MQTT

MQTT (Message Queuing Telemetry Transport) is a lightweight publish/subscribe messaging protocol designed for low-bandwidth, high-latency, or unreliable networks.

Purpose in AOFS

- Sensor telemetry transmission
- Event and alert messaging
- Field → Farm Controller aggregation
- Optional Farm → HQ synchronization

Layer Mapping

- Field Controller → Farm Controller
- Farm Controller → HQ / Federated Layer
- Optional local broker within farm LAN

Strengths

- Low bandwidth usage
- Works well over unstable connections
- Supports retained messages and QoS levels
- Simple implementation on embedded controllers (e.g., ESP32)

AOFS Compliance Notes

- MQTT must not be used to bypass Field Controller safety logic
- Loss of MQTT connectivity must not interrupt irrigation safety functions
- All received remote commands must be validated locally
- All transmitted and received events must be logged