MQTT Protocol API Guide
Industrial IoT Gateways

Overview

The MQTT Protocol API provides a lightweight, publish/subscribe messaging model ideal for Industrial IoT Gateways. This guide outlines connection, authentication, publish and subscribe methods, and payload structures.

Connection

- **Broker Address:** `mqtt://your-broker-address:1883`
- **Supported MQTT Versions:** 3.1, 3.1.1, 5.0

Sample Connection Payload

```
{
  "clientId": "gateway-001",
  "username": "iot_user",
  "password": "********",
  "cleanSession": true
}
```

Authentication

Gateways authenticate using a **username** and **password** during connection initiation. Secure connections (TLS/SSL) are recommended.

Publish

To send data from gateway devices to the broker, use the `PUBLISH` method.

Example Publish Topic

```
iot/gateway/gateway-001/sensor/temperature
```

Sample JSON Payload

```
{
  "timestamp": "2024-06-11T10:15:01Z",
  "value": 27.6,
  "unit": "C"
}
```

Subscribe

To receive messages, subscribe to topics of interest. Wildcards (`+` , `#`) may be used.

```
iot/gateway/+/sensor/#
```

Quality of Service (QoS)

Level	Description
0	At most once (fire and forget)
1	At least once (acknowledged delivery)
2	Exactly once (assured delivery)

Example Workflow

1. Connect gateway client to MQTT broker with credentials.
2. Subscribe to configuration or command topics.
3. Publish sensor data at defined intervals.
4. Handle incoming messages via callback or event.

Common Topics

Topic	Usage
`iot/gateway/{gatewayId}/sensor/temperature`	Temperature data
`iot/gateway/{gatewayId}/status`	Gateway status updates
`iot/gateway/{gatewayId}/command`	Downlink commands to gateway

Payload Recommendation

Use JSON format for payloads to ensure readability and flexibility.

```
{
  "deviceId": "sensor-xyz",
  "timestamp": "2024-06-11T10:20:00Z",
  "parameters": {
    "humidity": 54.1,
    "temperature": 25.4
  }
}
```

Error Handling

- Always check for connection acknowledgments.
- Implement retry logic on connection or publish failure.

References

- MQTT Essentials