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Message Brokers and MQTT

A message broker is an inter-application program module that allows applications and services to communicate and exchange information. It translates messages between formal messaging protocols, granting applications to exchange data even when they are written in different programming languages. Message brokers can store messages, route them, and deliver them to their desired destinations. They are a middle ground between producers and consumers in which there is discreetness between the two as the transmitters can send messages without the knowledge of details about the recipient such as their active status and their location in the network.

Message brokers allow for scalability, reliability, discretion, and versitality for applications. A few examples of what message brokers do is routing messages to a singular, or multiple, destinations, convert messages between different languages, and are responsible for the monitoring and management of messages. Some basic concepts of a message broker to consider are the producer, consumer, the queue, and also it's two most common distribution patterns; Point-to-point messaging and publish-subscribe. The producer is the application that is responsible for sending the data to be stored and delivered by the message broker. The consumer is the recipient that consumes the data sent and stored by the message broker. The queue is another component that stores and orders the messages in a filesystem while waiting for the consumer to be able to process them. Point-to-point messaging is the process where actions involved with messages are done only once between the producer and consumer. It is a direct

exchange where only one consumer receives the message. The publish-subscribe method is different to where producers send messages to a topic, or the queue, and any consumer subscribed to the topic will receive the message.

MQTT, or Message Queing Telemetry Transport, is a messaging protocol, designed for telemetry in network clients with resource constraints or low-bandwidth environments. MQTT is an upcoming and popular protocol and is now a leading protocol for connection between industrial IoT devices and the internet of things. It is designed to be simple, lightweight, and require minimal resources. The protocol uses the publish-subscribe method where MQTT clients can subscribe to and receive messages from MQTT topics. The MQTT broker is responsible for receiving the messages, filtering them, organizing what consumers are subscribed to the specific topics, and publishing the messages to the subscribed clients. Due to MQTT's simple optimization for low bandwidth and IoT devices, it is a great resource for house automation. An example of this is a home automation system containing devices such as Raspberry Pi and Arduino to control security systems, lights, temperature devices, and more. MQTT furthermore relies on TCP / IP for reliability in assured delivery and packet error checking, as well as encryption and security.

MQTT is a highly useful communication model that is efficient due to it's simplicity and reliability. It is a lightweight design that optimizes network bandwidth and has low power consumption. Message brokers in general are a very important resource in technology as they ensure that communication between applications are reliable, stable, and properly managed.