Universal-Adapter documentation

INSTALLING AND USING ANYVIZ UNIVERSAL-ADAPTER

VERSION 0.9.2.0

CONTENT

TARGET SPECIFICATIONS

The universal cloud adapter is designed to connect miscellaneous devices to AnyViz. The cloud adapter can be installed on Linux machines or on Windows.

	WIN32	LINUX (POSIX)
X86	X	X
X64	X	X
ARM		X
ARM64		X
MIPS[1]		X

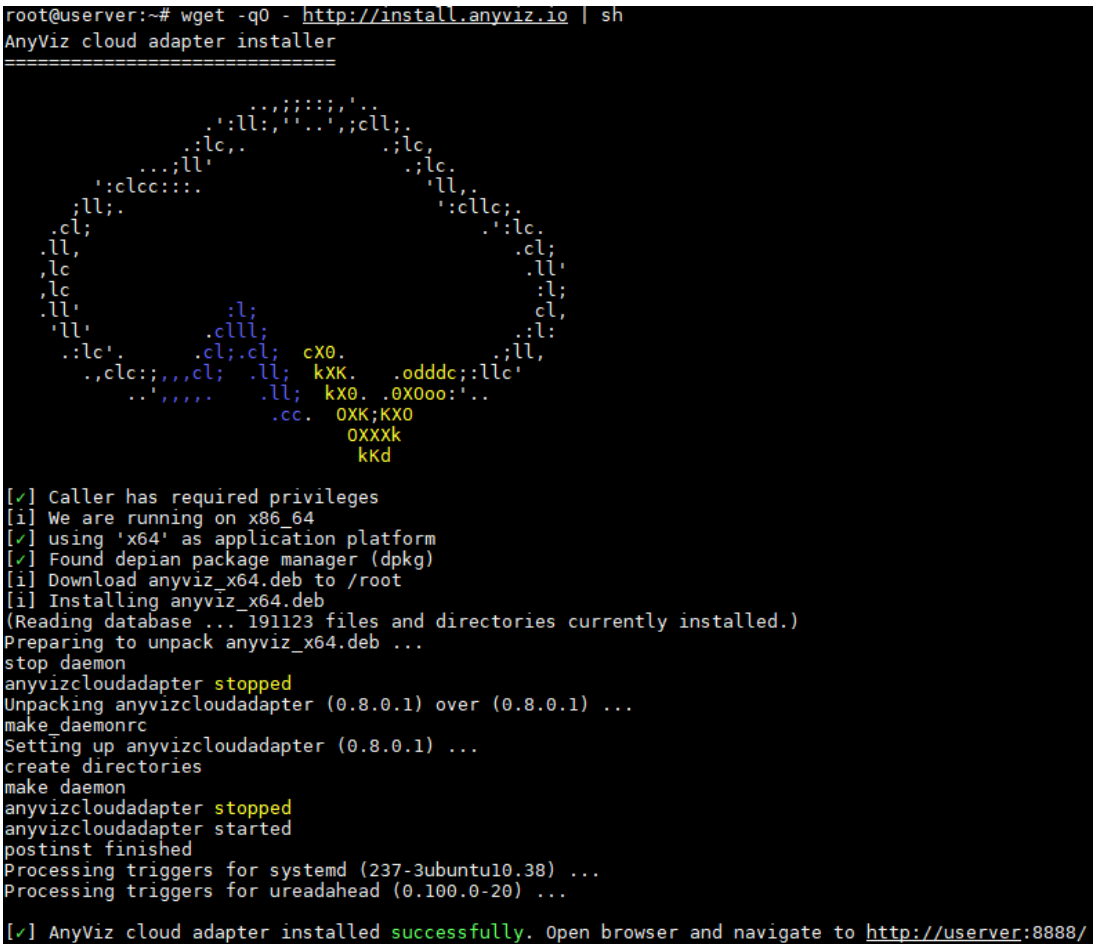
INSTALL CLOUD ADAPTER ON LINUX

We recommend installing AnyViz with the simple installation script. Alternatively, we offer the download links for a manual installation under Manually download package.

EASY GUIDED INSTALLATION

Enter the following command in the shell to perform the installation fully automatically.

```
wget -qO - http://install.anyviz.io | sh
```



[1] Only certain devices are supported

USING SNAP

AnyViz Cloud Adapter is available in Canonical's snap store. Follow these instructions to install the snap on your system.

MANUALLY DOWNLOAD PACKAGE

Alternatively, you can download the cloud adapter as one of the following packages and install it manually.

Debian packages

X86	https://download.anyviz.io/anyviz_x86.deb
X64	https://download.anyviz.io/anyviz_x64.deb
ARM	https://download.anyviz.io/anyviz_ARM.deb
ARM64	https://download.anyviz.io/anyviz_ARM64.deb

Itsy packages

X86	http://download.anyviz.io/anyviz_x86.ipk
X64	http://download.anyviz.io/anyviz_x64.ipk
ARM	http://download.anyviz.io/anyviz_ARM.ipk
ARM64	http://download.anyviz.io/anyviz_ARM64.ipk

The download link is available with http and https. After successful installation, the AnyViz cloud adapter starts automatically.

UNINSTALL CLOUD ADAPTER ON LINUX

For uninstalling AnyViz cloud adapter enter the following command:

VIA INSTALL SCRIPT

```
wget -qO - http://install.anyviz.io | sh -s remove
```

WITH DPKG PACKET MANAGER

```
sudo dpkg -r anyvizcloudadapter
```

WITH IPKG PACKET MANAGER

```
sudo ipkg remove anyvizcloudadapter
```

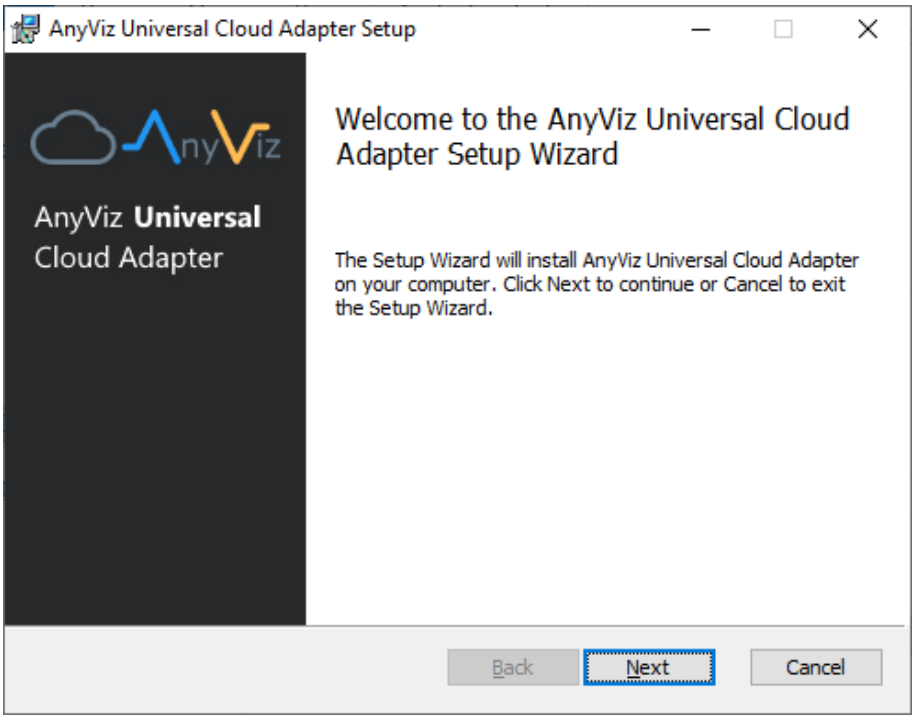
USING CLOUD ADAPTER IN DOCKER CONTAINER

AnyViz Cloud Adapter is also available on Docker Hub. Enter the following command to run AnyViz cloud adapter on a docker system:

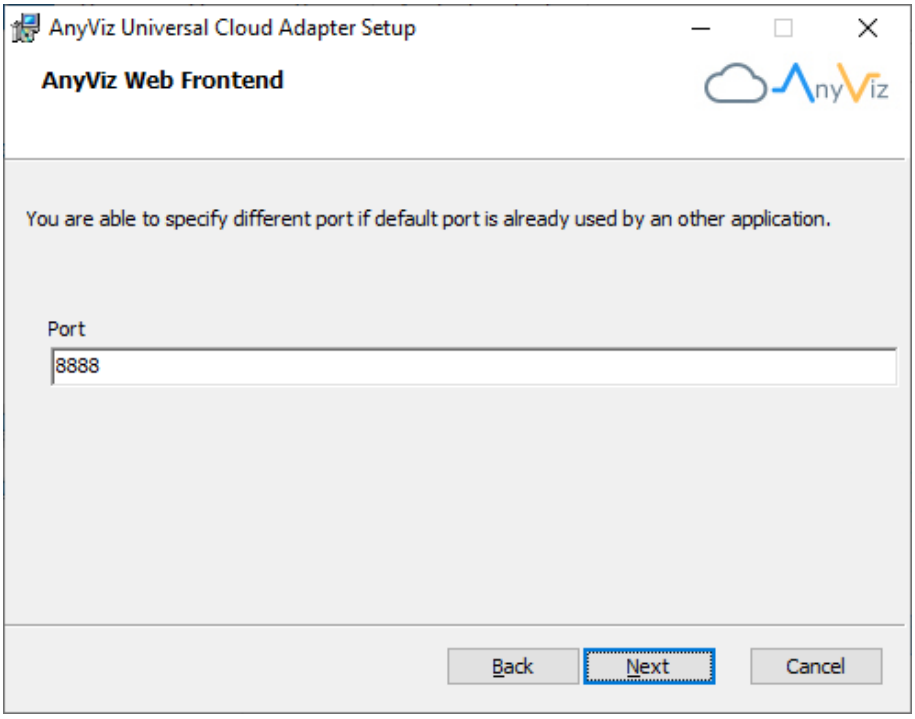
```
docker run -d -p 80:8888 anyviz/cloudadapter
```

INSTALL CLOUD ADAPTER ON WINDOWS

Download Setup file from https://download.anyviz.de/AnyVizUniversalCloudAdapter.msi and follow the instructions of the setup wizard.



The Cloud Adapter has a WEB frontend accessible via port 8888. If this port already exists on your system, you can specify an alternative port here.



INSTALL USING WINGET

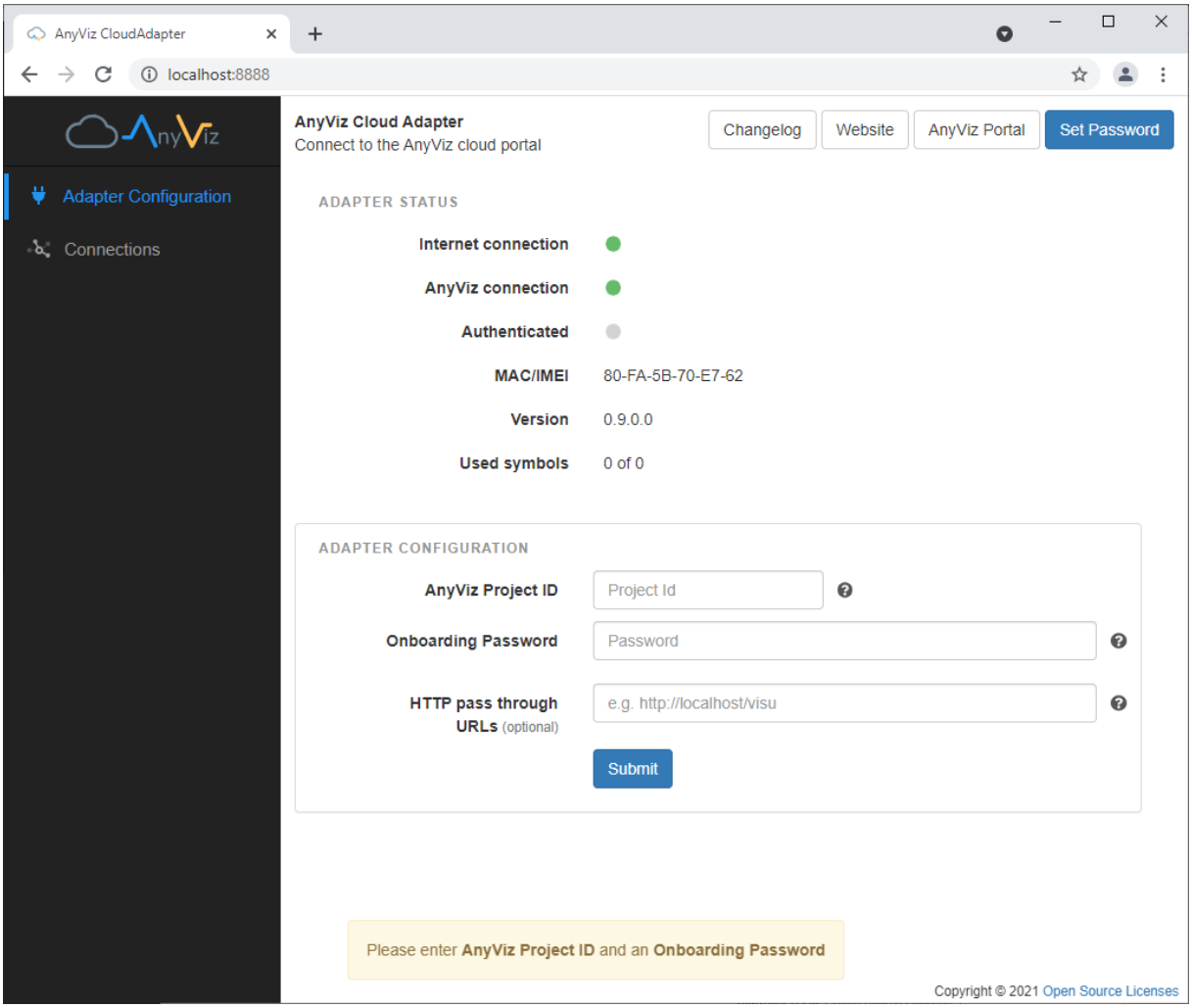
As an alternative to the MSI installer package, you can use the new Windows Package Manager called “winget”. For more information see [AnyViz Cloud Adapter pkg for winget].

```
winget install anyviz
```

CONFIG CLOUD ADAPTER

The cloud adapter comes with a web server. Enter the following URL to get to the configuration interface: http://[host]:8888

Then the following web page will be displayed:



CONFIGURATION PARAMETER

AnyViz Project Id	Project ID generated by AnyViz portal: Open the project settings at the top right of the AnyViz Portal
Onboarding Password	Password for secure Adapter communication: The password must be entered in AnyViz Portal once the connection has been established
HTTP pass through URLs	Speficy URL(s) for pass-through to the server, to display local websites in AnyViz Portal (e.g., http://localhost/visu). Multiple URLs can be separated with a semicolon. Limitations: No https support
Allow incoming VPN	Allow AnyViz Administrators to establish a secure VPN connection to this device (only displayed on Linux devices with TUN driver available)
Allow access to local network	If VPN is enabled, you can allow access to the local network and connect to individual devices (only display if VPN is enabled and iptables is available)

Please click submit after changing configuration parameter.

STATUS DISPLAY

Internet connection	Green if the address of the AnyViz portal can be resolved by the DNS server.
AnyViz connection	Green if the connection to AnyViz portal can be established.
Authenticated	Green if the adapter password matches the password entered in Portal
MAC Address	Address of the network adapter which is used by the cloud adapter
Used endpoints	Gives the number of tags used in AnyViz and the number of symbols which are send to the AnyViz portal

MANAGING CONNECTIONS

The universal cloud Adapter can handle several different connections. Switch to “Connections” and click on "New Connection" for a selection. You can then set up the connection as described below.

CREATE OPC-UA CONNECTION

Name	Enter a name to appear later in the AnyViz portal
Server url	Enter the URL of your OPC-UA server (e.g. opc.tcp://server:48010)
User name	If your OPC-UA-Server requires authentication, enter the username. Otherwise leave blank.
Password	If your OPC-UA-Server requires authentication, enter the password. Otherwise leave blank.

OPC-UA ENCRYPTION

The Universal Cloud Adapter automatically generates an OPC-UA client certificate valid for 20 years. By clicking on “Download client certificate”, the certificate can be fetched and stored in the server as a trusted client certificate.

Supported security policies: ‘Basic128Rsa15’, ‘Basic256’ and ‘Basic256Sha256’

CREATE MODBUS CONNECTION

The Modbus protocol is available as an Ethernet based Modbus TCP connection and as a serial Modbus RTU connection.

Modbus TCP connection

Name	Enter a name to appear later in the AnyViz portal
Hostname	Enter the hostname or IP address of the device
Port	Enter the TCP port number. Default for Modbus is 502
Byte order	Typically, the values of the Modbus registers are placed in Big Endian format. If the values do not appear as expected, try another “Byte order” to retrieve the values in Little Endian (or with swaped bytes) format.

Modbus RTU connection

Name	Enter a name to appear later in the AnyViz portal
Port	The Cloud Adapter lists all serial ports of your system. Select the port to which your Modbus device is connected.
Stop bits	Number of the stop bits (see description of the Modbus device)
Parity	Parity bit (see description of the Modbus device)
Baudrate	Baud rate (see description of the Modbus device)
Byte order	Typically, the values of the Modbus registers are placed in Big Endian format. If the values do not appear as expected, try another “Byte order” to retrieve the values in Little Endian (or with swaped bytes) format.

Create Modbus symbols

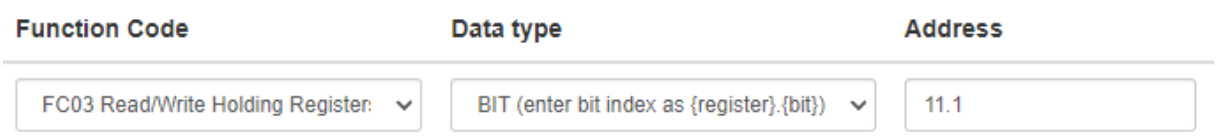
After a connection is configured, click on "New row" to create one or more new symbols. The following parameters can be entered.

Name	Enter a name to appear later in the AnyViz portal
Unit ID	Enter the unit ID (also known as slave ID) of your device
Function Code	The Modbus function code
Data type	Choose a data type from the list
Address	Enter the Modbus register address (zero based). If the registers in your device documentation start at 1, they may be register numbers. In this case, subtract the register number by 1.
Length	Only needed in the case of data type String and specifies the length in bytes.

Note: Some device descriptions are using the *Modicon convention*. If you see the first register on the list having a number 40001, that really tells you register #1, and it is a holding register (function code 3)

Bit addressing

It is possible to read and write individual bits of a register. For this purpose use the special data type "BIT" and specify the address in the format `{register}.{bit}`. Attention: For access to coils and inputs (FC01 and FC02) the data type BOOL must be selected.



CREATE SIEMENS TCP CONNECTION

You can read and write values from Siemens PLCs like (LOGO, S7-300, S7-400, S7-1200 or S7-1500) via the RFC1006 protocol.

Name	Enter a name to appear later in the AnyViz portal
Hostname	Enter the hostname or IP address of the device
Port	Enter the TCP port number of the device (Default is 102)
Rack	Rack number of communication processor (Default is 0)
Slot	Slot number of communication process (Mostly 0 or 2)

Now click on "New row" to create one or more new symbols. The following parameters can be entered.

Name	Enter a name to appear later in the AnyViz portal
Area	Choose a supported area from the list
DB	DB-Number (only required if area is DB)
Data type	Choose a data type from the list
Address	Enter the byte address (or bit address if datatype is BIT)

Bit addressing

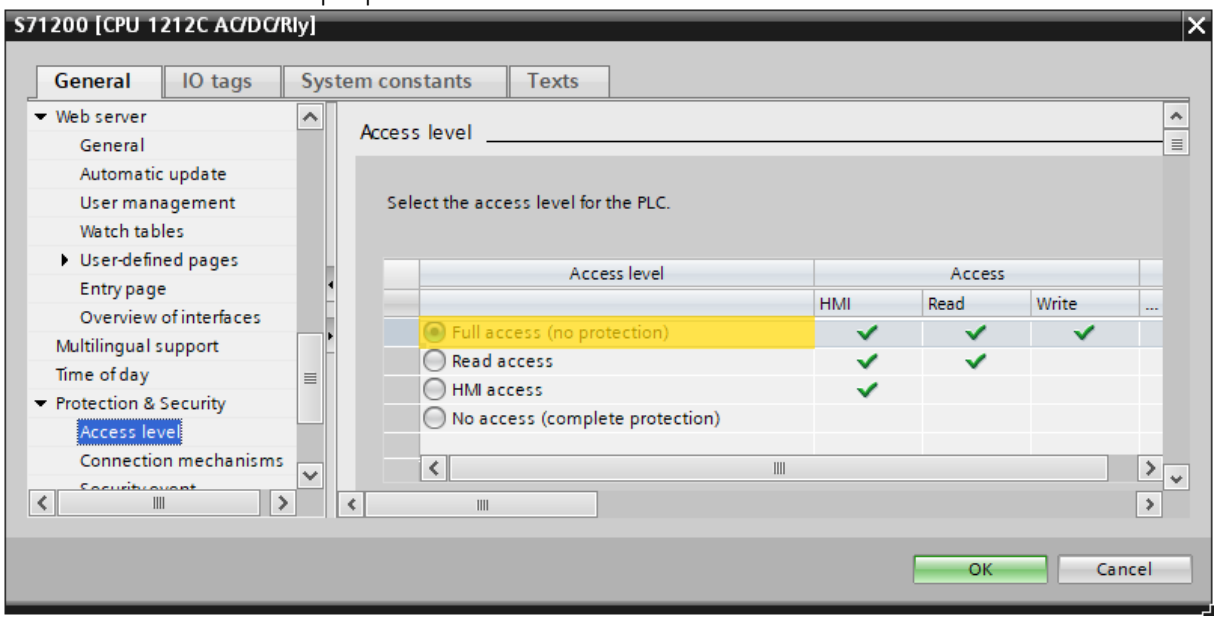
Siemens TCP allows to read or write single bits. In Siemens notation the 21th input bit is labeled with address `[2.4]`, which means bit 4 of byte 2. Choose data type `BIT` and enter address `2.4`.

Name	Area	DB	Data type	Address	Value
Input 2.4 (input #21)	Input	0	BIT (enter bit inde	2.4	false

System requirements

To be able to communicate with a Siemens PLC via the RFC1006 protocol, the following settings must be made in the TIA Portal.

Allow Full Access in CPU properties



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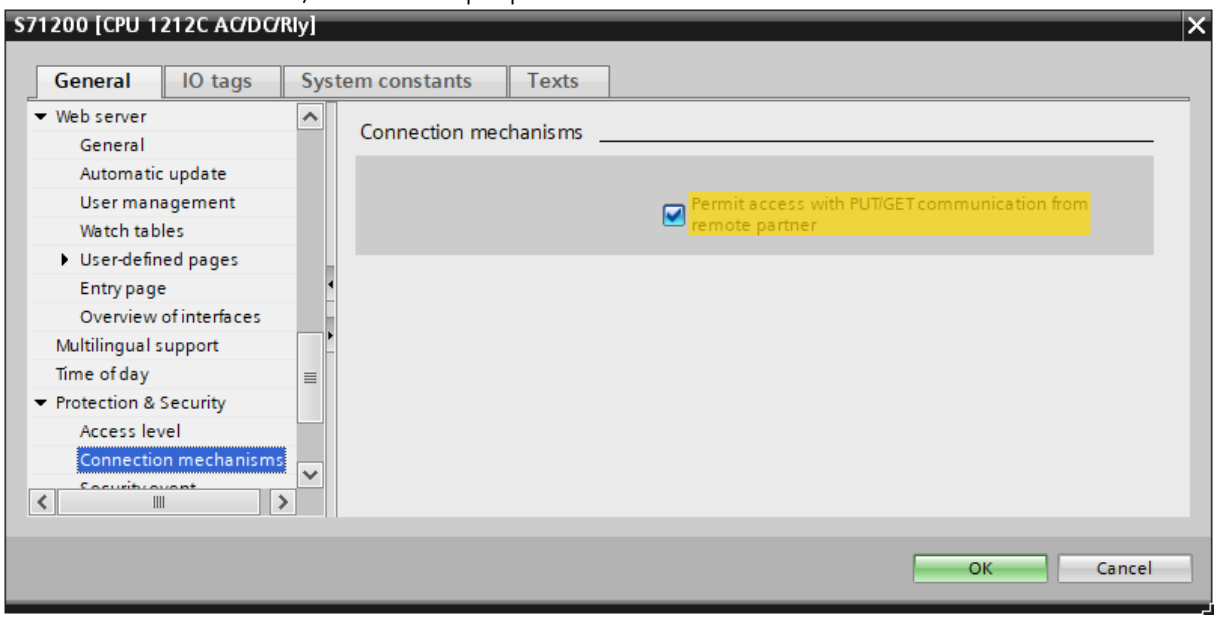
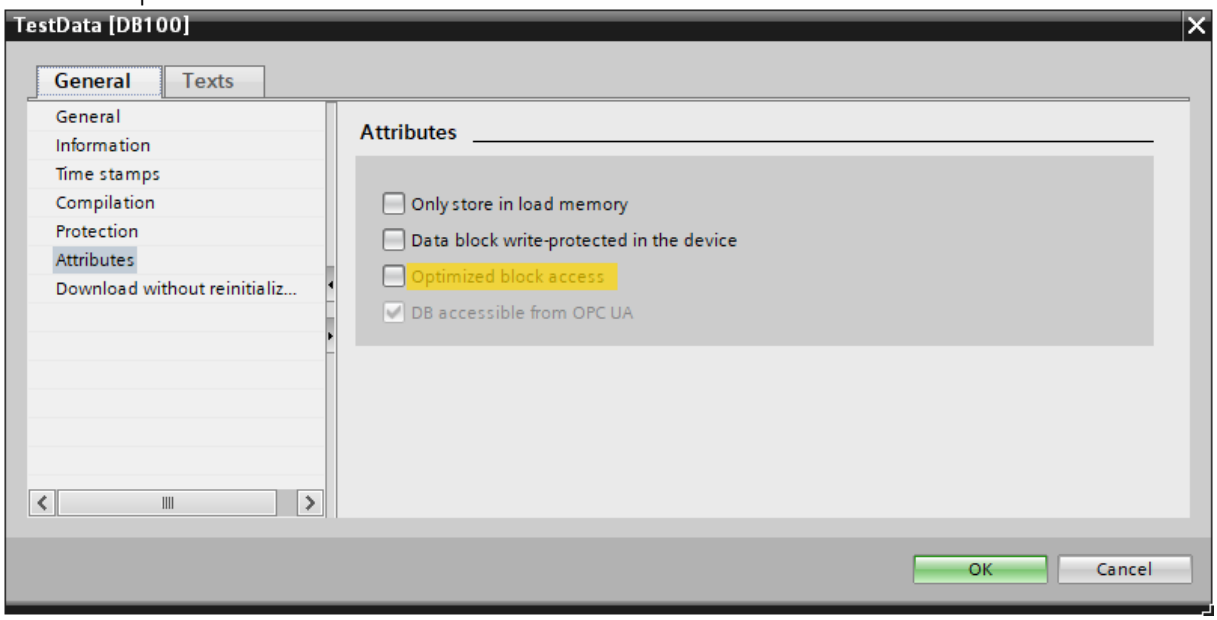
Permit access with PUT/GET in CPU properties



Disable “Optimized block access” in attributes of DBs



CREATE BECKHOFF ADS CONNECTION

TwinCAT ADS protocol is supported by Universal Cloud Adapter. The implementation is tested with TwinCAT 2 and TwinCAT 3 devices.

Name	Enter a name to appear later in the AnyViz portal
AMS NetId	The AMS Net Id is the address of the target PLC in the TwinCAT network. The AMS Net Id consists of 6 bytes and is represented in dot notation (e.g., 192.168.0.1.1.1)
Hostname	Enter IP address or hostname of PLC (e.g., 192.168.0.1)
Port	Port of TwinCAT runtime. These are the default ports of Beckhoff PLCs: • TwinCAT version 2: 801 • TwinCAT version 3: 851
Filter	Optional: If a filter is defined, only those variables of the PLC program are transmitted which have a comment containing the specified text
Local AMS NetId	Optional: Enter AMS NetId of the device where the Cloud Adapter is installed (used if this device has multiple addresses or is behind a NAT). The AMS NetId must match the route of the target device.

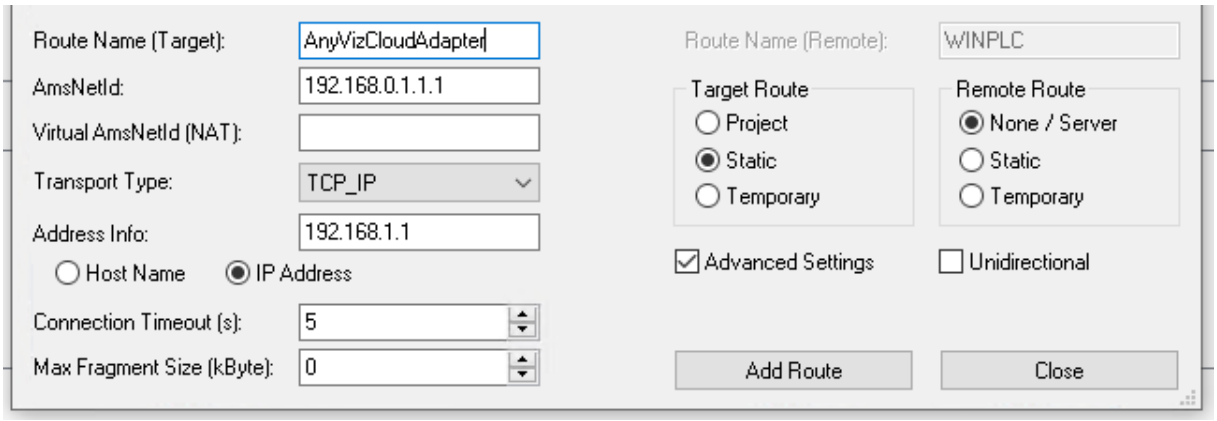
TwinCAT Routing

To enable communication between the cloud adapter and the PLC, a route must be created. Routes can be configured by several possibilities:

- TwinCAT Engineering: Go to the tree item SYSTEM/Routes and add a static route.
- TwinCAT Systray: Open the context menu by right click the TwinCAT systray icon. (not available on Windows CE devices)
    - TwinCAT 2: Go to Properties/AMS Router/Remote Computers
    - TwinCAT 3: Go to Router/Edit routes.
- TcAmsRemoteMgr: Windows CE devices can be configured locally (TC2/TC3). Tool location: /Hard Disk/System/TcAmsRemoteMgr.exe
- IPC Diagnose: Beckhoff IPC's provide a web interface for configuration (more information)

Example Routing configuration

Assuming the cloud adapter has the IP address "192.168.0.1", a static route must be created with the Ams NetId "192.168.0.1.1.1"



CREATE ETHERNET/IP CONNECTION

Use EtherNet/IP protocol to connect PLCs with following types to AnyViz Cloud:

- PLC/5
- SLC 500
- Logix-class
- Micro8xx
- MicroLogix
- ControlLogix/CompactLogix
- OMRON NJ/NX Serie

Name	Enter a name to appear later in the AnyViz portal
Hostname	Enter IP address or hostname of PLC
Path	Enter CIP Path (e.g. "1,0") to define rack and slot. Leave blank on Micro PLCs
CPU	Choose the matching CPU type of the list

Now click on "New row" to create one or more new symbols. The following parameters can be entered.

Name	Name of the PLC variable (must exactly match the name in your PLC program)
Data type	Choose a data type from the list

CREATE BACNET CONNECTION

AnyViz Cloud Adapter is able to browse all BACnet IP devices in your subnet. All supported objects will be displayed in AnyViz.

Name	Enter a name to appear later in the AnyViz portal
Adapter	Choose the network adapter which is connected to your BACnet devices
Instance Number	Enter a unique BACnet instance number that will be assigned to the Cloud Adapter (Default: 269849)

Note that only one BACnet connection per cloud adapter can be created.

Currently the following BACnet objects are supported:

- Analog Input
- Analog Output
- Analog Value
- Binary Input
- Binary Output
- Binary Value
- Multi-state Input
- Multi-state Output

After the click on “Submit” a WHO-IS request is sent on the network. Afterwards the objects for each responding device will be scanned. When the scan completes, the results are available in AnyViz.

CREATE M-BUS CONNECTION

Create a M-Bus connection to browse all M-Bus devices on a serial line. Be aware that in most cases an M-Bus level converter is needed.

Name	Enter a name to appear later in the AnyViz portal
Port	The Cloud Adapter lists all serial ports of your system. Select the port to which your Modbus device is connected.
Stop bits	Number of the stop bits (see description of the Modbus device)
Parity	Parity bit (see description of the Modbus device)
Baudrate	Baud rate (see description of the Modbus device)
Min. primary address	Enter the range of primary addresses used in your environment. Enter a smaller address range to reduce time for scanning devices.
Max. primary address	
Timeout (ms)	Enter the timeout in milliseconds to wait for a device response (Default: 2000ms)

After the click on “Submit” all devices of the given address range will be read out. The values of each device will be displayed in AnyViz once the scan operation is completed. Press Submit again after adding, removing, or changing a device on the line.

CREATE M-BUS OVER TCP CONNECTION

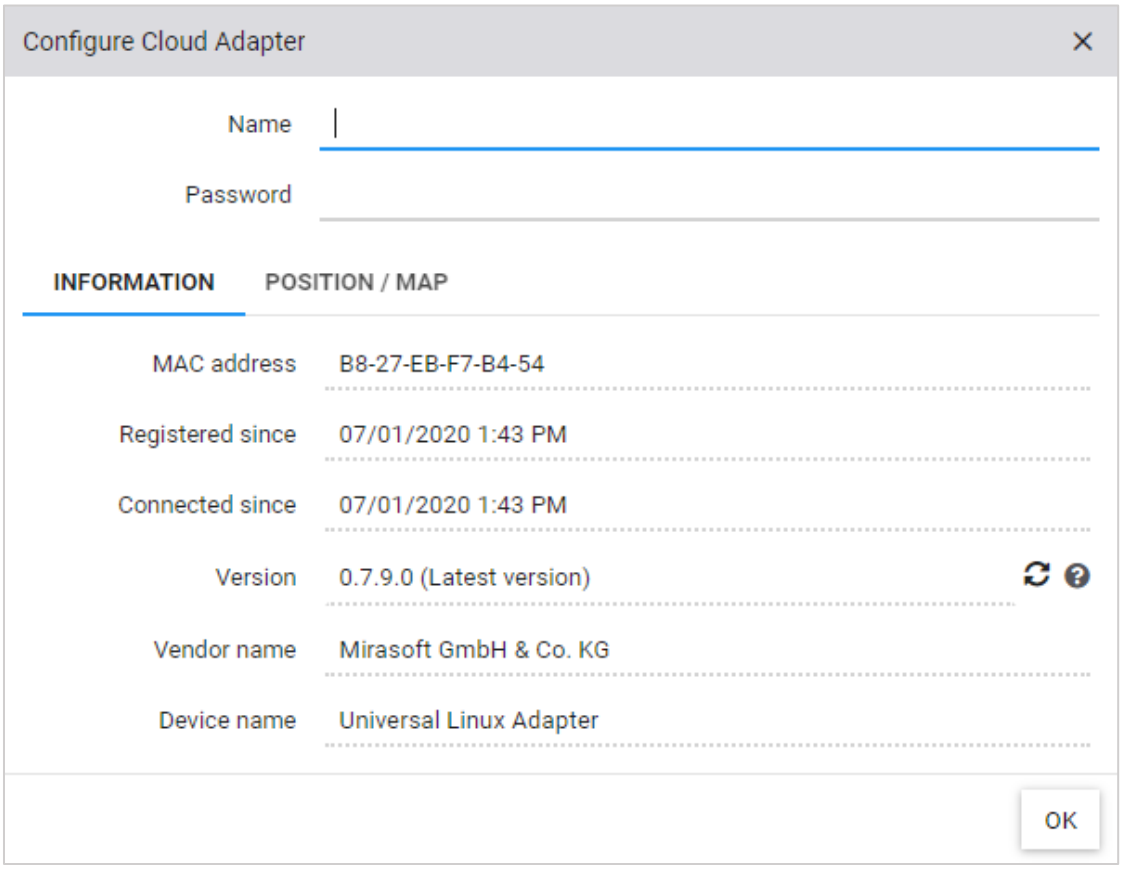
When using an M-Bus level converter with an Ethernet interface, an M-Bus over TCP connection can be created.

Name	Enter a name to appear later in the AnyViz portal
Hostname	Enter the hostname or IP address of the device
Port	Enter the TCP port number.
Min. primary address	Enter the range of primary addresses used in your environment. Enter a smaller address range to reduce time for scanning devices.
Max. primary address	
Timeout (ms)	Enter the timeout in milliseconds to wait for a device response (Default: 2000ms)

After the click on “Submit” all devices of the given address range will be read out. The values of each device will be displayed in AnyViz once the scan operation is completed. Press Submit again after adding, removing, or changing a device on the line.

CONNECTION CONFIRMATION

Once the connection to the AnyViz portal has been established, a new entry will appear in the AnyViz user interface. Move your mouse over the entry and click on the gear symbol. The cloud adapter dialog opens.



For verification, the same password must be entered, which was previously set in the cloud adapter configuration interface. Optionally, a name can be assigned, which will then be used for display.

ANYVIZ VPN

By enabling the “Allow incoming VPN” feature, you can use the universal cloud adapter to remotely access your device. Users who are logged in to the AnyViz Portal as an administrator can connect via the context menu in the cloud adapter Tree.

On some target systems, access to a local network can also be activated. If one of the available networks is selected, access to the entire network is possible via VPN.

A virtual network adapter is created on the cloud adapter system that connects to AnyViz Cloud. Administrators can connect to your device through a separate AnyViz VPN client.

DIAGNOSTICS

In the case of an error, a log file is created. The log file is available at http://[host]:8888/Log.txt.

TROUBLESHOOTING GUIDE

In case of malfunction, use the following instructions.

Internet connection issues

A working internet connection is required for both installation and operation. So first make sure that this works without issues. Check if Internet gateway and DNS server are configured correctly (e.g., by ping google.com) and make sure that outgoing communication to portal.anyviz.io is possible via TCP port 443.

Ensure valid time

If the AnyViz Cloud Adapter does not establish a connection despite a working Internet connection, the time of the device should be checked, as this is required for secure TLS encryption.

WebUI is not available

The Universal Cloud Adapter WebUI is accessible on port 8888 by default. In some cases, this port is already used by another application. On Windows, the port can be changed by reinstalling. On Linux, a different port can be set by the ANYVIZ_UI_PORT enviroment variable.