IoT Agent

An **IoT agent** is a software component or service that acts as an intermediary between physical IoT devices (like sensors, actuators, or edge devices) and higher-level applications or platforms (such as cloud services, databases, or IoT platforms like FIWARE, Azure IoT Hub, etc.). Its main purpose is to **translate, manage, and forward data and commands** between the physical and digital layers of the Internet of Things (IoT) ecosystem.

**🔧 Key Functions of an IoT Agent:**

1. **Protocol Translation**
   * Converts device communication protocols (e.g., MQTT, CoAP, Modbus, Zigbee) into formats understood by cloud platforms (e.g., HTTP, JSON, NGSI).
2. **Data Normalization**
   * Standardizes data from different devices so that it's uniform and usable by analytics or visualization layers.
3. **Device Management**
   * Handles registration, metadata, configuration updates, and status monitoring of connected devices.
4. **Command Execution**
   * Receives commands from the platform and forwards them to the appropriate devices (e.g., turning on a light or opening a valve).
5. **Security and Authentication**
   * Implements authentication, encryption, and access control between devices and services.

**📦 Example Use Case:**

In **FIWARE**, a common open-source IoT platform:

* A **FIWARE IoT Agent** (like the MQTT IoT Agent) acts as a bridge between MQTT devices and the **FIWARE Context Broker**.
* Devices send MQTT messages to the agent.
* The agent translates these into NGSI format and forwards them to the Context Broker.

[ IoT Device ] <--- MQTT/CoAP/... ---> [ IoT Agent ] <--- HTTP/NGSI ---> [ Cloud Platform / Application ]

**🧠 Analogy:**

Think of the IoT Agent like a **translator or interpreter**:

* Devices speak in "device language" (like MQTT).
* Cloud apps speak in "platform language" (like HTTP/JSON).
* The IoT Agent ensures they understand each other.