

Lenovo ThinkEdge SE10

Getting Started Guide for

AWS IoT Greengrass

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1 Document Information

1.1 Revision History (Version, Date, Description of change)

Version	Date	Description
1.0	June 2023	Publish Document

2 Overview

Lenovo has set out to solve some of the toughest challenges you face when it comes to capturing data at the outermost edge for your business. No edge environment is created exactly the same and the features and functionalities you need from your edge devices often vary. This is why we're revolutionizing our ThinkEdge portfolio with the most versatile edge client device : Lenovo ThinkEdge SE10.

Lenovo ThinkEdge SE10 is compact, yet powerful edge client built to be unconstrained on entry performance. It balances environmental requirements with reliable performance and effortless deployment and maintenance.

2.1 Introduction

The Lenovo ThinkEdge SE10 is the first ThinkEdge client in the Lenovo portfolio to be part of the Intel Atom Elkhart Lake class. With increased performance and graphics capabilities, the Lenovo ThinkEdge SE10 series features the Intel ATOM Elkhart Lake CPU up to 4 Core to capture data at the outermost edge.

The Lenovo ThinkEdge SE10 has purposeful design features and attributes that address an extensive range of vertical applications, including retail, manufacturing, logistics, smart spaces and more. It can handle any environment where data capture and processing is required.

Lenovo ThinkEdge SE10 is fan-less and rugged, built to withstand environments from 0° to 50° C (SE10) and -20° to 60° C (SE10-I) and come with an IP50 rating. Lenovo's ThinkEdge SE10 devices are MILSTD-810 certified, with vertical I/O to fit all Edge use cases.

As the smallest member of the ThinkEdge family with no sacrifice on vertical IO connectivity, the Lenovo ThinkEdge SE10 offers DIN and Rail mounting for easy deployment and maintenance. The Lenovo ThinkEdge SE10 is also compatible with Commercial Desktop Tiny sandwich BKT which enables an easy transfer to a fanless solution.

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 DataSheet

https://psref.lenovo.com/syspool/Sys/PDF/datasheet/ThinkEdge_%20SE10_datasheet_EN.pdf

3.2 Standard kit contents

Please refer to [Lenovo ThinkEdge SE10 Product Specification Reference](#) for hardware provided in the standard kit.

Lenovo ThinkEdge SE10 is normally shipped with Windows 10 IoT or Ubuntu operating system.

3.3 User provided items

User needs to provide keyboard, mouse and monitor to connect to ThinkEdge SE10 for debugging. Alternatively, if ThinkEdge SE10 device is connected to network, user can access it by well-known IP address over SSH or remote desktop depending on the operating system running on the device without keyboard, mouse or monitor.

3.4 3rd party purchasable items

None.

3.5 Additional Hardware References

Please refer to https://psref.lenovo.com/Product/ThinkEdge/ThinkEdge_SE10 for more product details.

4 Set up your Development Environment

4.1 Tools Installation (IDEs, Toolchains, SDKs)

Lenovo ThinkEdge SE10 is shipped with either Windows IoT or Ubuntu operating systems. You can use any version of supported AWS IoT Greengrass software for Lenovo ThinkEdge SE10 device based on your chosen operating system. For demo purpose, AWS IoT Greengrass 2.8.0 will be installed using manual resource provisioning on Ubuntu 22.04 operating systems in this document.

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 [OpenJDK 11](#).
- [GNU C Library](#) (glibc) version 2.25 or greater.

5 Set up your hardware

Please follow [Setup Guide - ThinkEdge SE10](#) and [User Guide -ThinkEdge SE10](#) to set up Lenovo ThinkEdge SE10 device.

6 Setup your AWS account and Permissions

Refer to the online AWS documentation at [Set up your AWS Account](#). Follow the steps outlined in the 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 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>

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 v2.8.0

9.2.1 Provide your credentials

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

```
export AWS_ACCESS_KEY_ID=<the access key id for your account>
export 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](#).

```
sudo -E java -Droot="/greengrass/v2" -Dlog.store=FILE \
-jar ./GGCoreInstall/lib/Greengrass.jar \
--aws-region us-west-2 \
--thing-name thing-name \
--tes-role-name GreengrassV2TokenExchangeRole \
--tes-role-alias-name GreengrassCoreTokenExchangeRoleAlias \
--component-default-user ggc_user:ggc_group \
--provision true \
--setup-system-service true \
--deploy-dev-tools 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

Lenovo ThinkEdge SE10 device is equipped with one HDMI out connector and one DisplayPort out connector, which can be used to connected to monitor. You can also connect to ThinkEdge SE10 with serial port. Please to [User Guide -ThinkEdge SE10](#) for detailed instruction about how to connect ThinkEdge SE10 to monitor over HDMI or DisplayPort, and serial connector to collect serial logs.

12 Troubleshooting

Refer to [User Guide -ThinkEdge SE10](#) for common device troubleshooting tips.

Refer to [Troubleshooting AWS IoT Greengrass](#) for AWS IoT Greengrass troubleshooting tips.