zenon
by COPA-DATA

Service Grid manual

Getting Started Guide

v.10.4

COPA-DATA

Contents

1 Welcome to COPA-DATA help

ZENON VIDEO TUTORIALS

You can find practical examples for project configuration with zenon in our YouTube channel (https://www.copadata.com/tutorial_menu). The tutorials are grouped according to topics and give an initial insight into working with different zenon modules. All tutorials are available in English.

GENERAL HELP

If you cannot find any information you require in this help chapter or can think of anything that you would like added, please send an email to documentation@copadata.com.

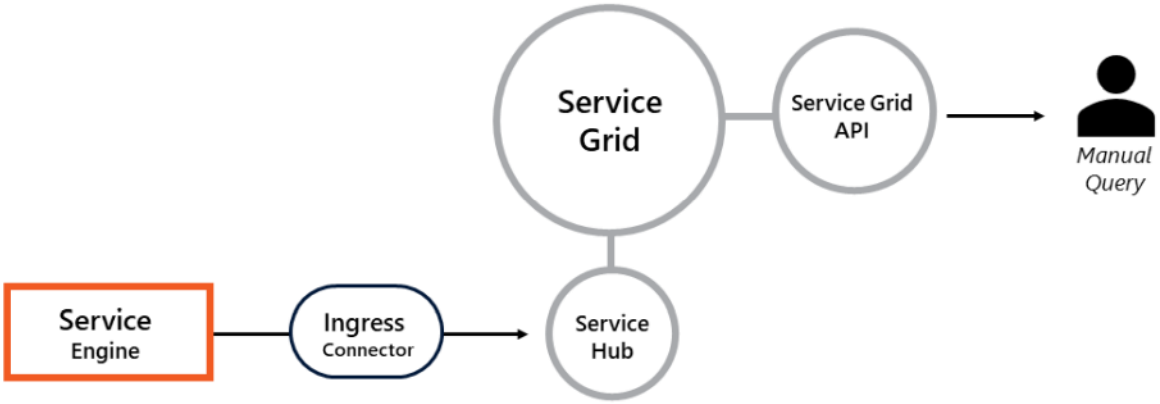
PROJECT SUPPORT

You can receive support for any real project you may have from our customer service team, which you can contact via email at support@copadata.com.

LICENSES AND MODULES

If you find that you need other modules or licenses, our staff will be happy to help you. Email sales@copadata.com.

2 Getting Started Guide (Windows native)



Test environment: Querying of process data of a Service Engine via Service Grid API.

In this guide, you will install and configure a simple use case for Service Grid in a test environment. With the necessary prior knowledge, you can work through this guide in 3 to 4 hours.

INSTALLATION OPTION

This guide only refers to the Service Grid (Windows-native) installation option.

The following applies for Service Grid (Windows native):

- Host operating system is Windows
- Service Grid is installed as a native Windows application

You can find further information and a comparison of all supported Service Grid installation options in the Help.

LEARNING OBJECTIVES

After working through this guide, you can:

- Initialize Service Grid
- Configure a zenon project for data transfer with Service Grid
- Query variable values of the zenon project using the Service Grid API

In doing so, you will have mastered the basic functions of Service Grid in a test environment.

OTHER USE CASES

All supported use cases for Service Grid are documented in the Help.

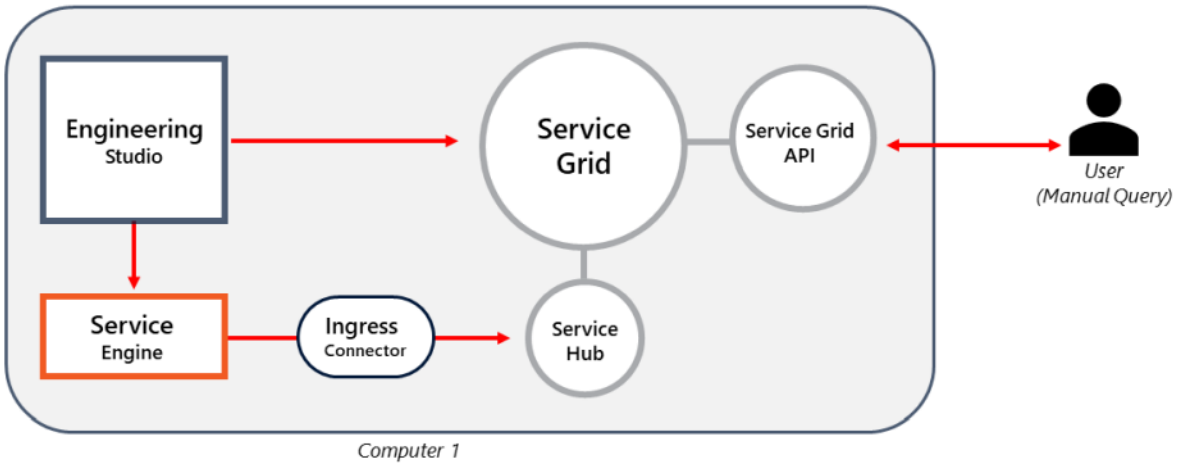
3 Test environment vs. productive environment

The test environment described in this guide is quicker and easier to set up than a typical productive environment.

The basic differences are:

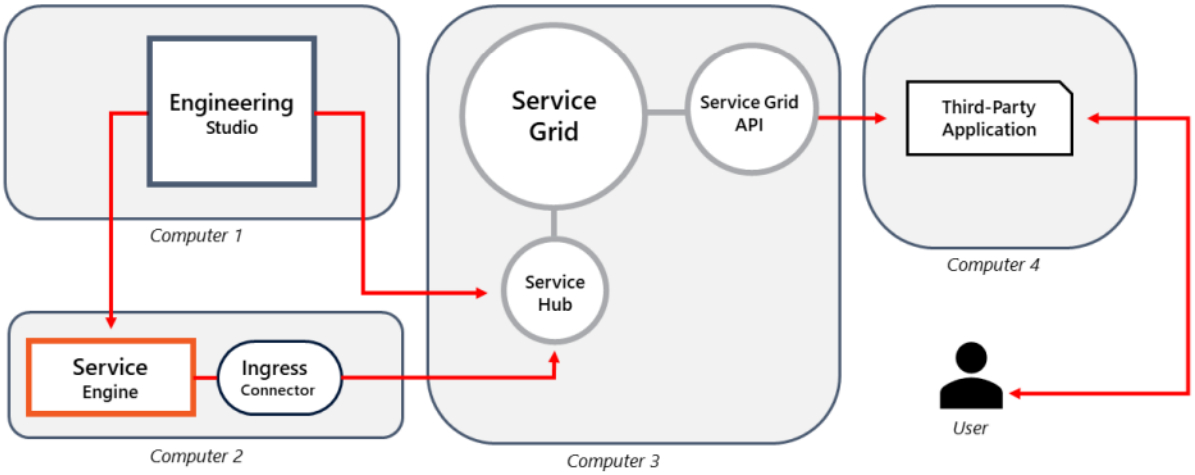
	Test environment	Productive environment
Installation option	▸ Service Grid (Windows native)	▸ Service Grid (Windows native) ▸ Service Grid (Docker on Linux)
Number of computers	▸ 1 computer for Service Grid and all clients	▸ 1 computer for Service Grid ▸ Dedicated computers for clients
Network topology	All applications run on the same computer.	The applications run on different computers. The computers can be distributed over different remote locations.
Passwords	It is possible to use predefined passwords in a protected test environment.	For all logins, it is essential that you assign your own secure passwords.

TEST ENVIRONMENT



Test environment: Service Grid and all clients are installed on the same computer. Service Grid API is queried by the user using a manual query.

PRODUCTIVE ENVIRONMENT



Productive environment: Each application is installed on a dedicated computer. Service Grid API is automatically queried for each third-party application.

4 Necessary prior knowledge

You require prior knowledge of zenon in order to use this guide.

You must know:

- How to create a zenon project
- How to start a project in Service Engine
- How to define variables and modify variable properties

Knowledge in these areas is advantageous (but not required):

- Use of a REST API
- HTTPS certificates and certificate infrastructures

In general, the following applies: You require knowledge of all applications that you would like to connect with each other using Service Grid.

5 Prepare the system

Before you can install Service Grid, the test environment must be prepared properly.

5.1 Test computer

The test computer for Service Grid must meet the following requirements:

1. Sufficient resources for the smooth operation of all installed applications (CPU, RAM, memory)
2. Functioning internet connection
3. No other software may be installed yet on the computer except for the operating system
4. In particular, no zenon applications may be installed yet

Recommendation: For this guide, use a dedicated test computer with a newly setup operating system.

5.2 Test VM

You can install Service Grid both on a physical test computer as well as in a virtual machine (test VM).

The following particular features must be noted when installing in a test VM:

- zenon demo licenses have significantly shorter license periods in a VM than on a physical computer
- The additional virtualization level of the VM can make troubleshooting more difficult

Secure operation of Service Grid is guaranteed both on a test computer as well as in a test VM.

5.3 DNS & network ports

Service Grid is a networked system. The services communicate with one another and with other computers.

The following network addressing is supported:

- Naming resolution: Domain Name System (DNS)
- Hostname: Fully Qualified Domain Name (FQDN)

The use of DNS and FQDN ensures that all services both in LAN and in WAN (internet) can be addressed securely.

These hostnames are explicitly not supported:

- "localhost"
- All hostnames that are not FQDN

Reason: Because the reliable addressing of services is not ensured.

The following applies for network ports:

- All network ports for Service Grid are documented.
- Make sure that these ports are not being used otherwise in your network or are not blocked, for instance, by firewalls.

Note: If required, you can reconfigure network ports.

5.4 Operating sytem and language settings

For the host operating system, you require:

- Windows 10, 64-bit (with the latest updates)

This guide uses English for:

- Windows operating system
- Language settings in the browser
- Service Grid
- All other applications

Recommendation: Configure your test computer accordingly.

5.5 Browser

You need a web browser to access the web interfaces of Service Grid.

The following web browsers are supported:

- Google Chrome
- Mozilla Firefox
- Microsoft Edge
- Apple Safari

Always use the most recent version of the respective browser.

6 Determine configuration values

In this chapter, you will compile all configuration values you need for the initialization and configuration of Service Grid.

Please note the following for working with configuration templates:

1. **System-specific values**: Must always be determined individually for your system (e.g. hostname, project ID). You may not apply the sample values.
2. **Non-system-specific values**: Can be defined by you (e.g. usernames, passwords). In a protected test environment, you can also apply the suggested sample values.

You must always assign your own passwords in productive environments or unprotected test environments.

6.1 Own template file

It is good idea to create your own template file for the configuration. A simple text file will do here.

It has the following advantages:

- You can look up all the configuration values in one place.
- You can apply configuration files using copy & paste.

The configuration template must be protected from unauthorized access.

6.2 Bookmarks for web interfaces

Create boomarks in the browser for the following URLs:

Name	Sample values	Description
Identity Service	https://mycomputer.mydomain.com:9430 System-specific value*	The **Identity Service** web interface allows each user to manage certain settings of their own user account.
Service Grid Studio	https://mycomputer.mydomain.com:9450 System-specific value*	The **Service Grid Studio** interface allows exclusively users with administrator privileges to fully administer Service Grid.

* You must replace mycomputer.mydomain.com in the URLs with the hostname of your computer (on page 12).

6.2.1 Determine hostname

To determine the actual hostname of a Windows computer:

1. Open a Windows command prompt.
2. Execute the following command:
   ping localhost
3. The command line interface shows your computer's actual hostname. This is usually a **Fully Qualified Domain Name (FQDN)**.
4. Examples of actual FQDNs are:
   - *MYCOMPUTER.mydomain.com*
   - *MyComputer.mydomain.com*
   - *mycomputer.myddomain.com*
5. Convert the actual hostname to lowercase letters: *mycomputer.mydomain.com*

You have thus determined the hostname you need for use in Service Grid.

6.3 zenon Project

In the test environment, you use Service Grid API to access variable data in a zenon project.

DETERMINE PROJECT PARAMETERS

You need the following values:

Parameter	Sample value	Description
Project Name	*ZENON10_DEMO*	This project is installed by default with Engineering Studio. You also have the option to use a different project of your choice.
Project ID	***a0f4d8f9-c009-41d5-bc30-457dd92f6a29*** System-specific value: You must determine the project ID (on page 13) yourself.	The unique identification number of your zenon project.
Variable	*ALC_GLOBAL_GROUND*	This variable is contained in the *ZENON10_DEMO* project. You also have the option to use a different variable of your choice.

Note: You can only determine these parameters once the zenon installation has been completed.

6.3.1 Determine project ID

The Project ID is individual for each zenon project. It is an automatically generated ID.

It is based on the following schema:

a0f4d8f9-c009-41d5-bc30-457dd92f6a29

To determine the project ID:

1. In Engineering Studio, select the demo project of zenon.
2. Select the main project node in the project.
3. Press the *Strg+Alt+E* keyboard shortcut.
   The file path of your zenon project is thus opened on your hard drive.
4. Select the superordinate folder name.
   Reason: The Project ID is identical to the superordinate folder name.
5. Open the context menu by right clicking on *Rename* with the mouse.
6. You can then copy the Project ID to the clipboard and use it again as you wish.

You have thus determined your Project ID. You can use this ID to uniquely address the project using the Service Grid API.

7 Installation

For the installation of Service Grid 10.4, you must strictly follow the order of individual installation steps provided in this guide. If you deviate from this order, it can lead to malfunctions.

The right order of installation is:

1. Installation of Service Grid 10.4 (Windows native)
2. Installation of zenon 10 platform setup
3. Installation of zenon 10 build update.
4. Installation of Service Grid Gateway 10.4

This order of installation ensures that Service Grid 10.4 will function properly.

7.1 Download

You can download all the installation files for Service Grid for free in the download section of the COPA-DATA website. This requires a one-time registration free of charge.

Download the following files:

1. Service Grid 10.4 (Windows native)
2. zenon 10 platform setup
3. Both installers for Service Grid Gateway 10.4:
   - x86 installer
   - x64 installer
4. Service Grid build update

You have thus downloaded all the required files for setup.

7.2 Service Grid 10.4

There is a separate installer for the setup of Service Grid 10.4.

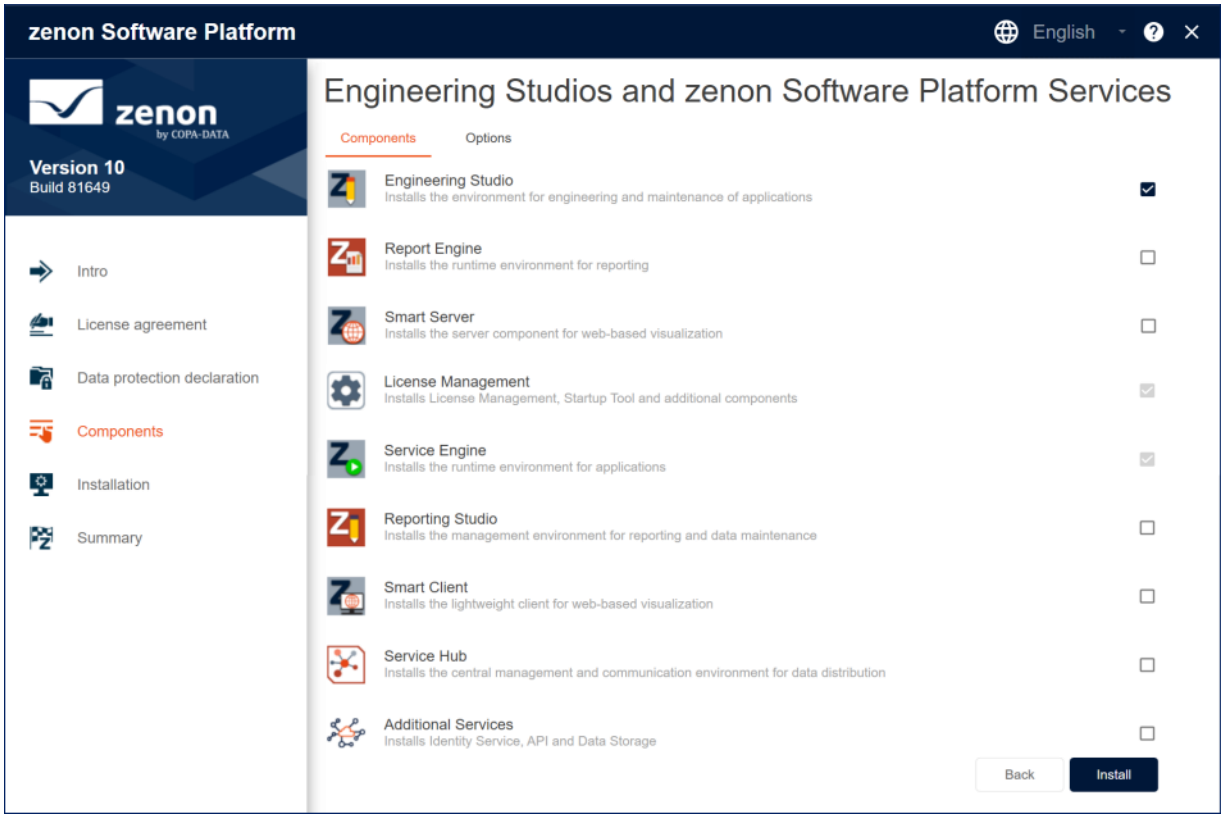
To install < NAME_SERVICE_GRID >:

1. It is absolutely essential to ensure beforehand that no zenon applications are installed on the test computer.
   Reason: Existing zenon applications can cause conflicts with the services of Service Grid.
2. Double-click on the file to start the installer for Service Grid.
3. Click on the **Install** button. Setup will then run through automatically.

4. After installation is successful, close the program window.
   Note: You cannot activate the license or configure Service Grid until later.

You have thus completed the first part of the Service Grid installation.

7.3 zenon platform



The test environment may only be installed with the highlighted components.

For the test environment, you must install zenon applications on the same test computer as Service Grid.

To install zenon:

1. It is absolutely essential to ensure beforehand that Service Grid 10.4 has already been installed (on page 14).
   Note: This is required for a functioning setup.
2. Mount the ISO file for the zenon platform setup.
3. Start the platform setup.
4. Click the **Customize** button in the **Engineering Studios and zenon Software** selection category.

5. Unselect all applications except Engineering Studio.
   Note: Service Engine and required additional applications such as **Licence Management** remain preset (checkbox highlighted in grey).
6. Make sure that only Engineering Studio is selected (blue checkbox).
7. Perform the installation.

You have thus installed zenon on the test computer.

7.3.1 Build update

You use Build update to update the zenon platform.

To install Build update:

1. Make sure beforehand that the setup of the zenon platform (on page 15) has been completed.
   Important: No applications of the platform may be open.
2. Open Build update.
3. Start the installation by clicking the **Install** button.
4. When installation is complete, close the window of the application.

You have thus installed the latest build of zenon.

7.3.2 Service Grid Gateway

Service Grid Gateway ensures compatibility between Service Grid and connected zenon clients.

To install Service Grid Gateway:

1. Make sure beforehand that the build update has been completed (on page 16).
2. Install first the installer for Service Grid Gateway (x86)
3. Then install the installer for Service Grid Gateway (x64)
   Note: You always require both versions (x86 and x64).

You have thus installed Service Grid Gateway.

7.3.3 Activate demo license

You need licenses to run Service Grid. You can use the provided zenon demo license in a test environment.

The following applies for the demo license:

- You can work through the entire test case with the demo license

- You must manually activate the demo license
- The term of the demo license depends on the computer platform selected
  - Physical test computer: *30-day* term
  - Test VM: *1-day* term

To activate the demo license:

1. Open the **zenon Startup Tool**
2. Switch to the **Tools** tab
3. Start the **Licence Manager**
4. Click on **Advanced options...**
5. Click on **Advanced license administation...**
6. Activate the demo license.

A valid activated license is required for the operation of Service Grid.

7.4 Monitor services

All services of Service Grid are automatically started by the operating system.

To monitor the status of the services of Service Grid:

1. Open the command line using the *Windows+R* shortcut.
2. Enter *services.msc*.
3. Confirm by clicking the Enter key. This then opens the console for the administration of services.
4. You can find the services under: *zenon Service Grid <servicename>*
5. In general, all zenon Service Grid services must be running in the *running* status.
   Exception: **Data-Storage** may be in the *exited* status (because it is not used).

Note: After changes to the configuration, it may be necessary in exceptional cases to restart services manually.

8 Create initial user (administrator)

You must create the first user account in **Identity Service** yourself.

To create the initial user:

1. Open the web interface for **Identity Service** in the browser using the bookmark.

2. Confirm the HTTPS certificate warning shown.
   Note: You cannot install the root certificate until later.
3. You receive the following message from **Identity Service**:
   Please create the initial user. This user will have administrator permissions.
4. Assign the User Credentials for the Initial User:
   - "*Administrator*" (sample value for **Username**)
   - "*Changeme123!*" (sample value for **Password**)
     Important: You must assign your own secure **Password** in productive systems or unprotected test systems.
5. Confirm your entries. You are then forwarded to the login for the **Identity Service**.
6. Log in.

You have thus created the initial user account and logged in to the web interface of the **Identity Service**. You are now logged in for all web interfaces in Service Grid.

9 Set up HTTPS relying party trust

Set up a HTTPS relying party trust using the Root Certificate.

A HTTPS relying party trust is needed in Service Grid for:

- All client computers that connect with Service Grid.
- The computer with the Service Grid installation.

Not having a relying party trust has the following consequences:

- Service Grid web interfaces: Display certificate warnings. You can confirm the certificate warning and establish the connection manually.
- Client applications: Do not display certificate warnings. There is no option to establish the connection manually.

You can find further information on certificates and relying party trusts in the Service Grid Help.

INSTALL ROOT CERTIFICATE

You must install the Service Grid Root Certificate on the test computer.

To download the certificate file:

1. Open the **Service Grid Studio** web interface using the bookmark. The HTTPS connection is currently shown as insecure.

2. Confirm the HTTPS certificate warning.
   Note: You cannot install the root certificate until later.
3. Go to the **Hub Controller** menu item.
4. Go to the **Certificates** subpage.
5. Click on the **Download CA Certificate** button.

You have thus saved the certificate file on your local computer.

To install the certificate:

1. Open the Windows **Run** dialog with the *WIN+R* keyboard shortcut.
2. Execute the following command at the command prompt:
   certlm.msc
3. This opens the Management Console (MMC) with the Windows Certificate Manager.
4. Go to this folder:
   Trusted Root Certification Authorities\Certificates.
5. Right-click on the *Certificates* folder. This opens the context menu.
6. Select the following option from the context menu:
   All Tasks\Import...
7. Import the certificate file.

You have thus installed the certificate and set up the HTTPS relying party trust.

CHECK THE HTTPS RELYING PARTY TRUST

To check the HTTPS relying party trust:

1. Restart your browser.
2. Open the web interface of **Service Grid Studio**.
3. The HTTPS connection is shown as secure. You no longer receive any certificate warnings.

You have thus checked the HTTPS relying part trust.

10 Engineering Studio

You must configure Engineering Studio for the data transfer between Service Engine and Service Grid.

10.1 Configure Service Hub

To configure the Service Hub:

1. Start Engineering Studio.
   Note: If Engineering Studio is already running, you must stop and restart it.
2. Select the zenon project.
3. Switch to the **Network** folder in the project properties.
4. Go to the **Service Grid - General** menu.
5. In the **Service Hub** drop-down item, select the entry for the computer on which Service Grid is installed.
   Note: The entry is only visible if a CCB exists for Engineering Studio.
6. Tick the **Execute Service Grid Ingress Connector** checkbox.
   Note: This checkbox is only visible if the connector is licensed.

You have thus configured Engineering Studio for the connection with the **Service Hub**.

10.2 Release variable

Service Engine can exchange data with Service Grid in different ways. The main method of data exchange is variables.

To configure Service Grid access rights for a variable:

1. In Engineering Studio, select the following **variable** in the **project manager**:

   ALC_GLOBAL_GROUND
2. Open the **Properties**of the variable.
3. Go to **Authorization/eSignature**.
4. Go to configure **Service Grid settings**.
5. Change the setting of the **Access permission** to:

   Read-only
   Note: This setting protects the variable against write access via Service Grid

You have thus assigned Service Grid access rights for this variable.

10.3 Starting Service Engine

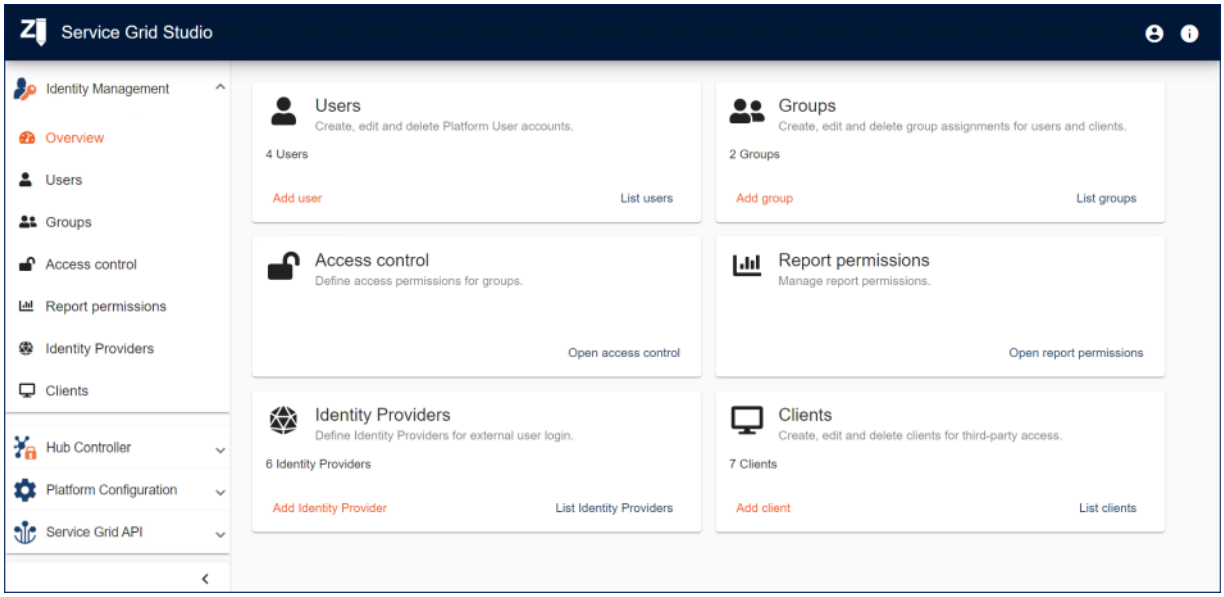
After completing configuration, you can start Service Engine.

To start Service Engine:

1. Save the project with all the changes.
2. Create all Service Engine files.
3. Start Service Engine.

Service Engine is now ready for the data transfer with Service Grid.

11 Identity Management



In Identity Management, you administer users, groups, resources and privileges.

Assign the Administrator user the privilege to access Service Engine via Service Grid.

To do this, the following configurations are necessary:

- You must create the new *Users* user group.
- You must assign the *Users* user group to the already existing *Administrator* user.
- The zenon project is a resource in Service Grid. You must assign this resource to the *Users* user group.
- You must now assign the **Service Grid API – Data Read** role to the resource.

The *Administrator* thus has read access to released variables and variable values in Service Engine via Service Grid API.

11.1 Create group and add users

To create a group:

1. Go to:
   - **Service Grid Studio** web interface
   - **Identity Management** menu entry

- **Groups** submenu

2. Click in the middle column on the **Create Group** button.
3. In the pop-up, enter the following group name: *Users*
4. Click on **Add**.
   The group will then be displayed in the middle column.

You have thus created the *Users* group.

To add a user to the group:

1. Select the *Users* group.
2. Click on the **Add user** button.
3. Select the *Administrator* user.
   Note: This user is displayed by default in the list as *admin admin*.
4. Click on **Add**.

You have thus added the *Administrator* user of the *Users* group.

11.2 Add resource and add role

To add the Service Engine resource to the Users group:

1. Make sure beforehand that Service Engine is running.
2. Open the web interface of **Service Grid Studio**.
3. Go to the **Identity Management** menu item.
4. Open the **Access Control** submenu.
5. Select the *Users* under **Groups**.
6. Click on the **Add Resources** button.
7. Select the project: *ZENON10_DEMO*.
8. Click on the **Add** button.

You have thus added the resource to the user group.

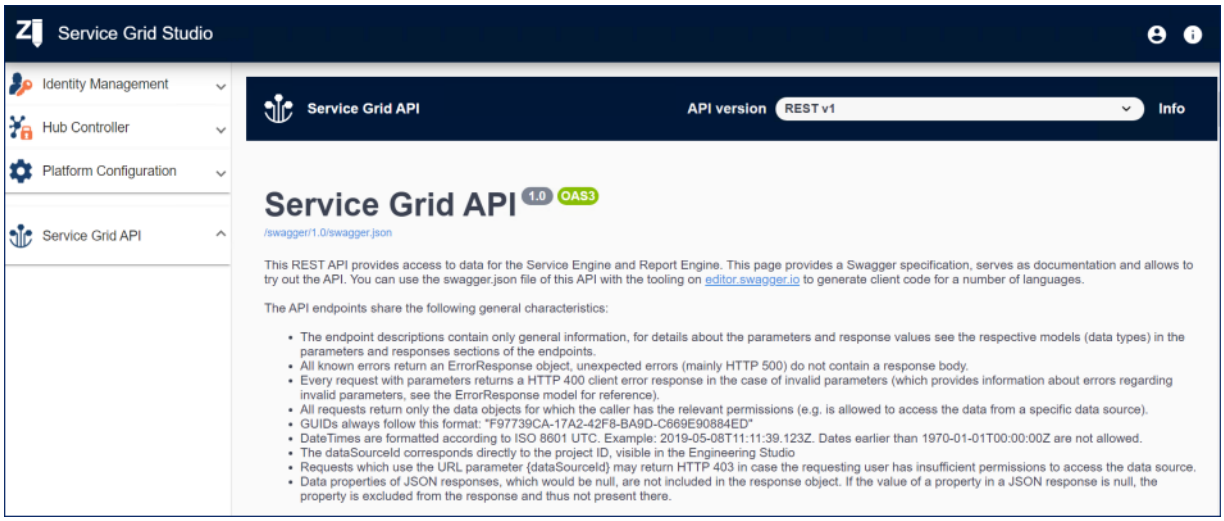
To assign the necessary role to the resource:

1. **Assigned Resources**: Click on the **...** button in the line for your Service Engine project.
2. Select **Manage roles** from the context menu.
3. Select the following permissions: **Service Grid API – Data Read**
4. Click on the **Submit** button.

You have thus assigned the necessary role to the resource.

From now on the *Administrator* user has read access to the released variable in Service Engine via Service Grid API.

12 Service Grid API



You can as a user access the Service Grid API via the web interface.

You can retrieve data from Service Grid via the Service Grid API .

There are basically two options to do this:

- In a test environment, you must access the Service Grid API **manually as the user**. To do this, use the Service Grid Studio web interface.
- In a productive environment, a **client application automatically** accesses the Service Grid API. To do this, you need an accordingly programmed third-party application.

For the test case described in this guide, you need neither a third-party application nor knowledge of API programming. Simply follow the instructions.

12.1 User authorization

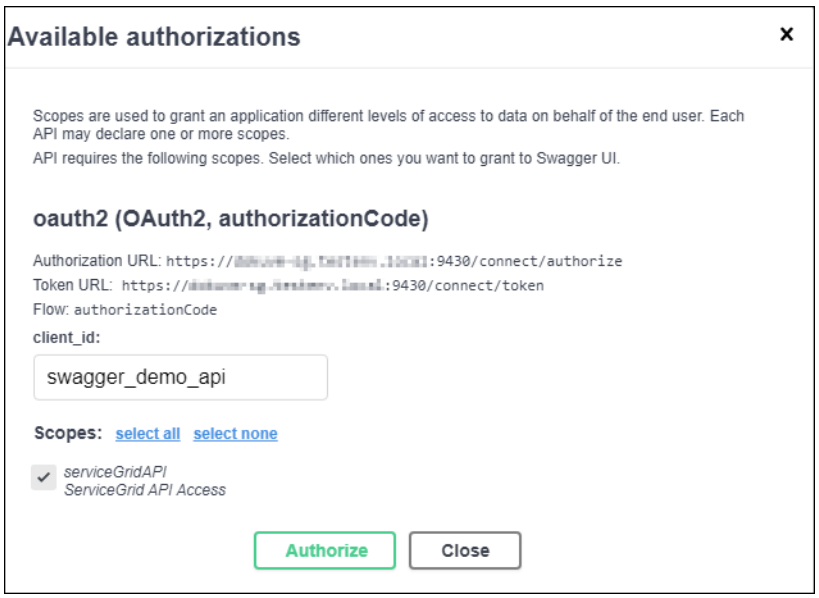
For manual retrieval using the Service Grid API, you must be authorized:

To authorize a user in Service Grid API:

1. Make sure beforehand that Service Engine is running.
2. Open the web interface of **Service Grid Studio**.
3. Go to the **Service Grid API** menu item.

4. Click on the green **Authorize** button. Then a pop-up opens.
   Note: You are not authorized by default. The icon displays an opened lock.
5. Make sure that the value for the **client_id** field is set to *swagger_demo_api*.
6. Activate the following checkbox:
   - **serviceGridAPI**
   - **ServiceGrid API Access**
     Note: You thus determine the scope of the application.
7. Click on the **Authorize** button.
8. After successful authorization, the system shows the message *Authorized*.
9. You can now close the pop-up by clicking the **Close** button. The authorization remains active.
   Note: If you are authorized, you will see the locked icon.

You have thus successfully authorized your user account to the Service Grid API .



Users must authorize themselves in the web interface in order to query Service Grid API.

Hint: Interpret error codes

If the authorization fails, Service Grid API outputs error codes. The error codes are documented in the Help.

12.2 Test 1: Query available project

In this test, you check which data sources Service Grid API can access.

SELECT ENDPOINT

1. Make sure beforehand:
   - That Service Engine is running.
   - That user authorization to the Service Grid API (on page 23) has been completed.
2. Open the web interface of Service Grid Studio.
3. Go to Service Grid API in the menu.
4. Check whether the value *REST v1* is set as **API version** in the header.
5. Go to the **DataSourcesApi** category.
6. Go within the category to the line with the */api/v1/datasources* endpoint.

You must configure this endpoint for the following query.

QUERY PROJECT

1. Click on the blue **Get** button in the line. This expands the endpoint.
2. Click on the **Try it out** button.
3. Click on the **Execute** button.
4. The result of the query shows:
   - **DataSourceId**: "*ZENON10_DEMO*"
5. Copy the *dataSourceId* into a text file. You need this value for the following test.
   Note: It is identical to the project ID of your project (on page 13).

You have thus queried the zenon project available to Service Grid.

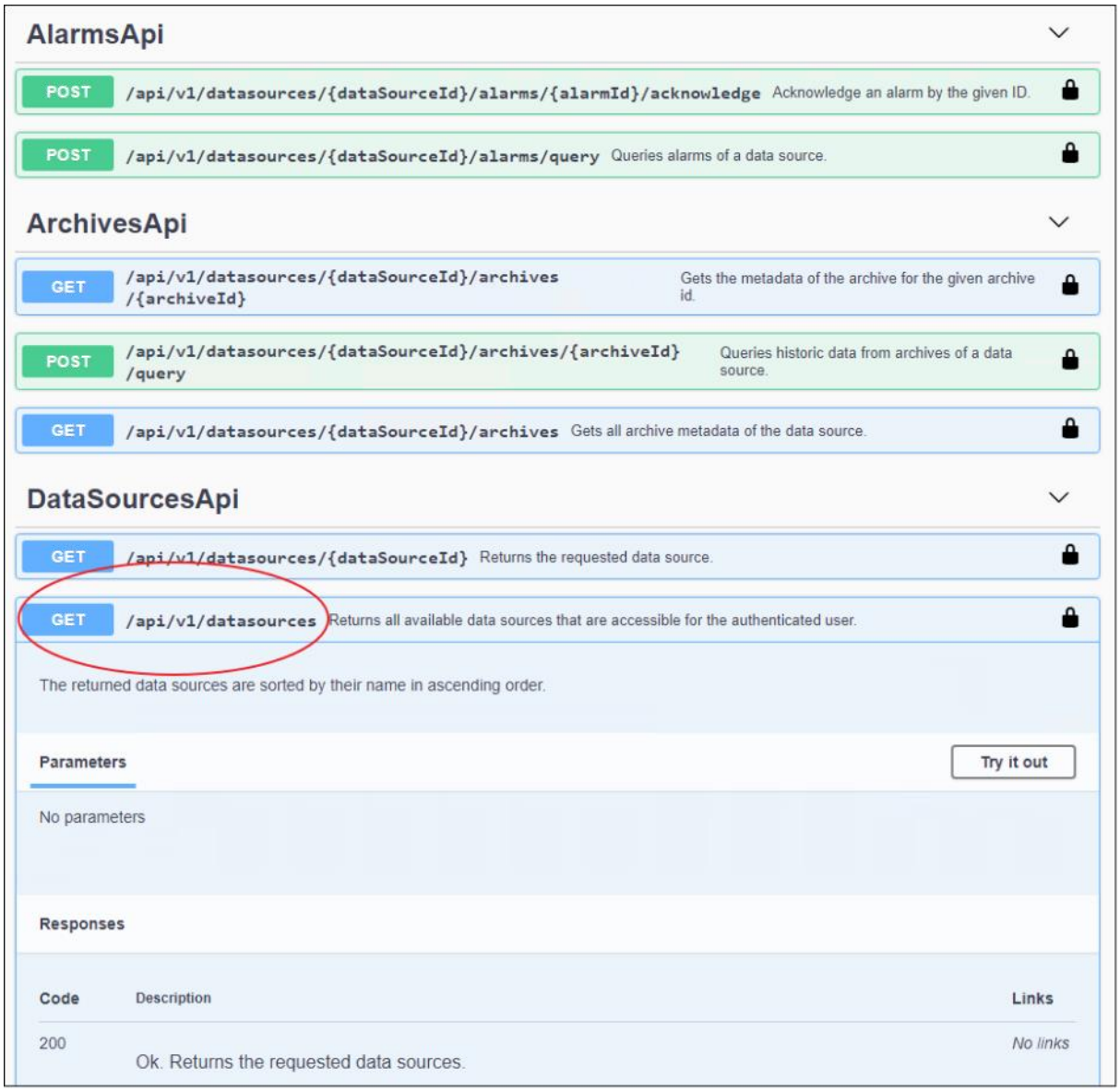
RESULT

The result of the query shows the available project:

Code Sample: Response body

```
{
"dataSources": [
{
"name": "ZENON10_DEMO",
"dataSourceId": "d3058681-c6a8-4b2e-908d-610676fce605",
"state": "Online"
}
]
}
```

SCREENSHOT



You can query available projects using the endpoint circled in red.

12.3 Test 2: Query available variables and variable values

In this test, you access released variables and variable values in the zenon project via Service Grid.

OPEN ENDPOINT

1. Make sure beforehand:
   - That Service Engine is running.

- That user authorization to the Service Grid API (on page 23) has been completed.

2. Open the Service Grid Studio web interface.
3. Go to the **Service Grid API** menu item.
4. Check whether the value *REST v1* is set as **API version** in the header.
5. Go to the **Variables API** category.
6. Go to the the line with the */api/v1/datasources/{dataSourceId}/variables/query}* endpoint.

You must configure the query in this endpoint.

CONFIGURE QUERY

1. Expand the line by clicking on the green **Post** button.
2. Click on the **Try it out** button. You have thus activated the input field for the **dataSourceId**.
3. Enter the **dataSourceId** (identical to the zenon project ID (on page 13)).
   Note: You have thus defined the target project for the query.
4. Change the following points in the **Query specification** (compare also code samples):
   a) *fields*: Replace the predefined "string" with "name", "value".
   You have thus defined the data fields for the query.
   b) *nameFilter*: Replace the predefined "string" with "*".
   You can use this placeholder to query all values unfiltered.
5. Then click on **Execute** to perform the query.
6. The query is acknowledged as follows: "Code 200" "Ok. Returns the queried variables."
7. The "Response body" section shows the query result (see code sample).

The query result shows the released variables and their variable values from the specified zenon project.

QUERY SPECIFICATION

Default Query:

Code Sample:

```
{
"fields": [
"string"
],
"nameFilter": {
"variableNames": [
"string"
]
}}
```

Custom Query (query of variables and variable values):

Code Sample:

```
{
"fields": [
"name", "value"
],
"nameFilter": {
"variableNames": [
"*"
]
}}
```

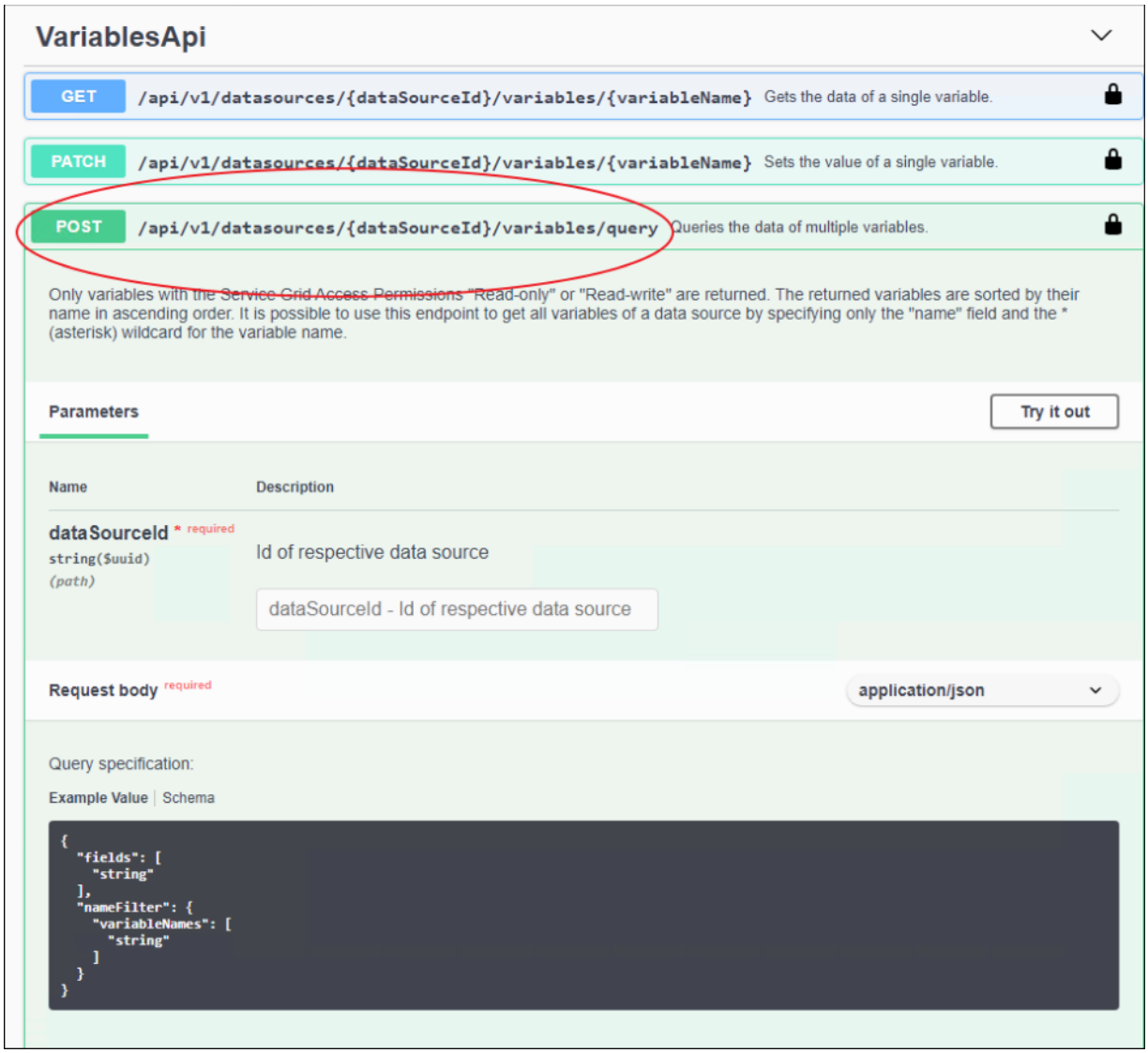
QUERY RESULT

The shared variable and the variable value are in the "Response body" section:

Code Sample:

```
{
"variables": [
{
"name": "ALC_GLOBAL_GROUND",
"value": "1"
}
]
}
```

SCREENSHOT



You must configure the query for this endpoint in the web interface.

13 Congratulations!

You have set up Service Grid and checked its functionality. You have succcessfully completed the Getting Started Guide.

You can find further information and detailed use cases in the Service Grid Help.