



## MQTT protocol for Tango devices

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# Agenda

- ▶ Ic@ms
- ▶ MQTT brief introduction
- ▶ Our contribution
- ▶ Our MQTT server example
- ▶ Conclusions



▶ IC@MS

Logged as: admin@gmail.com

Severity

All ▾

State

All ▾

Active since

## Active alarms

11/17/2020, 9:41:00 PM

Alarm	Severity	State	Active since	Description
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## Not active alarms

Alarm	Severity	State	Active since	Description
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tg_test	WARNING	NORM	Tue, 17 Nov 2020 20:40:55 GMT	TangoTest_alarms. Its hot.
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IC@MS

localhost:4000/history

# IC@MS

Admin Configuration [Logout](#)


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Search [Search](#)

Severity [All](#) State [All](#) Active since

## History

Date/Time	Severity	Alarm	Event
tg_test	WARNING	Mon, 16 Nov 2020 21:14:09 GMT	
tg_test	WARNING	Tue, 17 Nov 2020 07:24:11 GMT	
tg_test	WARNING	Tue, 17 Nov 2020 07:28:05 GMT	

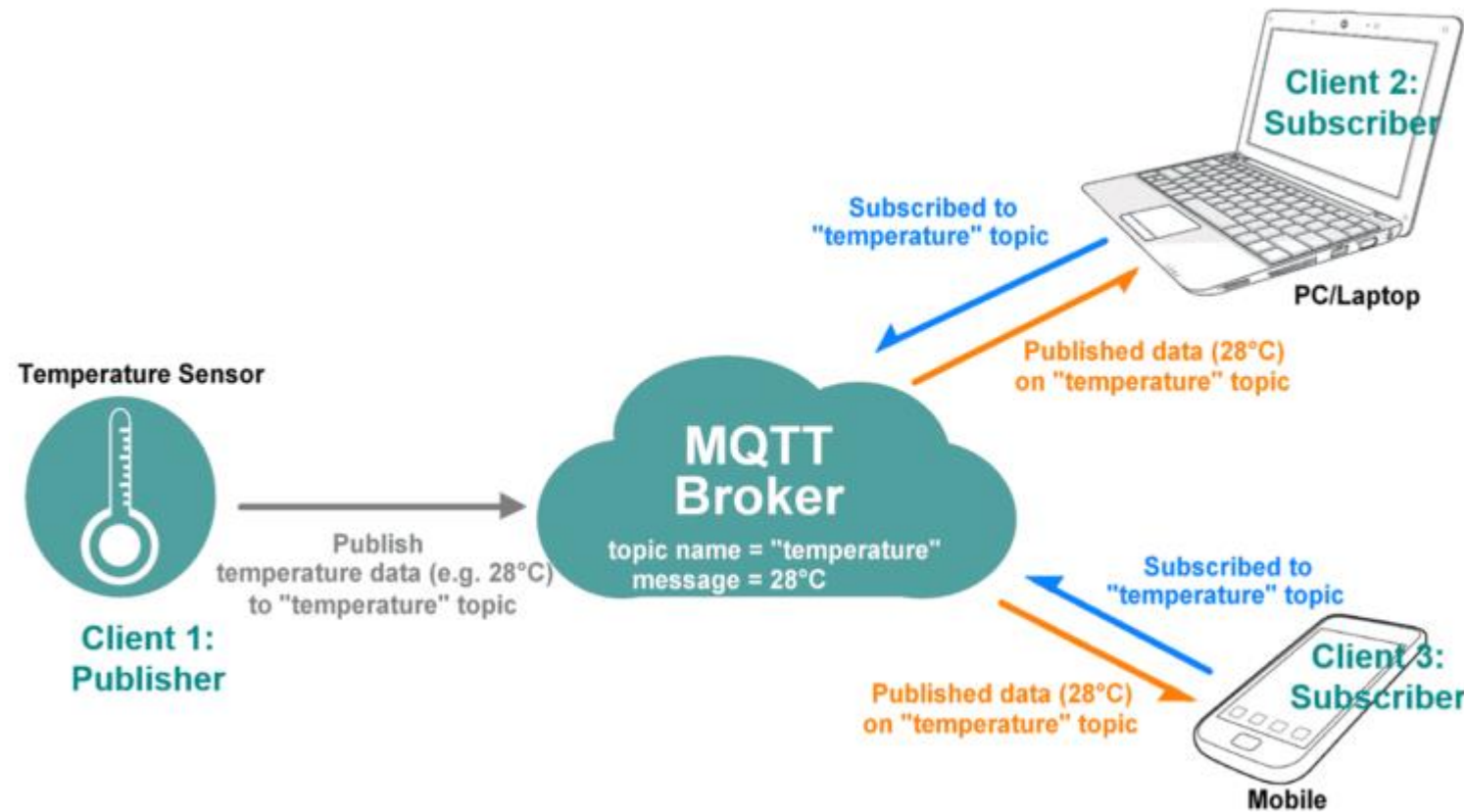


▶ MQTT

# MQTT

**MQTT (Message Queuing Telemetry Transport)** is lightweight, publish-subscribe network protocol. It is capable of transporting messages between different sensors and clients. The protocol usually runs over TCP/IP but there are other that can be used as well. It is mostly designed for connections with remote locations.

# MQTT schema



Source: <https://moxa.elmark.com.pl/2019/09/19/mqtt-iothinx/>



The background features a vibrant green gradient on the right side, transitioning into a dark blue area on the left. Overlaid on the left side are several overlapping, semi-transparent geometric shapes in various shades of green and blue, creating a layered, abstract effect. A thin white line runs diagonally across the lower-left portion of the image.

# ▶ OUR CONTRIBUTION

# Our contribution

- **MQTTAccess** - is a simple device server which provides MQTT topics data via Sub method and allows to publish via Pub method.  
<https://www.tango-controls.org/developers/dsc/ds/3404/>
- **Composer** - creates dynamic attributes and propagate signals from lower level devices. Compatible with HTTP, MQTT and Modbus device server. Composer provides a mechanism that retrieves values from JSON, XML, HTML documents, raw MQTT strings, Modbus register.  
<https://www.tango-controls.org/developers/dsc/ds/3406/>



▶ **OUR MQTT SERVER**

# MQTT server

- Based on:
  - mosquito
  - paho.mqtt
- Auth methods supported:
  - Login + password
  - Token
  - No-auth

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## ▼ Datasources

+ Add Datasource

**Data source name**

**Protocol**

composer01



Composer



access01



HTTP



access02




MQTT



## ▼ Composers

## Composers

+ Add composer

Composer name	Composer attributes	Composer Values
protocols/Composer/composer01		
	Eventqueuesize	0
	Http_temp	7.87
	Memusage	73356.0
	Mqtt_temp	14
	State	ON
	State	ON
Status	The device is in ON state.	

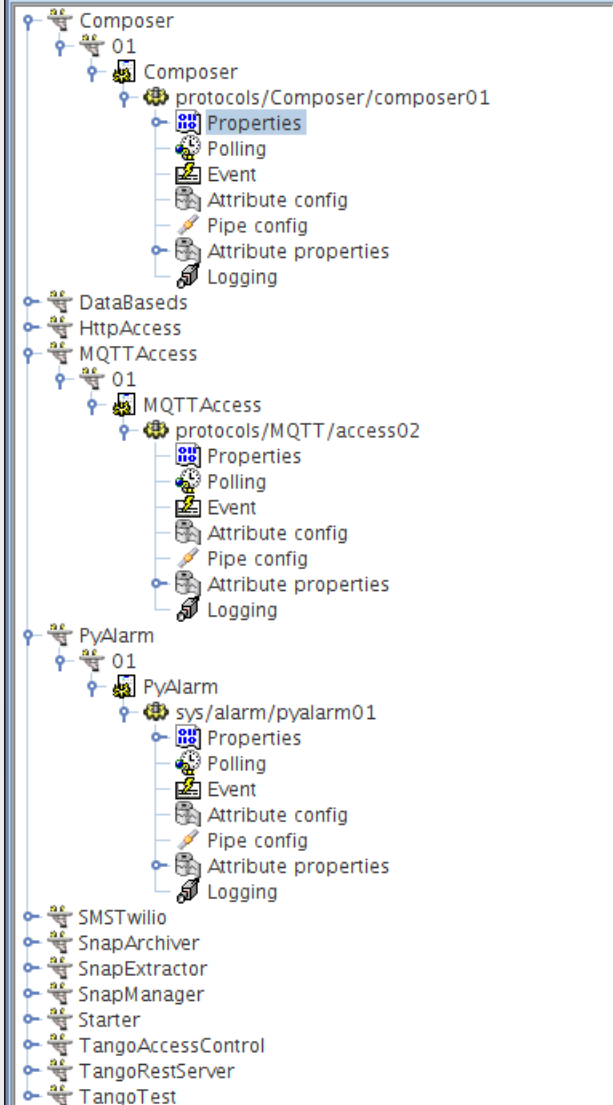


## Alarms

File Edit Tools Filter

Server: / Composer / 01 / Composer / protocols / Composer / composer01 / Properties

Server Device Class Alias Att. Alias Property



Device properties [protocols/Composer/composer01]

Property name	Value
DynamicAttributes	HTTP_temp = DevDouble(extract_from_json(COMM("protocols/HTTP/access01/Get", "?q=Krakow,pradmits=metricmode=json"), MQTT_temp = DevString(READ and extract_from_json(COMM("protocols/MQTT/access02/Sub", "home/temperature/t1"), "/value"))

```

HTTP_temp = DevDouble(extract_from_json(COMM("protocols/HTTP/access01/Get", "?q=Krakow,pradmits=metricmode=json"),
MQTT_temp = DevString(READ and extract_from_json(COMM("protocols/MQTT/access02/Sub", "home/temperature/t1"), "/value"))
MQTT_temp? = DevString(READ and extract_from_json(COMM("protocols/MQTT/access02/Sub", "home/temperature/t1"), "/value"))

```

```

if FORMAT == "json":
    data = {
        "name": NAME,
        "units": "C",
        "value": value,
        "timestamp": str(datetime.now())
    }
    client.publish(f"home/temperature/{NAME}", json.dumps(data))

```

Refresh

Apply

New property

Copy

Delete

The background features a series of overlapping, semi-transparent green geometric shapes, primarily triangles and trapezoids, that create a sense of depth and movement. The colors range from a light, pale green to a vibrant, saturated lime green. The shapes are layered, with some appearing to be in front of others, creating a complex, layered effect. The overall composition is clean and modern, with a focus on geometric forms and color gradients.

**But how to  
define an  
alarm?**



Server Device Class Alias Att. Alias Property

- Composer
  - 01
    - Composer **2**
      - protocols/Composer/composer01
        - Properties
        - Polling
        - Event
        - Attribute config
        - Pipe config
        - Attribute properties
        - Logging
- DataBases
- HttpAccess
- MQTTAccess
  - 01
    - MQTTAccess
      - protocols/MQTT/access02 **1**
        - Properties
        - Polling
        - Event
        - Attribute config
        - Pipe config
        - Attribute properties
        - Logging
- PyAlarm
  - 01
    - PyAlarm
      - sys/alarm/pyalarm01 **3**
        - Properties
        - Polling
        - Event
        - Attribute config
        - Pipe config
        - Attribute properties
        - Logging
- SMSTwilio
- SnapArchiver
- SnapExtractor
- SnapManager
- Starter
- TangoAccessControl
- TangoRestServer
- TangoTest

Device properties [sys/ alarm/ pyalarm01]

Property name	Value
AlarmDescriptions	tg_test:TangoTest_alarm_Its_hot
AlarmList	tg_test:(protocols/composer/composer01/MQTT_temp > 10.0)
AlarmReceivers	tg_test:icams_notify@s2innovation.com
AlarmSeverities	tg_test:WARNING
CreateNewContexts	True
Enabled	20
FromAddress	icams_notify@s2innovation.com
MailDashRoption	icams_notify@s2innovation.com -S smtp=postfix
MailMethod	smtp:postfix
SMSConfig	smslib:1
StartupDelay	20
VersionNumber	7.5.1
_SubDevices	icams-containers_tango-databases_1:10000/sys/database/2 sys/database/2 sys/snap/manager01 sys/snap/archiver01 sys/snap/extractor01

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Severity

All ▾

State

All ▾

Active since

## Active alarms

11/17/2020, 9:58:00 PM

Alarm	Severity	State	Active since	Description
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tg_test	WARNING	UNACK	Tue, 17 Nov 2020 20:54:32 GMT	TangoTest_alarms. Its hot.
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## Not active alarms

Alarm	Severity	State	Active since	Description
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The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the left and right sides of the frame, leaving a large white central area. The shapes are layered, creating a sense of depth and movement.

Thanks