REPORT

BACKGROUND

The MQTT protocol defines two types of network entities: a message broker and a number of clients. An MQTT broker is a server that receives all messages from the clients and then routes the messages to the appropriate destination clients. An MQTT client is any device (from a micro controller up to a fully-fledged server) that runs an MQTT library and connects to an MQTT broker over a network.

Information is organized in a hierarchy of topics. When a publisher has a new item of data to distribute, it sends a control message with the data to the connected broker. The broker then distributes the information to any clients that have subscribed to that topic. The publisher does not need to have any data on the number or locations of subscribers, and subscribers, in turn, do not have to be configured with any data about the publishers.

If a broker receives a message on a topic for which there are no current subscribers, the broker discards the message unless the publisher of the message designated the message as a retained message. A retained message is a normal MQTT message with the retained flag set to true. The broker stores the last retained message and the corresponding QoS for the selected topic. Each client that subscribes to a topic pattern that matches the topic of the retained message receives the retained message immediately after they subscribe. The broker stores only one retained message per topic.[[18]](https://en.wikipedia.org/wiki/MQTT#cite_note-MQTT_retained_messages-18) This allows new subscribers to a topic to receive the most current value rather than waiting for the next update from a publisher.

When a publishing client first connects to the broker, it can set up a default message to be sent to subscribers if the broker detects that the publishing client has unexpectedly disconnected from the broker.

Clients only interact with a broker, but a system may contain several broker servers that exchange data based on their current subscribers' topics.

A minimal MQTT control message can be as little as two bytes of data. A control message can carry nearly 256 megabytes of data if needed. There are fourteen defined message types used to connect and disconnect a client from a broker, to publish data, to acknowledge receipt of data, and to supervise the connection between client and server.

MQTT relies on the TCP protocol for data transmission. A variant, MQTT-SN, is used over other transports such as UDP or Bluetooth.

MQTT sends connection credentials in plain text format and does not include any measures for security or authentication. This can be provided by using TLS to encrypt and protect the transferred information against interception, modification or forgery.

The default unencrypted MQTT port is 1883. The encrypted port is 8883.

INSTALLATION PROCEDURE

CLIENT

sudo apt-get install python3-pip

pip3 install paho-mqtt      # If not Working Follow below Three Steps:

        OR

    tar -xvzf paho-mqtt-1.4.0.tar.gz

    chmod +x setup.py

    sudo python3 setup.py install

sudo apt-get install python3-tk

To run broker:

mosquitto -p 8008

SERVER

sudo apt-get install python3-pip

pip3 install paho-mqtt      # If not Working Follow below Three Steps:

        OR

    tar -xvzf paho-mqtt-1.4.0.tar.gz

    chmod +x setup.py

    sudo python3 setup.py install

sudo apt-get install python3-tk

To run broker:

mosquitto -p 8008

REFERENCES

1. [*"MQTT Version 5.0"*](https://docs.oasis-open.org/mqtt/mqtt/v5.0/mqtt-v5.0.html)*.*[*OASIS*](https://en.wikipedia.org/wiki/OASIS_(organization))*. 2019-03-07. Retrieved 2020-12-15.*
2. ^ [Jump up to:***a***](https://en.wikipedia.org/wiki/MQTT#cite_ref-tc_charter_2-0) [***b***](https://en.wikipedia.org/wiki/MQTT#cite_ref-tc_charter_2-1) [***c***](https://en.wikipedia.org/wiki/MQTT#cite_ref-tc_charter_2-2) [*"OASIS Message Queuing Telemetry Transport (MQTT) Technical Committee Charter"*](https://www.oasis-open.org/committees/mqtt/charter.php)*. OASIS. Retrieved 2020-12-15.*
3. [**^**](https://en.wikipedia.org/wiki/MQTT#cite_ref-mqttsn_sc_3-0) [*"MQTT SN Subcommittee"*](https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=mqtt-sn)*. OASIS. Retrieved 2020-12-15.*
4. [**^**](https://en.wikipedia.org/wiki/MQTT#cite_ref-4) [*"10th birthday party"*](https://web.archive.org/web/20150315025826/https:/mqtt.org/2009/07/10th-birthday-party)*. MQTT.org. July 2009. Archived from*[*the original*](http://mqtt.org/2009/07/10th-birthday-party)*on March 15, 2015. Retrieved April 25, 2015.*
5. [**^**](https://en.wikipedia.org/wiki/MQTT#cite_ref-5) [*"Transcript of IBM podcast"*](https://www.ibm.com/podcasts/software/websphere/connectivity/piper_diaz_nipper_mq_tt_11182011.pdf)*(PDF). IBM.com. November 2011. Retrieved January 7, 2021.*
6. [**^**](https://en.wikipedia.org/wiki/MQTT#cite_ref-6) [*"Getting Started with MQTT"*](https://www.hivemq.com/blog/how-to-get-started-with-mqtt/)*. HiveMQ. 2020-04-24.*
7. ^ [Jump up to:***a***](https://en.wikipedia.org/wiki/MQTT#cite_ref-:0_7-0) [***b***](https://en.wikipedia.org/wiki/MQTT#cite_ref-:0_7-1) *Team, The HiveMQ.*[*"Introducing the MQTT Protocol - MQTT Essentials: Part 1"*](https://www.hivemq.com/blog/mqtt-essentials-part-1-introducing-mqtt/)*. www.hivemq.com. Retrieved 2021-09-26.*
8. [**^**](https://en.wikipedia.org/wiki/MQTT#cite_ref-8) [*"MQTT v3.1 and MQTT v3.1.1 Differences"*](https://www.oasis-open.org/committees/document.php?document_id=55095&wg_abbrev=mqtt)*. OASIS Message Queuing Telemetry Transport (MQTT) TC. 12 February 2015. Retrieved 19 August 2021.*
9. [**^**](https://en.wikipedia.org/wiki/MQTT#cite_ref-mqtt31_spec_9-0) [*"MQTT V3.1 Protocol Specification"*](https://public.dhe.ibm.com/software/dw/webservices/ws-mqtt/mqtt-v3r1.html)*. Eurotech, International Business Machines Corporation (IBM). 2010. Retrieved 2020-12-15.*
10. [**^**](https://en.wikipedia.org/wiki/MQTT#cite_ref-10) [*"OASIS MQTT Technical Committee Minutes of for the meeting of Thursday, 25th April 2013 Teleconference"*](https://www.oasis-open.org/committees/download.php/49028/OASIS_MQTT_TC_minutes_25042013.pdf)*(PDF).*
11. [**^**](https://en.wikipedia.org/wiki/MQTT#cite_ref-mqtt311_spec_11-0) [*"MQTT Version 3.1.1"*](http://docs.oasis-open.org/mqtt/mqtt/v3.1.1/os/mqtt-v3.1.1-os.html)*. 2014-10-29. Retrieved 2020-12-16.*
12. [**^**](https://en.wikipedia.org/wiki/MQTT#cite_ref-12) [*"6 facts why it's worth upgrading to the brand new MQTT 3.1.1 version"*](https://www.hivemq.com/blog/6-facts-why-its-worth-upgrading-to-mqtt-3-1-1/)*. 2014-10-30. Retrieved 2020-12-16.*