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# **NVIDIA Xavier Documentation**

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**becauseofAI**

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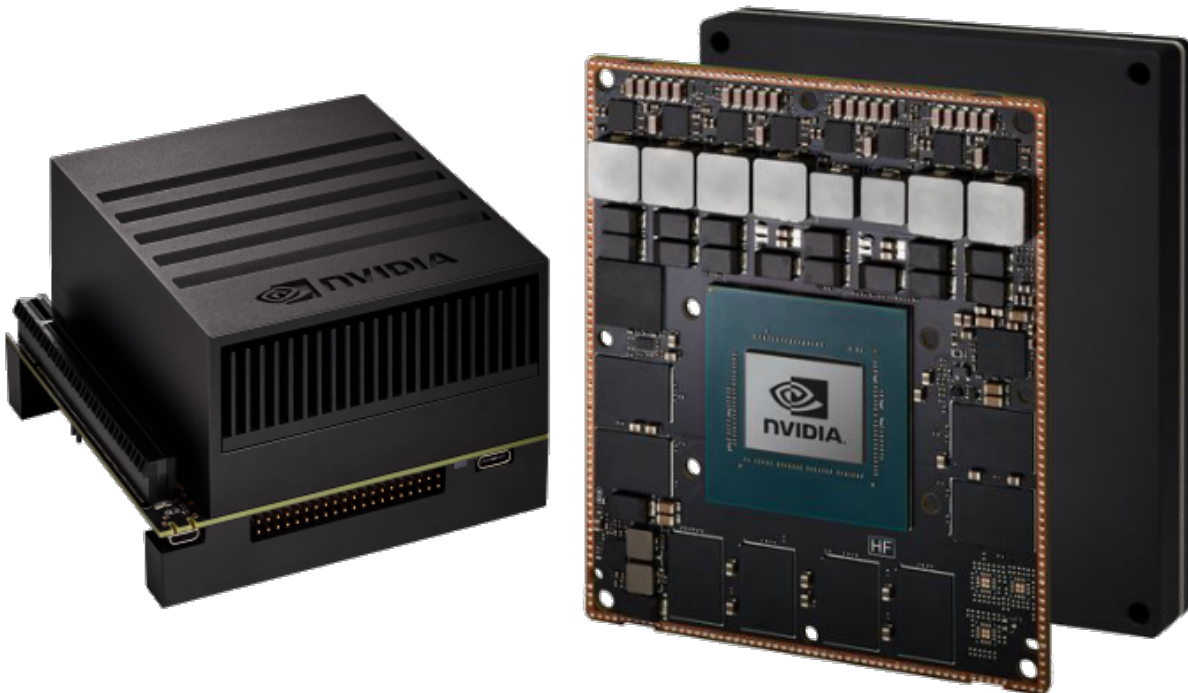
# CHAPTER 1

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## Hello Xavier

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NVIDIA Jetson AGX Xavier embedded compute module with Thermal Transfer Plate (TTP) as follow, only 100x87mm. Jetson AGX Xavier Developer Kit, including Jetson AGX Xavier module and reference carrier board.



The Jetson AGX Xavier is a newly released SoM by NVIDIA. Introduced in 2018, the Xavier can achieve 20 times the performance and 10 times the energy efficiency of its predecessor, the Jetson TX2. Among others, the SoM includes:

- Volta GPU with 512 cores
- 8-core ARM v8.2 CPU

- 16 GB LDDR4
- 2 NVDLA Deep Learning Accelerators
- 2 4Kp60 video codecs
- *Much, much more!*

The following video from NVIDIA provides a nice overview of the Jetson AGX Xavier.



On this section you are going to learn about the NVIDIA Jetson Xavier and what this platform has to offer. When you finish this section you are going to have a general knowledge of the Xavier's key features, its developer kits and software available for development on this platform.

- **SoM Overview** section enumerates the SoM processing, peripherals and packaging specifications.
- **Carrier Boards** section explores the supported carrier boards for the Xavier.
- **Software Support** section explores the available software development kits for the Xavier.

## 2.1 SoM Overview

SoM Overview section enumerates the SoM processing, peripherals and packaging specifications.

### 2.1.1 Processing Specifications

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#### 2.1.2 Peripherals

- xHCI host controller with integrated PHY
- 3 x USB 3.1 (10GT/s)
- 4 x USB 2.0
- SD/MMC Controller
- Display 3x eDP/DP/HDMI at 4Kp60 | HDMI 2.0, DP HBR3
- Camera 16x CSI-2 Lanes (40 Gbps in D-PHY V1.2 or 109 GBps in CPHY v1.1) 8x SLVS-EC lanes (up to 18.4 Gbps) Up to 16 simultaneous cameras
- PCIe 5x 16GT/s gen4 controllers | 1x8, 1x4, 1x2, 2x1 (3x) Root Port + Endpoint (2x) Root Port

- Ethernet — Gigabit Ethernet-AVB over RGMII
  - 5 x UART
  - 3 x SPI
  - 5 x I2C
  - 2 x CAN
  - 4 x I2S
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### 2.1.3 Package

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## 2.2 Carrier Boards

On this section you are going to know about the supported carrier boards for the Xavier.

- **Nvidia Xavier developer kit** is the carrier board sold by NVIDIA with the standard Xavier developer kit.
- **Connect Tech's Rogue** is a carrier with small footprint, designed for commercial deployment.
- **Connect Tech's Mimic** adapter allows the Xavier module to be installed onto a Jetson TX2/TX2i/TX1 carrier.

### 2.2.1 NVIDIA Xavier Developer Kit

#### Included in the box

- Jetson Xavier module with thermal solution
- Reference carrier board
- 65W power supply with AC cord
- Type C to Type A cable (USB 3.1 Gen2)
- Type C to Type A adapter (USB 3.1 Gen 1)

#### Developer Kit Overview

The NVIDIA Jetson Xavier Developer Kit has two main parts:

- Jetson Xavier Module with a thermal solution preattach
- Jetson Xavier Carrier Board

The carrier board was developed to be small and delivering the maximum possible options for prototyping. Following we show each of the carrier board sides and its components



## 2.2.2 Connect Tech Rogue

### Description

Connect Tech's Rogue is a full featured Carrier Board for the Jetson Xavier. It is specifically designed for commercially deployable platforms, and has an extreme small footprint of 92 x 105mm. It exposes similar interfaces than the developer kit, but adds 3x USB 3.1, 2x GbE, 2x HDMI and a locking Mini-Fit Jr. power input connector. Rugged camera add-on expansion boards will also be available for use with the Rogue to interface directly with the Xavier high density MIPI CSI interfaces.

## 2.2.3 Connect Tech Mimic

### Description

The Mimic Adapter from Connect Tech allows the Jetson Xavier module to be installed onto an NVIDIA Jetson TX2/TX2i/TX1 carrier. The Mimic Adapter is ideal for NVIDIA Jetson users who want to easily compare performance metrics between their existing TX2/TX2i/TX1 designs to the new Jetson AGX Xavier.

This small form factor adapter solution integrates easily onto any existing carrier board in Connect Tech's Jetson TX2/TX1 product line, as well as any custom platform. Mimic Adapter allows users to immediately gain access to Jetson AGX Xavier's impressive 20x compute performance increase and 10x energy efficiency improvement from the Jetson TX2. Enables a giant leap forward in capabilities for autonomous machines and edge devices.

## 2.3 Software Support

On this section you are going to know about the available software development kits for the Xavier.

- **NVIDIA JetPack** is the SDK offered by NVIDIA to develop for the NVIDIA Jetson platforms.

### 2.3.1 NVIDIA JetPack

Jetpack is an SDK that offers NVIDIA to develop for the NVIDIA Jetson platforms. This package includes the developer software to flash your Jetson Developer Kit with the latest OS image, to install developer tools for both host PC and Developer Kit, and to install the libraries and APIs, examples and documentation needed to start with your development.

Following are the Jetpack packages available for the Jetson Xavier:

- **Jetpack 4.1 EA** (Released on September 2018)



JetPack 4.1 is provided by NVIDIA to do development for the Jetson Xavier. This section allows you to get started with Jetpack 4.1. Provides you the information of what is included in the package, a description of each of its components and how to use them for your developments.

- Getting Started section is a simple guide to get your Xavier up and running.
- Components section explores what is inside JetPack 4.1, and provides a guide to the examples available for each component.
- Compiling Source Code section is a guide to compile JetPack 4.1 from source.
- Flashing the Board from Cmdline section is a guide to flash the board with command line instead of the install GUI.
- Performance Tuning section is a guide to configure and evaluate performance and power consumption on the Xavier.

### 3.1 Getting Started

Before using the developer kit you must install JetPack. A Linux host computer with the following minimum system requirements is needed to complete the installation:

- Ubuntu Linux x64 16.04 or 18.04
- Internet connection
- At least 23GB of disk space
- See Installing Jetpack for a detailed JetPack installation guide.

### 3.1.1 Installing JetPack

#### Requirements

Supported host operating systems are Ubuntu Linux x64 Version 18.04 or 16.04

#### Download Installer to Host Computer

1. Download JetPack 4.1 from <https://developer.nvidia.com/embedded/downloads>
2. Move binary into installation directory, `/home/$USER/JetPack-L4T/` is recommended

```
mkdir -p /home/$USER/JetPack-L4T/  
mv JetPack-${VERSION}.run /home/$USER/JetPack-L4T/
```

1. Set the Jetpack binary as executable and set correct permissions.

```
cd /home/$USER/JetPack-L4T  
chmod +x JetPack-${VERSION}.run
```

#### Run the Installer

1. Run the Binary

```
./JetPack-${VERSION}.run
```

## CHAPTER 4

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### Indices and tables

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- `genindex`
- `modindex`
- `search`