QNX

Classroom Environment Guide for QNX Training

Table of Contents

1. Overview

This classroom environment guide helps you set up a classroom environment for the following courses:

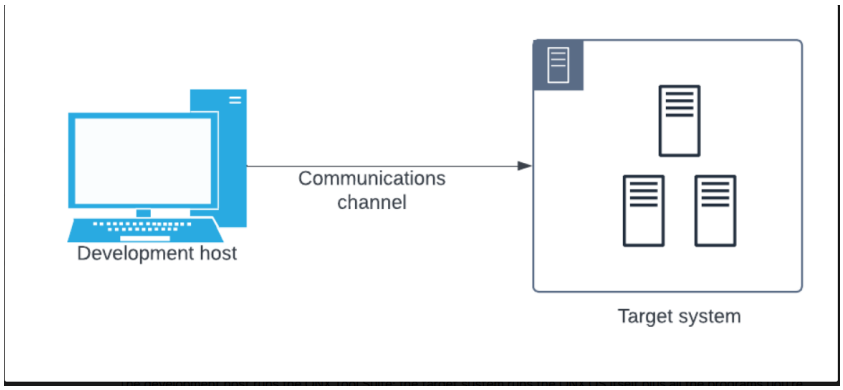
- Realtime Programming for the QNX RTOS
- Development & Debugging with the QNX Momentics IDE
- System Profiling and Analysis with the QNX Momentics IDE

2. What is required?

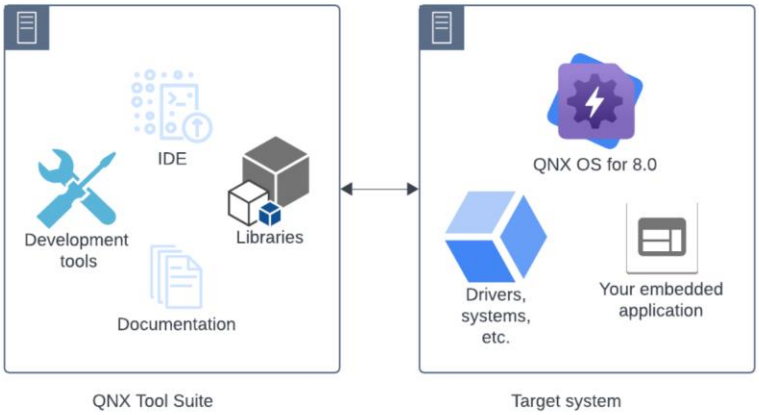
- Get a QNX account
- Get a license
- Download the QNX Software Center (QSC)
- Obtain the QNX SDP 8 image
- Obtain a QNX IDE
    - QNX Toolkit for Visual Studio Code or QNX Momentics IDE
- Setup your preferred virtual target or use Raspberry Pi. Choose one of the following:
    - VMWare
    - Virtualbox
    - QEMU
    - Raspberry PI. In a Raspberry Pi setup, use your preferred development host to flash the image to a micro SD card. Then you can boot the system and interact with it as a hardware target. For more information, refer to “Getting Started” in the *Raspberry Pi 4 QNX 8.0 Quick Start Target Image.*

3. About the training environment

In most cases, the preferred classroom environment is to have a Windows-based PC for each participant in the course. QNX training is done in a cross-development fashion, with a host machine containing the development tools, and a target system with the QNX Operating System, where course examples and exercises will be run. The following diagram depicts this:



The development host runs the QNX Tool Suite; the target system runs the QNX OS itself plus all the programs you're going to develop:



In most cases it is easiest to use a Virtual Machine (VM) to virtualize (simulate/emulate) a target machine running QNX RTOS right on the host development machine.

4. Get a QNX account

To use the myQNX License Manager or the QNX Software Center, you must first create a myQNX account. Setup is easy and takes only a few minutes.

To create your account:

1. Go to www.qnx.com and click **Sign In** at the top of the page.
2. Click **New Member**.

3. Fill in your email address and choose a password, then click **Create Account**. (Your password should contain only alphanumeric characters.)
4. Fill in your profile information, then click **Submit**.
5. Check your email for a confirmation key, and then use one of the following methods to activate your account:
    - Click the activation link in the confirmation email.
    - On the account creation page, enter the key and your email address, and then click **Continue**.

You are redirected to the login screen where you can log in to your myQNX account profile.

5. Get a license

You need a free, non-commercial QNX Software Development Platform 8.0 license for the training corses.

To obtain a license:

1. Get a free, non-commercial QNX Software Development Platform 8.0 license at https://www.qnx.com/getqnx.
2. Accept and deploy your license in your myQNX account.

6. Download and launch the QNX Software Center (QSC)

The QNX Software Center is the primary application used to manage, install, update, or uninstall any of your QNX software packages.

To install and launch the QNX Software Center:

1. Log in to your myQNX account: https://www.qnx.com/account/index.html
2. In your myQNX account profile, click the QNX Software Center link: https://www.qnx.com/download/group.html?programid=29178
3. Scroll down and click the installer link for your host OS.
4. Scroll down to **Related Documents** and open the installation note, which describes how to run the QNX Software Center installer. (The **Related Documents** section also includes release notes for the QNX Software Center.)
5. Install the QNX Software Center according to the installation note.

7. Obtain QNX SDP 8

The following development hosts are supported for the QNX Software Development Platform (SDP) 8:

- Microsoft Windows 10 64-bit or Windows 11 64-bit
- Ubuntu Desktop 22.04 LTS, Ubuntu Desktop 20.04 LTS, or Red Hat Enterprise Linux 9

To use QNX SDP 8.0, you need to have QNX Software Center 2.0. For information about installing and opening this other product, refer to Install and launch the QNX Software Center in the *QNX Software Center User's Guide*.

After you've opened QNX Software Center, you must install the QNX SDP packages as a new baseline product:

1. On the Welcome page, click **Add Installation** on the left to launch the **New Installation Wizard**.
2. In the first dialog, select **QNX Software Development Platform SDP 8.0** > **QNX Software Development Platform SDP 8.0**.
3. Follow the prompts (e.g., the **Next** buttons) to perform the installation. Be sure to select a Conservative installation policy.

For more information, refer to Install the QNX Software Development Platform in the *QNX Software Center User's Guide*.

8. Obtain a QNX IDE

You can use either the QNX Toolkit (extension for VS Code), or the Momentics IDE.

To obtain the QNX Toolkit:

The QNX Toolkit is an extension for Visual Studio Code that can be downloaded and installed from the Visual Studio Marketplace: https://marketplace.visualstudio.com/items?itemName=qnx.qnx-vscode

After successful installation of QNX Toolkit in Visual Studio Code, you can refer to the Overview tab found on the QNX Toolkit installation page and complete the **Getting started with QNX Toolkit** walkthrough.

To obtain the QNX Momentics IDE:

To install a completely new Momentics application or a second copy in a different location:

1. Select **Add Installation** from the Welcome screen or the **Advanced** tab.
2. Expand the **QNX Momentics IDE** group, then click **QNX Momentics IDE**.

Note:

To read the product release notes before proceeding with the installation, right-click the package, then select **Properties** > **Release Notes**.

3. Click **Next**.
4. Accept the default installation folder, name, and description, or modify them according to your requirements.
5. Ignore the settings for the update policy, debug symbols, experimental packages, and target architectures—they don't apply to the IDE.
6. Click **Next**.
7. Make sure that the **QNX Momentics IDE** item is checked, then click **Next**.
8. Review the list of packages that the QNX Software Center will install, then click **Finish** to start the installation process.

Upon completion of the installation process, the new installation of the IDE becomes your current installation and appears in the **Installed** tab.

9. Setup a virtual environment or use Raspberry Pi

The QNX IDEs makes use of the `mkqnximage utility, a QNX system image generator utility, which was installed as part of the QNX SDP 8. It generates images to run in virtualization environments. The following virtualization environments are the supported options for the QNX training courses:

- VMware Workstation Pro or Player – A hosted virtualized machine.
- VirtualBox – An open-source hosted VM for x86 virtualization.

- QEMU (Quick EMUlator) — A free and open-source emulator.

You can configure various options for the generated images, including the target CPU architecture. x86-64 is the recommended target architecture for the course. Currently, only the following combinations of host OS, VM platform, and target CPU architecture have been known to work and are recommended for use during the course (VMware preferred for all hosts). Other combinations may generate images but have not been tested by the instructors for training purposes. It is also possible to use a Raspberry Pi 4B as a target instead of using a virtual target:

Virtualization Technology	Host OS	QNX Guest CPU Architecture
VMWare	Windows 10	x86-64
VMware	Windows 11	x86-64
VirtualBox (v6.1.32+)	Windows 10 (not 11)	x86-64
QEMU	Ubuntu	x86-64

Raspberry Pi:

Technology	Requirements	Extra hardware
Raspberry Pi 4	2GB model or higher Micro SD card - 8GB or more	• (Optional) USB keyboard • (Optional) USB mouse • (Optional) HDMI display and micro HDMI to HDMI cable (or touchscreen and micro HDMI to HDMI and USB dual cable) • (Optional) USB-TTL converter • (Optional) Camera

VMware and VirtualBox are 3rd party products that can be downloaded from their hosted websites www.vmware.com and www.virtualbox.org

respectively. QEMU is available for download from www.qemu.org . The advantages of using a VM for training are that it is quick and easy to set up and that it gives a consistent, predicable environment. Also, the IDE will produce a pre-configured virtual machine image to save time. Instruction for creating the VM for use in the course will be provided later in this document.

10. Creating the virtual machine image of a QNX runtime system

Prior to creating your virtual machine (VM) image using the IDE, you must install the 3rd party application required to host the VM you have chosen. The virtualization technologies supported within the IDE are shown in the table earlier in this document and are obtained directly from the vendors.

For the purposes of example, you'll use QNX Toolkit to create a QNX virtual machine target using VMware.

To create your QNX OS target system as a VM, you need to create a target connection using QNX Toolkit. Before creating the target connection, ensure that you've configured the qnx.sdpPath setting. For information about configuring the SDP path, refer to Getting started in *QNX Toolkit for Visual Studio Code*. To fix problems you may encounter when you work with the QNX Toolkit, refer to Known issues in *QNX Toolkit for Visual Studio Code*.

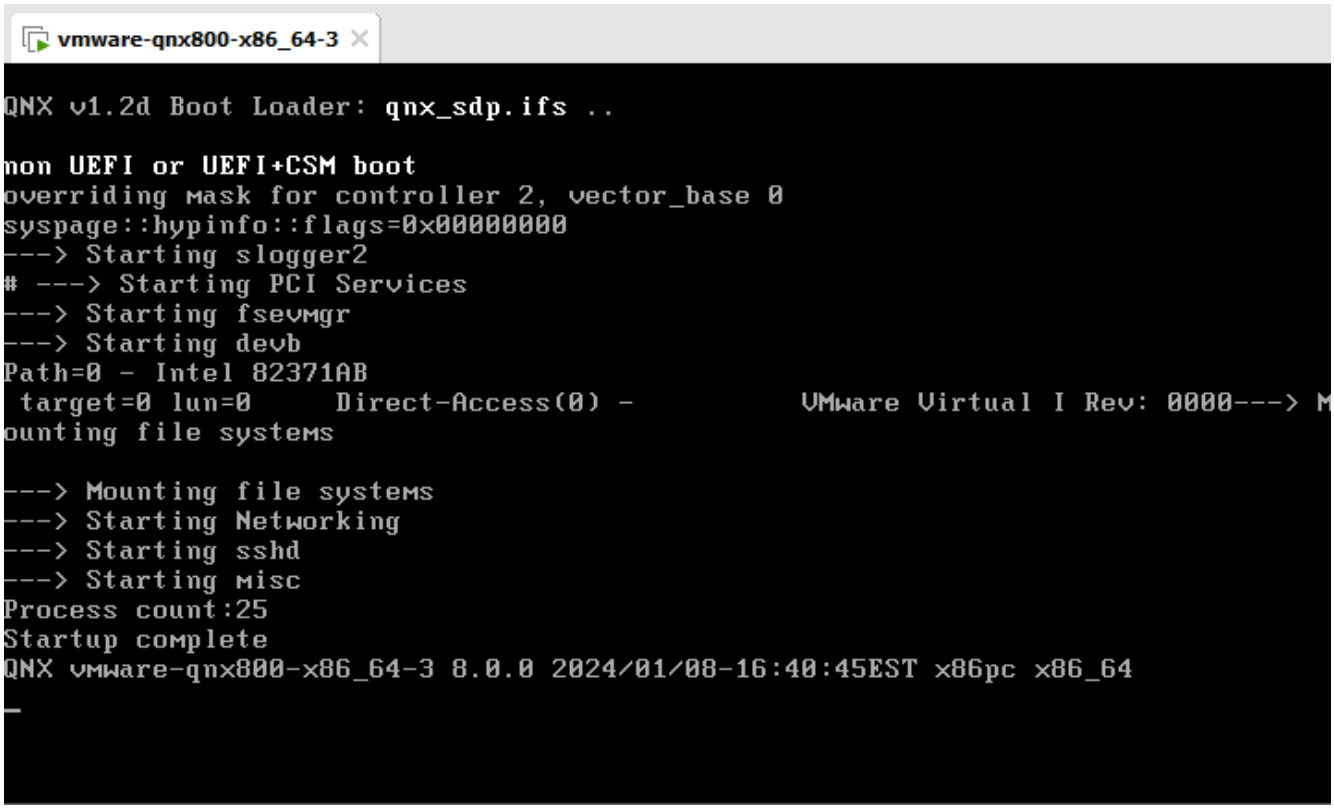
Creating a target connection

You have to install VMware before the IDE can run the VM. This is different from using a physical target system.

To create a new virtual target:

1. Ensure that VMware is installed.
2. From **QNX TARGETS**, click the plus button.
3. Type vm to create a new virtual machine.
4. Select **vmware** from the list.
5. Select the architecture. A message is displayed that you have successfully created the target. For best performance, select **x86_64** to match the architecture of your host machine. However, you may also choose to run your guest in an emulated aarch64 environment.

6. Enter extra mkqnximage options or leave the field blank. To override the defaults, you can provide a free-form string with mkqnximage settings.
7. Your VMware Workstation or VMware Workstation player opens and the QNX virtual machine boots up. A screen is displayed similar to the following:



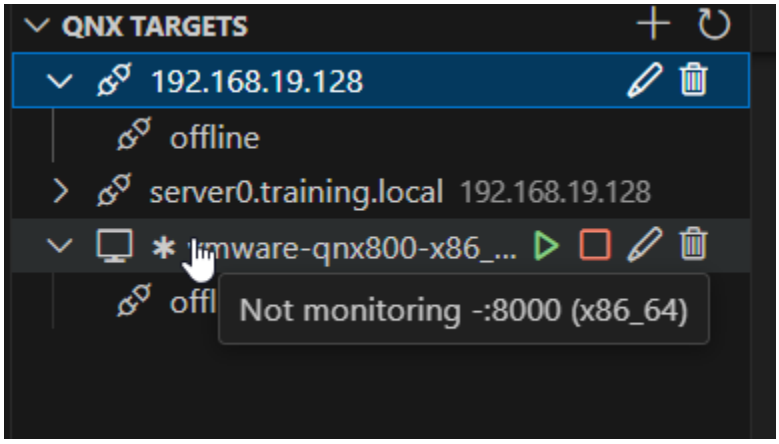
Controlling a virtual target

You can start, stop, and re-build virtual targets.

To control the virtual target:

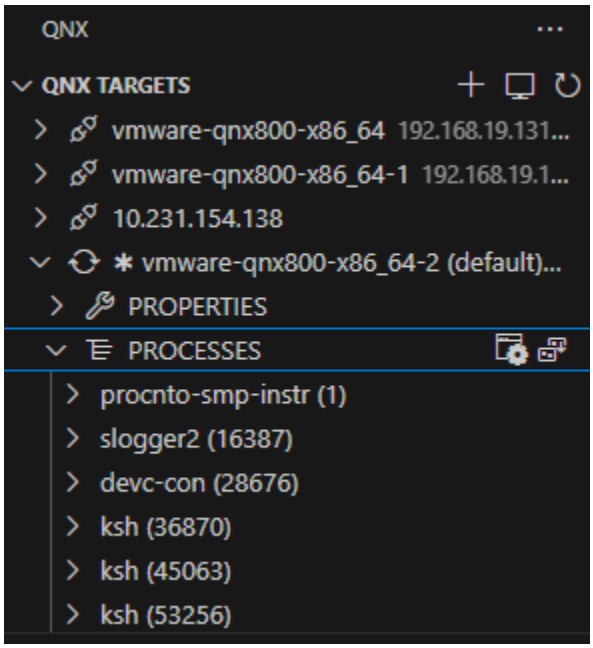
1. From **QNX COMMANDS**, click one of the following options:

- **Run VM** — QNX Toolkit builds a new virtual machine.
- **Stop VM** — the virtual machine is shut down.
- **Rebuild VM** — the image is rebuilt.



System Information

If you want to see what's running on the target, you can click it in the Primary Side Bar of the QNX Toolkit extension. From there, you can view the following: **Properties**, **Processes**, **Filesystem**, **Cores**, **Physical Memory**, and **Dashboards**.



11. Creating the Raspberry Pi image of a QNX runtime system

To create the Raspberry Pi image, you need to get the QNX OS image, flash the image to a micro SD card, and then configure for first boot. Your

Raspberry functions as a hardware target, and you can use a keyboard and a mouse to interact with it. You can use your development host of choice (Windows or Linux) to flash the QNX image onto an SD card.

For more information, refer to “Getting Started” in the *Raspberry Pi 4 QNX 8.0 Quick Start Target Image.*

12. Download Course Exercises

Download the included exercises in the **Resources** section of this lesson.

13. What to do if you are having trouble or need more information

VirtualBox network interface requirements

If this is the first time using VirtualBox, make sure it has a network interface before creating the VM image using the IDE. To create a network, select the **Network** settings from **Tools** from the left pane and then click on the **Create** icon. Also, you have to enable DHCP.

VirtualBox versions 6.1.20 to 6.1.30 are known to have a network interface implementation that is not recognized by the QNX network driver. Install a version of VirtualBox 6.1.32 – 6.1.40.

VMware Workstation Player

If you are using VMware Workstation Player, the IDE will not automatically launch the Player for you. You will need to manually launch VMware Workstation Player, choose **Open** from the File menu, and navigate to the Workspace you created when you launched Momentics. You should find a folder with the same name as the Target Name you set in section 4, step 4 above. You should search for a file named vmware.vmx or similar, select it to launch the VM that was created. Or you can also add the VM Player’s path to your host’s search path.

Have a look at the following links for more information:

- Quick Start Guide
  https://www.qnx.com/developers/docs/8.0/com.qnx.doc.qnxsdp.quickstart/topic/about.html
- QNX Momentics IDE User's Guide
  https://www.qnx.com/developers/docs/8.0/com.qnx.doc.ide.userguide/topic/ide_intro.html

Contacts:

https://blackberry.qnx.com/en/company/contact