MQTT vs HTTP vs CoAP: choosing an IoT protocol

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The right protocol depends on the device, the network and how data needs to flow. Here are the three you will meet most often.

TL;DR The short version

- The right IoT protocol depends on the device, the network and how data needs to flow.
- MQTT is lightweight publish/subscribe through a broker; HTTP is the web's request/response; CoAP is HTTP-like over UDP for constrained devices.
- Many small, frequent messages and pushes to devices point to MQTT; existing web infrastructure and larger exchanges point to HTTP.

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MQTT

A lightweight publish/subscribe protocol that runs over TCP and routes messages through a broker. It offers three delivery levels (at most once, at least once, exactly once) and suits many devices sending small messages on unreliable links.

HTTP

The web’s request/response protocol. Universally supported and easy to debug, but heavier for tiny devices and not designed for pushing messages to them.

CoAP

A protocol modelled on HTTP but built for constrained devices and networks, running over UDP. It keeps the familiar request/response style with a much smaller footprint.

Choosing

1. Many devices, small frequent messages, need to push to devices: MQTT.
2. Existing web infrastructure and larger, less frequent exchanges: HTTP.
3. Very constrained devices and lossy networks: CoAP.
4. Whichever you choose, secure it with TLS or DTLS and authenticate devices.

Related credential: IoT & Embedded Systems Practitioner. Explore the exam facts and syllabus.

Sources and further reading

1. OASIS. MQTT Version 5.0. docs.oasis-open.org/mqtt/mqtt/v5.0/.
2. IETF RFC 7252. The Constrained Application Protocol (CoAP). rfc-editor.org/rfc/rfc7252.

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