEFI configuration, you may need to access the UEFI for general system configuration or troubleshooting purposes.

2.5.2.1 Access UEFI

> **Important**
>
> To access the UEFI setup menu, you must be using a keyboard that is physically connected to the DGX Spark device.
>
> If the keyboard is a Mac keyboard, it might not have a key that UEFI recognizes as Del; use Esc only.

To access the UEFI setup menu:

1. Power on or restart the system.
2. Immediately press `Esc` or `Del` and hold it until the UEFI setup menu appears.

> **Note**
>
> The timing for pressing `Esc` or `Del` is critical. Press the key as soon as the system starts booting, before the OS begins loading.

2.5.2.2 UEFI Documentation

For detailed information about UEFI settings and configuration options, refer to the DGX Spark UEFI Manual.

2.5.2.3 Enable or Disable WiFi and Bluetooth

You can enable or disable both Wireless LAN and Bluetooth together in UEFI, which completely disables all wireless access for security enhancement. To disable only one (WiFi or Bluetooth) individually, use the OS settings instead. You might disable wireless to meet lab or security policy, or enable it for initial setup when Ethernet is not available.

1. Go to **Advanced** → **Advanced Menu** → **IO Port Access**.
2. Set **Wireless LAN & Bluetooth** to the desired state (enabled or disabled).

2.5.2.4 Boot from a USB Device

To boot from a USB device, use one of the following methods. You might do this to run system recovery, reinstall the OS, or boot from live or diagnostic media.

Set USB as the first boot device (persistent):

1. Go to **Boot** → **Boot Option Priorities**.
2. Use `Enter` on each entry to set the boot order. Place the USB device at the top.

Boot from USB once (one-time):

1. Go to **Save & Exit**.
2. Under **Boot Override**, select the USB device and press `Enter`. The system boots from that device for the current boot only.

The USB device must appear in the boot option list. If it does not, ensure the device is connected before you enter UEFI and that it is bootable.

2.5.2.5 Enable or Disable Secure Boot

To enable or disable Secure Boot, perform the following steps. You might disable it to use PXE boot or run custom boot loaders, or enable it to meet security or compliance requirements.

1. Go to **Security** → **Secure Boot**.
2. Set **Secure Boot** to **Enabled** or **Disabled** as needed. The default is **Enabled**.
3. Save changes and exit from the **Save & Exit** menu. A platform reset may be required for the change to take effect.

Secure Boot is active when it is enabled, the Platform Key (PK) is enrolled, and the system is in User mode.

2.5.2.6 Configure PXE Boot

To configure UEFI for PXE boot, perform the following steps. You might do this to deploy or reimage the DGX Spark over the network, or to boot the recovery image from a PXE server.

Note

Before enabling PXE boot, you must either disable Secure Boot or enroll the PXE bootloader (`grubnetaa64.efi.signed`) in UEFI. For details, see *PXE Boot Setup*.

1. Go to **Advanced** **Network Stack Configuration**.
2. Set **Network Stack** to **Enabled**.
3. Set **Ipv4 PXE Support** or **Ipv6 PXE Support** (or both) to **Enabled** as needed.
4. Optionally set **PXE boot wait time** (seconds to press Esc to abort PXE) and **Media detect count**.
5. In **Advanced**, open the network configuration screen for the NIC you want to use for PXE (listed by MAC address). Enable and configure IPv4 or IPv6 for that device as required.
6. Save changes and exit from the **Save & Exit** menu.

For PXE server setup, bootloader configuration, and DHCP setup, see *PXE Boot Setup*.

Important

Always save your UEFI configuration changes from the **Save & Exit** menu so the system restarts with your new settings applied.

2.5.2.7 Troubleshooting

If you experience issues after making UEFI changes:

- Revert to UEFI defaults and restart
- Apply changes incrementally to identify problematic settings
- Update to the latest UEFI version if available
- Consult the DGX Spark UEFI Manual for specific setting descriptions
- For additional troubleshooting guidance and support options, see spark-maintenance-troubleshooting.

2.5.3. Spark Stacking

2.5.3.1 Connecting DGX Spark Systems into a Virtual Cluster

2.5.3.1.1 Overview

This guide explains how to connect two DGX Spark systems into a virtual compute cluster using simplified networking configuration and a QSFP/CX7 cable for high-performance interconnect.

The goal is to enable distributed workloads across Grace Blackwell GPUs using MPI (for inter-process CPU communication) and NCCL v2.28.3 (for GPU-accelerated collective operations).

Additional Information can be found in the Connect Two Sparks playbook.

2.5.3.1.2 System Requirements

Before you begin, ensure the following:

- Both DGX Spark systems have Grace Blackwell GPUs, are connected to each other using a QSFP/CX7 cable, and are running Ubuntu 24.04 (or later) with NVIDIA drivers installed

> **Note**
>
> The DGX Spark CX-7 ports support ethernet configuration only.
>
> Approved cables for the CX-7 ports are:
>
> - Amphenol: NJAAKK-N911 (QSFP to QSFP112, 32AWG, 400mm, LSZH), *NJAAKK0006 is the 0.5m version of this cable*
> - Luxshare: LMTQF022-SD-R (QSFP112 400G DAC Cable, 400mm, 30AWG)

- The systems have internet access for initial software setup
- You have sudo/root access on both systems

2.5.3.1.3 Setup Networking Between Spark Systems

2.5.3.1.3.1 Option 1: Automatic IP assignment (recommended)

Follow these steps on **both DGX Spark nodes** to configure network interfaces using `netplan`. The following commands should be run in a terminal session (either local or remote).

1. **Download the netplan configuration file**

```
sudo wget -O /etc/netplan/40-cx7.yaml https://github.com/NVIDIA/dgx-spark-
↪playbooks/raw/main/nvidia/connect-two-sparks/assets/cx7-netplan.yaml
```

2. **Set appropriate permissions on the configuration file**

```
sudo chmod 600 /etc/netplan/40-cx7.yaml
```

3. **Apply the netplan configuration**

```
sudo netplan apply
```

2.5.3.1.3.2 Option 2: Manual IP assignment (advanced)

Follow these steps to manually assign IP addresses for dedicated cluster networking.

1. **On Node 1, assign a static IP address and bring up the interface**

```
sudo ip addr add 192.168.100.10/24 dev enP2p1s0f1np1
sudo ip link set enP2p1s0f1np1 up
```

2. **On Node 2, assign a static IP address and bring up the interface**

```
sudo ip addr add 192.168.100.11/24 dev enP2p1s0f1np1
sudo ip link set enP2p1s0f1np1 up
```

3. **From Node 1, verify connectivity by testing connection to Node 2**

```
ping -c 3 192.168.100.11
```

4. **From Node 2, verify connectivity by testing connection to Node 1**

```
ping -c 3 192.168.100.10
```

2.5.3.1.4 Run the DGX Spark Discovery Script

This step will automatically identify interconnected DGX Spark systems and set up SSH authentication without requiring a password.

The following commands should be run in a terminal session (either local or remote) on both nodes.

On both nodes:

1. **Download the discovery script**

```
wget https://github.com/NVIDIA/dgx-spark-playbooks/raw/refs/heads/main/
↪nvidia/connect-two-sparks/assets/discover-sparks
```

2. **Make the script executable**

```
chmod +x discover-sparks
```

3. **Run the discovery script**

```
./discover-sparks
```

Example output:

```
Found: 192.168.100.10 (spark-1b3b.local)
Found: 192.168.100.11 (spark-1d84.local)

Copying your SSH public key to all discovered nodes using ssh-copy-id.
You may be prompted for your password on each node.
Copying SSH key to 192.168.100.10 ...
Copying SSH key to 192.168.100.11 ...
nvidia@192.168.100.11's password:

SSH key copy process complete. These two sparks can now talk to each
↪other.
```

2.5.3.1.5 Install Required Software and Verify the Configuration

With the networking configured and the systems able to communicate with each other, the next step is to install the required software for distributed workloads and run test workloads to verify that GPU-to-GPU communication is working correctly and to measure performance across the stacked systems.

For complete instructions on building NCCL, running the NCCL test suite, and interpreting the results, see the NCCL Stacked Sparks playbook.

2.5.3.1.6 Troubleshooting

- Ensure the QSFP/CX7 interface is active and used for IP assignment
- Verify connectivity between nodes via `ping`
- Check your interface bindings with `ip a` and `ethtool`
- If the discovery script fails, manually verify SSH connectivity between nodes
- For additional troubleshooting guidance and support options, see spark-maintenance-troubleshooting

2.5.3.1.7 Next Steps

Once tested, this configuration can be scaled to support:

- Job orchestration with Slurm or Kubernetes
- Containerized execution with Singularity or Docker

2.6. Software

The DGX Spark comes with a comprehensive software stack optimized for AI development, machine learning, and data science workflows. This section provides detailed information about the included software components and their configuration.

2.6.1. DGX OS

2.6.1.1 Overview

NVIDIA DGX OS is a customized Linux distribution that provides a stable, tested, and supported operating system foundation for running AI, machine learning, and analytics applications on DGX systems. It includes platform-specific optimizations, drivers, and diagnostic tools tailored for NVIDIA hardware.

DGX OS serves as the underlying operating system for your DGX Spark, providing:

- A robust Linux foundation optimized for AI workloads
- Pre-configured drivers and system settings for NVIDIA hardware
- Security updates and system maintenance capabilities
- Compatibility with the broader NVIDIA software ecosystem

Note

For more information about DGX OS, see the official documentation at: https://docs.nvidia.com/dgx/dgx-os-7-user-guide/introduction.html

2.6.1.2 Security and Compliance

DGX OS is based on Ubuntu. For Ubuntu security capabilities and supported compliance standards (such as FIPS, CIS, and DISA-STIG), see the Ubuntu security standards.

2.6.1.3 Release Cadence

DGX OS follows a regular release schedule with updates typically provided twice per year, around February and August, for the first two years after initial release. Additional updates and security patches are provided between major releases and throughout the support lifecycle.

2.6.2. NVIDIA Sync

2.6.2.1 Overview

NVIDIA Sync is a system tray utility that runs on Windows, Mac, and Ubuntu to simplify launching applications and containers on remote Linux systems. The primary example is working with a DGX Spark, GB10, or DGX Station device on your local network. However, the approach is general and works with a broad range of devices, such as a cloud instance on a public network.

NVIDIA Sync needs only the hostname on your network plus your username and password for the device. After that, you can one-click launch local Integrated Development Environments (IDEs) and applications, such as VS Code, Cursor, and AI Workbench directly from the NVIDIA Sync UI.

You can add custom applications and scripts to run on the remote device. NVIDIA Sync has a Custom Application feature that handles connection details, such as port forwarding, so that you can run web applications or containers on the remote device and still access them as if they were running locally.

In addition, NVIDIA Sync has a *Tailscale Integration* that creates a secure tunnel to a device on your private network. This lets you access your DGX devices for compute and inference without being on that network, such as when you are at a coffee shop or a job site.

2.6.2.1.1 Terminology

- **Adding a device** — Manually configuring SSH details so that NVIDIA Sync can access the device and manage key-based access. This requires the device password.
- **Importing a device** — Selecting an existing SSH alias from your local main SSH configuration file for NVIDIA Sync to use. This bypasses manual configuration in the Sync application.
- **Connecting a device** — Activating the SSH connection to an added or imported device through NVIDIA Sync so that you can launch applications on it.
- **Adding a Tailscale device** — Enabling the Tailscale integration and following the steps to add an added or imported device to the same tailnet as your NVIDIA Sync application.
- **Direct connection** — Connecting to a device on the same network as your laptop without using the Tailscale integration.
- **Tailscale connection** — Connecting to a device using the Tailscale feature.

2.6.2.1.2 General Use Pattern

The general use pattern for NVIDIA Sync is:

1. Add or import a remote device to NVIDIA Sync.
2. Connect to the device through NVIDIA Sync.
3. One-click launch an IDE or application on the device.
4. Add a custom application to the device and launch it.
5. Use NVIDIA Sync to stop applications running on the device.

6. Disconnect from the device through NVIDIA Sync.

2.6.2.1.3 Limitations

- NVIDIA Sync does not support connections through jump or bastion servers.
- You can add multiple remote devices to NVIDIA Sync, but Sync only supports working on one device at a time.

2.6.2.2 Installation and Onboarding Flow

2.6.2.2.1 Installation

For Windows:

1. Download the Windows installer.
2. Double-click the installer `.exe` file.
3. Accept the license agreement.
4. Complete the installation.

For Mac:

1. Download the Mac application.
2. Drag and drop the application into your Applications folder.
3. Open NVIDIA Sync from the Applications folder.

For Ubuntu:

1. Configure the package repository:

```
curl -fsSL https://workbench.download.nvidia.com/stable/linux/gpgkey |
↪sudo tee -a /etc/apt/trusted.gpg.d/ai-workbench-desktop-key.asc
echo "deb https://workbench.download.nvidia.com/stable/linux/debian
↪default proprietary" | sudo tee -a /etc/apt/sources.list
```

2. Update package lists:

```
sudo apt update
```

3. Install NVIDIA Sync:

```
sudo apt install nvidia-sync
```

2.6.2.2.2 Onboarding Flow

The application opens after installation completes. If it does not, double-click the desktop icon to open it.

The onboarding flow has five steps:

1. Read and agree to the EULA.
2. Select local IDEs you want NVIDIA Sync to launch and manage on your remote devices.
3. Add your first remote Linux device to NVIDIA Sync.
4. Connect to that device through NVIDIA Sync.

5. Launch an application on the device.

2.6.2.3 Working with Direct Connections

2.6.2.3.1 Overview and Prerequisites

NVIDIA Sync allows you to add any remote Linux device for which you have SSH access directly over the network. This type of direct connection requires your laptop to be on the same network as the device and for Sync to have the required SSH information (for example, IP address, hostname, username and password, or key).

Direct connections will work only if your laptop is on the same network as the remote device, or the remote device is accessible from the internet (for example, a cloud VM). A typical example is working with a device on a LAN, such as a home or corporate network.

If you are not on the same network as your remote device, you may be able to connect using the Tailscale integration. For more information, see the *Working with Tailscale Connections* section below.

2.6.2.3.2 Adding a Device for a Direct Connection

There are a few different scenarios for adding a device for a direct connection.

2.6.2.3.2.1 Adding a DGX Spark or a GB10 Device with Device Name

After initial setup, the system broadcasts its hostname using multicast DNS (mDNS) so you can find and add it without the IP address.

If you are on a network that does not support mDNS, you will need the device IP address on the network.

1. Open the Settings window by clicking the gear icon in the top left corner.
2. Select the **Devices** tab, then click **Add Device**.
3. The device discovery modal opens to show the device name.
4. Select the device and fill in the fields in the configuration modal:
   - **Name:** Enter a name to identify this device.
   - **Hostname or IP:** Pre-populated with the device name you selected.
   - **Port number:** The default is 22.
   - **Username:** Enter your username for accessing the device.
   - **Password:** Enter your password for accessing the device.
5. Confirm the details by clicking **Add**.

If the details are correct, the device will be added and you can then directly connect to it using Sync.

2.6.2.3.2.2 Adding with Known IP Address

If the device is not broadcasting its name with mDNS or you are on a network that suppresses mDNS, you need to use a known IP address.

1. Open the NVIDIA Sync app and select **Add Device**.
2. Select **Add a device manually** at the bottom of the broadcast modal.
3. Fill in the fields in the configuration modal:

- **Name:** Enter a name to identify this device.
- **Hostname or IP:** Enter the IP address for the device on the network.
- **Port number:** The default is 22.
- **Username:** Enter your username for accessing the device.
- **Password:** Enter your password for accessing the device.

4. Confirm the details by clicking **Add**.

If the details are correct, the device will be added and you can then directly connect to it using Sync.

2.6.2.3.2.3 Importing an Existing SSH Configuration

NVIDIA Sync can also add a device that is already aliased in your main SSH configuration file. On Mac and Linux this file is `~/.ssh/config`, and on Windows it is `C:\Users\<user-name>\.ssh\config`.

Entries from that file are used as-is and must use key-based access to the remote device. Ensure the SSH alias is valid and working before importing.

1. Open the NVIDIA Sync app and select **Add Device**.
2. Select **Add a device manually** at the bottom of the broadcast modal.
3. Entries from the main SSH configuration file are shown.
4. Select the appropriate alias.
5. Confirm the import by clicking **Add**.

2.6.2.3.3 Using a Directly Connected Device

Once you have added a device to NVIDIA Sync, you can connect to it as long as you are on the appropriate network. To connect from anywhere, configure the Tailscale integration. For more information, see *Working with Tailscale Connections*.

2.6.2.3.3.1 Connecting and Disconnecting

To connect to a device that you have added:

1. Ensure you are on the same network as the device.
2. Open the NVIDIA Sync app.
3. Select the device name in the drop-down menu in the top left corner.
4. Click **Connect**.

To disconnect from a currently connected device:

1. Open the NVIDIA Sync pop-up window.
2. Click **Disconnect**.

2.6.2.4 Working with Tailscale Connections

2.6.2.4.1 Overview and Prerequisites

There are situations where you would like to access your device even though you are not on the same network. This is useful if you have a DGX Spark on your home network but want to use it while working away from home.

NVIDIA Sync supports this kind of connection using a Tailscale integration. Tailscale is an open source client along with a service platform that provides a peer-to-peer mesh called a “tailnet.” Tailscale works with NVIDIA Sync to access your device from relatively anywhere. Learn more about Tailscale in the Tailscale documentation.

NVIDIA Sync has directly integrated the Tailscale service so that Sync itself is a node that can be connected to the other devices in your tailnet. This means that you do not need to install the Tailscale client on your laptop. Rather, you can enable the feature in Sync.

2.6.2.4.2 Enabling the Tailscale Integration

To enable the Tailscale integration:

1. Open **Settings** and select the **Tailscale** tab.
2. Click **Enable Tailscale**.
3. A browser window opens. Sign in to Tailscale and click **Connect**.
4. Wait until you see Login Successful in the browser window.
5. Close the browser and return to NVIDIA Sync.

If the browser does not open, use the option in NVIDIA Sync to resend the request. If the enable flow fails, check the error message in NVIDIA Sync for details.

2.6.2.4.3 Adding a Device to Tailscale

To add a device to your Tailscale network using NVIDIA Sync, follow these steps to generate and use an authentication key. This process securely links your device to your tailnet and ensures it can communicate with other devices through Tailscale.

1. Open the NVIDIA Sync app and go to **Settings**.
2. Select the **Tailscale** tab.
3. Click **Add a Device**.
4. Select the device to add from the drop-down menu at the top of the modal.
5. Use the link in the modal to go to the Tailscale authentication key settings.
6. Create an authentication key using the default settings.
7. Copy and paste it into the modal and select **Add Device**.
8. A terminal opens connected to the device. Follow the instructions to ensure that the Tailscale client is installed and properly authenticated on the device.

2.6.2.4.4 Connecting to a Tailscale Device

NVIDIA Sync selects the connection type automatically. No user selection is required. The connection indicator in NVIDIA Sync shows which connection type is active.

If the connection drops, NVIDIA Sync enters a reconnecting state. Reconnection typically takes approximately 30 seconds. Click **Cancel** to stop. If the system tray is hidden and a connection error occurs, the tray may open automatically to display the error.

2.6.2.4.5 Switching Networks Automatically

When you move between networks (for example, from a local network to a remote network), NVIDIA Sync switches from direct to Tailscale connection automatically. The reconnecting state is displayed briefly, then the connection indicator updates. No action is required. This applies to the NVIDIA Sync managed tunnels and to SSH-enabled applications using SSH aliases (such as VS Code or Cursor).

2.6.2.4.6 Managing Tailscale Devices

You can manage the devices that are connected to your Tailscale network directly from within NVIDIA Sync using the following tools:

Tailscale Devices screen: View all devices added to Tailscale from the Tailscale settings screen in NVIDIA Sync.

Reauthenticating: If a device's Tailscale authorization expires, reauthenticate it from the Tailscale Settings screen.

Removing devices from Tailscale: Removing the device from Tailscale deletes credentials and disconnects the device from your tailnet. Select **Remove device** from the action menu and follow the terminal prompts. Removing a device from Tailscale requires a direct connection. You cannot do this over a Tailscale connection.

> **Note**
>
> When you remove or deauthenticate a device from Tailscale, its keys are expired (they appear as expired in the Tailscale administration console). The device is not removed from the console.

2.6.2.4.7 Troubleshooting Connection Failures

If you see a message saying "Unable to Connect," use the following troubleshooting steps:

1. Verify your network connection.
2. In the Tailscale administration console, confirm the device is enrolled and not expired.
3. Expand the source error for more details.

If the tray is hidden when an error occurs, it might open automatically to display the message.

2.6.2.4.8 Disabling the Tailscale Integration

To disable the Tailscale integration, follow these steps:

1. Open **Settings** and select the **Tailscale** tab.
2. Use the three-dot action menu and select **Disable Tailscale**.

> **Warning**
>
> Tailscale devices remain visible in your Tailscale administration console. Remove them before disabling the Tailscale integration. Disconnecting clears NVIDIA Sync's Tailscale credentials but does not remove the devices.

2.6.2.4.9 FAQ / Common Issues

My session timed out during setup

Complete the Tailscale login in the browser before the session expires. If it expires, start the enable flow again from **Settings Tailscale**.

I accidentally closed the browser

Resend the request from NVIDIA Sync. The enable flow can be retried.

My device shows as expired in Tailscale

Reauthenticate the device from the Enrolled Devices screen, or generate a new authentication key and re-enroll.

Unenroll command is hanging

Unenroll requires a direct connection. Connect to the device over your local network, then unenroll. You cannot unenroll over a Tailscale connection.

2.6.2.5 Configuring and Using Applications

2.6.2.5.1 Overview

NVIDIA Sync streamlines the process of launching applications and containers on remote systems, ensuring reliable connectivity across both private and public networks.

Once a remote device has been added or imported to NVIDIA Sync, you can one-click launch applications while Sync handles the connection details.

NVIDIA Sync divides applications between default and custom:

- **Default applications** — Fixed list of commonly used IDEs and development platforms, such as Cursor, VS Code, VS Code Insiders Edition, and NVIDIA AI Workbench.
- **Custom applications** — All other applications; these require manual configuration through the **Custom** tab in the Settings window.

In addition, DGX devices like DGX Spark and GB10 include the DGX Dashboard. NVIDIA Sync works with the DGX Dashboard without any configuration on your part. The DGX Dashboard automatically appears if it is available on the device.

2.6.2.5.2 Launching an SSH Terminal

NVIDIA Sync always allows you to launch an SSH terminal on the remote without any setup on your part. The terminal opens into the default shell on the remote with the user set to the user you have configured for that connection. The session opens in the working directory set, defaulting to your home directory.

2.6.2.5.3 Default Applications

NVIDIA Sync detects the following applications when they are installed locally and prompts you to enable them during onboarding:

- Cursor
- VS Code
- VS Code Insiders
- NVIDIA AI Workbench

2.6.2.5.4 Launching a Default Application

To launch a default application, follow these steps:

1. Open the NVIDIA Sync application.
2. Connect to an existing device.
3. Select the application from the pop-up menu.
4. Wait for the application to launch.

2.6.2.5.5 Custom Scripts and Applications

2.6.2.5.5.1 Overview and Prerequisites

Custom scripts allow you to write and run bash scripts on a connected device and access web-based services through an SSH tunnel to your local computer.

This allows you to define, launch, and connect to webapps, containers, and servers on the remote device through a port that you define in the NVIDIA Sync app. You can also use this to run background tasks like downloading data and models.

Scripts are created on a per-device basis and they run in the user's home directory on the remote device. When you create or edit a custom script, NVIDIA Sync automatically saves or updates it on the remote device.

Once you have added a script to a device, it shows in the NVIDIA Sync app when it is connected to the device. You run it by selecting the associated port in the application.

NVIDIA Sync runs the script as your user on the remote device using a bash command.

The only prerequisite for using this feature is that bash is installed on the remote device.

2.6.2.5.5.2 Adding and Editing a Custom Script to a Remote Device

Custom scripts are added on the **Custom** tab of the Settings window. To add a script to the device, you must first add or import the device to NVIDIA Sync and then connect to it through Sync.

1. Connect to an existing device.
2. Verify that bash is installed.
3. Open **Settings** → **Custom** tab.
4. Click **Add New**, or click **Edit** on an existing script.
5. Enter an identifying name and desired port in the Add Custom modal.
6. Write your bash script in the **Launch Script** code editor.
7. Configure the launch settings.
8. Click **Add** or **Update**.

You can also add a script from the pop-up menu by clicking **Add New** in the **Custom** section.

2.6.2.5.5.3 Selecting a Port for the Script

You must assign a port for the script even if the script will run in the background on the remote device. The assigned port is bound between the remote device and your local device, and the local port is bound until you stop the custom application or disconnect NVIDIA Sync.

For example, assigning port 8000 for a custom application binds local port 8000 to remote port 8000, and local port 8000 is bound until it is released.

2.6.2.5.5.4 Configuring Launch Settings

The Add Custom modal lets you configure how the custom script launches a user interface.

- **Auto open in browser at the following path** — Opens your default web browser after the application starts. It opens to `http://localhost:<port>/<URL Path>`. Leaving the URL path unset will load the root of the web application.
- **Launch in Terminal** — Opens an SSH terminal to the remote with the script running in it. This is useful if you need to monitor the status of the application or script being launched or run. The terminal stays connected even if the script fails.

Leaving these options blank runs the script in the background without opening any interface.

2.6.2.5.5.5 Writing the Bash Script

The Add Custom modal has a simple file editor that lets you write, edit, and paste text that is saved locally in the application as well as on the remote device. You can write standard bash scripts for Python, Docker, and similar tools.

You should ensure that there is a new line at the end of the script. However, you do not need to include the interpreter line (for example, `#!/bin/bash`) at the top of the file.

NVIDIA Sync runs the script as your user on the remote device with a bash command.

2.6.2.5.5.6 Running a Custom Script

1. Connect to a device.
2. In the main window, find your script under the **Custom** section.
3. Click the script to start it.

If **Launch in Terminal** is enabled, an OS terminal window opens with the script running interactively. Otherwise, the script runs in the background.

If **Auto open in browser** is enabled, NVIDIA Sync waits for the service to become available (up to 30 seconds) and then opens the URL in your default browser.

2.6.2.5.5.7 Stopping a Custom Script

Click the **x** on the running script in the pop-up window to close it. This stops the service and releases the port.

2.6.2.6 Working with Ports and Tunnels

The following information can be useful when assigning ports to custom scripts or resolving connection issues.

Login shell: Opening a terminal through NVIDIA Sync uses a `bash` login shell, so the $PATH (including `/usr/local/cuda/bin`) matches a manual SSH session.

Custom port: Set and persist a non-default SSH port for each device when adding the device.

Port conflicts: If a port is already in use, NVIDIA Sync displays a clear error instead of failing silently or routing to the wrong application. If a port-in-use error appears, release the port and retry.

2.6.2.7 Common Issues

My PATH looks different in an NVIDIA Sync terminal compared to SSH

NVIDIA Sync uses a `bash` login shell, so $PATH (including `/usr/local/cuda/bin`) should match a manual SSH session.

Port-in-use error

Release the port or stop the application using it, then retry.

NVIDIA Sync is not discovering my device

Confirm the device is broadcasting `_ssh._tcp` on the network. Check that mDNS is working and the device is reachable.

2.6.3. DGX Dashboard

2.6.3.1 Overview

The DGX Spark comes with a built-in dashboard that provides an overview of the system's current operational metrics, the ability to apply updates, change some system settings, and access local Jupyter Notebooks.

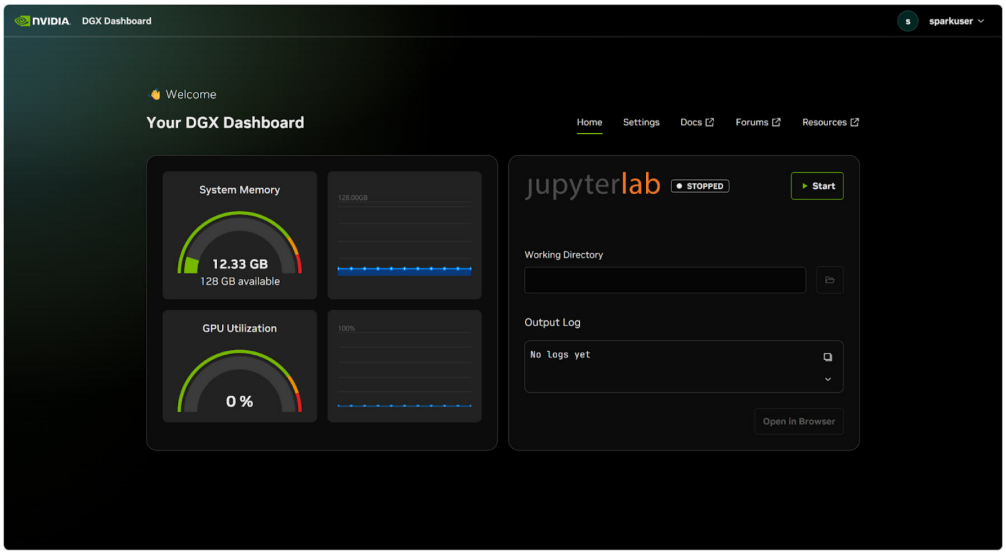


Fig. 2: The DGX Dashboard provides real-time system monitoring and integrated JupyterLab access

> **Note**
>
> To run updates and change the device name, you must have `sudo` access. The account created during initial setup will have access.

2.6.3.2 Integrated JupyterLab

The dashboard includes an integrated JupyterLab instance that provides a convenient development environment:

- When started, JupyterLab creates a virtual environment in the specified working directory and automatically installs a set of recommended packages
- If you enter a new working directory and start JupyterLab, a new environment will be created
- Each user account on the device is assigned a port located in `/opt/nvidia/dgx-dashboard-service/jupyterlab_ports.yaml`
- To access JupyterLab remotely, you must tunnel it just like the dashboard itself. The port to tunnel is in the ports file. Using NVIDIA Sync, this tunnel is managed for you automatically and just works

2.6.3.3 Accessing the Dashboard

The dashboard can be accessed locally by clicking on the "Show Apps" button in the bottom left corner of the Ubuntu desktop. Then, in the app grid, select the "DGX Dashboard" shortcut to open the dashboard in your default web browser.

Remotely, the dashboard can be accessed using NVIDIA Sync or via a manually created SSH tunnel. If using NVIDIA Sync, after connecting, simply click on the "DGX Dashboard" button and the dashboard will open in your default web browser at http://localhost:11000.

To manually access over SSH, first open a tunnel, e.g., `ssh -L 11000:localhost:11000 <username>@<IP or spark-abcd.local>`. Then, open the dashboard in your web browser at http://localhost:11000.

2.6.4. NVIDIA Container Runtime for Docker

2.6.4.1 Overview

The NVIDIA Container Runtime enables Docker containers to access GPU resources on DGX Spark systems. It provides hooks based on the Open Container Initiative (OCI) specification, which is an open standard for container runtimes. These OCI hooks are triggered when the `--gpus` flag is used, ensuring GPU devices are made available inside the container. The runtime acts as a bridge between Docker and the NVIDIA drivers, allowing containers to utilize GPU acceleration for AI/ML workloads, CUDA applications, and other GPU-accelerated software.

Key benefits: - Seamless GPU access within containers - Automatic driver and library management - Support for multi-GPU configurations - Compatibility with popular container orchestration platforms

The runtime works in conjunction with the NVIDIA Container Toolkit, which provides the necessary components to expose GPU devices and CUDA libraries to containerized applications.

2.6.4.2 Installation

The NVIDIA Container Toolkit is preinstalled and configured on DGX Spark systems. This includes:

- NVIDIA Container Runtime
- Docker integration
- GPU device access configuration
- CUDA library management

The runtime is ready to use out of the box for running GPU-accelerated containers.

2.6.4.2.1 Optional: Add User to Docker Group

By default, Docker requires `sudo` privileges to run commands. Adding your user to the docker group allows you to run Docker commands without `sudo`, which provides:

- **Convenience**: No need to type *sudo* before every Docker command
- **Better workflow**: Seamless integration with development tools and scripts
- **Reduced friction**: Faster iteration when working with containers

To add your user to the docker group:

```
sudo usermod -aG docker $USER
newgrp docker
```

Note

This step is optional. You can continue using Docker with `sudo` if you prefer not to modify group memberships.

2.6.4.3 Usage

2.6.4.3.1 Basic GPU Access

Run a container with GPU access using the `--gpus` flag:

```
docker run -it --gpus=all nvcr.io/nvidia/cuda:13.0.1-devel-ubuntu24.04 nvidia-
↪smi
```

This command: - Runs an interactive container (`-it`) - Enables access to all GPUs (`--gpus=all`) - Uses the NVIDIA CUDA development image - Executes `nvidia-smi` to display GPU information

2.6.4.3.2 Set GPU Capabilities

Control which GPU capabilities are available to the container:

```
docker run -it --gpus '"capabilities=compute,utility"' nvcr.io/nvidia/cuda:13.
↪0.1-devel-ubuntu24.04 nvidia-smi
```

2.6.4.4 Validation

2.6.4.4.1 Test GPU Access

Run the test command to verify GPU access:

```
docker run -it --gpus=all nvcr.io/nvidia/cuda:13.0.1-devel-ubuntu24.04 nvidia-
↪smi
```

Expected output should show:

- GPU device information
- Driver version
- CUDA version

- Memory usage and temperature

2.6.4.5 Troubleshooting

2.6.4.5.1 Runtime Not Found

If you encounter "runtime not found" errors:

1. Verify NVIDIA Container Toolkit is installed:

```
nvidia-ctk --version
```

2. Check Docker daemon configuration:

```
cat /etc/docker/daemon.json
```

3. Restart Docker service:

```
sudo systemctl restart docker
```

2.6.4.5.2 Driver/Container CUDA Mismatch

If you see CUDA version mismatches:

1. Check host CUDA driver version:

```
nvidia-smi
```

2. Use a container image with compatible CUDA version:

```
docker run -it --gpus=all nvcr.io/nvidia/cuda:13.0.1-devel-ubuntu24.04
↪nvidia-smi
```

2.6.4.5.3 Permission Issues

If you encounter permission errors:

1. Ensure your user is in the docker group (if not using sudo):

```
groups $USER
```

2. Check device permissions:

```
ls -la /dev/nvidia*
```

3. Verify Docker daemon has access to GPU devices:

```
sudo docker run -it --gpus=all nvcr.io/nvidia/cuda:13.0.1-devel-ubuntu24.
↪04 nvidia-smi
```

2.6.4.5.4 Container Startup Issues

If containers fail to start:

1. Check Docker logs:

```
docker logs <container_id>
```

2. Verify GPU devices are available on host:

```
ls /dev/nvidia*
```

3. Test with a minimal container:

```
docker run --rm --gpus=all nvcr.io/nvidia/cuda:13.0.1-devel-ubuntu24.04
↪echo "GPU test successful"
```

2.6.5. NGC

2.6.5.1 Overview

NVIDIA GPU Cloud (NGC) is a comprehensive registry of GPU-optimized containers, pre-trained models, and AI/ML software that enables rapid development and deployment of AI applications. For DGX Spark users, NGC provides access to the latest frameworks, tools, and optimized environments specifically designed for the Grace Blackwell architecture.

Key benefits for DGX Spark users:

- **Optimized Containers**: Pre-configured environments with the latest AI/ML frameworks, CUDA, and libraries optimized for Grace Blackwell GPUs
- **Pre-trained Models**: Access to state-of-the-art models and model collections for various AI tasks
- **Rapid Development**: Skip complex environment setup and focus on your AI/ML projects
- **Cutting-edge Software**: Access to the latest NVIDIA software stack and experimental features

NGC is particularly valuable for DGX Spark users because it provides the most current and optimized software stack for this new platform, ensuring you have access to the latest performance optimizations and features.

2.6.5.2 Getting Started

2.6.5.2.1 Create an NGC Account

1. Visit the NGC website
2. Click **Sign Up** and create a free account
3. Verify your email address
4. Complete your profile information

2.6.5.2.2 Generate an API Key

1. Log in to your NGC account
2. Navigate to **Setup** -> **API Key**
3. Click **Generate API Key**
4. Copy and securely store your API key

Note

Your API key is required for pulling containers and accessing NGC resources. Keep it secure and never share it publicly.

2.6.5.2.3 Install NGC CLI (Optional)

The NGC CLI provides convenient command-line access to NGC resources. Your DGX Spark system requires the ARM64 version of the NGC CLI which can be found on the **ARM64 Linux** tab at https://org.ngc.nvidia.com/setup/installers/cli.

For more information on installing and using the NGC CLI, see NGC CLI Documentation.

2.6.5.2.4 Authenticate with Docker

Configure Docker to access NGC registries:

```
# Login to NGC with Docker
docker login nvcr.io
# Username: $oauthtoken
# Password: <your-api-key>
```

2.6.5.3 Basic Usage

2.6.5.3.1 Pull and Run a Container

Start with a popular AI/ML framework container:

```
# Pull a PyTorch container optimized for Grace Blackwell
docker pull nvcr.io/nvidia/pytorch:24.08-py3

# Run the container with GPU access
docker run -it --gpus=all nvcr.io/nvidia/pytorch:24.08-py3
```

2.6.5.3.2 Explore Available Resources

Browse NGC resources through the web interface:

- **Containers**: AI/ML frameworks, development environments, and specialized tools
- **Models**: Pre-trained models for computer vision, natural language processing, and more
- **Helm Charts**: Kubernetes deployment configurations
- **Jupyter Notebooks**: Interactive tutorials and examples

2.6.5.4 Common Workflows

2.6.5.4.1 Development Environment

Use NGC containers as your development environment:

```
# Run a development container with persistent storage
docker run -it --gpus=all \
  -v /path/to/your/project:/workspace \
  nvcr.io/nvidia/pytorch:24.08-py3
```

2.6.5.4.2 Model Inference and Training

Access pre-trained models and training scripts:

```
# Pull a model from NGC
ngc registry model download-version "nvidia/nemo/bertbaseuncased:1.0.0rc1"

# Or use models directly in containers
docker run -it --gpus=all \
  nvcr.io/nvidia/pytorch:24.08-py3
```

2.6.5.5 Best Practices

2.6.5.5.1 Container Management

- **Pin Versions**: Use specific container tags for reproducible environments
- **Regular Updates**: Periodically update to newer container versions for latest optimizations
- **Resource Limits**: Set appropriate memory and CPU limits for your workloads

2.6.5.5.2 Data Persistence

- **Volume Mounts**: Mount your data directories into containers for persistence
- **Model Storage**: Store trained models and checkpoints outside containers
- **Configuration**: Keep configuration files in version control

2.6.5.5.3 Security

- **API Key Security**: Store your NGC API key securely and rotate it regularly
- **Container Scanning**: Scan containers for vulnerabilities before use
- **Network Security**: Use appropriate network configurations for your environment

2.6.5.6 Troubleshooting

2.6.5.6.1 Common Issues

Authentication Failures

```
# Verify your API key is correct
docker login nvcr.io
# Check if your account has access to the requested resource
```

Container Pull Issues

```
# Check network connectivity to NGC registry
curl -I https://ngc.nvidia.com

# View container catalog on NGC website
# Visit https://catalog.ngc.nvidia.com/containers

# Or use NGC CLI to list available containers
ngc registry image list nvidia/*

# Try pulling with verbose output to see specific error
docker pull nvcr.io/nvidia/pytorch:24.08-py3
```

GPU Access Problems

```
# Verify NVIDIA Container Runtime is installed
docker run --rm --gpus=all nvcr.io/nvidia/cuda:13.0.1-devel-ubuntu24.04
↪nvidia-smi
```

2.6.5.6.2 Getting Help

- **NGC Documentation**: Visit the NGC documentation
- **Community Forums**: Join the NVIDIA Developer Forums
- **Additional Support**: For troubleshooting guidance and support options, see spark-maintenance-troubleshooting

2.6.6. NVIDIA AI Enterprise—DGX Spark Quick Start Guide

NVIDIA AI Enterprise—DGX Spark is an enterprise-grade software platform for AI development, deployment, and optimization on DGX Spark and NVIDIA GB10 Grace Blackwell Superchip-based systems. It provides libraries, frameworks, microservices, drivers, and enterprise support to accelerate inference, training, customization, observability, and guardrailing.

2.6.6.1 Set Up Your DGX Spark System

Before accessing NVIDIA AI Enterprise—DGX Spark, you must complete the initial setup of your DGX Spark system. Follow the steps in *First Boot and Initial Configuration*. After your system is powered on and connected to your network, continue with the steps in this guide.

2.6.6.2 Optional: NVIDIA AI Enterprise—DGX Spark Evaluation

If you would like to try NVIDIA AI Enterprise—DGX Spark before purchasing, NVIDIA offers a 90-day trial of NVIDIA AI Enterprise. You can register here.

2.6.6.3 Order Confirmation Message

After your order is processed, you will receive an order confirmation message from NVIDIA containing the information required to access NVIDIA AI Enterprise software and enterprise support.

Your NVIDIA Entitlement Certificate is attached to the message and provides instructions for using the certificate.

If you manage software access or licensing in your organization, follow the instructions in the NVIDIA Entitlement Certificate. Otherwise, forward the order confirmation message and NVIDIA Entitlement Certificate to your IT administrator.

2.6.6.4 Create Your NVIDIA AI Enterprise Account

To access NVIDIA AI Enterprise—DGX Spark and technical support, you must have an NVIDIA Cloud Account (NVIDIA AI Enterprise Account), which provides access to:

- **NVIDIA NGC** - Access to NVIDIA AI Enterprise—DGX Spark software component.
- **NVIDIA Enterprise Support Portal** - Access to support services.

Both can be accessed from the NVIDIA Application Hub.

Before you begin, have your order confirmation message available.

1. In the NVIDIA Entitlement Certificate instructions, follow the **Register** link.
2. Fill out the form on the NVIDIA Enterprise Account Registration page and click **REGISTER**. You will receive an email with instructions to log in to the NVIDIA Application Hub.
3. Open the email and click **Log In**.
4. On the Login page, enter your email address and click **Sign In**.
5. On the Create Your Account page, provide and confirm a password, then click **Create Account**. You will receive an email to verify your address.
6. Open the verification email and click **Verify Email Address**.

You can now log in to the NVIDIA Application Hub to access NVIDIA NGC and the NVIDIA Enterprise Support Portal.

2.6.6.5 Access NVIDIA AI Enterprise—DGX Spark Software Asset

1. Go to the NVIDIA NGC Catalog and log in if prompted.
2. On the **NVIDIA NGC Search** page, set the **DGX Spark** filter or look for the **DGX Spark Collection**.
3. Click the software asset to learn more or download it.

2.7. Common Use Cases

The DGX Spark is designed to support a wide range of AI, machine learning, and data science workflows. Visit https://build.nvidia.com/spark for practical guides to help you get started. That site is regularly updated with new content and information and will be the single source of truth for your Spark device.

2.8. PXE Boot Setup

The DGX Spark UEFI BIOS supports PXE boot. Several manual customization steps are required to get PXE to boot the DGX OS image or the DGX Spark recovery image.

Caution

This document is meant to be used as a reference. Explicit instructions are not given to configure the DHCP, HTTP, and TFTP servers. The end user's IT team is expected to configure these servers to fit their company's environment and security guidelines.

2.8.1. Requirements

- TFTP server
  - Software that provides TFTP service.
- HTTP server
  - An HTTP server is used to transfer large files, such as the iso image and `initrd`. alternatively, TFTP can be used for this purpose. HTTP is used in the example below.
- DHCP server
  - Software that provides dynamic host configuration protocol (DHCP) service.

Note

The TFTP server, HTTP server, and DHCP server can all be configured on the same system, or they can each be on different systems.

- linux bootloader
- ip address: `<ftp ip>`
- fully qualified host: `<ftp host>`

This topic provides some guidance concerning how to set up a PXE boot environment for DGX systems. For complete details, refer to online documentation for setting up a PXE boot server. In this example, `xinetd` is used to provide TFTP service; `dnsmasq` is used to provide DHCP service; and `syslinux` is used as the bootloader.

2.8.2. Overview of the PXE Server

The PXE server requires configuration in the following areas:

- bootloader (grub)
- TFTP contents (the kernel and `initrd`)

  In this example, TFTP is configured to serve files from `/local/tftp/`. You will need to configure your TFTP server to serve files from `/local/tftp` or the directory you desire to use.
- HTTP contents (the iso image)

  In this example, HTTP is configured to serve files from `/local/http/`. You will need to configure your HTTP server to serve files from `/local/http` or the directory you desire to use.
- DHCP

2.8.2.1 PXE Server Configuration for DGX OS Image

In this example, the directory structure on the HTTP and TFTP server looks like this:

```
/local/
   http/
      base_os_7.0.0/
         base_os_7.0.0.iso

   tftp/
      baseos/
         vmlinuz
         initrd
      grub/
         grub.cfg
      grubnetaa64.efi.signed
```

Note

The `vmlinuz` and `initrd` files are specified relative to the TFTP root, `/local/tftp/`; and the location of the ISO, `base_os_7.0.0.iso`, is relative to the HTTP root, `/local/http/`.

Here, the DHCP and PXE servers are configured to use the above directory structure. The person responsible for deploying the PXE environment should change the directory names and structure to fit their infrastructure.

You can set up the directory structure on your HTTP and TFTP server similarly.

The contents of the /local/tftp/grub/grub.cfg file should look something like this:

```
set default=0
set timeout=5

menuentry 'Install BaseOS 7.0.0' {
   linux /baseos/vmlinuz fsck.mode=skip autoinstall ip=dhcp url=http://
↪<Server IP>/base_os_7.0.0/base_os_7.0.0.iso nvme-core.multipath=n nouveau.
↪modeset=0
   initrd /baseos/initrd
}
```

Note

The kernel boot parameters should match the contents of the corresponding ISO's boot menu found in `/mnt/boot/grub/grub.cfg`.

When the system being installed boots via PXE, boot files located on `/local/tftp` are retrieved from the TFTP server. (In this example, the TFTP server is provided by the `xinetd` service whose configuration file, `/etc/xinetd.d/tftp`, specifies that the boot files are located on `/local/tftp`.) When a system is PXE booted, the `grubnetaa64.efi.signedi` file that is designated in the DHCP server's `dhcpd.conf` file is retrieved by TFTP transfer (see *Configure Your DHCP Server*). By default, after the `grubnetaa64.efi.signed` is booted, the PXE boot `grub.cfg` file, `grub/grub.cfg` in this example, provides menu options for booting further. The PXE boot `grub.cfg` config file specifies the locations of the kernel and `initrd` files relative to the tftp directory.

- Configure the HTTP Directory:

  Configure the HTTP file directory and ISO image by placing a copy of the Base OS 7.0.0 ISO in directory `/local/http/base_os_7.0.0/`. In this example, the full path is `/local/http/base_os_7.0.0/base_os_7.0.0.iso`.

- Configure the TFTP Directory By Using the Following Steps:

  Mount the Base OS 7.0.0 ISO. Assume your mount point is `/mnt`:

  ```
  sudo mount -o loop /local/http/base_os_7.0.0/base_os_7.0.0.iso /mnt
  ```

  Copy the kernel and `initrd` from the ISO to the tftp directory:

  ```
  cp /mnt/casper/vmlinuz /local/tftp/baseos/vmlinuz
  cp /mnt/casper/initrd /local/tftp/baseos/initrd
  ```

  Unmount the Base OS 7.0.0 ISO:

  ```
  umount /mnt
  ```

- Download GRUB binaries and Copy it for PXE Booting into Place:

  ```
  cd /tmp
  wget -q http://ports.ubuntu.com/ubuntu-ports/dists/jammy/main/uefi/grub2-
  ↪arm64/current/grubnetaa64.efi.signed
  cp grubnetaa64.efi.signed /local/tftp/
  ```

2.8.2.2 PXE Server Configuration for Recovery Media

In this example, the directory structure on the HTTP and TFTP server looks like this:

```
/local/
   http/
      fastos/
         usb.customer.tar.gz
   tftp/
      fastos/
         vmlinuz
         initrd
      grub/
         grub.cfg
      grubnetaa64.efi.signed
```

Note

The `vmlinuz` and `initrd` files are specified relative to the TFTP root, `/local/tftp/`; and the location of the ISO, `usb.customer.tar.gz`, is relative to the HTTP root, `/local/http/`.

Here, the DHCP and PXE servers are configured to use the above directory structure. The person responsible for deploying the PXE environment should change the directory names and structure to fit their infrastructure.

You can set up the directory structure on your HTTP and TFTP server similarly.

The contents of the /local/tftp/grub/grub.cfg file should look something like this:

```
set default=0
set timeout=5

menuentry "Install DGX Spark FastOS" {
    linux /fastos/vmlinuz nouveau.modeset=0 console=tty0 console=ttyS0,921600
 ↪sbsa_gwdt.action=1 noui pxeinstall=true fastos_usbimg_url=http://<Server IP>
 ↪/fastos/usb.customer.tar.gz ip=dhcp static_ip=<static ip>:<gateway ip>
    initrd /fastos/initrd
}
```

When the system being installed boots via PXE, boot files located on `/local/tftp` are retrieved from the TFTP server. (In this example, the TFTP server is provided by the `xinetd` service whose configuration file, `/etc/xinetd.d/tftp`, specifies that the boot files are located on `/local/tftp`.) When a system is PXE booted, the `grubnetaa64.efi.signedi` file that is designated in the DHCP server's `dhcpd.conf` file is retrieved by TFTP transfer (see *Configure Your DHCP Server*). By default, after the `grubnetaa64.efi.signed` is booted, the PXE boot `grub.cfg` file, `grub/grub.cfg` in this example, provides menu options for booting further. The PXE boot `grub.cfg` config file specifies the locations of the kernel and `initrd` files relative to the tftp directory.

- Configure the HTTP Directory:

  Configure the HTTP file directory and ISO image by placing a copy of the DGX OS exactly as `/local/http/usb.customer.tar.gz`. Download the recovery media archive file (tar.gz format) from https://developer.nvidia.com/downloads/dgx-spark/dgx-spark-recovery-image-1.120.38.tar.gz and change its name to `usb.customer.tar.gz`.

- Configure the TFTP Directory By Using the Following Steps:

  Untar the `usb.customer.tar.gz` file to the `/tmp` directory:

  ```
  tar xpfv /tmp/usb.customer.tar.gz
  ```

  Copy the kernel and `initrd` from the tarball to the tftp directory:

  ```
  cp /tmp/usbimg.customer/usb/vmlinuz /local/tftp/fastos/
  cp /tmp/usbimg.customer/usb/initrd /local/tftp/fastos/
  ```

- Download GRUB binaries and Copy it for PXE Booting into Place:

  ```
  cd /tmp
  wget -q http://ports.ubuntu.com/ubuntu-ports/dists/jammy/main/uefi/grub2-
   ↪arm64/current/grubnetaa64.efi.signed
  cp grubnetaa64.efi.signed /local/tftp/
  ```

2.8.3. TFTP and HTTP Server Verification

After you have set up all elements of your PXE server, prior to doing a PXE install, verify that the TFTP and HTTP servers are working properly.

TFTP Server Verification

To verify that the TFTP server has been set up correctly, from a different system on the same subnet, use `tftp` to get one of the files that will be obtained via `tftp` during the PXE boot. In this example, the TFTP server has been set up to serve files from `/local/tftp`. The grub configuration file, `grub.cfg` is located on `/local/tftp/grub/grub.cfg`; therefore, from the TFTP command prompt, request grub.cfg via `get grub/grub.cfg`.

```
cd /tmp
tftp <TFTP_Server_IP>
get grub/grub.cfg
quit
```

HTTP Server Verification

To verify that the HTTP server has been set up correctly, use the `wget` command to get one of the files that will be obtained via HTTP during the PXE boot. In this example, the HTTP server has been set up to serve files from `/local/http`. The tarball, `usb.customer.tar.gz`, is located on `/local/http/fastos/usb.customer.tar.gz`; therefore, test the HTTP request to retrieve `usb.customer.tar.gz` by running the following commands:

```
cd /tmp
wget http://<HTTP Server IP>/fastos/usb.customer.tar.gz
```

2.8.4. Useful Parameters for Configuring Your System's Network Interfaces

`static_ip=<static ip>:<gateway ip>`: tells the initramfs to configure the system's interfaces using a static IP address.

2.8.5. Parameters Unique to the Spark OS Installer

- `usb.skipfw`: Skips the firmware update step during the installation.
- `usb.shell`: Starts a shell instead of installing the OS.
- `noui`: Disables the user interface during the installation.
- `autoinstall`: Enables the autoinstall feature during the installation.

2.8.6. Configure Your DHCP Server

The DHCP server is responsible for providing the IP address of the TFTP server and the name of the bootloader file in addition to the usual role of providing dynamic IP addresses. The address of the TFTP server is specified in the DHCP configuration file as `next-server`, and the bootloader file is specified as `filename`. The architecture option can be used to detect the architecture of the client system and to serve the correct version of the grub bootloader (x86, IA-32, ARM, and so on).

An example of the PXE portion of `dhcpd.conf` is:

```
class "pxeclients" {
  match if substring (option vendor-class-identifier, 0, 9) = "PXEClient";
    filename "grubnetaa64.efi.signed";
    next-server <TFTP_Server_IP>;
    option root-path "/local/tftp";
}
```

For example, this is a dhcpd.conf file:

```
authoritative;
default-lease-time 120;
max-lease-time 120;
ddns-update-style none;


subnet 192.168.99.0 netmask 255.255.255.0 {
pool {
   range 192.168.99.2;

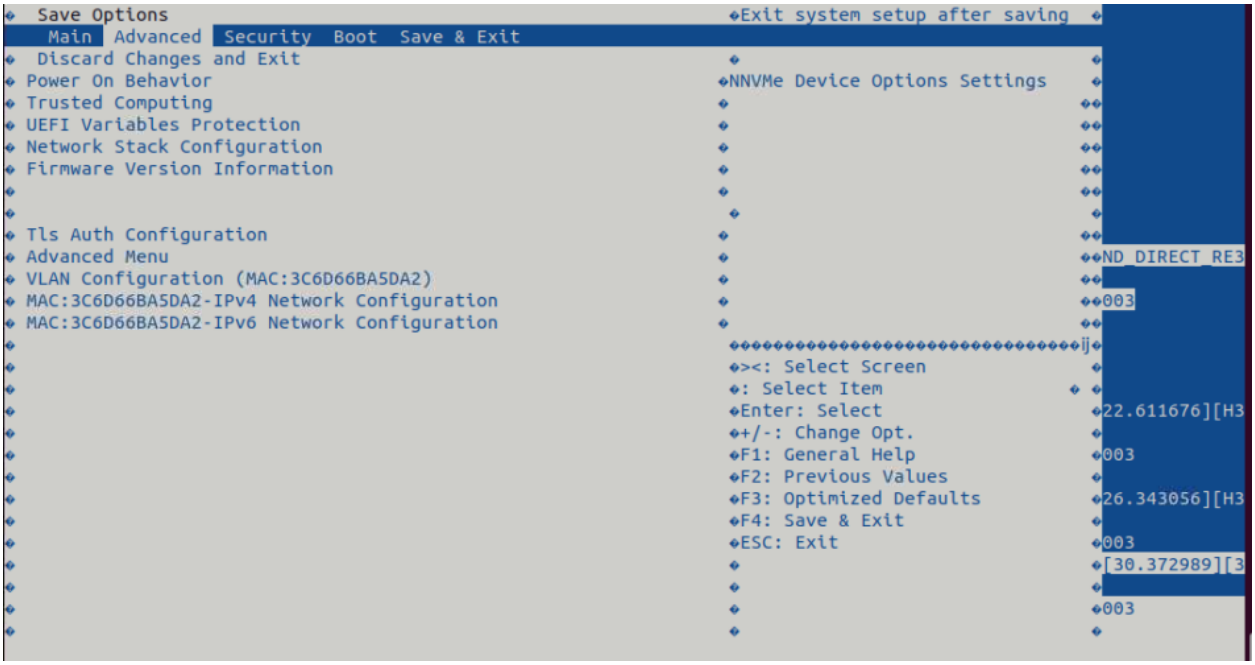
# Required for PXE Boot
class "pxeclients" {
   match if substring (option vendor-class-identifier, 0, 9) = "PXEClient";
      filename "grubnetaa64.efi.signed";
      # TFTP Server IP address
      next-server 192.168.99.1;
      option root-path "/local/tftp/";
}

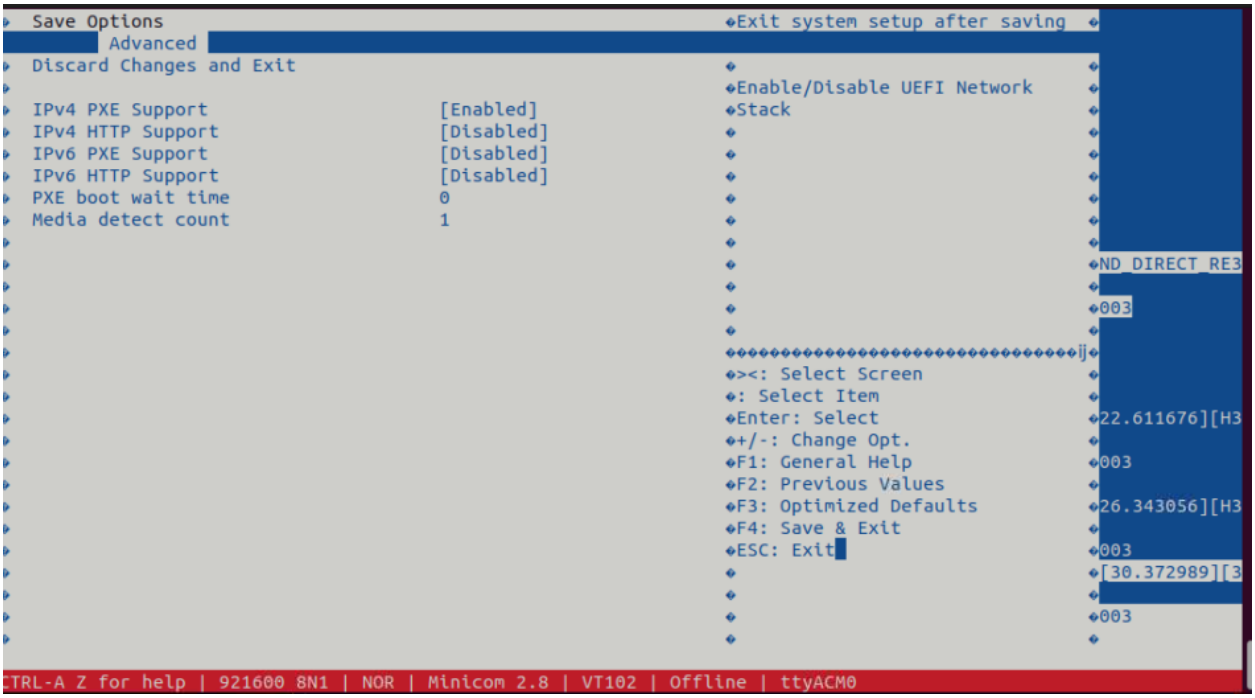
}
}
```

2.8.7. Enable PXE Boot on the DGX Spark

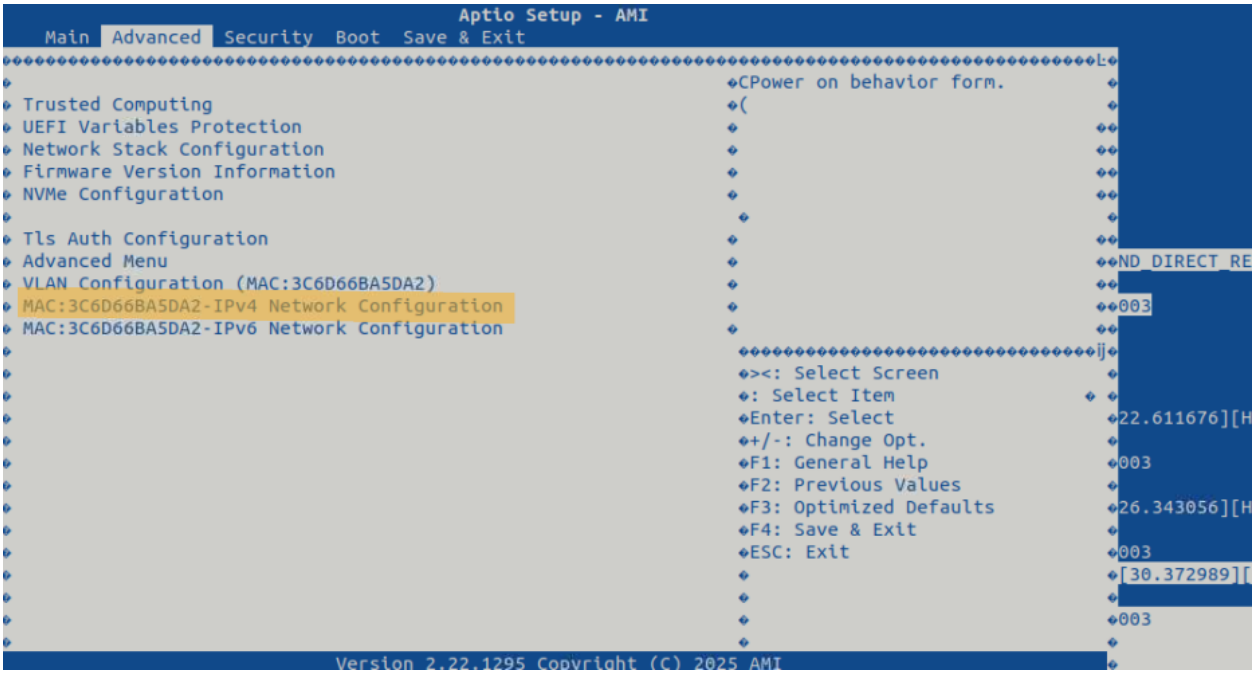
Before enabling PXE Boot, you need to disable the secure boot feature in the UEFI menu or enroll the grubnetaa64.efi.signed in the UEFI menu.

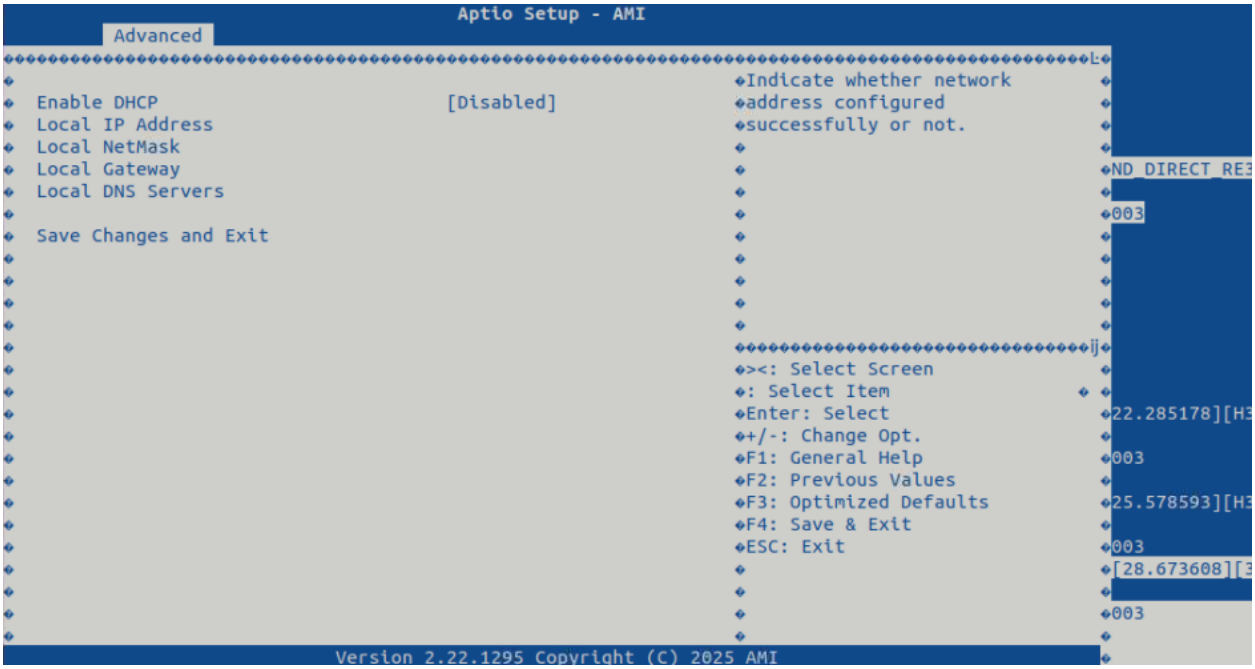
Enable PXE Boot on the DGX Spark by enabling it in `Network Stack Configuration` menu.





Select the NIC you want to use for PXE Boot and enable PXE Boot.





Save and Exit.

After you finished, you can use the UEFI boot menu to do PXE boot and modify the boot order. See https://docs.nvidia.com/dgx/dgx-spark-uefi/boot-tab.html.

2.9. OS and Component Update Guide

This section provides guidance for updating the operating system, software components, and firmware on your DGX Spark. The DGX Spark runs on NVIDIA DGX OS, which is an Ubuntu-based Linux distribution optimized for AI workloads.

> **Note**
>
> **Founders Edition Only**: The update information in this guide applies only to the DGX Spark Founders Edition. Devices from other manufacturers may have different update procedures.

2.9.1. Update Methods

We strongly recommend using the DGX Dashboard for all system updates on your |spark|. The dashboard ensures your system stays up to date with the latest NVIDIA-optimized components and configurations. While standard Ubuntu package management methods will work, the dashboard provides the most reliable and tested update path for your DGX system.

2.9.2. Using DGX Dashboard for Updates

The DGX Dashboard is the **primary and recommended** way to perform system updates on your DGX Spark. It provides a centralized interface for:

- Viewing available system updates

- Installing security patches and system updates
- Managing NVIDIA driver updates
- Managing firmware updates
- Monitoring update status and progress

For detailed information about using the DGX Dashboard, including how to access it and perform updates, see *DGX Dashboard*.

Warning

Before performing any system or firmware updates:

- Ensure your system is connected to a stable power source
- Close all running applications and save your work
- Have a recovery plan in place
- Schedule updates during maintenance windows when possible

2.9.3. Manual System Updates

Note: While manual updates using standard Ubuntu package management commands will work, we strongly recommend using the DGX Dashboard for all updates to ensure optimal system performance and compatibility.

For advanced users or when the DGX Dashboard is not available, you can perform system updates manually using the following steps:

1. Open a remote or local terminal on the DGX Spark device.
2. Run the following commands:

```
sudo apt update
sudo apt dist-upgrade
sudo fwupdmgr refresh
sudo fwupdmgr upgrade
sudo reboot
```

These commands will:

- Update the package lists and upgrade all installed packages (including OS components and drivers)
- Refresh the firmware metadata and upgrade all firmware components
- Reboot the system to apply updates

2.9.4. Update Best Practices

- **Use the DGX Dashboard**: Always prefer the DGX Dashboard for system updates to ensure compatibility and optimal performance
- **Regular updates**: Check for updates regularly, especially security patches
- **Backup before major updates**: Always backup critical data before major system changes

- **Stable power**: Ensure your system has a stable power supply during updates
- **Maintenance windows**: Schedule updates during planned maintenance windows when possible

2.10. System Recovery

This section provides information about system recovery procedures for your DGX Spark.

Note

Founders Edition Only: This recovery information applies only to the DGX Spark Founders Edition. The Founders Edition OS is not distributed as an ISO; recovery media is provided as a tar.gz archive. OEM variant images are only available from the respective OEMs. Devices from other manufacturers may have different recovery procedures.

2.10.1. System Recovery Overview

The system recovery process for the DGX Spark allows you to restore the operating system and firmware to their original factory state. This process is useful when dealing with system corruption, fatal configuration errors, or other issues that prevent normal system operation.

2.10.1.1 Recovery Requirements

Before beginning the recovery process, ensure you have the following:

- A USB flash drive with 16GB or larger capacity
- A keyboard and display connected to your DGX Spark
- Access to download the recovery media from NVIDIA support

2.10.1.2 Recovery Process Steps

The recovery process involves downloading recovery media, creating a bootable USB drive, and following a series of UEFI configuration steps. Follow these steps carefully to ensure successful system recovery.

1. **Download Recovery Media**:
   - Download the recovery media archive file (tar.gz format) from https://developer.nvidia.com/downloads/dgx-spark/dgx-spark-recovery-image-1.120.38.tar.gz
   - Save the file to your local system
2. **Create Recovery USB Drive**:
   - Download and unzip the recovery media archive file
   - Insert the USB drive into your system
   - Within the extracted files, use one of the following commands to create the recovery drive:

> **Note**
>
> **Creating the recovery drive requires administrator privileges.** On Windows systems, this is typically done by running the command as an administrator (i.e. from an elevated PowerShell or Command Prompt). If supported by the host system, you will be prompted by the system to run the command with elevated privileges.

Windows:

```
CreateUSBKey.cmd
```

Linux:

```
CreateUSBKey.sh
```

MacOS:

```
CreateUSBKeyMacOS.sh
```

> **Warning**
>
> This process will erase all data on your USB drive. Ensure you have backed up any important data before proceeding.

3. **Boot from Recovery USB Drive**:
   - Disconnect any external storage devices from the DGX Spark
   - Connect the USB drive to one of the USB ports on your DGX Spark
   - If your DGX Spark is powered off, boot the device into UEFI settings by holding down the `Esc` or `Del` key immediately after powering on the device

   > **Important**
   >
   > Make sure to use a keyboard plugged directly into a USB port on the DGX Spark device. Some Bluetooth keyboards, even those with USB connections, may not work during this process. If your keyboard isn't recognized, use a standard USB keyboard.

4. **Restore UEFI Defaults**:
   - Tap the `Right Arrow` key to select the "Save & Exit" page within the UEFI settings
   - Tap `Down Arrow` to select "Restore Defaults" and select "Yes" in response to "Load Optimized Defaults"
   - Select "Save Changes and Reset" - the device will reboot
   - While the device is rebooting, hold down the `Esc` or `Del` key to re-enter UEFI settings a second time
5. **Enable Secure Boot**:
   - Use the `Right Arrow` key to select "Security"
   - Confirm that "Secure Boot" is set to "Enabled"

- Select “Restore Factory Keys”
- Use the arrow keys to select the “Save and Exit” BIOS screen, and select “Save Changes and Reset”

6. **Boot from Recovery Media**:
   - While the device is rebooting, hold down the `Esc` or `Del` key to re-enter UEFI settings a third time
   - Tap the `Right Arrow` key to select the “Save & Exit” page in UEFI settings
   - Tap `Down Arrow` to move to the “Boot Override” section
   - Select the USB drive and tap `Enter`
   - The device will reboot using the USB drive - follow the on-screen steps to update your firmware and re-install the OS on the device’s SSD
7. **Restore System from Recovery Environment**
   - On the welcome screen, press `Enter` to continue. To cancel the process, press `Esc`.

   - On the warning screen, select [EXIT] to restart without proceeding, or select [START RECOVERY] to begin reflashing the SSD. Be aware that this will completely erase the internal SSD on the DGX Spark.

- Monitor the Recovery Progress screen for detailed output from the recovery process and the progress of the SSD reflash.

- When the process is complete, review the progress screen and follow the prompt to continue. Scroll or page through the recovery output if needed, for example during customer support.

- On the final screen, confirm that the DGX Spark has been reset to factory state and press `Enter` to restart the device.

2.11. Contacting NVIDIA Support

If you need assistance with your DGX Spark system, you can contact NVIDIA support:

- **Customer Support**: For case management and direct technical assistance, visit the NVIDIA Enterprise Support page at https://www.nvidia.com/en-us/support/enterprise/.
- **Community Forums**: Join the NVIDIA Developer Forums (https://forums.developer.nvidia.com/) to ask questions, share experiences, and get help from other users and NVIDIA engineers.

2.11.1. Field Diagnostic Software

NVIDIA Field Diagnostic is a software program used to test the DGX Spark system and detect hardware failures, and is intended for health checks of your DGX Spark setup and a pre-check for RMA qualification of the overall system.

For complete instructions, refer to the `Field Diagnostics User Guide`.

2.11.2. Removing a Previous Version

Remove the previous version of the field diagnostic software before installing a new one with the following commands:

```
sudo dpkg -P dgx-spark-fieldiag
sudo rm -rf /opt/nvidia/dgx-spark-fieldiag
sudo apt autoremove dgx-spark-fieldiag
```

2.11.3. Installing the Field Diagnostic Software

The Field Diagnostic software package is named `dgx-spark-fieldiag_<version>-1_arm64.deb`. To install the package using the NVIDIA CUDA APT Repository, follow these steps:

1. Add the NVIDIA CUDA repository key:

   ```
   sudo mkdir -p /usr/share/keyrings
   curl -fsSL https://developer.download.nvidia.com/compute/cuda/repos/
   ↪ubuntu2404/sbsa/cuda-archive-keyring.gpg | sudo tee /usr/share/keyrings/
   ↪cuda-archive-keyring.gpg > /dev/null
   ```

2. Add the CUDA APT repository and install:

   ```
   echo "deb [signed-by=/usr/share/keyrings/cuda-archive-keyring.gpg] https:/
   ↪/developer.download.nvidia.com/compute/cuda/repos/ubuntu2404/sbsa /" |
   ↪sudo tee /etc/apt/sources.list.d/cuda-sbsa-ubuntu2404.list
   sudo apt-get update
   sudo apt-get install dgx-spark-fieldiag
   ```

3. Verify the installation:

   ```
   dpkg -l | grep dgx-spark-fieldiag
   ```

The software dependencies (stress-ng, fio, and memtester) are automatically installed on your system when you install the .deb package.

2.11.4. Running Field Diagnostics

After installing the package, the field diagnostic software is located at `/opt/nvidia/dgx-spark-fieldiag`.

2.11.4.1 Before Running

Disable Secure Boot before running field diagnostics:

1. Check the current Secure Boot state:

```
sudo mokutil --sb-state
```

2. Reboot and enter UEFI setup (press **Delete** during boot, or run `sudo systemctl reboot --firmware-setup`).
3. Go to **Security** → **Secure Boot** → **Disable Secure Boot**.
4. Save the changes and reboot the system.

2.11.4.2 Running the Diagnostic

To execute field diagnostics, use root access:

1. Run:

```
sudo init 3
```

2. When the system switches to TTY console mode, log in at the TTY console.
3. Run:

```
cd /opt/nvidia/dgx-spark-fieldiag
sudo ./partnerdiag --field
```

The diagnostic takes approximately 30 minutes. A PASS/FAIL banner appears when complete. You can also run the diagnostic over SSH using the same commands.

> **Note**
>
> If you interrupt the diagnostic (for example, with Ctrl+C), power cycle the system before running the tests again.

2.11.4.3 After Running

Re-enable Secure Boot after the diagnostic completes:

1. Run `sudo systemctl reboot --firmware-setup`.
2. Go to **Security** → **Secure Boot** → **Enable Secure Boot**.
3. Save the changes and reboot the system.

For detailed instructions, including the Spec JSON file and log retrieval, refer to the Field Diagnostics User Guide.

2.11.4.4 Verifying Tool Installation

You can verify whether these tools are installed properly on your system using the following commands. These commands should display the path to each tool binary.

```
which fio
which memtester
which stress-ng
```

2.12. Third-Party License Notices

This NVIDIA product contains third party software that is being made available to you under their respective open source software licenses. Some of those licenses also require specific legal information to be included in the product. This section provides such information.

2.12.1. LIBICONV Library

NVTelemetry is using the `libiconv` library, which is licensed under the GNU Lesser General Public License (LGPL). `libiconv` source code can be obtained from the following link: https://ftp.gnu.org/pub/gnu/libiconv/libiconv-1.15.tar.gz.

The `libiconv` library is provided under the following terms:

```
                    GNU GENERAL PUBLIC LICENSE
                       Version 3, 29 June 2007

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"Major Component", in this context, means a major essential component
(kernel, window system, and so on) of the specific operating system
(if any) on which the executable work runs, or a compiler used to
produce the work, or an object code interpreter used to run it.
```

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```
  The "Corresponding Source" for a work in object code form means all
the source code needed to generate, install, and (for an executable
work) run the object code and to modify the work, including scripts to
control those activities.  However, it does not include the work's
System Libraries, or general-purpose tools or generally available free
programs which are used unmodified in performing those activities but
which are not part of the work.  For example, Corresponding Source
includes interface definition files associated with source files for
the work, and the source code for shared libraries and dynamically
linked subprograms that the work is specifically designed to require,
such as by intimate data communication or control flow between those
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  You may convey a work based on the Program, or the modifications to
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terms of section 4, provided that you also meet all of these conditions:

    a) The work must carry prominent notices stating that you modified
    it, and giving a relevant date.

    b) The work must carry prominent notices stating that it is
    released under this License and any conditions added under section
    1.  This requirement modifies the requirement in section 4 to
    "keep intact all notices".

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    additional terms, to the whole of the work, and all its parts,
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    Appropriate Legal Notices; however, if the Program has interactive
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    work need not make them do so.

  A compilation of a covered work with other separate and independent
works, which are not by their nature extensions of the covered work,
```

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```
and which are not combined with it such as to form a larger program,
in or on a volume of a storage or distribution medium, is called an
"aggregate" if the compilation and its resulting copyright are not
used to limit the access or legal rights of the compilation's users
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  You may convey a covered work in object code form under the terms
of sections 4 and 5, provided that you also convey the
machine-readable Corresponding Source under the terms of this License,
in one of these ways:

    a) Convey the object code in, or embodied in, a physical product
    (including a physical distribution medium), accompanied by the
    Corresponding Source fixed on a durable physical medium
    customarily used for software interchange.

    b) Convey the object code in, or embodied in, a physical product
    (including a physical distribution medium), accompanied by a
    written offer, valid for at least three years and valid for as
    long as you offer spare parts or customer support for that product
    model, to give anyone who possesses the object code either (1) a
    copy of the Corresponding Source for all the software in the
    product that is covered by this License, on a durable physical
    medium customarily used for software interchange, for a price no
    more than your reasonable cost of physically performing this
    conveying of source, or (2) access to copy the
    Corresponding Source from a network server at no charge.

    c) Convey individual copies of the object code with a copy of the
    written offer to provide the Corresponding Source.  This
    alternative is allowed only occasionally and noncommercially, and
    only if you received the object code with such an offer, in accord
    with subsection 6b.

    d) Convey the object code by offering access from a designated
    place (gratis or for a charge), and offer equivalent access to the
    Corresponding Source in the same way through the same place at no
    further charge.  You need not require recipients to copy the
    Corresponding Source along with the object code.  If the place to
    copy the object code is a network server, the Corresponding Source
    may be on a different server (operated by you or a third party)
    that supports equivalent copying facilities, provided you maintain
    clear directions next to the object code saying where to find the
    Corresponding Source.  Regardless of what server hosts the
    Corresponding Source, you remain obligated to ensure that it is
    available for as long as needed to satisfy these requirements.

    e) Convey the object code using peer-to-peer transmission, provided
```

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```
    you inform other peers where the object code and Corresponding
    Source of the work are being offered to the general public at no
    charge under subsection 6d.

  A separable portion of the object code, whose source code is excluded
from the Corresponding Source as a System Library, need not be
included in conveying the object code work.

  A "User Product" is either (1) a "consumer product", which means any
tangible personal property which is normally used for personal, family,
or household purposes, or (2) anything designed or sold for incorporation
into a dwelling.  In determining whether a product is a consumer product,
doubtful cases shall be resolved in favor of coverage.  For a particular
product received by a particular user, "normally used" refers to a
typical or common use of that class of product, regardless of the status
of the particular user or of the way in which the particular user
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