How to create a GSD file in TIA Portal

This guide shows you how to create a GSD file in TIA Portal for an S7-1200 PLC that works as an I-Device. You configure the CPU as an IO device, set up the transfer areas, compile the project, and export the generic station description (GSD) file. You then install the file in TIA Portal so you can use it in other projects.

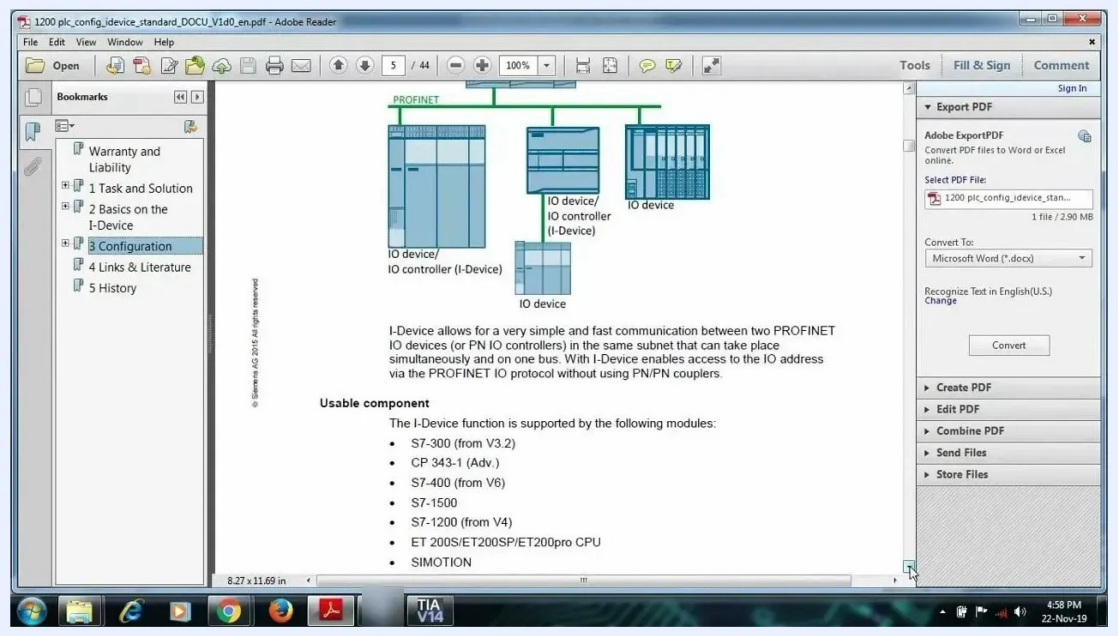
Background: the I-Device function

The I-Device function allows simple, fast communication between two PROFINET IO devices or controllers on the same subnet. Communication can run simultaneously and on one bus. The I-Device gives you access to IO addresses through the PROFINET IO protocol without PN/PN couplers.

The schematic diagram (Figure 1-1) shows a PROFINET network with these devices:

- IO controller (main controller)
- IO device/IO controller (I-Device)
- IO device

In this setup, the S7-1200 PLC acts as the I-Device and connects to the other devices.



Schematic diagram of a PROFINET network with an IO controller, an IO device/IO controller (I-Device), and an IO device.

Prerequisites

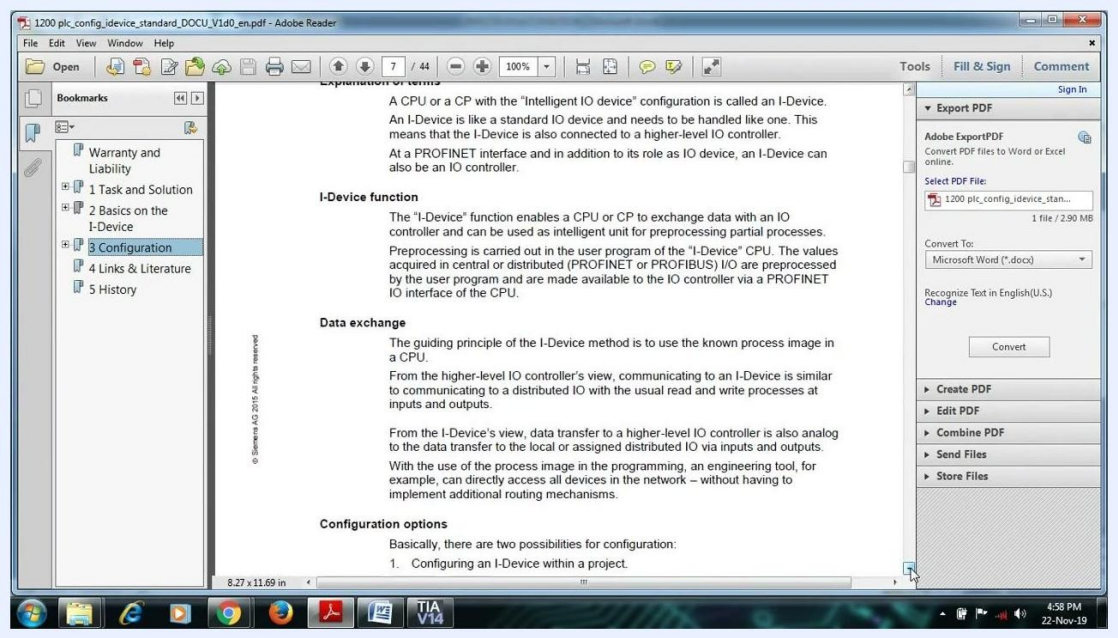
- TIA Portal installed on your computer.
- A hardware platform that supports the I-Device function. The supported modules are:
  - S7-300 (from V3.2)
  - CP 343-1 (Adv.)
  - S7-400 (from V6)
  - S7-1500
  - S7-1200 (from V4)
  - ET 200S, ET 200SP, and ET 200pro CPU
  - SIMOTION
- A folder on your computer where you can save the exported GSD file. This guide uses C:\New folder\GSD.

Step 1. Open a project in TIA Portal

Open TIA Portal. Start a new project, or open your existing project for the I-Device GSD configuration.

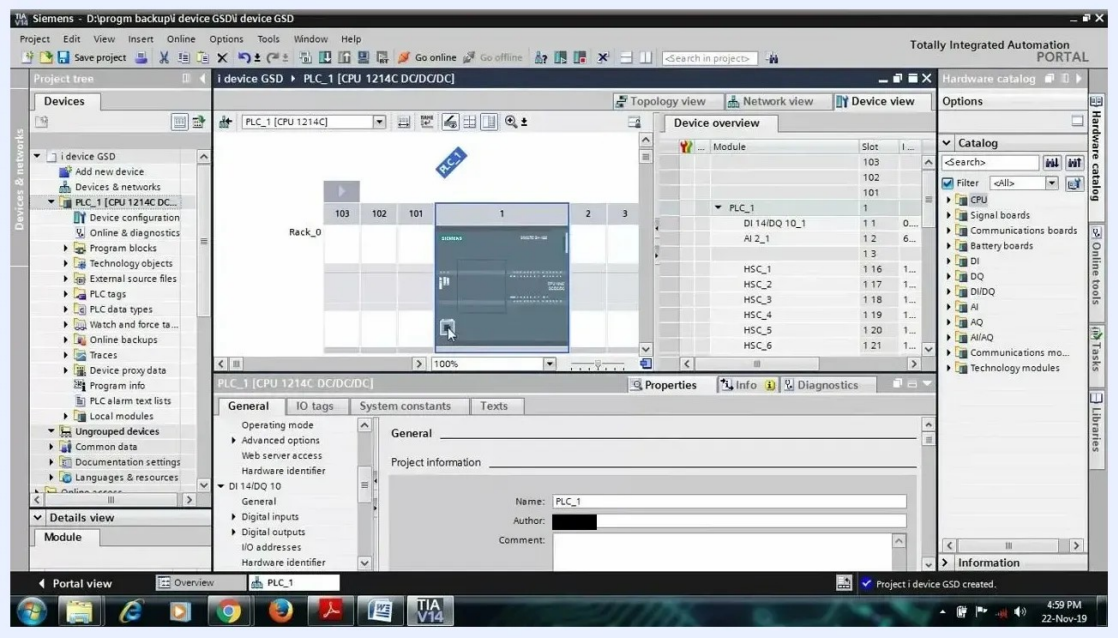
Step 2. Add the S7-1200 CPU

1. In the project tree, go to the **Devices & networks** section and select **Add new device**.
2. In the **Add new device** dialog, expand **Controllers** and select **SIMATIC S7-1200**.
3. Select the CPU model for your hardware. This example uses **CPU 1214C DC/DC/DC** (article no. 6ES7 214-1AG40-0XB0, version V4.2).
4. Review the device description and click **OK**.



The Add new device dialog with SIMATIC S7-1200 CPU 1214C DC/DC DC selected, showing the article number, version, and description.

The device view now shows the S7-1200 CPU in the rack layout. The project information panel shows the device name (for example, PLC_1), the author, and the comment fields. The hardware catalog and device overview panels are available for further configuration.

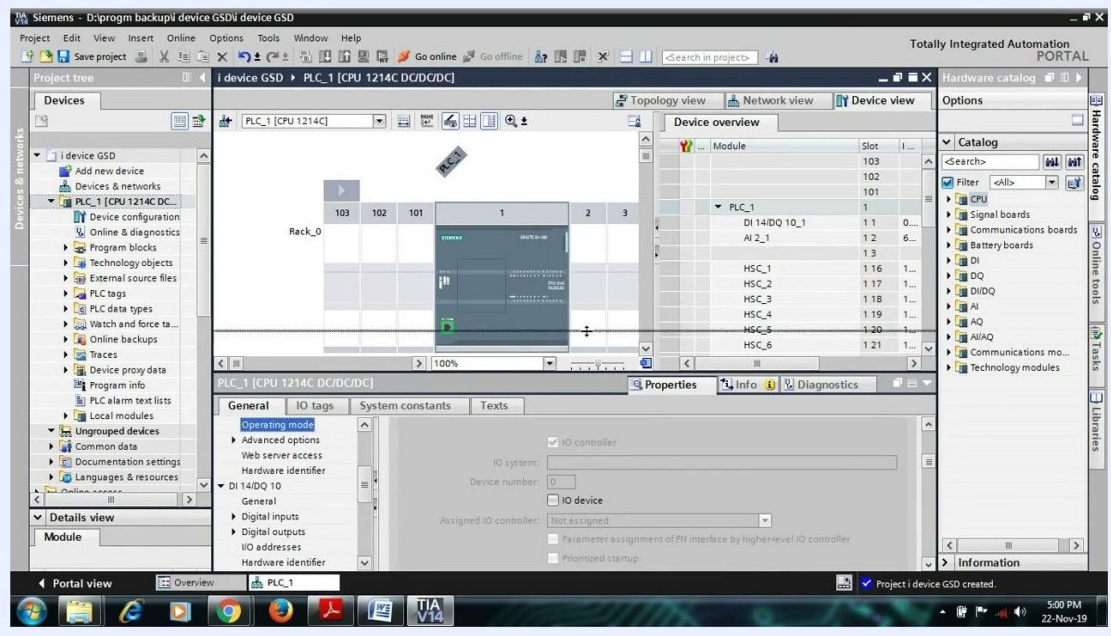


The device view with the S7-1200 CPU in the rack, the project information panel, and the hardware catalog.

Step 3. Set the CPU as an IO device

1. In the device view, select the CPU module.

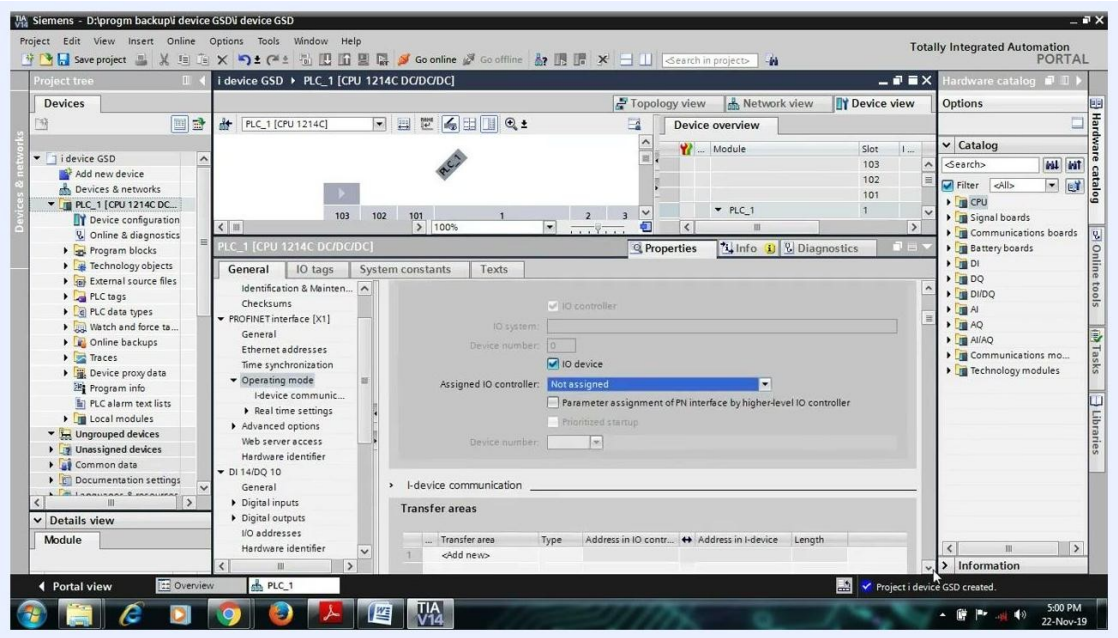
2. In the properties panel, expand **General** and select **Operating mode**.



The properties panel with Operating mode selected for the S7-1200 CPU.

3. Select the **IO device** check box.

After you select it, the **Assigned IO controller** field appears and is set to "Not assigned". Options for parameter assignment and prioritized startup may also be available. Under **I-device communication**, the **Transfer areas** table appears. By default, it lists an INPUT transfer area, and you can add new transfer areas as needed.



The Operating mode properties with IO device selected, the Assigned IO controller field, and the Transfer areas table.

Step 4. Configure the transfer areas

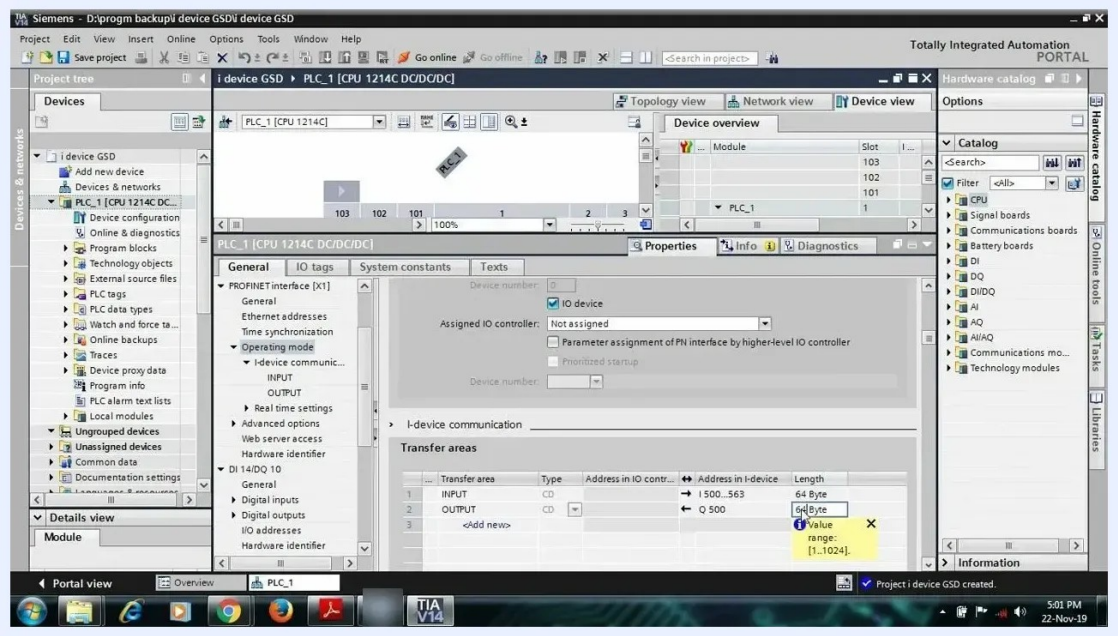
In the **Transfer areas** table under **I-device communication**, locate the OUTPUT row and set these values:

- **Address in IO controller**: Q 500
- **Address in I-device**: Q 500
- **Length**: 64 Byte

Make sure the INPUT area uses these values:

- **Address in IO controller**: I 500...563
- **Address in I-device**: I 500...563
- **Length**: 64 Byte

Confirm that the values are within the valid range. For example, the length can be 1–1024.



The Transfer areas table with the INPUT and OUTPUT areas both set to 64 Byte, with addresses I 500…563 and Q 500.

Step 5. Review the transfer area details

Click the INPUT or OUTPUT entry to open its detailed settings. Verify these values for each area:

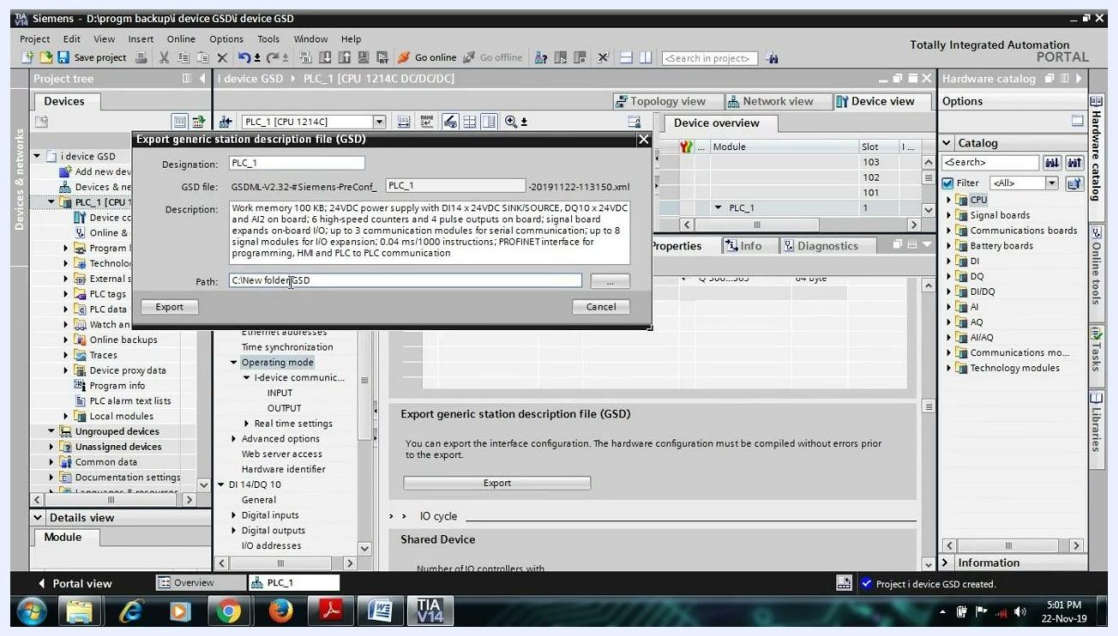
- **Start address**: 500
- **Length**: 64 Bytes
- **Process image**: Automatic update

You can also add comments or enable PROFIenergy communication if you need it.

Step 6. Compile the hardware configuration

1. Click the **Compile** button (checkmark icon) in the toolbar.
2. Wait for the compile process to finish.
3. Check that there are no errors.

A warning such as "PLC_1 is not assigned to an IO-Controller" may appear. Compilation should still complete successfully.



The compile results showing no errors, warnings about the IO-Controller assignment, and a successful compilation.

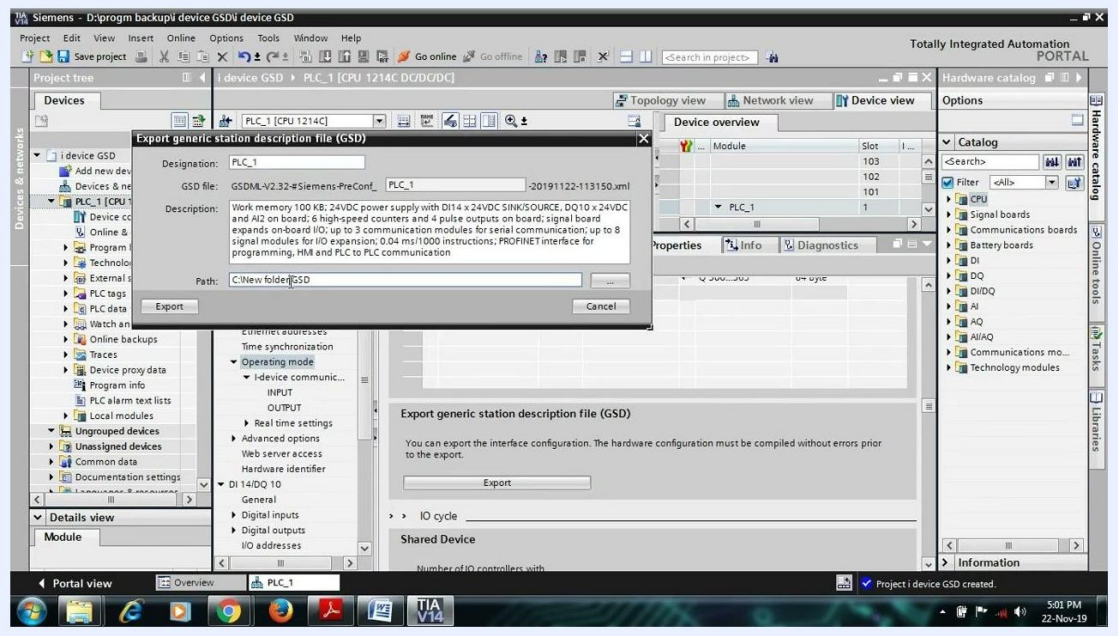
Step 7. Export the GSD file

This step creates the GSD file in TIA Portal.

1. In the properties panel, scroll to the **Export generic station description file (GSD)** section.
2. Click **Export**.
3. In the dialog, check or set these fields:

    - **Designation**: PLC_1
    - **GSD file**: generated automatically, for example GSDML-V2.32-Siemens-PreConf_PLC_1-20191122-113150.xml
    - **Description**: filled in automatically with the device details
    - **Path**: the export location, for example C:\New folder\GSD

4. Click **Export** to save the GSD file.



The Export generic station description file (GSD) dialog with the designation, file name, description, and export path fields.

Step 8. Verify the exported GSD file

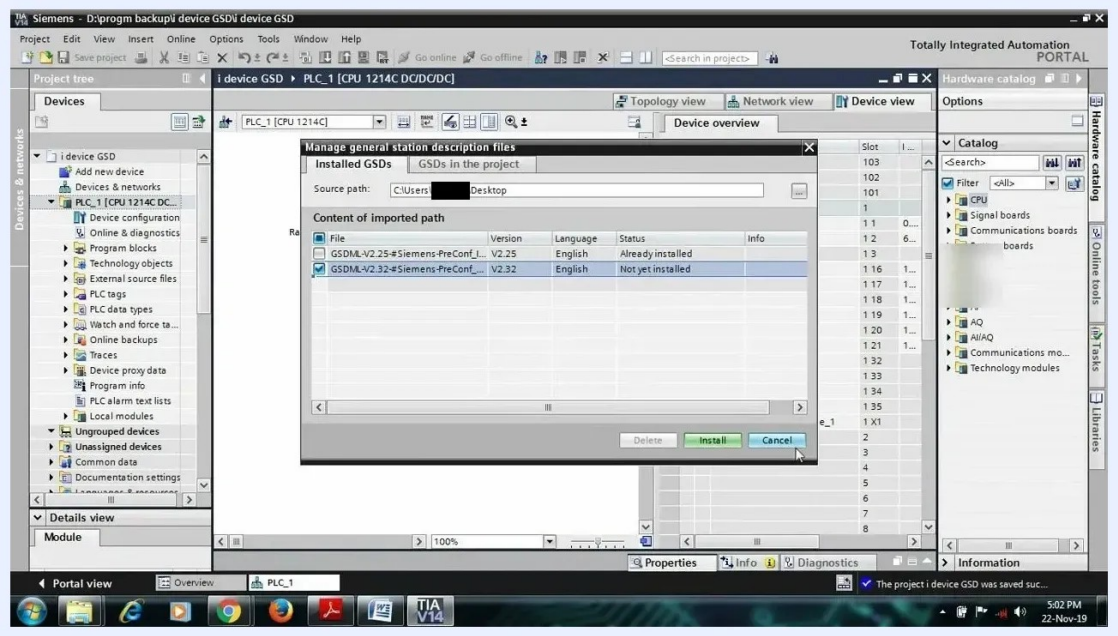
1. Open Windows Explorer.
2. Go to the export folder (C:\New folder\GSD).
3. Find the file GSDML-V2.32-Siemens-PreConf_PLC_1-20191122-113150.xml.
4. Confirm that the file exists and is accessible for use in other projects or systems.

Step 9. Install the GSD file in TIA Portal

After you create the GSD file in TIA Portal, you can install it in a TIA Portal environment.

1. Return to TIA Portal.
2. Open the **Manage general station description files** dialog. You can access it from the hardware catalog or the device configuration area.
3. Set **Source path** to the folder that contains your GSD files (for example, C:\Users\[username]\Desktop).
4. Review the **Content of imported path** list. Files that are already installed show the status "Already installed". New files show the status "Not yet installed".

5. Select the check box next to each GSD file you want to install.
6. Click **Install** to add the GSD file to your TIA Portal environment.

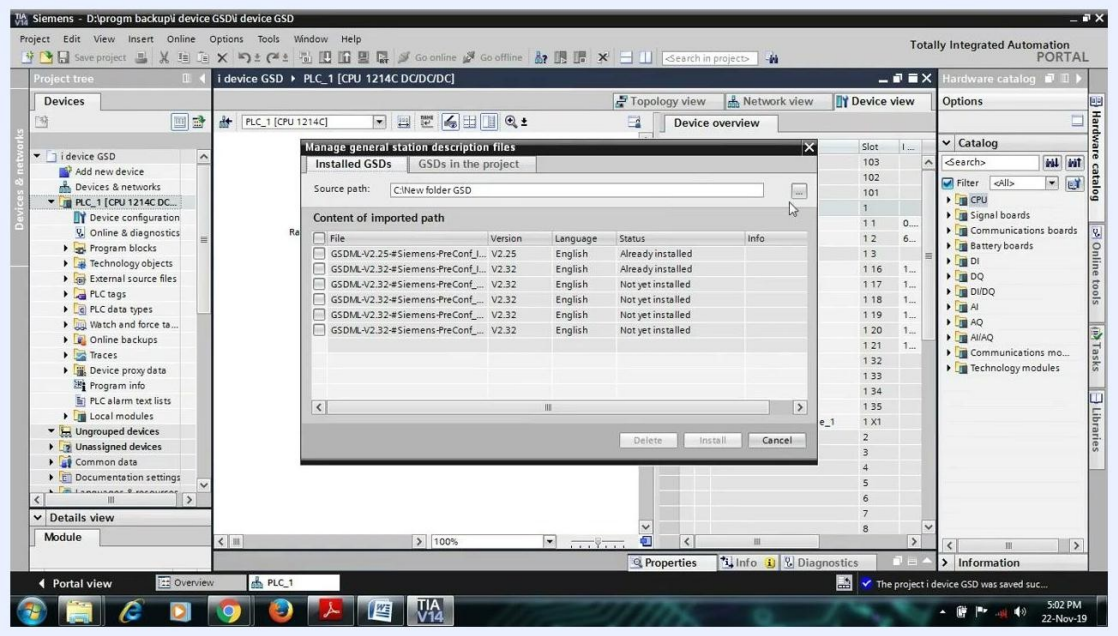


The Manage general station description files dialog with the GSDML files, their version, language, and installation status, and the Install button highlighted.

Step 10. Verify the installation

1. Check that the new GSD file appears in the list with the status "Already installed".
2. Close the dialog to return to the main device view.

3. Confirm that your device and modules appear correctly in the **Device overview** and the **Project tree**.



The device view with the PLC and modules in the rack, and the device overview and project tree visible.

Summary

You configured an S7-1200 CPU as an IO device and set up its INPUT and OUTPUT transfer areas. You then compiled the configuration, exported the GSD file, and verified it on your computer. Finally, you installed the file in TIA Portal and checked the result in the device view.

What's next

Use the exported GSD file in other projects or systems that need to communicate with this I-Device. Install it there with the **Manage general station description files** dialog.