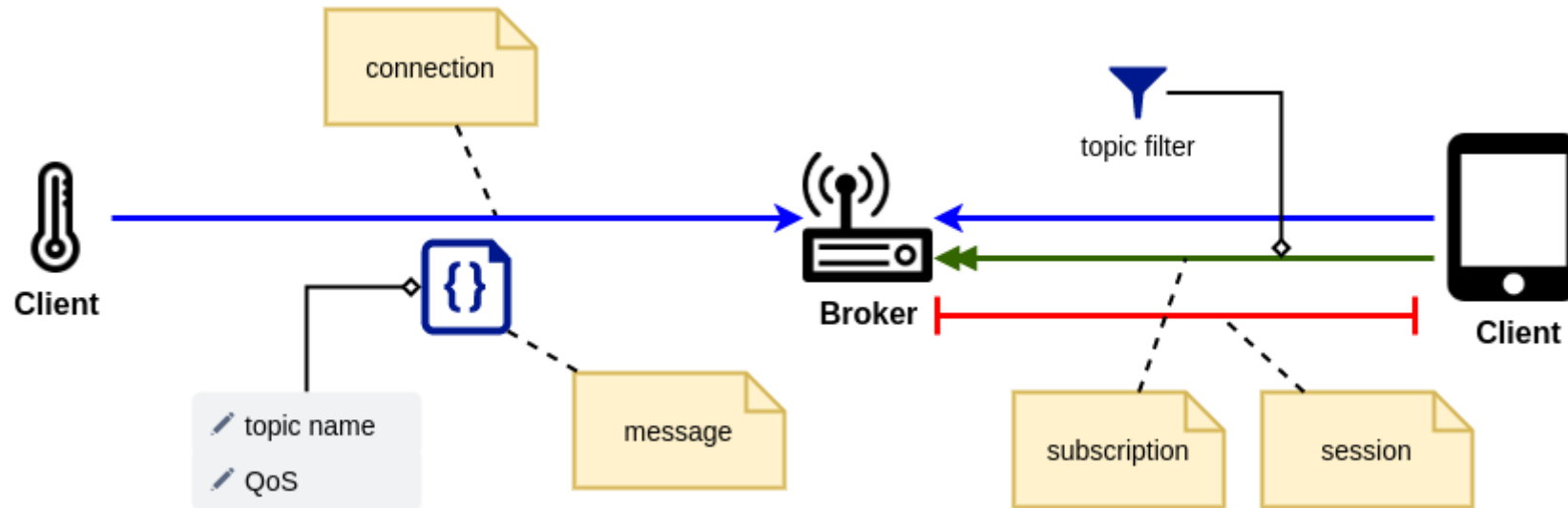

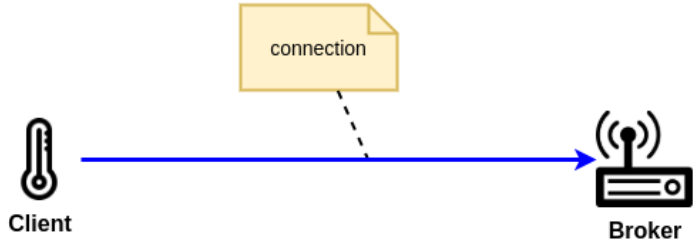
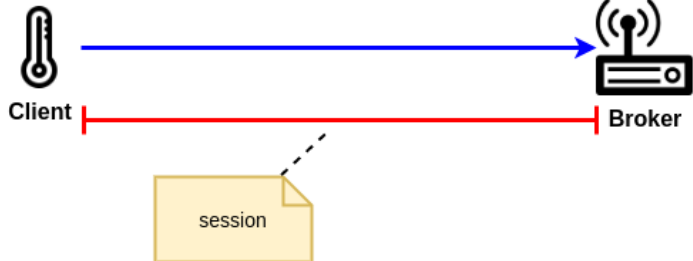
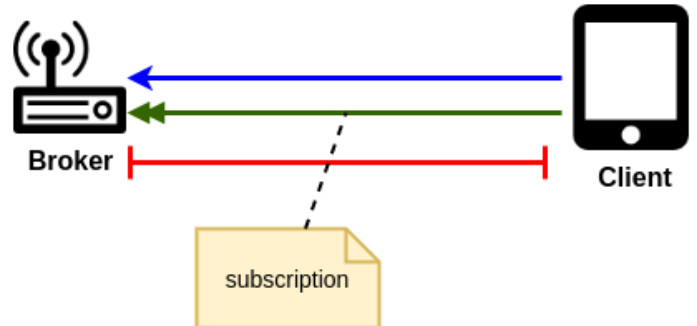
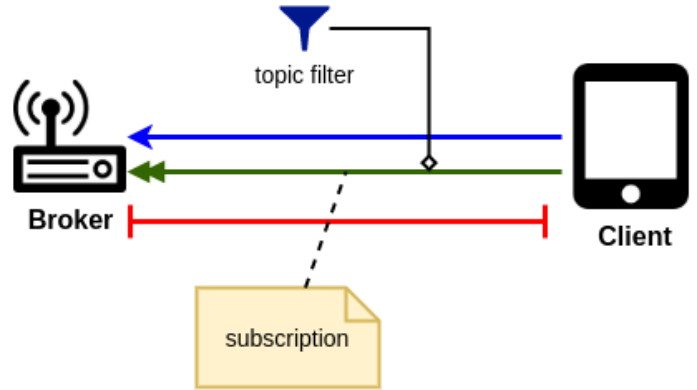
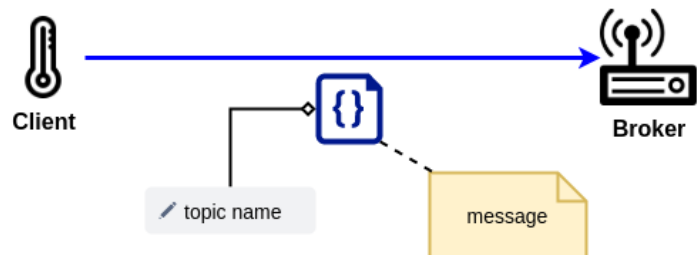


## MQTT Overview

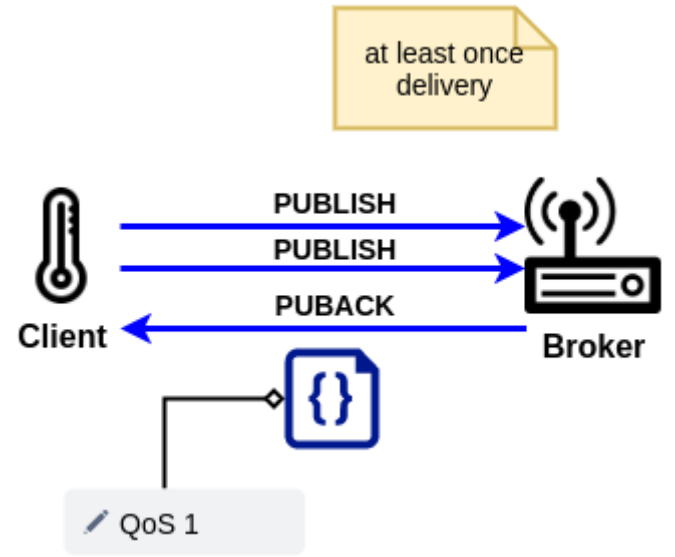
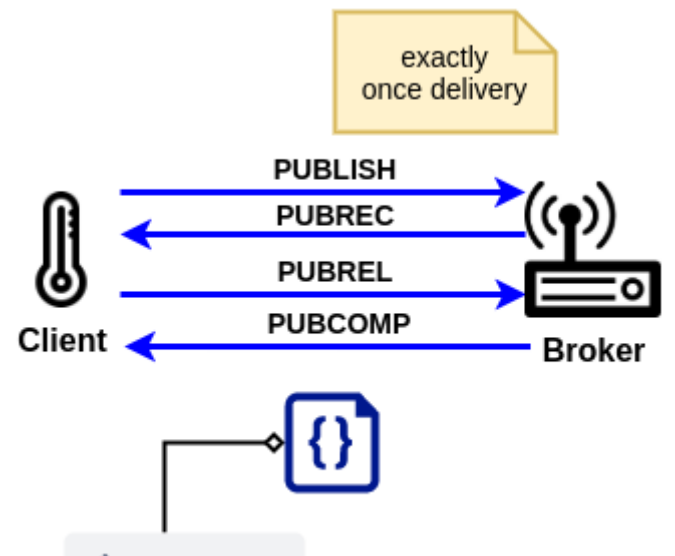


Term	Explanation	Diagram
	A <b>program</b> or <b>device</b> that uses MQTT. Client:	
Client	<ul style="list-style-type: none"> <li>• opens the Network Connection to the Server</li> <li>• publishes Application Messages that other Clients</li> <li>• subscribes to request Application Messages</li> <li>• unsubscribes to remove a request for Application Messages</li> <li>• closes the Network Connection to the Server</li> </ul>	<p>Client</p>

Term	Explanation	Diagram
Server (Broker)	<p>A program or device that acts as an intermediary between <b>Clients</b> which publish <b>Application Messages</b> and Clients which have made <b>Subscriptions</b>. Server:</p> <ul style="list-style-type: none"> <li>• accepts Network Connections from Clients</li> <li>• accepts Application Messages published by Clients</li> <li>• processes Subscribe and Unsubscribe requests from Clients</li> <li>• forwards Application Messages that match Client Subscriptions</li> <li>• closes the Network Connection from the Client</li> </ul>	
Connection	Connects the <b>Client</b> to the <b>Server</b> . Provides the means to send an ordered, lossless, stream of bytes in both directions.	
Session	<p>A <b>stateful</b> interaction between a <b>Client</b> and a <b>Server</b>.</p> <p>Some Sessions last only as long as the Network Connection, others can span multiple consecutive Network Connections between a Client and a Server.</p>	

Term	Explanation	Diagram
Subscription	Subscription comprises a <b>Topic Filter</b> and a maximum <b>QoS</b> . A Subscription is associated with a single <b>Session</b> . A Session can contain more than one Subscription. Each Subscription within a Session has a different Topic Filter.	 <p>The diagram shows a Broker (represented by a server icon with an antenna) and a Client (represented by a smartphone icon). A blue arrow points from the Client to the Broker, and a green arrow points from the Broker to the Client. A red bracket below the Client is connected by a dashed line to a yellow note labeled 'subscription'.</p>
Topic Filter	An expression contained in a <b>Subscription</b> to indicate an interest in one or more <b>topics</b> . A Topic Filter can include wildcard characters.	 <p>The diagram shows a Broker and a Client. A blue arrow points from the Client to the Broker, and a green arrow points from the Broker to the Client. A blue funnel icon labeled 'topic filter' is connected to the blue arrow. A red bracket below the Client is connected by a dashed line to a yellow note labeled 'subscription'.</p>
Topic Name	The <b>label</b> attached to an <b>Application Message</b> which is matched against the <b>Subscriptions</b> known to the Server.	 <p>The diagram shows a Client (represented by a thermometer icon) and a Broker (represented by a server icon with an antenna). A blue arrow points from the Client to the Broker. A blue box containing a curly brace '{ }' is connected to the blue arrow. A grey note labeled 'topic name' is connected to the blue box. A yellow note labeled 'message' is connected to the blue arrow.</p>

Term	Explanation	Diagram
Application Message	<p>The <b>data</b> carried by the MQTT protocol across the network for the application. When an Application Message is transported by MQTT it contains:</p> <ul style="list-style-type: none"> <li>• payload data,</li> <li>• a Quality of Service(QoS),</li> <li>• a collection of Properties,</li> <li>• a Topic Name.</li> </ul>	
Will Message	<p>An <b>Application Message</b> which is published by the <b>Server</b> after the <b>Network Connection</b> is <b>broken</b>.</p>	
QoS 0	<p><b>At most once</b> delivery</p> <p>The message is delivered according to the capabilities of the underlying network. No response is sent by <b>Server</b> and no retry is performed by the <b>Client</b>. The message arrives at the <b>Server</b> either once or not at all.</p>	

Term	Explanation	Diagram
QoS 1	<p><b>At least once</b> delivery</p> <p>A QoS 1 PUBLISH packet sent by <b>Client</b> is acknowledged by a PUBACK packet sent by <b>Server</b>. The message arrives at the <b>Server</b> once or more times.</p>	 <p>The diagram illustrates the QoS 1 delivery process. A yellow note at the top right states "at least once delivery". A Client (represented by a thermometer icon) sends two PUBLISH packets to a Broker (represented by a server icon with an antenna). The Broker responds with a PUBACK packet. A blue box with curly braces {} is connected to the Client, and a grey box labeled "QoS 1" is connected to the blue box.</p>
QoS 2	<p><b>Exactly once</b> delivery</p> <p>The <b>Server</b> PUBLISH packet acknowledges receipt with a two-step acknowledgement process. For use when neither loss nor duplication of messages are acceptable. There is an <b>increased overhead</b> associated with QoS 2.</p>	 <p>The diagram illustrates the QoS 2 delivery process. A yellow note at the top right states "exactly once delivery". A Client (represented by a thermometer icon) sends a PUBLISH packet to a Broker (represented by a server icon with an antenna). The Broker responds with a PUBREC packet, then a PUBREL packet, and finally a PUBCOMP packet. A blue box with curly braces {} is connected to the Client, and a grey box labeled "QoS 2" is connected to the blue box.</p>