AIME
Automation of Internet Managed Entities

Automation Enablement Platform

EMBRACE IoT →

Predistic Ltd.

Who Are We?

* Predistic is a software company based in Sofia, Bulgaria

* Founded mid 2011 by a team of software engineers with 10+ years of experience

* Used to working in multi-national teams

* We deliver software services to two major customers:
  * Continental Automotive GmbH
  * Siemens Logistics GmbH

* Current products and services:
  * **AIME**: Edge & Core IoT application enablement platform
  * **GRAS**: Smart Farming Solutions
  * **Software development services** in Automotive, Embedded Systems, IoT, Smart Farming

* Profound experience in embedded software and complex systems requiring higher level of expertise

* We are flexible, open-minded and looking for new technological challenges!

AIME: Automation of Internet Managed Entities

Edge & Core IoT AEP

AIME is an Edge & Core IoT application enablement platform (AEP) that helps companies build complete IoT systems

High-level Uniform Language

Used for data collection, data flow, Edge connectivity, administration and configuration of IoT devices

System Resiliency & Scalability

AIME supports system scalability and continuous development of processes, allowing changes on-the-fly with little to no downtime

Arduino-based

AIME is an Arduino-based Framework, capable to run on any RTOS, and includes IoT firmware and communication capabilities

IoT Infrastructure Management

AIME uses Microcontrollers to manage the IoT Infrastructure and is able to orchestrate unlimited number and types of IoT hardware
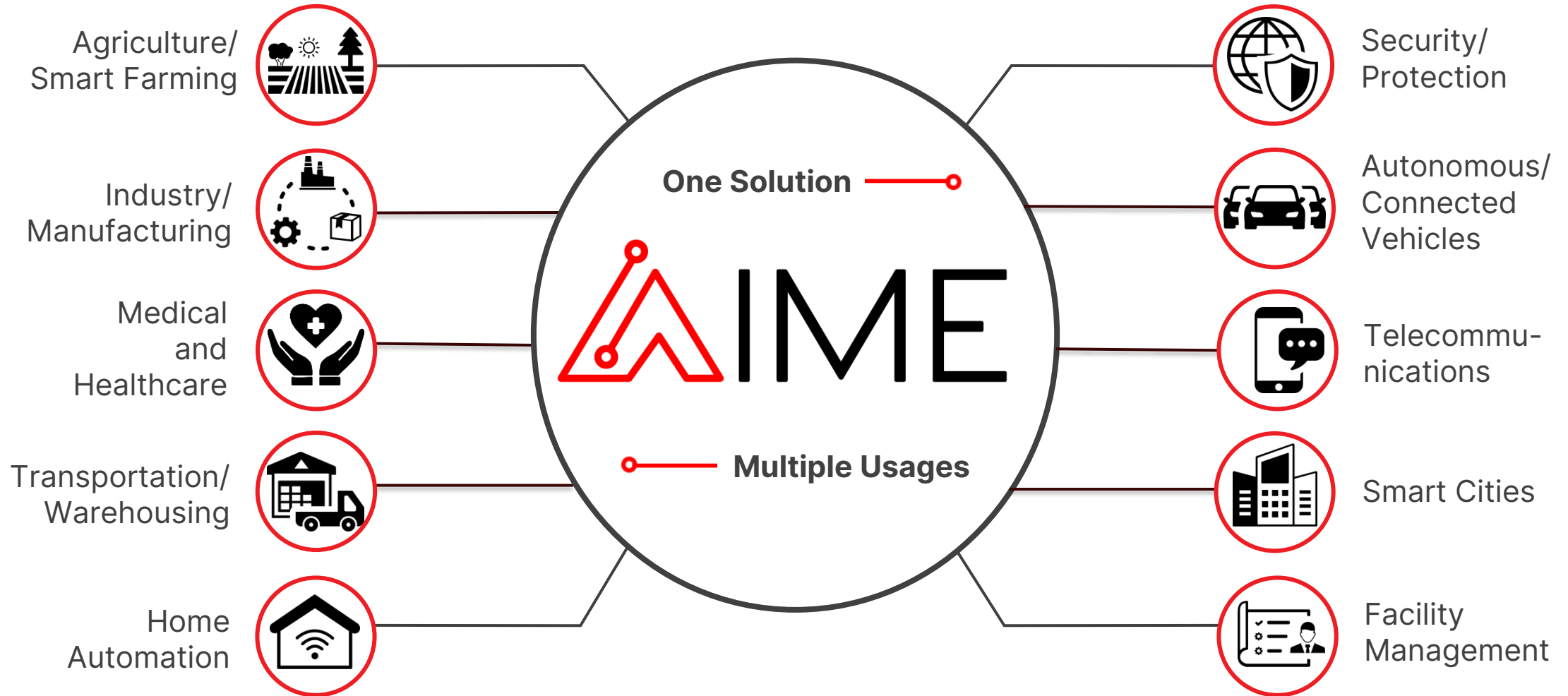
Suitable for All Businesses

We ensure business and digital transformation and integrate with preexisting business systems
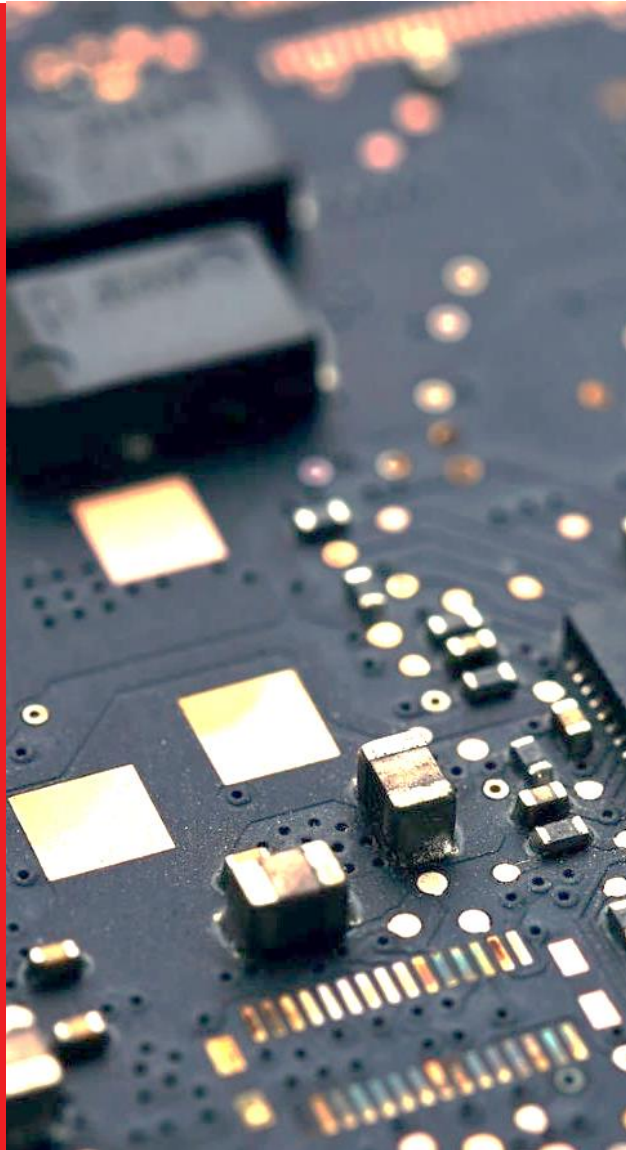
Uses

Integration: Before AIME

AIME
Automation of Internet Managed Entities

There are one or more preexisting Customer Systems in different industries

Offline data consolidation

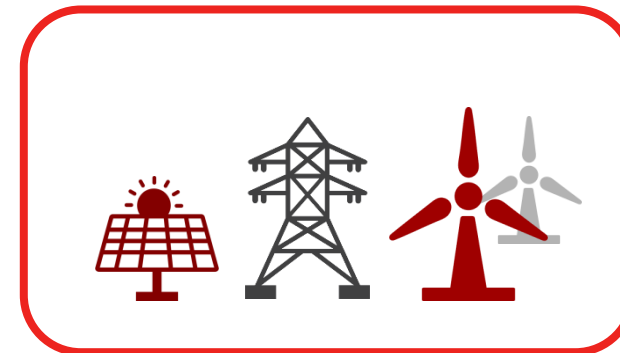All collected data is transferred to Cloud, skyrocketing costs for data traffic and Cloud processing power

Central Cloud
Public, On-Premise, Hybrid

Massive data exchange
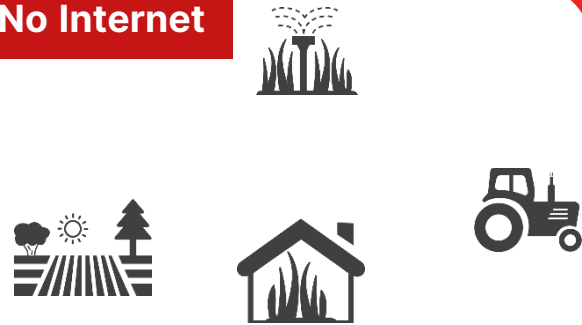
No Internet

Data from individual business domains is collected using different Systems/Channels

HOTEL

OFFICE

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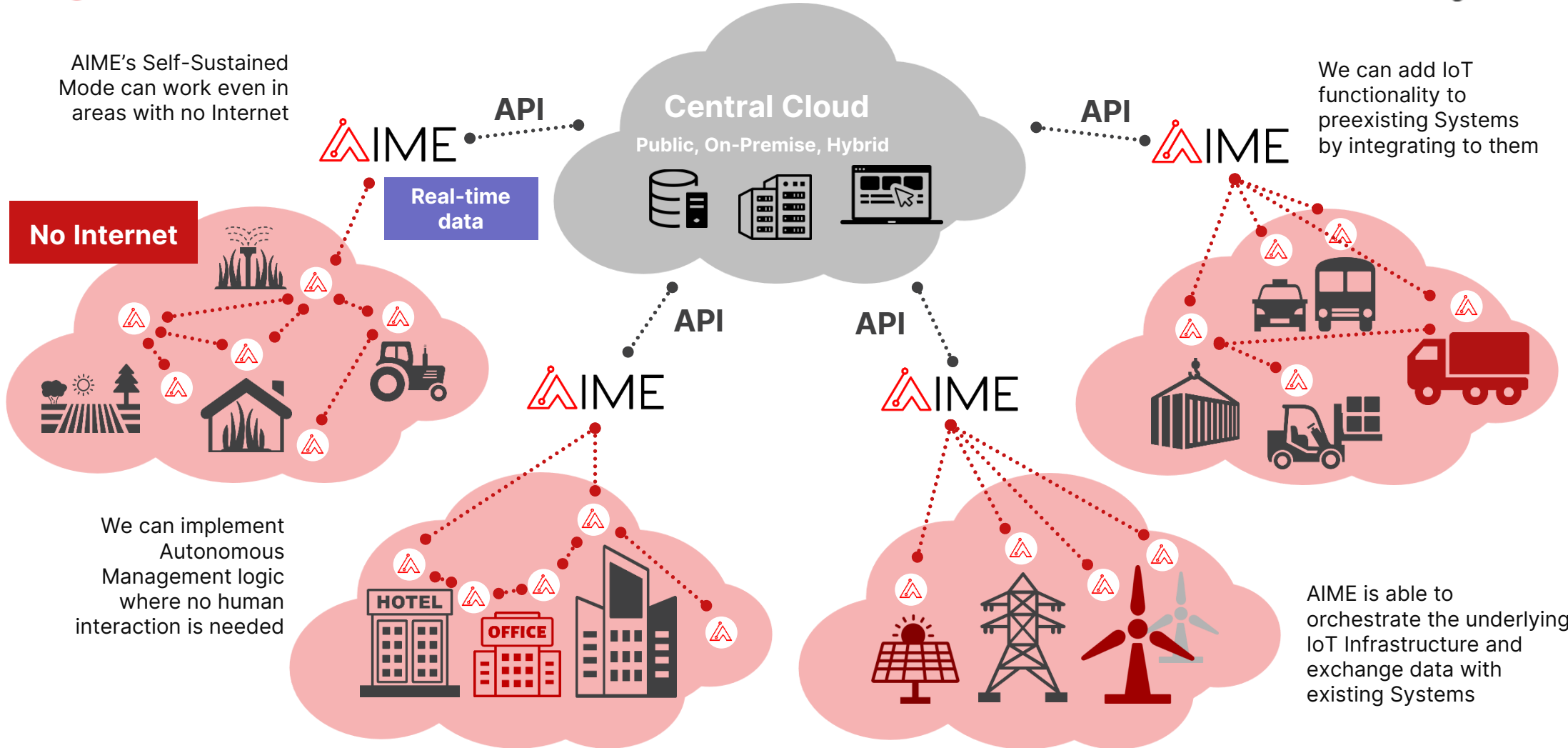
AIME in Multi-Cloud Business Structure

AIME
Automation of Internet Managed Entities

Multiple levels of Micro Clouds can be implemented, creating a Multi-Cloud IoT Structure

Edge Computing topology can be implemented with AIME for complementing Customer Clouds

AIME transfers only meaningful data up to Cloud, minimizing traffic and saving cost

Cloud N

Central Cloud
Public, On-Premise, Hybrid

Cloud 2

Micro Cloud

AIME integrates with other Management Systems to create highly scalable and resilient Infrastructures

Micro Cloud

Micro Cloud

AIME orchestrates Swarms of IoT Devices

Edge Swarm

Edge Swarm

Edge Swarm

Edge Swarm

No Internet

AIME processes most data at Device level

Edge Nodes

HOTEL

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AIME-Enabled Hardware

IoT-Enabled Sensors

* Temperature, Humidity, Acidity, Wind, Light level, Presence & many more

Microcontrollers (MCUs)

* For controlling Sensors

* Data processing at Device level

Management Boards & Meteo Stations

* For Smart Farming & other industries

* For managing Sensors & Actuators

* Connectivity options: WiFi, WiFi mesh, GSM, LoRa mesh. Bluetooth/BLE, NBIoT and LoRa WAN enabled.

IoT Actuators

* For controlling mechanical & other devices & mechanisms

E-paper Displays

* Price/shelf labels

* Information & Status Displays

How to Use AIME?

1. DEPLOYMENT

* AIME is installed as a firmware on compliant devices. Installation happens wirelessly, with the Integrator being in close proximity to the device.

* Initial configuration happens exactly after that with the help of AIME Manager software tool.

2. USAGE

* The device starts working right away and all features are now available: remote monitoring of IoT Sensors, remote control of Actuators, communication between IoT devices, remote update, remote configuration, etc.

3. MONITORING

* Remote monitoring of Sensor measurements and control over actuators happens in real-time using standard Web Browser.

4. RECONFIGURATION & UPDATE

* After initial deployment and configuration, subsequent reconfigurations and updates happen remotely by AIME manager residing on the device and accessible via standard Web Browser.

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AIME Technical Sheet

* Built-in support for common IoT Sensors models over I^2C, SPI, Digital inputs, Analog inputs, Pulse counter/with inputs, RS-232/RS485 serial connected sensors

* Supported Actuators: Digital out, solid state relay, low voltage relay, PWM controlled servos

* Supported Displays: e-paper displays mono, gray and color, OLED displays, TFT displays

* Support for Microcontroller Units (MCU): Espressif ESP32C3, ESP32, ESP32S2, ESP32S3 and other models supported by Arduino framework

* Support for communication between MCUs/Sensors/Actuators though WiFi, GPRS, WiFi Mesh, LoRa Mesh; integration with NBIoT, Bluetooth

* Incorporation of mesh networks and MQTT broker client for communication between devices

* **JcCcL** (JSON Configuration Control and Command Language): Privately developed communication protocol named JcCcL for MCU configuration, commanding and data transfer. JcCcL is a high-level Uniform Language based on JSON. JcCcL can also be used for AIME integration in Edge and/or cloud environments.

* **AIME Configuration Manager**: Web-based application helper (GUI) for easy generation of JcCcL code. It is built-in per MCU available through controller's AP service and/or HTTPS connection as well as through central Web service using MQTT broker.

AIME Technical Sheet

1. DEVICES MANAGEMENT

* AIME can orchestrate **MCUs**, **IoT Sensors** and **Actuators**

* AIME can orchestrate **Swarms** of IoT Devices, **Micro-clouds** and Devices in other configurations

* AIME manages Actuators for both **switch on/off cases**, and **voltage regulation**

2. DATA MANAGEMENT & PROCESSING

* We provide smart **data processing mainly at Device Level**, eliminating most data traffic and information security threats

* We use Microcontrollers (MCUs) together with IoT Sensors to incorporate **functionality at endpoint level**

* Processing happens in **real-time**

* We keep most **data locally**

AIME Technical Sheet

Automation of Internet Managed Entities

3. DATA TRANSFER

* Data transfer can happen directly **between IoT devices**; between IoT devices via MQTT, between IoT devices and Internet MQTT Server;

* We transfer only **meaningful data** as defined by user rules, not ANY data

* We provide multiple communication technologies: **WiFi, WiFi Mesh, BLE mesh, LoRa Mesh, Global-Band LTE NB-IoT1, Global-Band LTE CAT-M1, GPRS/EDGE**

4. SECURITY

* **TLS1.2+** for all internet connections and **ChaCha** encryption in mesh communication

* **User** and **password** assigned to each device and to each communication channel

* We **keep sensitive data in local Swarms**, out of public Internet/Clouds

* Data is provided in JcCcL format, making it secure and easy to manage and collect

AIME Technical Sheet

5. INTEGRATION

* AIME presents data in **normalized** and standardized way using compressed and structured format

* We are also flexible at using client-defined formats for exchanging data through **REST API**

6. SYSTEM UPDATE

We offer **changes on-the-fly** in configuration for data collection and Edge functionality without the need to flash new firmware:
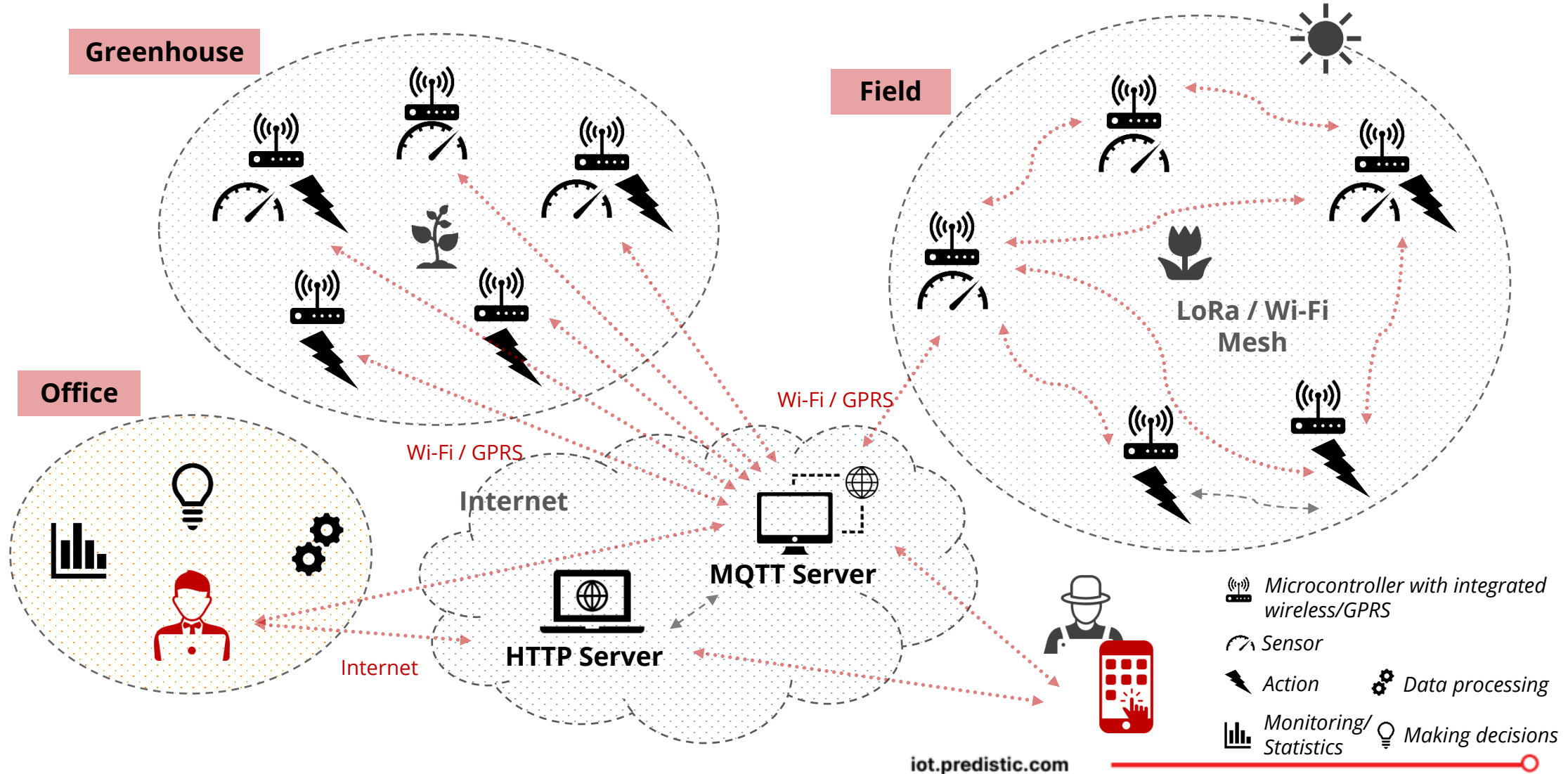
* Remotely via Internet

* On-site by trained technician. No need to open any physical control panels; operation can be done by WiFi.

* We also offer OTA capabilities for easy firmware upgrade and maintenance

IoT Edge Configurations

AIME supports various configurations for Edge Computing nodes based on Customer needs

IoT Edge Node

Micro Cloud

Standalone edge computing

Distributed edge computing

Swarm edge computing
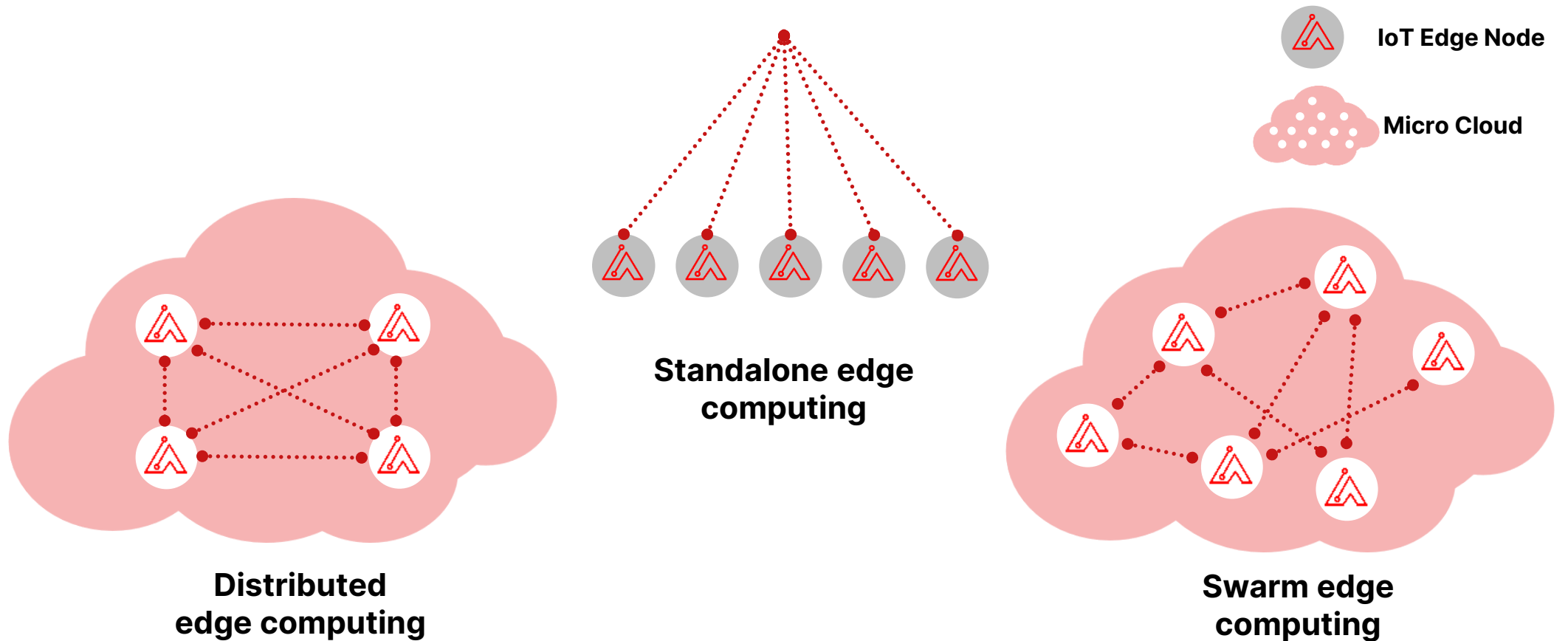
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Use Case: Smart Farming

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