Getting Started Guide

Subject	ADLINK MVP-6100 Getting Started Guide for AWS IoT Greengrass
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MVP-6100

ADLINK
LEADING EDGE COMPUTING

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Revision History

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0.2	Table of content adjusted	2025-01-06
0.3	Device setup updated	2025-01-22

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Brief

This Getting Started Guide provides information on how the abovementioned model(s) can be set up for AWS IoT Greengrass.

Note that this documentation is intended for reference purposes only as there can be variance due to diverse factors and/or applications.

Disclaimer

The information contained herein, including but not limited to product specifications and procedures, is for reference purposes only and is subject to change without notice.

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1. Applicable Operating Systems

Platform	Host	Device
OS version	Ubuntu 22.04	Ubuntu 22.04

2. Overview

The ADLINK MVP-6100 Series is a fanless embedded computing platform featuring the 9th Generation Intel® Core™ processor, optimized for edge computing applications.

The MVP-6100 Series combines high-performance computing, scalable functionality, I/IO enhancements, and industrial-grade reliability onto a compact fanless platform, providing reliable simultaneous operation for performance-critical applications in industrial automation, logistics, transportation, and smart city sectors.

2.1. Datasheet

Refer to the MVP-6100 datasheet for more information.

3. Environment Setup

3.1. Tools Installation

You can use any version of AWS IoT Greengrass software based on your chosen operating system. AWS IoT Greengrass 2.6.0 can be installed using manual resource provisioning.

3.2. Other Software Required

- **Java Runtime Environment (JRE) version 8 or later**
  To use Java to develop custom components, you must install a Java Development Kit (JDK), i.e. Amazon Corretto 11 or OpenJDK 11.
- **GNU C Library (glibc) version 2.25 or later**

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4. Device Setup

Refer to the MVP-6100 user's manual for detailed information on how to set up the platform.

Standard kit content/user-provided items

Refer to the **MVP-5100_6100_Service_manual_Rev1.1**, *MVP-6120/6140 section,* for instructions installing the user's SATA drive or other storage devices (CFast card/M.2 module) for later operation system installation.

Hardware setup

Refer to the **MVP-6100_50-1Z306-1000_10** manual, *chapter 4 Getting Started,* for instructions on attaching the DC power connector and wall-mount brackets.

Refer to *Appendix A, Power Consumption,* for the information on system power consumption for different configurations. Actual power consumption may vary depending on the attached devices and operating systems.

System	Power Off	System Idle	Processor Full Load	System Full Load	Recommended Power Supply
MVP-610X Intel®Xeon®80W	4W	24W	130W	160W	220W or 280W
MVP-610A Intel® Core™ i7 65W	3.7W	21W	127W	144W	220W or 280W
MVP-6101 Intel® Core™ i7	3.6W	24W	65W	97W	220W or 280W
MVP-6102 Intel® Core™ i5	3.7W	22W	64W	94W	220W or 280W
MVP-6103 Intel® Core™ i3	3.8W	22W	56W	85W	220W or 280W
MVP-6104 Celeron®	4W	20W	41W	69W	220W or 280W

5. About AWS IoT Greengrass

The AWS IoT Greengrass client software, also known as AWS IoT Greengrass Core software, runs on Windows and Linux-based distributions, such as Ubuntu or Raspberry Pi OS, for devices with ARM or x86 architectures. With AWS IoT Greengrass, you can program devices to act locally on the data they generate, run predictions based on machine learning models, and filter and aggregate device data. AWS IoT Greengrass also enables the local execution of AWS Lambda functions, Docker containers, native OS processes, or custom runtimes of your choice.

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AWS IoT Greengrass Version 2 is a major version of AWS IoT Greengrass that introduces the following features:

- **Publisher-supported components** – AWS IoT Greengrass now offers Publisher-supported components. These components are developed, offered, and serviced by third-party vendors. For more information, see Publisher-supported components.
- **Operate a Greengrass device in VPC** – Operating a Greengrass core device in a VPC is now available. This enables you to perform deployments in a VPC without public internet access. For more information, see Operate an AWS IoT Greengrass core device in a VPC.
- **Greengrass Testing Framework (GTF)** – The GTF for AWS IoT Greengrass Version 2 is now available. GTF is a collection of building blocks to supports end-to-end automation. It enables AWS IoT Greengrass Version 2 internal customers to use the same testing framework that the service team uses for qualifying software changes, automated acceptance, and quality assurance purposes. For more information, see Greengrass Testing Framework on GitHub.
- **PSA-certified** – AWS IoT Greengrass nucleus versions 2.7.0 and later are now Platform Security Architecture (PSA) certified. For more information, see AWS IoT Greengrass is PSA-certified

To learn more about AWS IoT Greengrass, see How AWS IoT Greengrass works and What's new in AWS IoT Greengrass Version 2.

6. Greengrass Prerequisites

Refer to the online documentation detailing the prerequisites for AWS IoT Greengrass, then follow the instructions in the two steps below.

Step 1: Set up an AWS account

Sign up for an AWS account

If you do not have an AWS account, complete the following steps.

1. Open https://portal.aws.amazon.com/billing/signup.
2. Follow the online instructions.

Part of the sign-up procedure involves receiving a phone call and entering a verification code. When you sign up for an AWS account, an *AWS account root user* is created. The root user can access to all AWS services and resources in the account. For security best practices, assign administrative access to a user and use only the root user to perform tasks requiring access.

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Step 2: Set up your environment

Note: This example uses a Linux OS. For other operating systems, refer to Step 2 above for guidance.

Set up a Linux device for AWS IoT Greengrass V2

1. Install the Java runtime required for AWS IoT Greengrass Core software. We recommend using Amazon Corretto or OpenJDK long-term support versions (version 8 or higher. The following commands show how to install OpenJDK on your device.

- For Debian-based or Ubuntu-based distributions:

```
sudo apt install default-jdk
```

- For Red Hat-based distributions:

```
sudo yum install java-11-openjdk-devel
```

- For Amazon Linux 2:

```
sudo amazon-linux-extras install java-openjdk11
```

- For Amazon Linux 2023:

```
sudo dnf install java-11-amazon-corretto -y
```

When the installation is complete, run the following command to verify that Java is running on your Linux device.

```
java -version
```

The command prints the version of Java running on the device. For example, on a Debian-based distribution, the output might look similar to the following sample.

```
openjdk version "11.0.9.1" 2020-11-04
OpenJDK Runtime Environment (build 11.0.9.1+1-post-Debian-1deb10u2)
OpenJDK 64-Bit Server VM (build 11.0.9.1+1-post-Debian-1deb10u2, mixed
mode)
```

2. (Optional) Create the default system user and group that runs components on the device. Alternatively, you can allow the AWS IoT Greengrass Core software installer to create this user and group during installation using the --component-default-user installer argument. For more information, see Installer arguments.

```
sudo useradd --system --create-home ggc_user
sudo groupadd --system ggc_group
```

3. Verify that the user running the AWS IoT Greengrass Core software (typically root) has permission to use sudo with any user and any group.
   a. Run the following command to open the /etc/sudoers file.

```
sudo visudo
```


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b. Verify that the permission for the user is similar to the following example.
```
root    ALL=(ALL:ALL) ALL
```

4. (Optional) To run containerized Lambda functions, you must enable cgroups v1 and mount the *memory* and *devices* cgroups. If you don't plan to run containerized Lambda functions, you can skip this step.

To enable these cgroup options, boot the device with the following Linux kernel parameters.
```
cgroup_enable=memory cgroup_memory=1 systemd.unified_cgroup_hierarchy=0
```

For information on viewing and setting kernel parameters for your device, see the documentation for your operating system and boot loader. Follow the instructions to set the kernel parameters permanently.

5. Install all other required dependencies on your device as specified in the list of Device requirements.

7. AWS IoT Greengrass Installation

Follow the online guide to Install with automatic provisioning. Then, refer to the instructions in the following steps:

1. Set up the device environment

Set up a Linux device for AWS IoT Greengrass V2

- Install the Java runtime, which AWS IoT Greengrass Core software requires to run. We recommend that you use Amazon Corretto or OpenJDK long-term support versions. Version 8 or higher is required. The following commands show you how to install OpenJDK on your device.
  - For Debian-based or Ubuntu-based distributions:
```
sudo apt install default-jdk
```
  - For Red Hat-based distributions:
```
sudo yum install java-11-openjdk-devel
```
  - For Amazon Linux 2:
```
sudo amazon-linux-extras install java-openjdk11
```


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- For Amazon Linux 2023:

```
sudo dnf install java-11-amazon-corretto -y
```

When the installation is complete, run the following command to verify that Java is running on your Linux device.

```
java -version
```

The command prints the version of Java that runs on the device. For example, on a Debian-based distribution, the output might look similar to the following sample.

```
openjdk version "11.0.9.1" 2020-11-04
OpenJDK Runtime Environment (build 11.0.9.1+1-post-Debian-1deb10u2)
OpenJDK 64-Bit Server VM (build 11.0.9.1+1-post-Debian-1deb10u2, mixed mode)
```

2. Provide AWS credentials to the device

For development environments, you can use the option "Use long-term credentials from an IAM User".
E.g.

```
export AWS_ACCESS_KEY_ID=<the access key id for your user>
export AWS_SECRET_ACCESS_KEY=<the secret access key for your user>
```

3. Download the AWS IoT Greengrass Core software

You can download the latest version of the AWS IoT Greengrass Core software from the following location:
https://d2s8p88vqu9w66.cloudfront.net/releases/greengrass-nucleus-latest.zip

4. Install the AWS IoT Greengrass Core software

a. Download the AWS IoT Greengrass Core software

On your core device, download the AWS IoT Greengrass Core software to a file named greengrass-nucleus-latest.zip.

Linux or Unix

```
curl -s https://d2s8p88vqu9w66.cloudfront.net/releases/greengrass-nucleus-latest.zip > greengrass-nucleus-latest.zip
```

Unzip the AWS IoT Greengrass Core software to a folder on your device.
Replace *GreengrassInstaller* with the folder that you want to use.

```
unzip greengrass-nucleus-latest.zip -d GreengrassInstaller && rm greengrass-nucleus-latest.zip
```


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b. Install the AWS IoT Greengrass Core software

Run the installer with arguments that specify the following:

1. Create the AWS resources required for the core device to operate.
2. Specify to use the ggc_user system user to run software components on the core device. On Linux devices, this command also specifies to use the ggc_group system group, and the installer will create the system user and group for you.
3. Set up the AWS IoT Greengrass Core software as a system service that runs at boot. On Linux devices, this requires the Systemd init system.

To set up a development device with local development tools, specify the --deploy-dev-tools true argument. The local development tools may take up to a minute to deploy after the installation completes.

For more information about the arguments you can specify, see Installer arguments.

c. Install the AWS IoT Greengrass Core software

Run the AWS IoT Greengrass Core installer. Replace the argument values in your command as follows.

/greengrass/v2 or *C:\greengrass\v2*: The path to the root folder where the WAS IoT Greengrass Core software will be installed.

GreengrassInstaller: The path to the folder where you unpacked the AWS IoT Greengrass Core software installer.

Region: The AWS Region in which to find or create resources.

MyGreengrassCore: The name of the AWS IoT thing for your Greengrass core device. If the entity doesn't exist, the installer will create it. The installer will also download the certificates to authenticate as the AWS IoT thing. For more information, see Device authentication and authorization for AWS IoT Greengrass.

MyGreengrassCoreGroup: The name of AWS IoT thing group for your Greengrass core device. If the thing group doesn't exist, the installer will create it and add the thing to it. If the thing group exists and has an active deployment, the core device will download and run the software that the deployment specifies.

GreengrassV2IoTThingPolicy: The name of the AWS IoT policy that allows the Greengrass core devices to communicate with AWS IoT and AWS IoT Greengrass. If the AWS IoT policy doesn't exist, the installer will create a permissive AWS IoT policy with this name. You can restrict this

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policy to fit your use case. For more information, see Minimal AWS IoT policy for AWS IoT Greengrass V2 core devices.

GreengrassV2TokenExchangeRole: The name of the IAM role that allows the Greengrass core device to obtain temporary AWS credentials. If the role doesn't exist, the installer will create it and attach a policy named *GreengrassV2TokenExchangeRole*Access. For more information, see Authorize core devices to interact with AWS services.

GreengrassCoreTokenExchangeRoleAlias. The alias to the IAM role that allows the Greengrass core device to get temporary credentials later. If the role alias doesn't exist, the installer will create it and point it to the IAM role you specify. For more information, see Authorize core devices to interact with AWS services.

Linux or Unix

```
sudo -E java -Droot="/greengrass/v2" -Dlog.store=FILE \
  -jar ./GreengrassInstaller/lib/Greengrass.jar \
  --aws-region region \
  --thing-name MyGreengrassCore \
  --thing-group-name MyGreengrassCoreGroup \
  --thing-policy-name GreengrassV2IoTThingPolicy \
  --tes-role-name GreengrassV2TokenExchangeRole \
  --tes-role-alias-name GreengrassCoreTokenExchangeRoleAlias \
  --component-default-user ggc_user:ggc_group \
  --provision true \
  --setup-system-service true
```


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8. AWS IoT Greengrass Installation

8.1. Creating the Component on Your Device

A component is a software module that runs on AWS IoT Greengrass core devices. Components enable you to create and manage complex applications as discrete building blocks that you can reuse across different Greengrass core devices. Every component is composed of a *recipe* and *artifacts*.

Follow the instructions under the section Develop and test a component on your device to create a simple component on your device.

To develop a Hello World component on your device

1. Create a folder for your components with subfolders for recipes and artifacts. Run the following commands on your Greengrass core device to create these folders and change them to the component folder.

Replace *~/greengrassv2* or *%USERPROFILE%\greengrassv2* with the path to the folder to use for local development.

```
mkdir -p ~/greengrassv2/{recipes,artifacts}
cd ~/greengrassv2
```

2. Use a text editor to create a recipe file that defines your component's metadata, parameters, dependencies, lifecycle, and platform capability. Include the component version in the recipe file name so that you can identify which recipe corresponds to which component version. You can choose YAML or JSON format for your recipe.

Refer to the AWS link for more detailed information:
https://docs.aws.amazon.com/greengrass/v2/developerguide/create-first-component.html

8.2. Uploading the "Hello World" Component

When you finish developing a component on your core device, you can upload it to the AWS IoT Greengrass service in the AWS Cloud. You can also create the component directly in the AWS IoT Greengrass console. AWS IoT Greengrass provides a component management service that hosts your components, allowing you to deploy them to individual devices or fleets of devices. To upload a component to the AWS IoT Greengrass service, follow these steps:

1. Upload component artifacts to an S3 bucket.
2. Add each artifact's Amazon Simple Storage Service (Amazon S3) URI to the component recipe.

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3. Create a component in AWS IoT Greengrass from the component recipe.

Follow the instructions on Create your component in the AWS IoT Greengrass service to upload your component to the cloud, where it can be deployed to other devices as needed.

8.3. Deploying Your Component

With AWS IoT Greengrass, you can deploy components to individual devices or groups of devices. When you deploy a component, AWS IoT Greengrass installs and runs that component's software on each target device. You specify which components to deploy and the configuration update to deploy for each component. You can also control how the deployment rolls out to the devices that the deployment targets. For more information, see Deploy AWS IoT Greengrass components to devices.

Two ways to deploy your component:

- Deploy your component (console)
- Deploy your component (AWS CLI)

Follow the instructions on Deploy your component to deploy and verify that your component is running.

9. Debugging

Visit ADLINK download page for more product information.

10. Troubleshooting

For device support and inquiries, visit the ADLINK support pages below:

- https://adlinktech.com/en/Askanexpert
- https://www.adlinktech.com/en/Medical_Healthcare_Service_and_Support

For more information on AWS IoT Greengrass, refer to Troubleshooting Greengrass v2.

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