APPLICATION EXAMPLE

Integration and Usage of the WinCC OA Telegram Bot Library

SIMATIC WinCC Open Architecture

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Table 0-1 OSS Packages

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1. Introduction

1.1. Overview

This document describes the integration of the WinCC OA Telegram Bot Library within WinCC OA projects. The library enables real-time communication, allowing users to receive alerts, monitor trends, access current values, and manipulate predefined variable tags directly through Telegram mobile application.

1.2. Components used

This application example has been created with the following hard- and software components:

Component	Number	Article number
WinCC OA 3.20 Server Basis	1	6AV6355-1AA50-0BA0
WinCC OA V3.20, Para Standard	1	6AV6355-1AA50-0CH0

Table 1-1 WinCC OA Licenses

You can purchase these components from the Siemens Industry Mall.

1.3. Requirements

- Installed WinCC OA version 3.20
- Installed WinCC OA JavaScript Manager for Node.js WinCC OA JavaScript Manager for Node.js

This application example consists of the following components:

Component	File name	Note
Manual	WinCCOATelegramBotAppExample.pdf	This document
Example Project WinCC OA	WinCCOATgBotExample.zip	Pre-configured project for testing the example in WinCC OA
Subproject WinCC OA (the bot library)	tgbotlib.zip	Subproject for WinCC OA

Table 1-2 Application Example Parts

2. Engineering

2.1. Project integration

2.1.1. System requirements

- WinCC OA Version 3.20 P1 or higher installation and license (incl. Para)
- Minimal system requirements for WinCC OA (see WinCC OA Documentation)

2.1.2. Installation WinCC OA

To carry out the installation of WinCC OA, please follow the steps in the WinCC OA documentation.
You can find the documentation under following link: Installation of WinCC OA

2.1.3. Preparation

Unpack the supplied ZIP archive "tgbotlib.zip" into the folder where the project is to be created.
The ZIP-archive contains the folder: tgbotlib: The Telegram Bot subproject

2.1.4. Creating a WinCC OA Project

To create your own project and use it with the tgbot library, the following steps can be followed:

1. Start the WinCC OA Project Administrator and create a new WinCC OA project

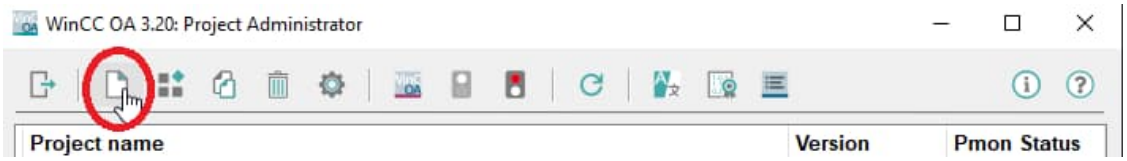

Figure 2-1 Project Administrator

2. Select the option “Legacy Standard project“ and click “Next“

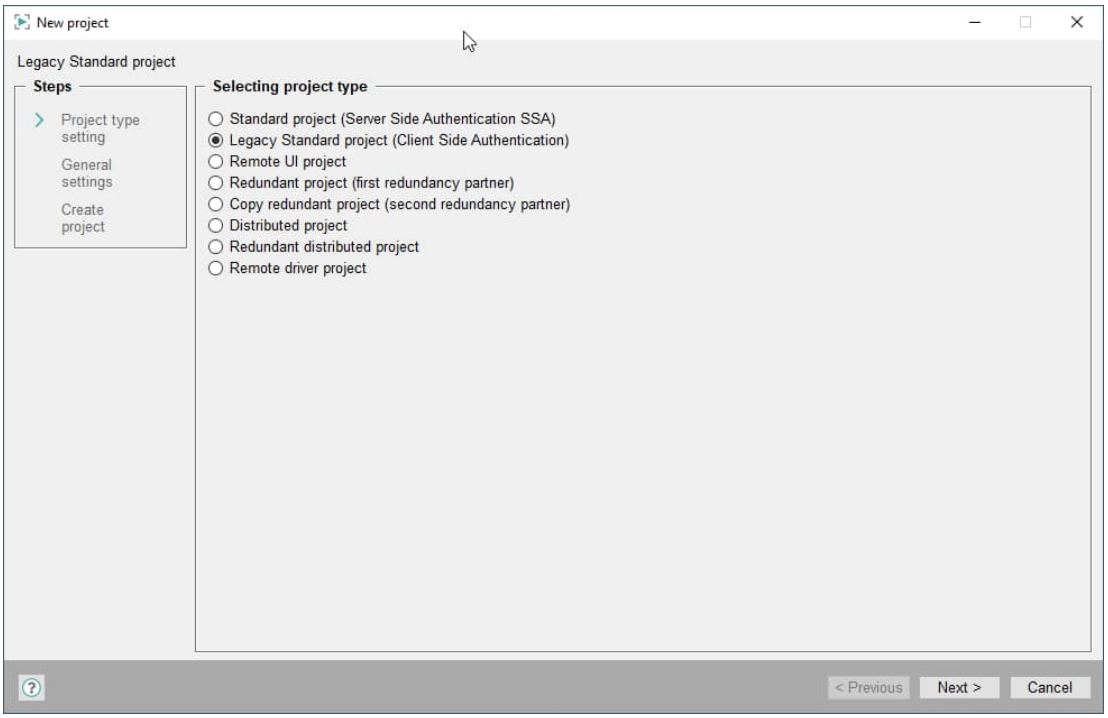

Figure 2-2 Project type selection

3. Enter a project name and select “Englisch – US“ as project language. Define your project path, select “Use SQLite“, and click „Next“.

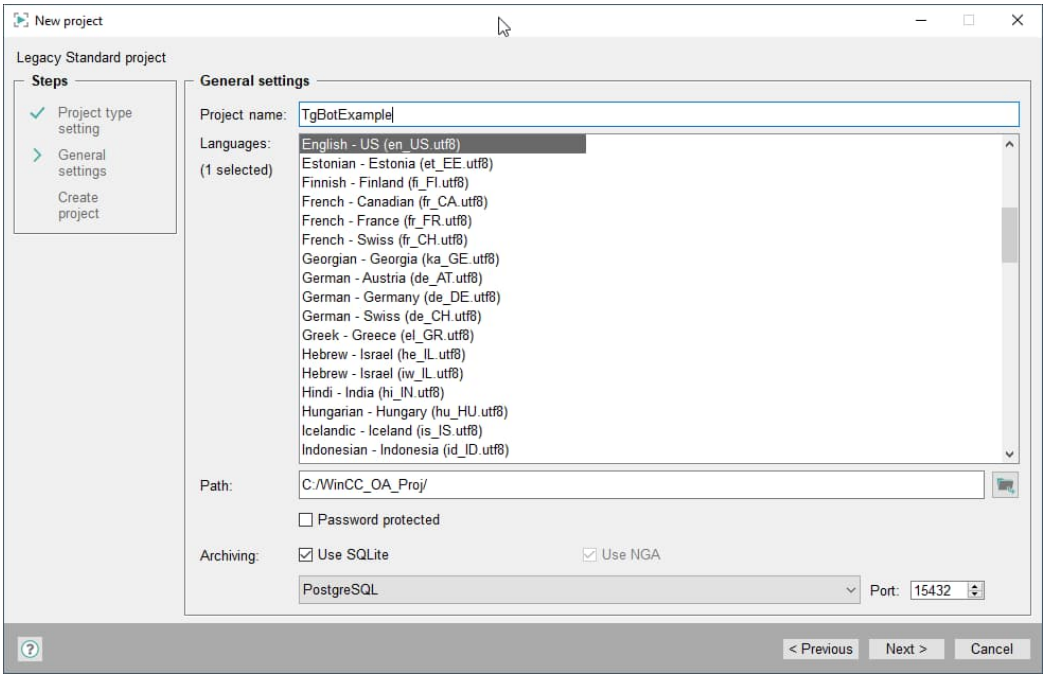

Figure 2-3 General settings

4. Click “OK“ to finish the creation of the new project

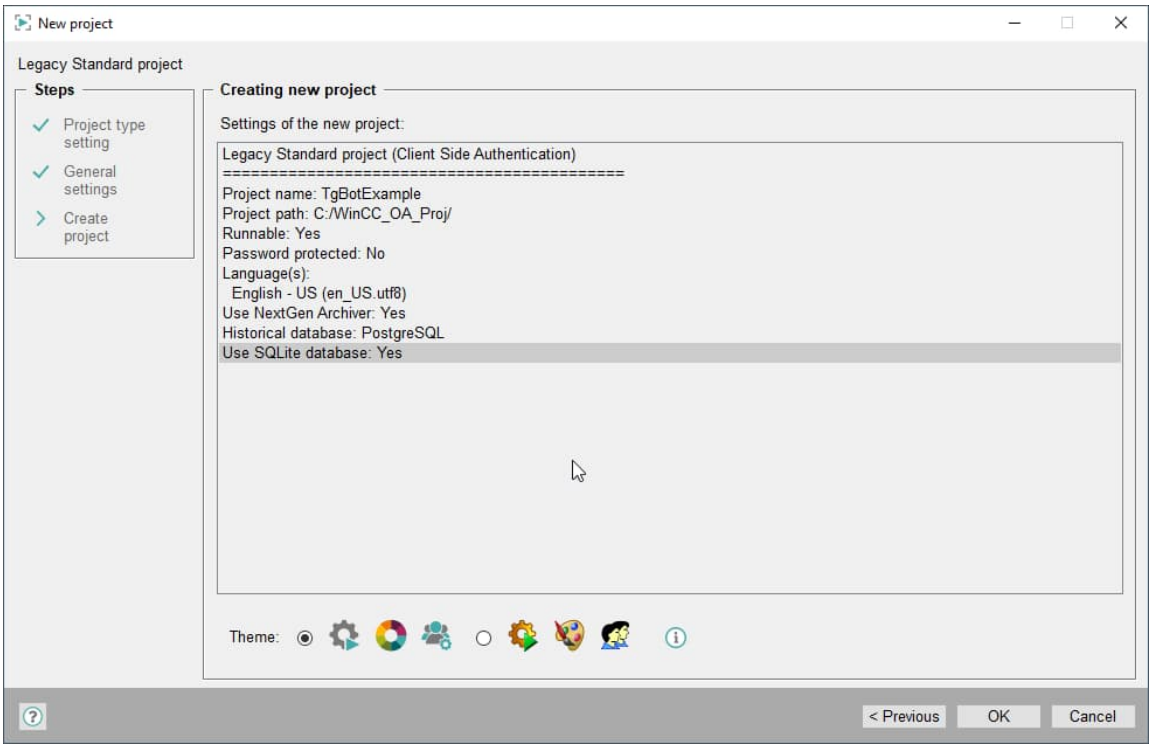

Figure 2-4 Project creation summary

5. After clicking on “OK”, a dialog opens, which allows you set a password for the “root” user. When “Yes” is selected, another dialog opens, where you can enter the desired password.

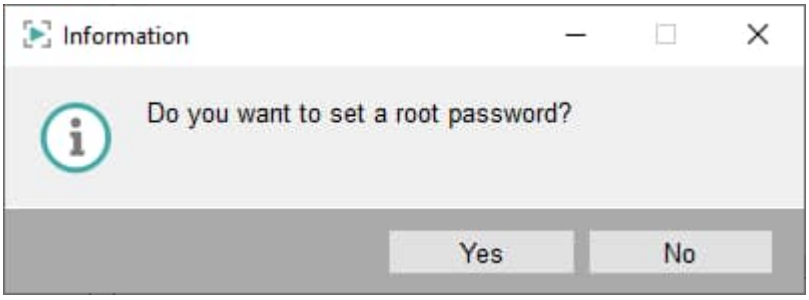

Figure 2-5 Dialog to set "root" password

6. The WinCC OA “Project Administrator”now shows your newly created project.

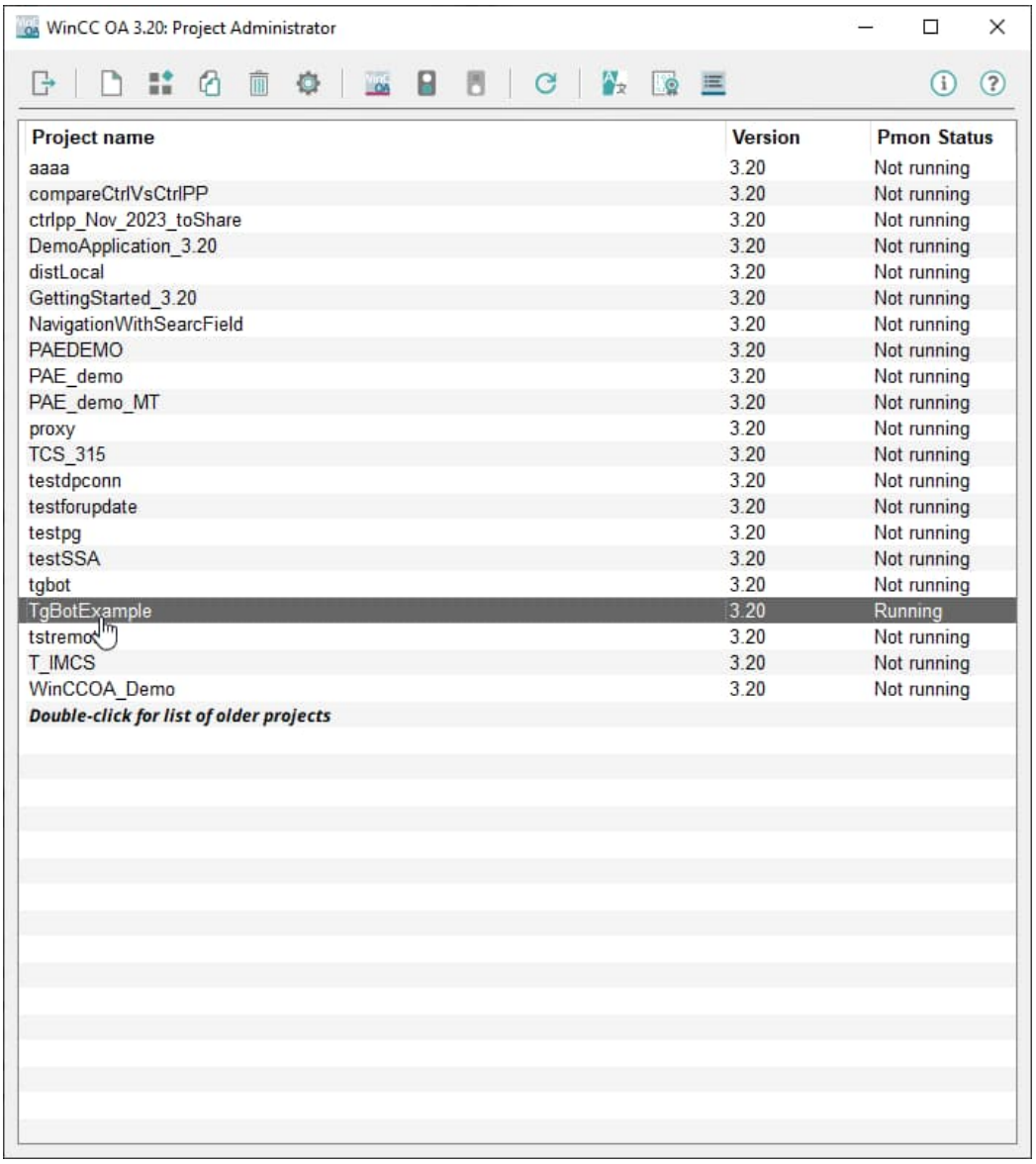

Figure 2-6 Project Administrator with new project

2.1.5. Registration and integration of the Telegram Bot library as a WinCC OA subproject

1. In the WinCC OA Project Administrator click on (see Figure 2-6) to register a new project. From the previously created folder in the section 2.1.3, select the folder “tgbotlib“, deselect the checkbox “Runnable“, and click on OK.

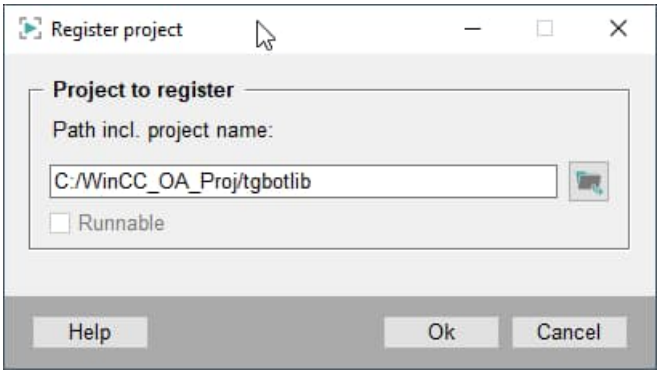

Figure 2-7 Project registration dialog

The subproject is now registered.
Attention: Subprojects (not runnable projects) do not appear in the WinCC OA Project Administrator!

2. To assign the registered subproject to your project, first select your project in the “Project Administrator” panel, then click in the WinCC OA project administrator on to open the project properties.

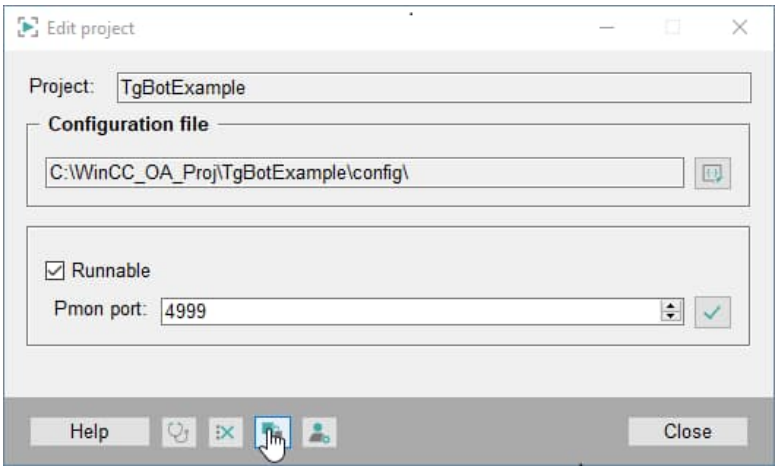

Figure 2-8 Project editing dialog

Now click on to display the available subprojects.

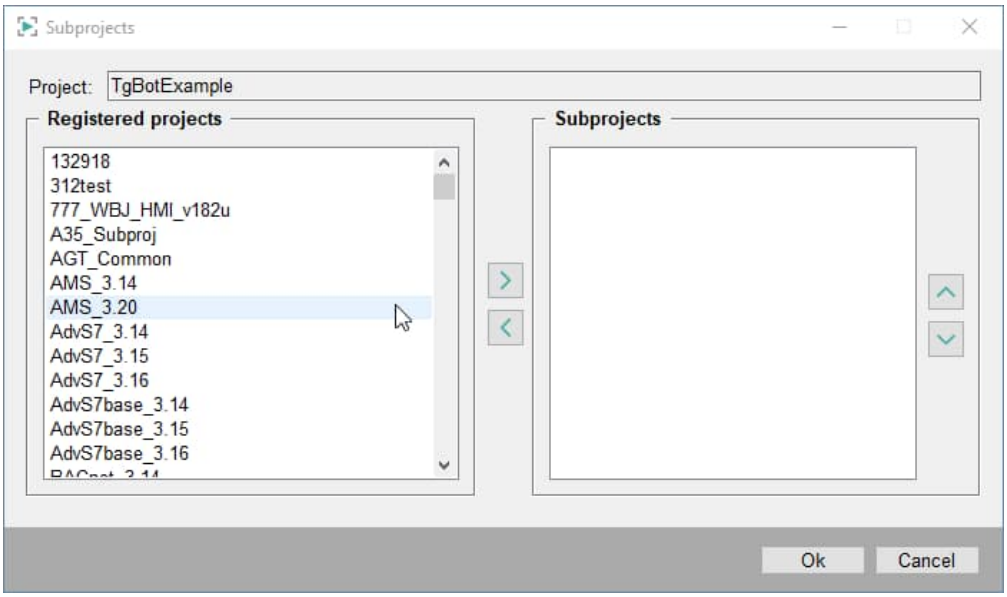

Figure 2-9 Manage subprojects

Select the subproject "tgbotlib" then move it by means of to the right list

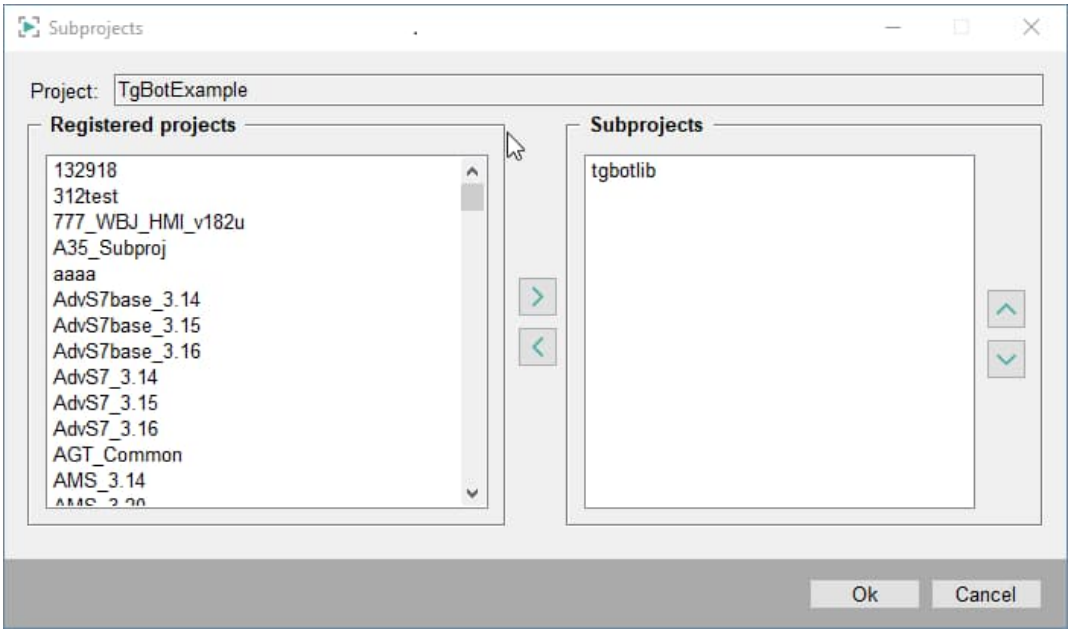

Figure 2-10 Include the subproject into your project

Click "OK" and "Close".

3. Be sure that this is the correct order of the project and subprojects in the config file of your project.

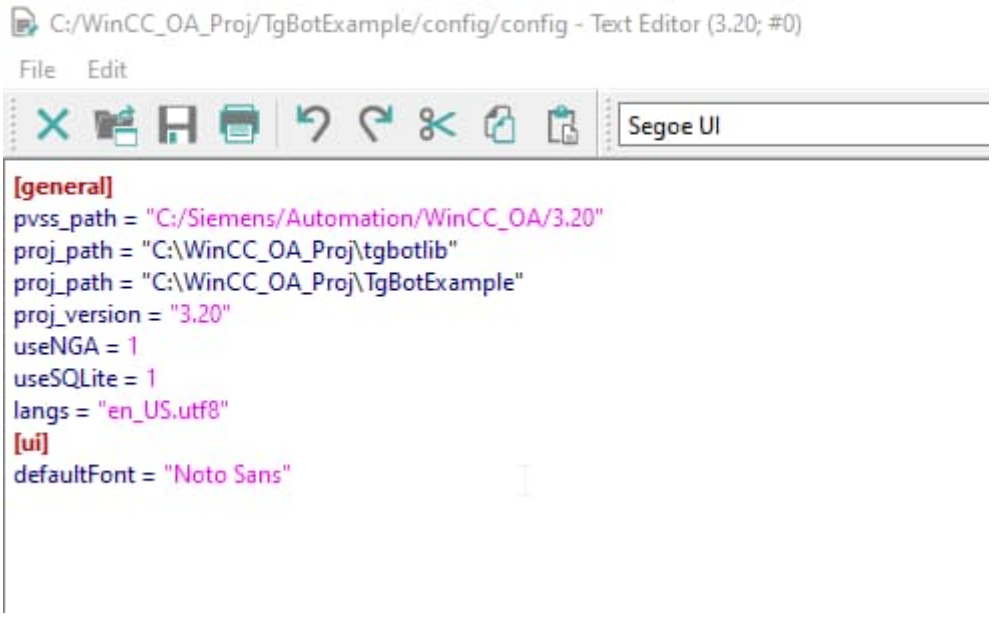

Figure 2-11 Project config file – Order of projects / subprojects

2.1.6. Setting up the Telegram Bot.

2.1.6.1. Telegram Bot Registration

Register and configure a new Telegram Bot for use with WinCC OA:

1. Open Telegram and Access the @BotFather bot:
    - Start a chat with the @BotFather bot, the official bot management interface in Telegram.
2. Create a New Bot:
    - Use the command “/newbot”.
    - Follow the instructions to assign a name and username to your bot.
    - Upon successful creation, you will receive a unique API Key. Copy (and save) this key, as it will be required for integration.
3. Adjust Privacy Settings:
    - Use the command /setprivacy in @BotFather.
    - Set privacy to "Disable" to allow the bot to receive messages from both private and group chats.

2.1.6.2. Installation Dependencies

To install all dependencies powershell command “npm install” should be executed in the following subfolder path “tgbotlib\javascript” from the previously created folder in the section 2.1.3.

2.1.6.3. WinCC OA Configuration

1. Run the project using the start button in the Project Administrator

   In the GEDI open the ASCII manager.

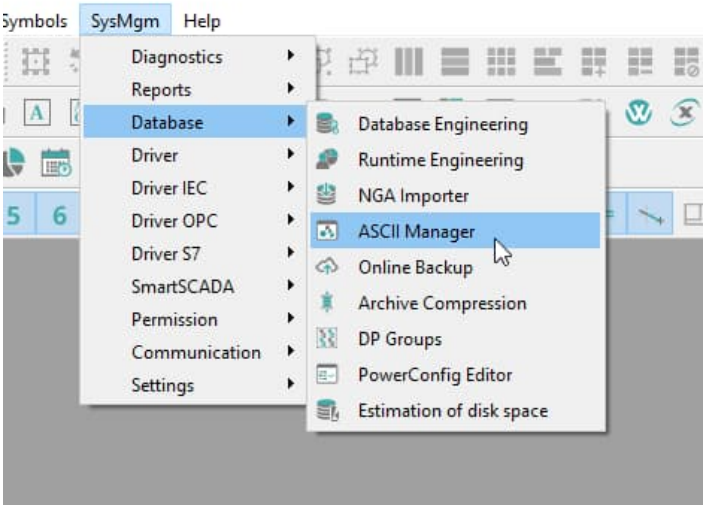

Figure 2-12 GEDI – ASCII Manager

2. Within the ASCII Manager Panel import ”tgbot.dpl”

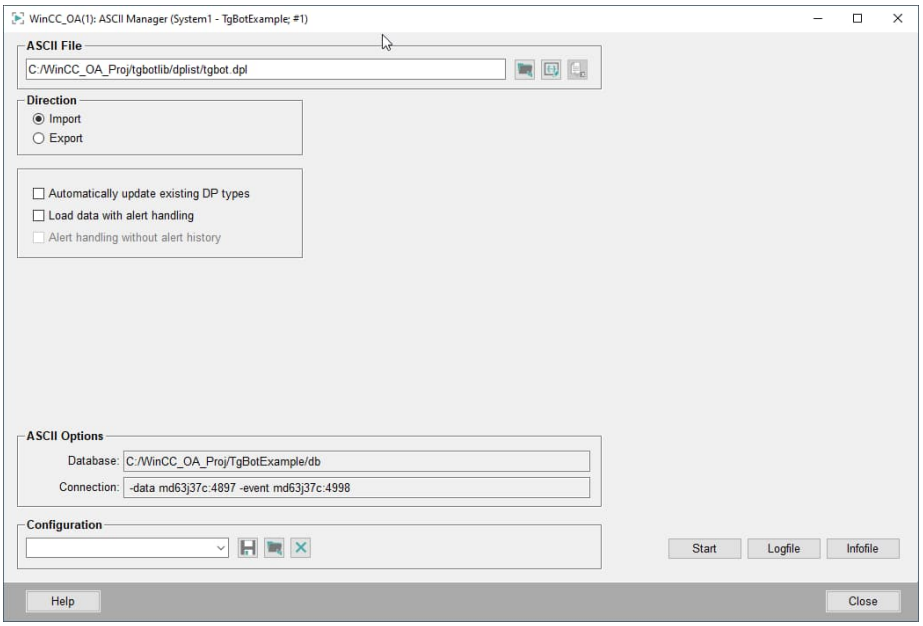

Figure 2-13 ASCII Manager Panel import

3. Open the panel “TgBotPanel.pnl” from “tgbotlib/Panels/” and run it using the following icon in GEDI (Save and run in QuickTest).
   Put the API key from 2.1.6.1 into the relevent field and press ”Set API key”

   Note: After restarting the panel the API key will not be shown, that it is not availablefor other users running the same panel (for security reasons). There is no need to enter it every time you open the panel, even if the field is empty.

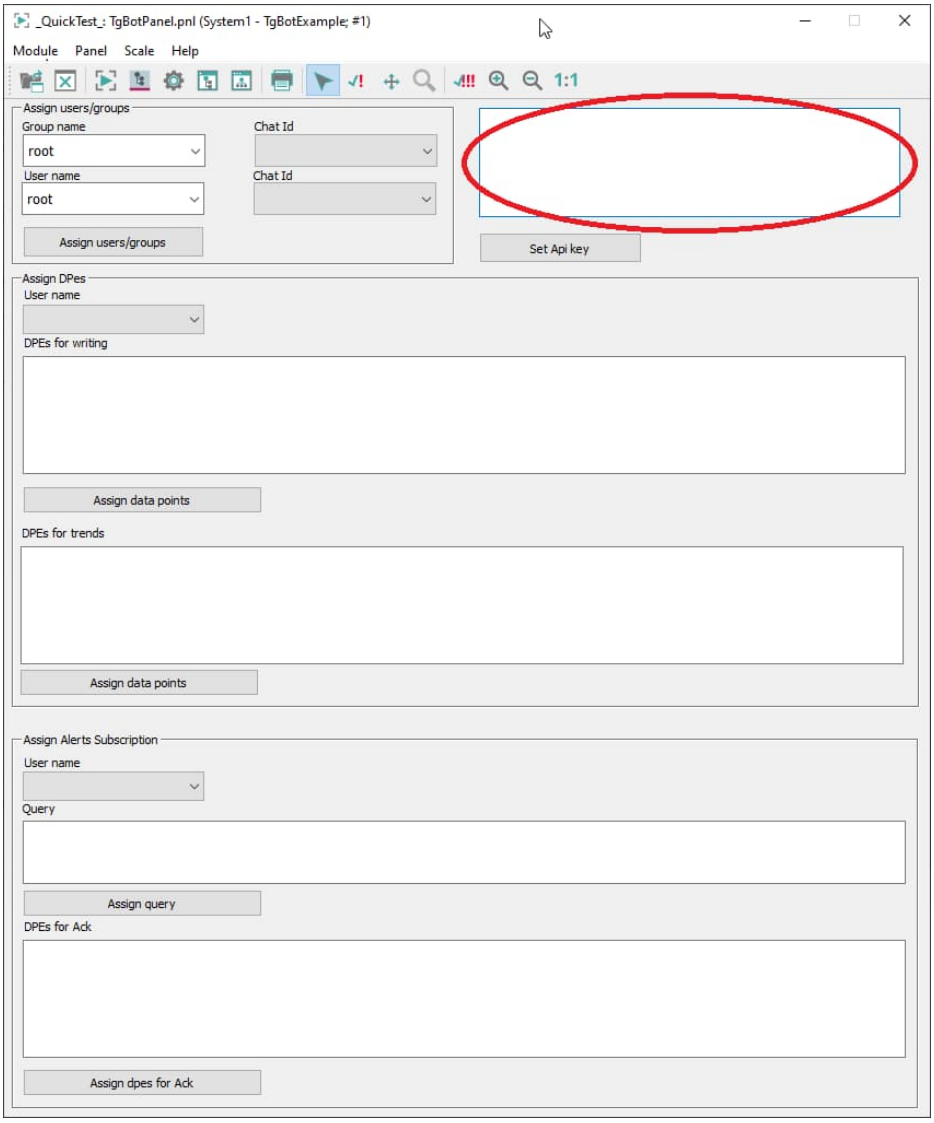

Figure 2-14 TgBot Configuration

4. In the WinCC OA Console, add and start a new JavaScript Manager with the options: “tgbot/index.js”.

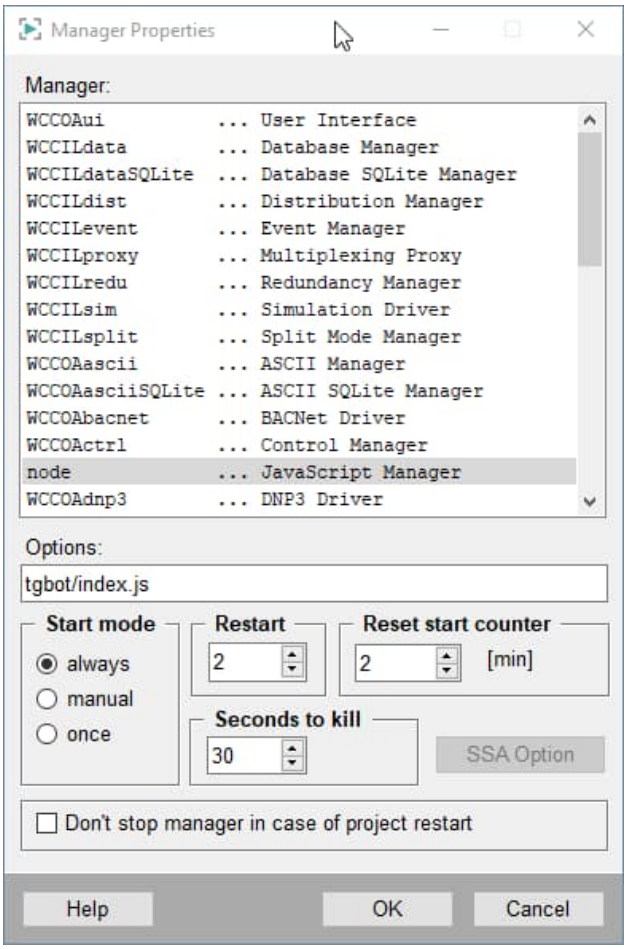

Figure 2-15 Add a new js Manager

2.2. Operation

1. Initiate Communication
    - Start a chat with your bot in Telegram. Alternatively, create a new group and add the bot as a member.
    - Note:
        - If the bot is added to a group, the corresponding Chat ID will be a negative value.
        - If the bot menu is not appearing and need to show it, send a message to the chat with "/start"
2. Link Users/Groups to Chat IDs:
    - In the "TgBotPanel.pnl", assign a user or user group to the Chat ID obtained from Telegram by clicking on "Assign users/groups" button.

      This links the bot to the user or group in WinCC OA.

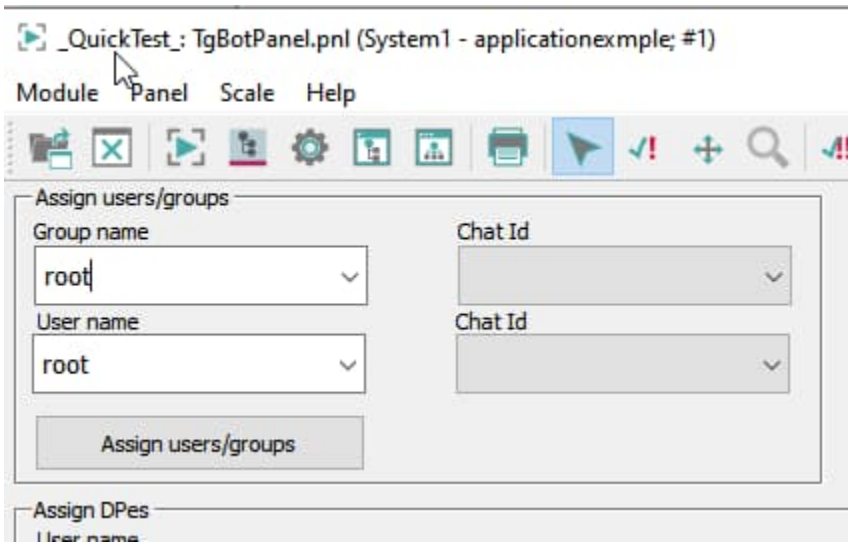

Figure 2-16 Binding users and groups names to chats ids

Notes:

- Only existing WinCC OA users and groups can be assigned to a chat ID.
- It is not allowed to use the same name for WinCC OA users and WinCC OA groups. E.g.: The "User" should not be "root" user and at the same time the "Group" should not be "root" group
- Each Telegram user or group interacting with the WinCC OA Telegram Bot is identified by a "Chat ID". This ID is required to link the Telegram chats with specific users or groups in WinCC OA.

  Through the "TgBotPanel.pnl" panel, administrators can assign Chat IDs to users or groups, enabling personalized access to system data and alarms. Once assigned, users can receive alarms, monitor trends, set data point values, and acknowledge alerts directly via Telegram.

  That is why it is essential to avoid using identical names for users and groups to prevent conflicts.

2.2.1. Configuring Data Points and Alerts

The “TgBotPanel.pnl” panel provides several configuration fields for mapping data points and alerts.
Use a semicolon (;) as delimiter when entering multiple values.

- Choose the username or groupname (representing the Telegram chat ID, only bound usernames are available) you need to assign the datapoints to.

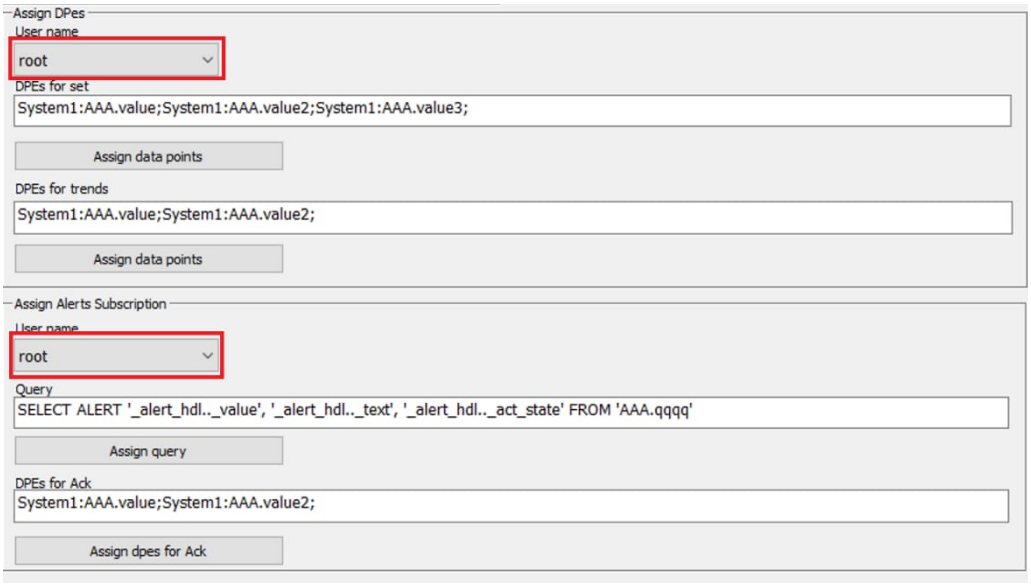

Figure 2-17 Selecting a user/group and assigning datapoints to a user/group

1. DPEs for set (Writing Values from Telegram)

   Define list of data points elements (DPEs) that users can set via telegram chat values for. E.g.: ”System1:AAA.value;System1:AAA.value2;System1:AAA.value3;”

2. DPEs for trends (Usable in Telegram Trends)

   Define list of data points elements which are available for trends in a telegram chat. E.g.: ”System1:AAA.value;System1:AAA.value2;”

3. Query (Usable for Alert Monitoring in Telegram)

   Define SQL-style queries for alert subscription for specific chat. E.g.:

   “SELECT ALERT '_alert_hdl._value', '_alert_hdl._text', '_alert_hdl._act_state' FROM 'AAA.qqqq'”

4. DPEs for Ack (Acknowledgment of Alarms in Telegram)

   List alerts data points elements that users can acknowledge via Telegram. E.g.: ”System1:AAA.value;System1:AAA.value2;”

2.2.2. Telegram Menu Structure and Button Functionality

Note: Please use datapoints and queries that exists in your project and if you are using the application example refer to section 3. for data point and query details.

1. Navigate to the “Configs” submenu

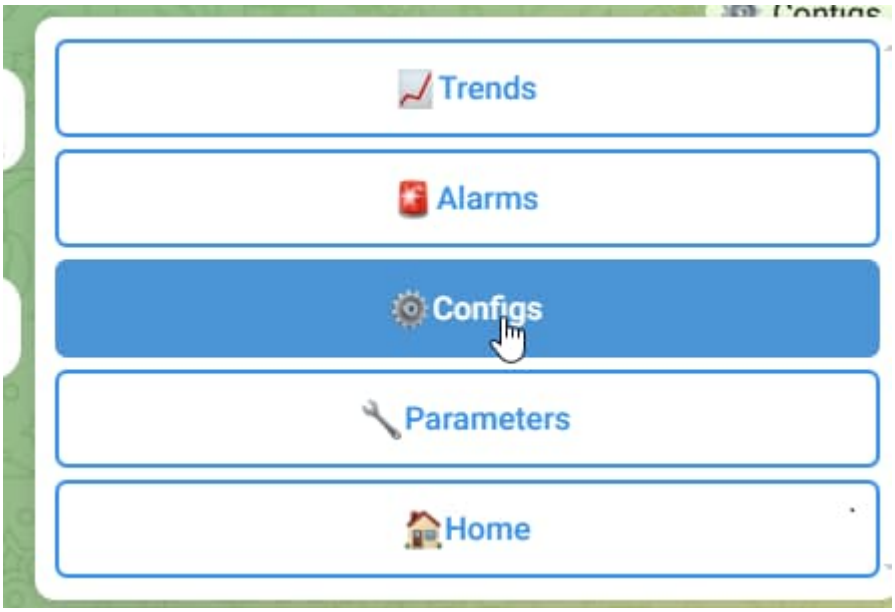

Figure 2-18 Main menu overview

2. Chose the menu option “Trends conf”

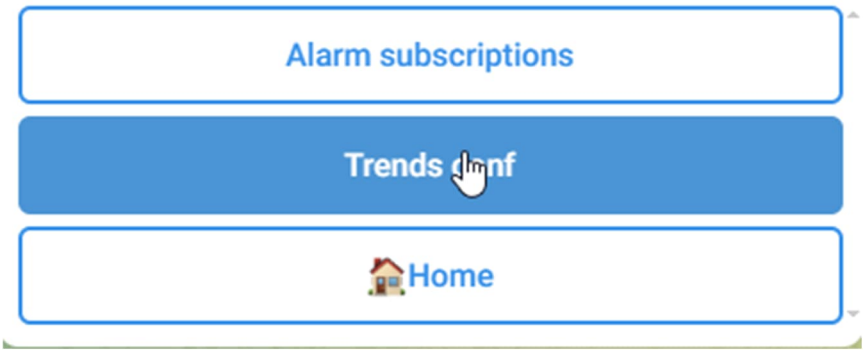

Figure 2-19 Config menu overview

3. Chose the menu option “Add trend”

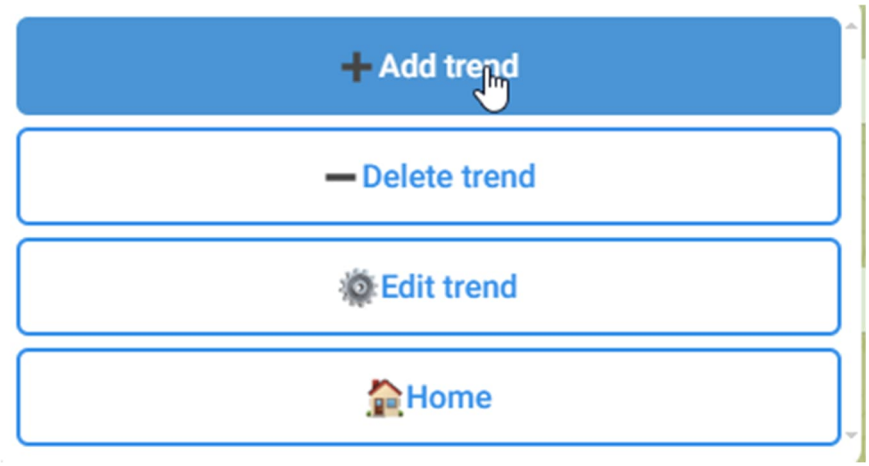

Figure 2-20 Trend’s config menu overview

4. Type a name for the new trend

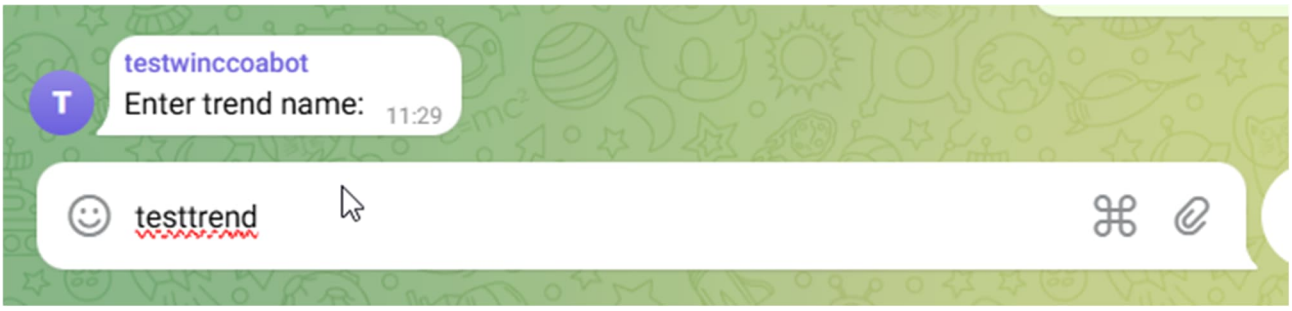

Figure 2-21 Example of creating new trend

5. Add desired data point

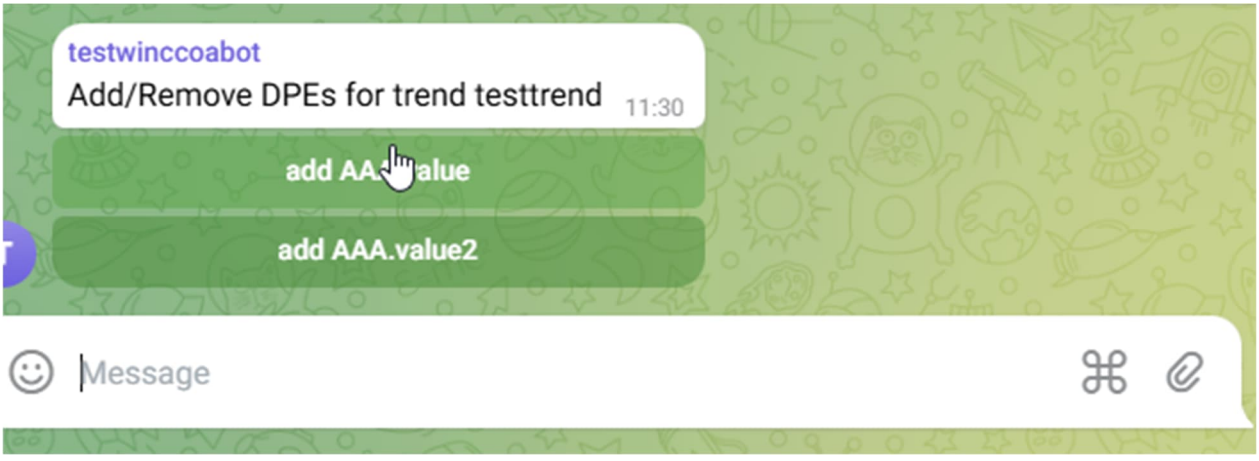

Figure 2-22 Adding datapoints to a trend

6. The trend is now available from the Trend menu

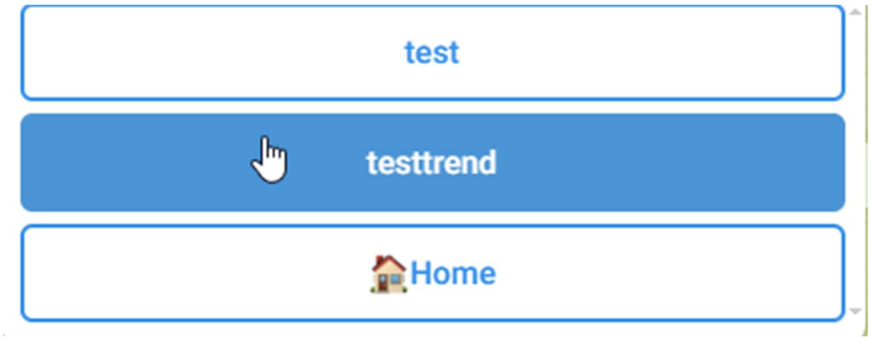

Figure 2-23 List of available trends

7. Choose a time range

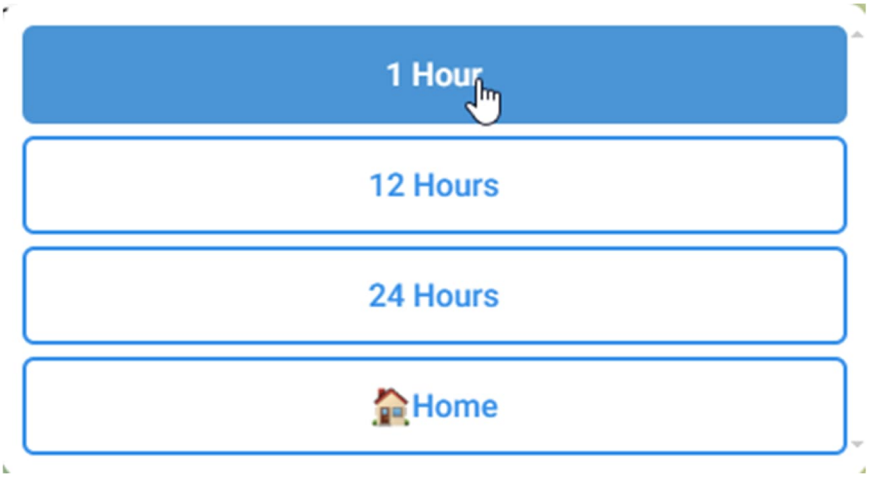

Figure 2-24 List of available predefined time ranges

8. Changes within the time range will be shown, if there were no changes on the datapoints in specified time interval message “There is no data for this period” will appear.

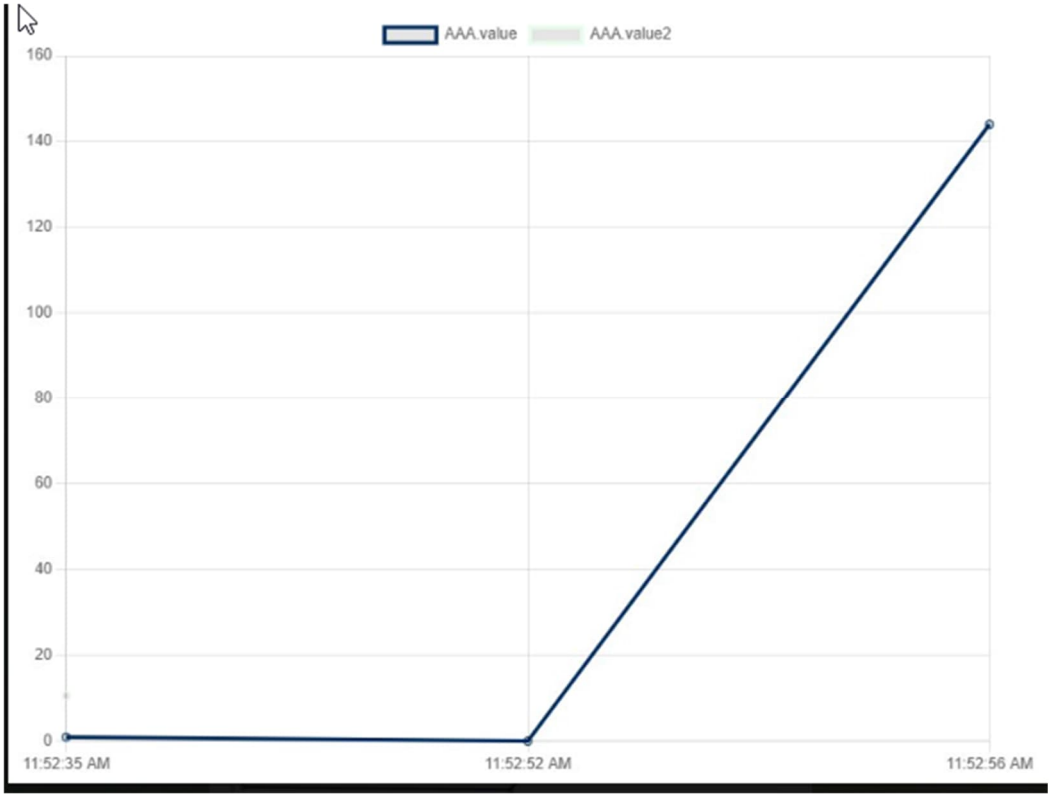

Figure 2-25 Example of a trend

Similarly, users can configure alarms or set values of data points.
Please see next section for a detailed menu overview

2.2.3. Menu Overview

Main Menu

📈 Trends: Opens the trends menu, allowing users to analyze data trends.

🚨 Alarms: Provides alarm-related features.

⚙️ Configs: Opens a submenu with configuration options.

🔧 Parameters: Enables interaction with system parameters.

🏠 Home: Returns to the main menu.

Submenus

Configs Menu

- Alarm subscriptions: Manages alarm subscriptions.
- Trends conf: Configures trend analysis.
- 🏠 Home: Returns to the main menu.

Trends Time Ranges Menu:

- 1 Hour: Displays trends for the past hour.
- 12 Hours: Displays trends for the past 12 hours.
- 24 Hours: Displays trends for the past 24 hours.
- 🏠 Home: Returns to the main menu.

Trends Conf Menu:

- ➕ Add trend: Adds a new trend.
- ➖ Delete trend: Deletes an existing trend.
- ⚙️ Edit trend: Edits trend configuration.
- 🏠 Home: Returns to the main menu.

2.2.4. Functional Descriptions

📈 **Trends**

- **Purpose**: Displays trends for specified time ranges.
- **User Interaction**: User selects a preconfigured trend and a time range, and the bot retrieves trend data.

🚨 **Alarms**

- **Purpose**: Displays current alarms list.
- **User Interaction**: Users interact with alarms, acknowledgement as needed.

⚙️ **Configs**

- **Purpose**: Provides configuration options for alarms and trends.
- **Note**:
    - For trends: "_archive" config needs to be set on the data points to be able to use trends.
    - For alarms: By default, all the alarms are unmuted, and we can mute them using the bot config menu

- **User Interaction**: User navigates through options to create, delete, edit trends or to mute/unmute alarms.

🔧 **Parameters**

- **Purpose**: Allows users to set values for datapoint elements.
- **User Interaction**: User uses inline buttons for setting new values.

Note If an interaction involves modifying a previous message from the bot (e.g., updating a button state after user action), avoid performing the interaction twice to prevent conflicts. If the same interaction is executed twice, it may attempt to modify the already updated message, leading to errors. In such cases, restart the manager to reset the state and ensure consistent behavior.

3. Usage example

The attached example project provides preconfigured a WinCC OA dashboard and a simulation of several values. For demonstration purposes of this functionality next steps should be done:

1. Run the attached project: “applicationexample”
2. Navigate to the folder “<PROJ_PATH>/javascript/tgBot” and execute powershell command “npm install”
3. Run the GEDI and start the panel ”TgBotPanel.pnl” from “applicationexample/panels”
4. Set the API key and follow the steps in section 2.1.6.
5. Start the “JavaScript Manager” through console

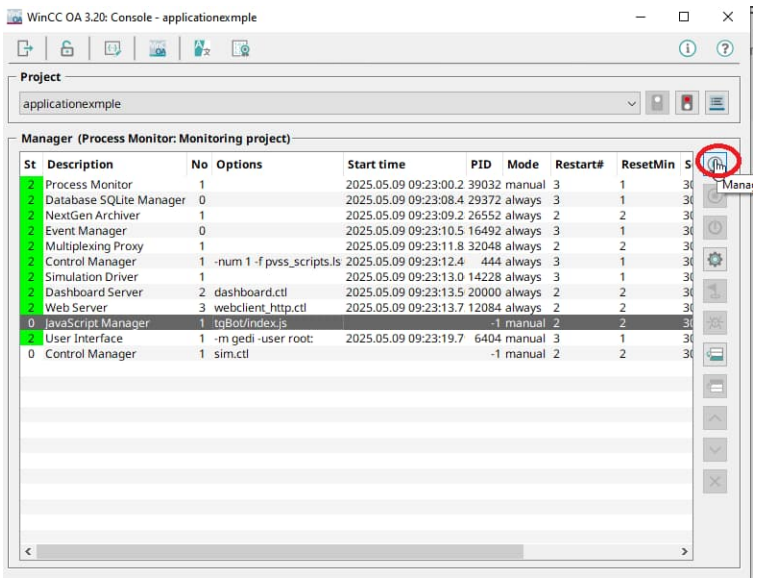

Figure 3-1 Managers overview

6. Start a new chat with the bot in Telegram and assign the Chat ID to a user or a group in the WinCC OA panel “TgBotPanel.pnl”
7. For the user or the group, set fields “DPEs for writing”, ”DPEs for trends”, ”DPEs for ack”:

   System1:Enterprise/Dallas/Press/Press_103/Line/OEE/OEE_Availability.;System1:Enterprise/Dallas/Press/Press_103/Line/OEE/OEE_Performance.;System1:Enterprise/Dallas/Press/Press_103/Line/OEE/OEE_Quality.;

   Set the field ”Query”: “SELECT ALERT '_alert_hdl._value', '_alert_hdl._text', '_alert_hdl._act_state' FROM 'System1:Enterprise/Dallas/Press/Press_103/Line/OEE/OEE_*.**’”

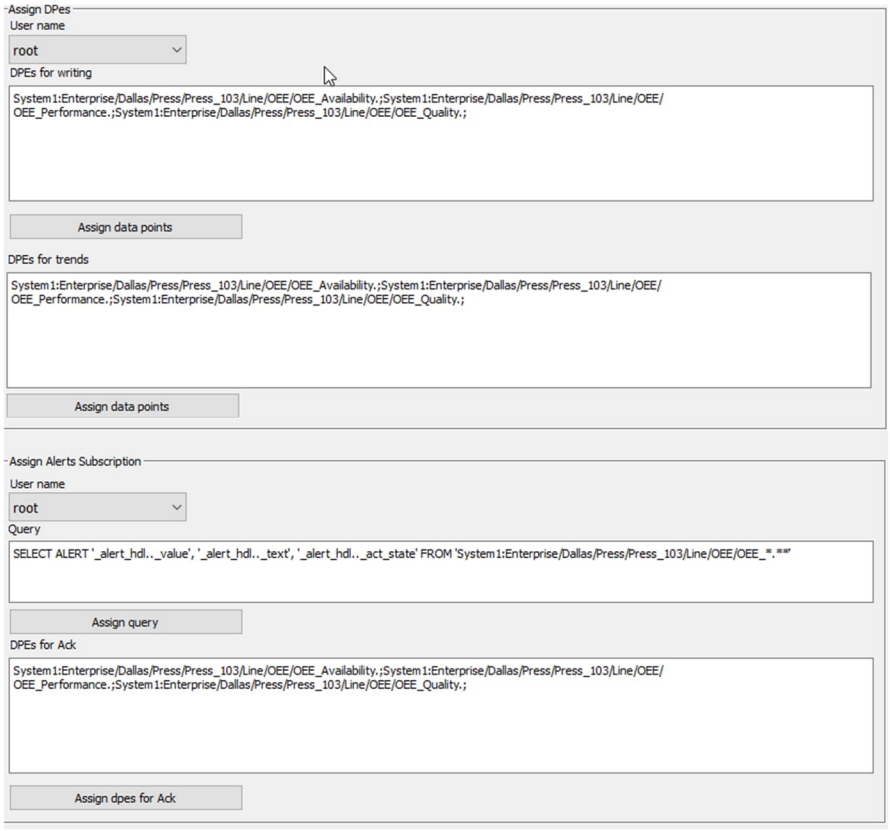

Figure 3-2 Example of configured chat

8. Run the “Control Manager” number 5 with options “sim.ctl” though console
9. Start the panel “SimulationPanel.pnl” from “applicationexample/panels”, and press ”Start Simulation”.

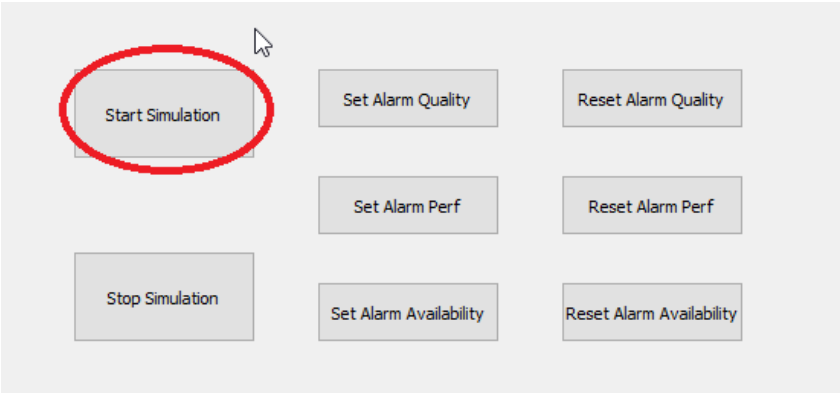

Figure 3-3 Start simulation

10. In a web browser navigate to http://localhost:8080/
11. Login as Para without password.
12. Open the dashboard “Press 103”

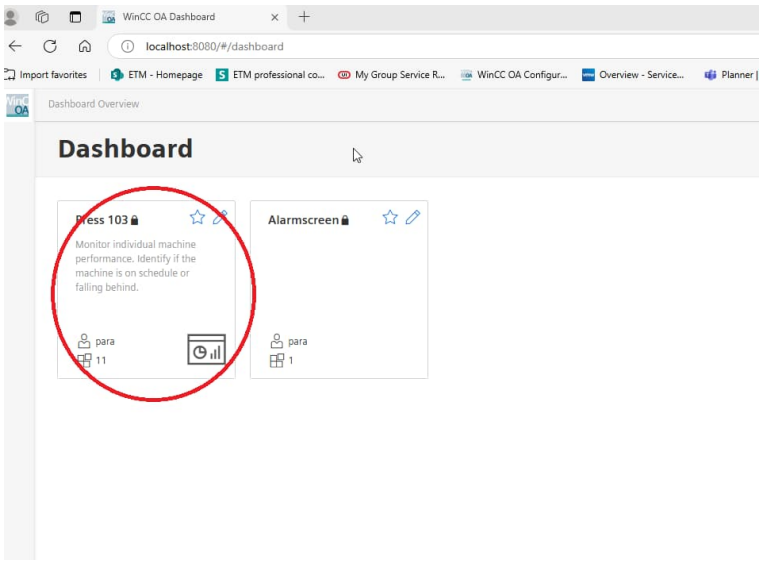

Figure 3-4 Dashboard panel

13. Observe the values changes.

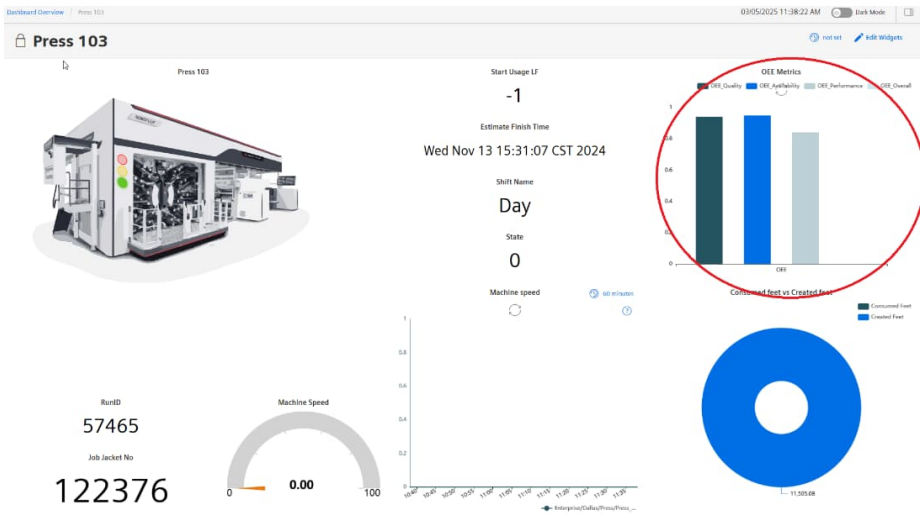

Figure 3-5 Dashboard overview for a specific machine

14. The simulation is working, Alerts can be simulated by pressing corresponding buttons on the panel ”SimulationPanel.pnl”.

    In Telegram you can observe the valuechanges in trends too.

Note. No need to add the “tgbotlib” subproject because its folders are already merged into our “applicationexample” project, Only add the “tgbotlib” as subproject if you are integrating the solution with your own project

4. Appendix

Important WinCC OA specific abbreviations

Acronym	Long form	Meaning
WinCC OA	Simatic WinCC Open Architecture	A SCADA system for visualizing and operating of processes, production flows, machines and plants in all lines of business. Distributed systems enable any number of stand-alone systems, from 2 to 2048, to be linked via a network. Each subsystem can be configured either as a single-user or multi-user system, redundant or not, in each case.
DPT	Data point type	Object definition (class) of a structured data object as mapping of a real device. Single data points (instances) are derived from the DPT. Therefore, the data point type is a form of template.
DP	Data point	Structured, device-oriented data object as representation of a real device within the control system. A data point contains one or more data point elements (process variables).
DPE	Data point element	Single process information within a device-oriented data point. Each DPE corresponds to a value/state. In addition to the value, there are DPE attributes like time stamp, quality information or origin.
GEDI	Graphic Editor GEDI	Graphic Editor. It is used both for drawing of process images ("panels") as well as for designing of symbols, dialogs, and scripting.
PARA	Configuration Tool	Editor for the creation and configuration of data point types, data points, and data point elements as well as their configs.
ASCII	American Standard Code for Information Interchange	Standardized protocol for storage and transfer of characters/text. In WinCC OA, the acronym also refers to the database import/export manager. It is a module to export and import configurations as ASCII files. Mass configuration can therefore be carried out in a spread sheet program (for example MS Excel), file editor, or in an external database.
D	Driver Manager ("Driver")	Interface for connecting controllers (PLC, DDC, ...) fieldbuses and telecontrol systems. A driver handles the communication via an external protocol and enables the exchange of information with WinCC OA. The processing of data from the “field” to WinCC OA contains event orientation, old/new comparison, transformation, conversion, and smoothing. The protocol of the Driver must be the same as the protocol of the “field” device. Furthermore, the connection (how to reach the device) must be configured in WinCC OA. For exchanging data, a periphery address must be configured on a corresponding DPE.
CTRL	Control Manager ("Scripting")	Processing unit that allows to process user specific logic / business logic (control scripts).

	Control possesses an easy to learn syntax (similar to ANSI-C) and is processed by an interpreter (CTRL Manager).

Table 4-1 WinCC OA specific abbreviations

Service and support

WinCC OA Extended Services

Do you have questions about WinCC OA projects, need additional features, or require technical assistance? ETM provides 24/7 access to our complete service and support expertise for WinCC OA.

Our range of services includes the following:

- Extended Services provide tailored support for your evolving needs
- All kind of analysis/troubleshooting for older WinCC OA versions than our current mainline
- Project startup workshop
- Architecture definition
- Project engineering assistance with dedicated contact person
- Special project developments (special requirements, web widgets, gateways, etc.)
- WinCC OA library development assistance
- Project or architecture reviews with report
- Project-specific problem or performance analysis
- Project upgrade (analysis with report, assistance during upgrade, etc.)
- Assistance for complex error reproduction scenarios
- On-site assistance for any tasks related to WinCC OA and their components
- 24/7 on-duty assistance or priority callback for certain time range
- Database support Oracle®, InfluxDB®, PostgreSQL® and MS SQL®
- Raima/HDB to SQLite/NGA migration
- Setup and consulting for WinCC OA Add-ons e.g., APM, AMS, DRS, …
- WinCC OA Security services (as per the WinCC OA Security Guideline, NIS2)
- Tests on unsupported platforms (e.g., unsupported OS)
- Individual Workshops (driver workshop, UI workshop, business logic, etc.)
- Factory Acceptance Test (FAT)/Site Acceptance Test (SAT) assistance
- Creating of prototypes, proof of concepts, demos, etc.
- Project tender analysis and evaluation of projects

  You can find detailed information on our range of services in the service catalog web page:

www.winccoa.com/documentation/WinCCOA/latest/en_US/Support/topics/support_extendedServices.html

SiePortal

The integrated platform for product selection, purchasing and support - and connection of Industry Mall and Online support. The SiePortal home page replaces the previous home pages of the Industry Mall and the Online Support Portal and combines them.

- Products & Services
  In Products & Services, you can find all our offerings as previously available in Mall Catalog.
- Support
  In Support, you can find all information helpful for resolving technical issues with our products.
- mySieportal
  mySiePortal collects all your personal data and processes, from your account to current orders, service requests and more. You can only see the full range of functions here after you have logged in.

You can access SiePortal via this address:

sieportal.siemens.com

Technical Support

The Technical Support of Siemens Industry provides you fast and competent support regarding all technical queries with numerous tailor-made offers.
– ranging from basic support to individual support contracts. Please send queries to Technical Support via Web form:

siemens.com/SupportRequest

WinCC OA – Training and Certification

To fully leverage the flexibility and openness of WinCC OA, we offer a wide range of training courses, from beginner to expert levels. Our modules cover various topics, with options for individual training. For WinCC OA partners, completing specific courses is required to obtain or maintain partner status, ensuring the highest level of expertise and support.

For more information on our offered trainings and courses, as well as their locations and dates, refer to our web page:

www.winccoa.com/support/training.html

Change documentation

Version	Date	Modifications
V1.0	4/2025	First version

Table 4-2 Change Documentation

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