Getting Started Guide for AWS IoT Greengrass: Intel® NUC

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1. Document Information

Version	Date	Description
1.0	August 2022	Publish Document
2.0	November 2022	Publish Document
3.0	July 2023	Publish Document

2. Overview

2.1 Introduction

Intel® NUC is a small form factor PC that allows you to customize your mini PC experience to fit a wide range of use cases. This document describes how to set up AWS IoT Greengrass on an Intel® NUC device running Ubuntu/Windows. At the end of this guide, the Intel® NUC will work as a Greengrass device that can communicate securely with AWS IoT Core for you to easily integrate Intel® NUC into your IoT solution stack.

2.2 About AWS IoT Greengrass

To learn more about AWS IoT Greengrass, see how it works and what's new.

3. Hardware Description

3.1 Data Sheet

Tested NUC models are listed below. Please identify your NUC device's SKU and choose the appropriate link to view its datasheet.

Note: All NUC devices listed above are tested on Ubuntu and Windows.

SKUs	Datasheet URL
NUC11TNHv5	NUC11TNHv5 Datasheet
NUC11TNHi3	NUC11TNHi3 Datasheet
CM11EBv716W	CM11EBv716W Datasheet
NUC11ATKC4	NUC11ATKC4 Datasheet
NUC12WSKv7	NUC12WSKv7 Datasheet
BELM12HBv716W	ELM12HBv7 Datasheet
NUC13ANHi5	NUC13ANHi5 Datasheet
NUC13ANKv7	NUC13ANKv7 Datasheet
NUC12SNKi72	NUC12SNKi72 Datasheet

3.2 Additional Hardware References

Please refer to the Intel® NUC device page and select your NUC model for more product details.

4. Setup your Development Environment

4.1 Tools Installation (IDEs, Toolchains, SDKs)

You can use any version of AWS IoT Greengrass software for Intel® NUC devices based on your chosen operating system. For demo purposes, AWS IoT Greengrass 2.6.0 will be install using manual resource provisioning. Please refer to the demo section for more details.

4.2 Prerequisites

- Java Runtime Environment (JRE) version 8 or greater.
  To use Java to develop custom components, you must install a Java Development Kit (JDK).
  We recommend that you use Amazon Corretto 11 or OpenJDK 11.

- GNU C Library (glibc) version 2.25 or greater.

5. Setup your hardware

Please refer to User Guide for Intel® NUC and Operating System Installation for Intel® NUC to setup Intel® NUC device.

6. Setup your AWS Account and Permission

Refer to the online AWS documentation at Set up your AWS account. Follow the steps outlined in these sections below to create your account and a user and get started:

- Sign up for an AWS account and
- Create a user and grant permissions
- Open the AWS IoT console

Pay special attention to the Notes.

7. Create Resources in AWS IoT

Refer to the online AWS documentation at Create AWS IoT Resources. Follow the steps outlined in these sections to provision resources for your device:

- Create an AWS IoT Policy
- Create a thing object

Pay special attention to the Notes.

8. Install the AWS Command Line Interface

To install the AWS CLI on your host machine, refer to the instructions at Installing the AWS CLI v2 . Installing the CLI is needed to complete the instructions in this guide.

Once you have installed AWS CLI, configure it as per the instructions in this online guide. Set the appropriate values for Access key ID, Secret access key, and AWS Region. You can set Output format to "json" if you prefer.

9. Install AWS IoT Greengrass

9.1 Download the AWS IoT Greengrass 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

You can download a specific version of the AWS IoT Greengrass Core software from the following location. Replace version with the version to download.

https://d2s8p88vqu9w66.cloudfront.net/releases/greengrass-version.zip

9.2 Install the AWS IoT Greengrass Core software

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

```
unzip greengrass-nucleus-latest.zip -d GGCoreInstall
rm greengrass-nucleus-latest.zip
```

Verify the version of the AWS IoT Greengrass Core software:

```
java -jar ./GGCoreInstall/lib/Greengrass.jar –version
```

You will see the Greengrass version displayed - similar to:

```
AWS Greengrass v2.6.0
```

9.2.1 Provide your credentials

Run the following commands to provide the credentials to the AWS IoT Greengrass Core software.

For Linux :

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

For Windows (cmd)

```
set AWS_ACCESS_KEY_ID=<the access key id for your
account>
set AWS_SECRET_ACCESS_KEY=<the secret access key for your
account>
```

9.2.2 Run the Installer

Run the installer as shown below. Modify the values as per your region, install directory and thing name.

Use the --provision true option to have the installer set up the "thing" and required policies for you. If you prefer to configure Greengrass manually, see the online guide.

For Linux:

```
sudo -E java -Droot="/greengrass/v2" -Dlog.store=FILE \
-jar ./GGCoreInstall/lib/Greengrass.jar \
--aws-region us-west-2 \
--thing-name thing-name \
```

```
--test-role-name GreengrassV2TokenExchangeRole \
--test-role-alias-name \
GreengrassCoreTokenExchangeRoleAlias \
--component-default-user ggc_user:ggc_group \
--provision true \
--setup-system-service true \
--deploy-dev-tools true
```

For Windows(cmd):

```
java -Droot="C:\greengrass\v2" "-Dlog.store=FILE" ^
  -jar ./GreengrassInstaller/lib/Greengrass.jar ^
  --init-config ./GreengrassInstaller/config.yaml ^
  --component-default-user ggc_user ^
  --setup-system-service true
```

If all goes well, you will see the following output on the device console:

```
Successfully configured Nucleus with provisioned resource
details!
Configured Nucleus to deploy aws.greengrass.Cli component
Successfully set up Nucleus as a system service
```

The local development tools (specified by the --deploy-dev-tools option) take some time to deploy. The following command can be used to check the status of this deployment:

```
aws greengrassv2 list-effective-deployments --core-
device-thing-name thing-name
```

When the status is SUCCEEDED, run the following command to verify that the Greengrass CLI is installed and runs on your device. Replace /greengrass/v2 with the path to the base folder on your device as needed.

```
/greengrass/v2/bin/greengrass-cli help
```

10. Create a Hello World Component

In Greengrass v2, components can be created on the edge device and uploaded to the cloud, or vice versa.

10.1 Create the component on your edge device

Follow the instructions online under the section To create a Hello World component to create, deploy, test, update and manage a simple component on your device.

10.2 Upload the Hello World component

Follow the instructions online at Upload your component to upload your component to the cloud, where it can be deployed to other devices as needed.

11. Debugging

SKUs	Debugging Documentation
NUC11TNHV5	Intel® NUC 11 Pro Kit NUC11TNHv5
NUC11TNHi3	Intel® NUC 11 Pro Kit NUC11TNHi3
NUC11ATKC4	Intel® NUC 11 Essential Kit - NUC11ATKC4
CM11EBv716W	Intel® NUC 11 Compute Element CM11EBv716W
NUC12WSKv7	Intel® NUC 12 Pro Kit NUC12WSKv7
BELM12HBv716W	Intel® NUC 12 Compute Element ELM12HBv7
NUC13ANHi5	Intel® NUC 13 Pro Kit NUC13ANHi5
NUC13ANKv7	Intel® NUC 13 Pro Kit NUC13ANKv7
NUC12SNKi72	Intel® NUC 12 Enthusiast Kit - NUC12SNKi72

12. Troubleshooting

Please refer to Intel® NUC support page for common device troubleshooting tips.

Please refer to Troubleshooting AWS IoT Greengrass for AWS IoT Greengrass troubleshooting tips.