

MQTT and Sparkplug: a shared contract for industrial data

MQTT carries messages but does not define a data model. Sparkplug fills that gap by standardizing topic names and payload structure.

In short

- MQTT provides topics, quality-of-service levels, retained messages and last-will messages, but it leaves the topic hierarchy and message content to the application.
- Sparkplug defines the topic namespace, payload format and device state on top of MQTT, with birth and death messages showing which values are current.
- An unknown value and a zero value are different states, and the consuming layer must preserve that difference.

01 / What MQTT provides

MQTT is a lightweight publish/subscribe messaging protocol working through a broker. It offers topic names, quality-of-service levels, retained messages and a last-will message sent when a connection drops. The topic hierarchy and the message content are left to the application, which is why two vendors' MQTT do not automatically understand each other.

02 / What Sparkplug defines

Sparkplug is a specification defining a topic namespace, payload format and device state management on top of MQTT. When a device connects, a birth message announces all its tags and types; when it leaves, a death message is published. A subscriber therefore knows which values are current and which are stale.

03 / Data quality and time

Each value in the payload can come with a timestamp and a data type. You should still document whether the timestamp is produced at the source or at the gateway. A value being "unknown" and being "zero" are different states; the consuming layer must preserve the difference.

04 / Connecting to an AI pipeline

A model or data lake should subscribe to a registered, versioned consumer layer, not directly to device topics. Manage topic names and tag names as a contract. This guide is a general architecture suggestion; details depend on the specification version of the product used.

Try it

Write a small contract table for five tags of a machine, with topic name, data type, unit and "unknown" behaviour.

References and online guide

[Open the online guide](#)

[Eclipse Sparkplug](#)

[MQTT.org](#)

Proposed pilot steps do not claim field accuracy. Synthetic examples are not measurements from a production site.