MQTT documentation

CONNECTING DEVICES WITH THE MQTT PROTOCOL

VERSION 1.4.1

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ABOUT THE MQTT PROTOCOL

MQTT (Message Queuing Telemetry Transport) is an open messaging protocol for machine-to-machine (M2M) communication. It is well suited to provide information to the AnyViz cloud system. Here, the AnyViz portal acts as a broker. All topics provided by the MQTT client can be created and used as data points in AnyViz.

CONNECTION

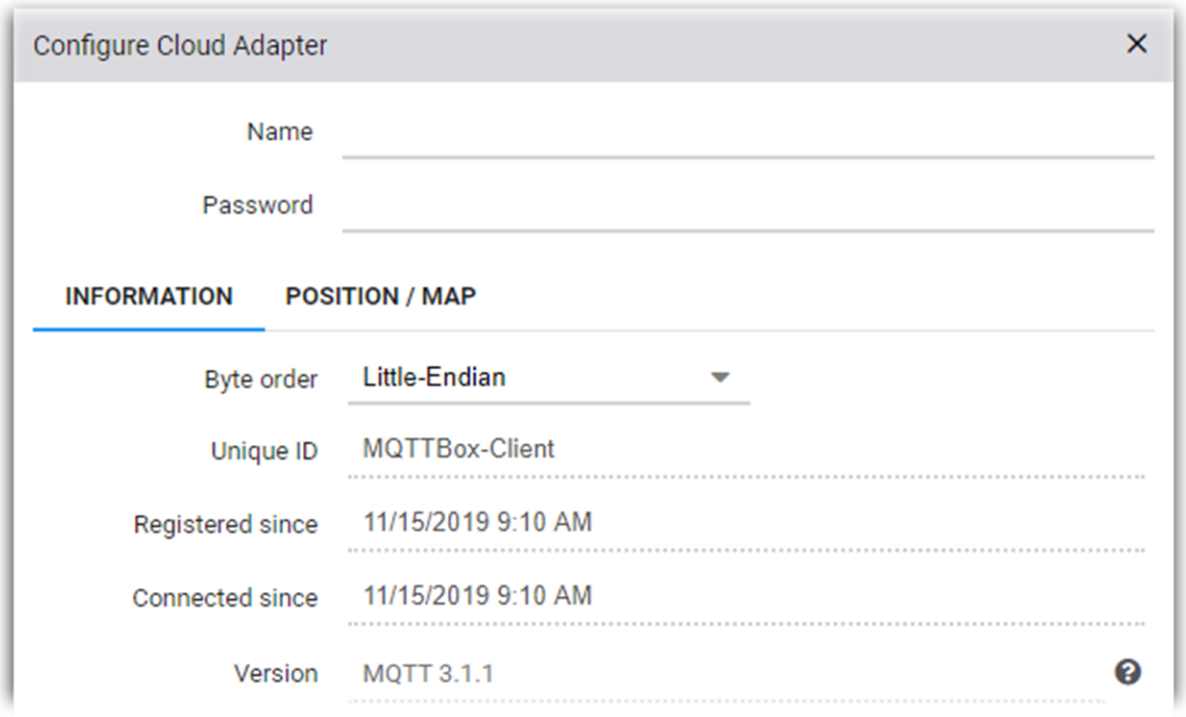
The MQTT client connects directly to the AnyViz portal, which acts as an MQTT broker. To map the MQTT client to the AnyViz project, the AnyViz project number must be passed in the form of the username. A password set by the MQTT client must be confirmed in the AnyViz portal. Subsequently incoming topic messages are accepted by the AnyViz server.

CONNECTION PARAMETERS

Server	portal.anyviz.io The hostname to which the connection is to be established.
Port	8883 (TLS), 1883 (TCP) It is recommended to connect via port 8883 with server certificate validation. The alternative port 1883 is for testing purposes only and is not recommended for lack of encryption.
Client ID	The MQTT client ID can be freely assigned and is used for identification in the AnyViz portal. The MQTT connection is rejected if no client ID is transmitted or the client ID exceeds the maximum length of 250 characters. Because the client ID is used for unique identification within a project, the ID must not change.
Username	The username is used for the assignment of the customer project. For this reason, the project number displayed on the AnyViz portal must be transferred as the username.
Password	Please assign a password for the MQTT connection, which must be confirmed in the AnyViz portal.
Certificate	To encrypt communication over port 8883 and to verify the server host, the public AnyViz certificate is used. Client authentication by certificate is not supported at this time.
Version	3.1.1 The MQTT protocol is implemented in version 3.1.1 in AnyViz. Clients with an older version are not rejected, but compatibility cannot be guaranteed in this case.
Will-Topic	The Will-Topic supported by the MQTT protocol is not processed in AnyViz.

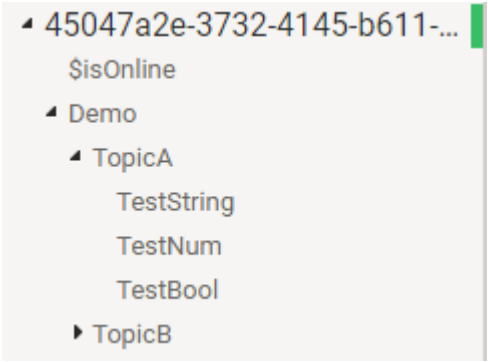
CONNECTION CONFIRMATION

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 MQTT client. Optionally, a name can be assigned, which will then be used for display. The byte order must be set correctly if the topic values are transmitted binary.

If the correct password is entered, the entry changes from yellow to green and all incoming topics are listed below.



TOPIC TRANSMISSION

The transmission of values takes place in the MQTT protocol via so-called topic messages. They consist of a topic name, a byte sequence as a value and a QoS. The topic name is displayed hierarchically in the AnyViz portal. The formatting of the value must be specified in the AnyViz portal. The following methods are supported.

LIMITATIONS

- The maximum message size is limited to 1MB (Header + Topic + Payload)
- The maximum number of topics is limited to 10 times of the number of data points subscribed in the AnyViz service plan (For example, if there are 50 data points subscribed in the AnyViz service plan, the 501th topic is ignored)
- The topic name must not contain any dots

BINARY FORMATTING

The values of a topic can be transferred in raw format. It should be noted that the correct byte order is specified on the Cloud Adapter (see Connection confirmation). When creating a data point, the data type must be specified. The following data types are available:

	Description	Length
Bool	Logical value	1 Byte
Byte	8 bit integer	
SByte	8 bit signed integer	
UInt16	16 bit integer	2 Byte
Int16	16 bit signed integer	
UInt16	32 bit integer	4 Byte
Int32	32 bit signed integer	
Float	32 bit floating point	
UInt64	64 bit integer	8 Byte
Int64	64 bit signed integer	
Double	64 bit floating point	
String	Text with variable length	X Byte

TEXT FORMATTING

Alternatively, the values of one topic can be transmitted as a string value. AnyViz then provides the ability to convert the string to a number or logical state. It should be noted that numbers must be transferred in English format with a dot as a decimal separator. When transmitting strings, the following data types are available:

	Description
String (Text)	Value is used to display text
String (Numeric)	Value is converted to a number
String (Logical)	Value is converted to Bool

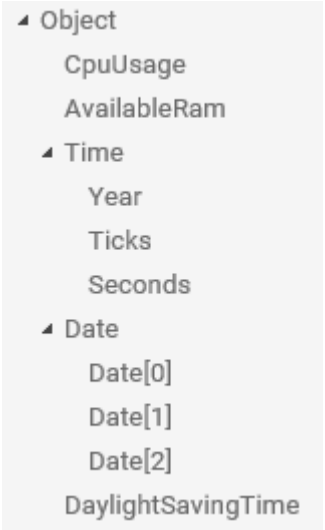
JSON FORMATTING

Very convenient is the transfer of JSON content. A JSON content transferred in UTF8 will automatically be recognized by AnyViz if formatted correctly. All fields of the JSON object are displayed as individual symbols hierarchically in AnyViz. Below is an example:

Transmitted JSON string

```
{
    "TimeString" : "12:05:27",
    "CpuUsage" : 30.81138,
    "AvailableRam" : 5083,
    "Time" : {
        "Year" : 2017,
        "Ticks" : 56919765,
        "Seconds" : 27
    },
    "Date" : [2017, 12, 7],
    "DaylightSavingTime" : false
}
```

Presentation in AnyViz



Thus, each field of a JSON object can be converted into a data point. An indication of the data type is not necessary. However, the following should be noted when transferring the topics in JSON format:

- New fields of a JSON object are only displayed after reconnecting the MQTT client in AnyViz
- If the referenced field is missing in a transferred JSON object, the value will be null and a question mark is displayed as a value
- The JSON string must begin and end with a brace

QUALITY OF SERVICE

AnyViz supports all QoS methods specified in MQTT 3.1.1:

- At most once (0)
- At least once (1)
- Exactly once (2)

PUBLISH / SUBSCRIBE

After a publish message, the topic is displayed as a read-only symbol. After a subscribe message, the topic is shown as a write-only symbol. If a topic is described in both a publish message and a subscribe message, this topic is displayed as a readable and writable symbol. In this way, the values can be read and written.

LIMITATIONS

Not all features of the MQTT protocol are supported at the current time. Features that are not supported:

- Authentication with client certificate: Authentication is based on username and password
- Last will message

COMPARISON

Compared to the AnyViz protocol, the MQTT protocol has a significantly lower functionality. The following list gives an overview:

	MQTT	AnyViz
Receive values	✔	✔
Write values	✔	✔
Buffering when connection is lost		✔
Time synchronization		✔
Routing of On-Premises websites		✔
Encrypted transmission	✔	✔
Low amount of data	✔ [1]	✔
VPN connection		✔

[1] Although the header is very compact, transferring the full topic name will result in more data traffic