GRAS®

Smart farming solutions

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
- Delivered software services to two major customers:

Continental
The Future in Motion

Siemens Logistics

- 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
- Winner of multiple awards

GRAS

AIME
Automation of Internet Managed Entities

GRAS
Smart farming solutions

Finalist:
“Digital Transformation”

Winner of „Excellence in Innovations“ brand for 2022

EXCELLENCE IN INNOVATION 2022

ARC FUND
Applied Research and Communication Fund Bulgaria

1st prize:
"Plant-Growing Technologies“
AGRA 2022 exhibit

IFP INTERNATIONAL FAIR PLOVDIV

Award "Contribution to the Mechanization of Agriculture"
Category "Bulgarian manufacturer of agricultural machinery"

Земеделска техника 30 години
127 години Земеделска техника

Finalist: **“Successful Bulgarian ICT product/service” 2022**

Winner: **“Successful ICT product benefiting Bulgarian economy” 2022**

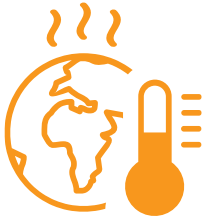
bait
Bulgarian Association of Information Technologies

Farmer Pain Points

Food for 10 bln.

people until 2050

Lack of labor force



Unpredictable weather

Water shortage

Insufficient cultivable land & soil erosion

High resources cost

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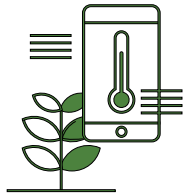
OUR SOLUTION: GRAS

Ultra flexible Smart Farming solution that can work anywhere, with any number of Sensors and Actuators

FOR 24/7 CROP MONITORING AND CONTROL



Monitors field and greenhouse conditions on smartphone

Controls farming infrastructure remotely: manually or automatically

GRAS

What is GRAS?

- GRAS is a clever solution for **monitoring and management** in all areas under cultivation, agricultural buildings, open fields, green scapes, and warehouses
- GRAS helps optimize processes and **saves water, energy and manual labor**
- GRAS helps **cut losses and reduce risks** associated with rural production by automation
- GRAS allows farmers to **monitor field and greenhouse conditions remotely** using their laptop, PC or mobile phone, take decisions and take actions remotely if needed
- GRAS can **control farming infrastructure manually or automatically**, for example start or stop irrigation systems

GRAS®

What's Included?

GRAS includes:

- **Sensor measurements**: Soil moisture / air temperature, acidity, light, sound, movement, pressure and much more
- **Data transfer**: Building wireless (LoRa or WiFi) or GPRS networks for data exchange between fields, greenhouses, servers and client devices (smartphone, tablet or computer)
- **Web interface**: Presenting the measured data via web or mobile interface (customized based on customer's preferences), accessible via the Internet
- **Remote control / Automation**: Taking manual actions such as starting / stopping irrigation systems, switching on / off lighting or mechanical devices, opening / closing windows, control of ventilation and other types of systems
- Actions can be **automatic or manual** based on changing conditions in the field / greenhouse

GRAS

GRAS is All-in-One Solution

- Offline mode (No Internet)
- Multi-network SIM card
- Changes on-the-fly
- Both measurement and control (Sensors and Actuators)
- Fully customizable
- Integration with third-party vertical systems

GRAS

GRAS Technology: Unique Features

Mesh communication between IoT Devices

- System can work **without Internet**
- Sensitive **data is secure** and out of public Internet
- System can work **without human interaction**

Processing captured data at endpoint device level

- **Reduced** data traffic
- **No expensive servers** / high data-processing costs
- **Stable** real-time connection

Changes on-the-fly

- **Add Sensors** & Actuators anytime
- **Over the air update** and maintenance
- **Change IoT** Devices settings

GRAS

Smart Sensors

- Air temperature
- Airflow
- Soil temperature at various depths
- Rainfall
- Leaf wetness
- Acidity
- Wind speed
- Dew point temperature
- Wind direction
- Soil and Air relative humidity
- Solar radiation
- Atmospheric pressure
- Smoke
- Volatile components, CO2, CH4
- GPS sensors
- Smart cam
- And many more!

Controlled Mechanisms

- Pumps
- Irrigation systems
- Ventilation systems
- Heating systems
- Lightning
- Anti-frost systems
- Feeding systems
- Locking / access control systems
- Windows, doors, greenhouse blinds
- And many more!

Universal SIM Card / Tracking Device

Displays / LED Lights

- E-paper, TFT displays, OLED displays, etc.
- Show sensors' measurements in real-time
- Show notifications, warnings, alarms
- LED lights for signalization

Where to Use GRAS?

GREENHOUSES

ANIMAL HUSBANDRY

NURSERY GARDENS

AGRICULTURAL BUILDINGS AND WAREHOUSES

VINEYARDS

SOWN FIELDS

ORCHARDS

AQUACULTURE

FORESTRY

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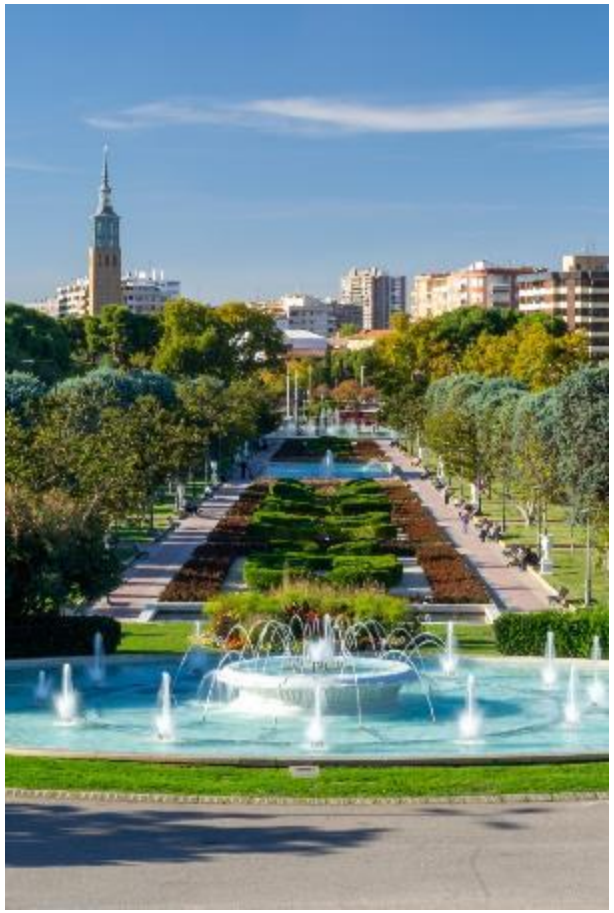
Where to Use GRAS in Cities?

GARDENS / PARKS / PLAYGROUNDS



URBAN / VERTICAL FARMING

LANDSCAPING

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Benefits for Farmers

- Monitoring environmental conditions 24/7
- Better and data-driven decisions
- Immediately take action upon a change in the environment that may affect crops or animals
- Manage agricultural assets in time and remotely
- Peace of mind that you can monitor your farm at any time, even if you are not physically there
- Lower labor costs and more free time for business owners
- Reduced risks and losses
- Save time, effort and resources
- Optimal conditions for crops and animals
- Better profit

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Benefits for the Environment

- IoT technologies have low power consumption
- Improve the energy efficiency of existing equipment, systems and buildings
- Reduce risks and losses
- Save resources
- Maximize produce

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How to Use GRAS?

Cloud

Smart Sensors

Internet /

Wireless connection

Internet

Remote Monitoring & Control

Internet /

Wireless connection

Internet

Automatic Mode

Action

GRAS

Use Case: Monitoring & Control over Irrigation System

Moisture Sensor

Internet / Wireless connection

Cloud

Internet

Low moisture alert

Starting the irrigation remotely

Internet

Internet / Wireless connection

Automatic Mode

Internet

Irrigation system starts

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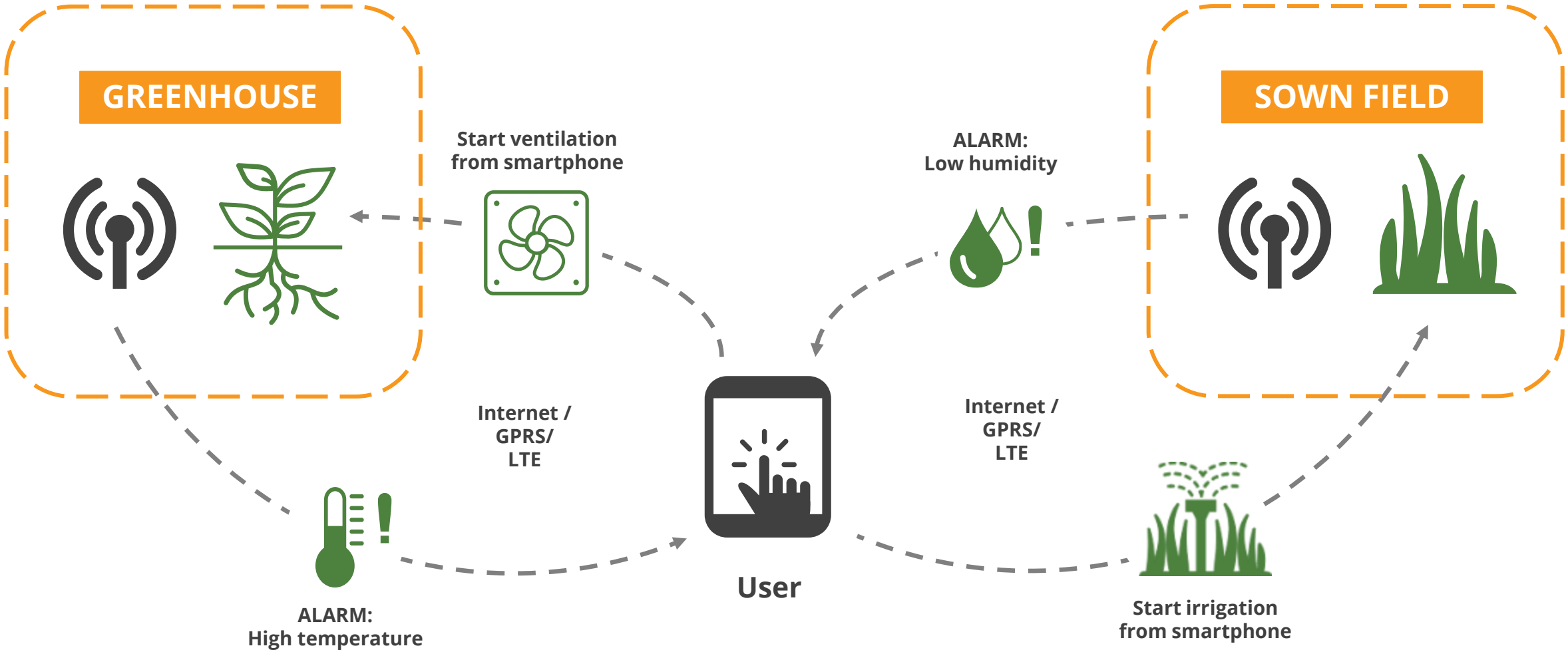
Use Case: Manual Remote Monitoring & Control over Irrigation & Ventilation Systems



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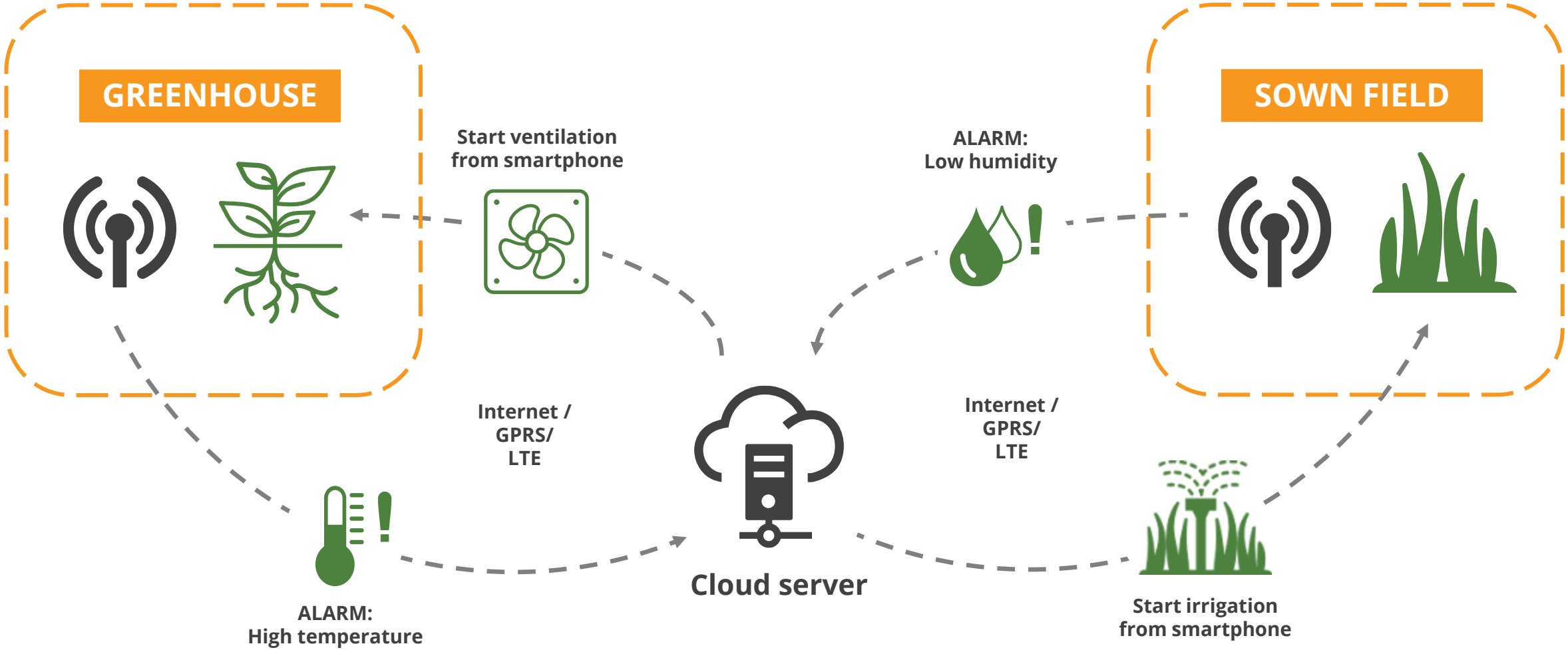
Use Case: Automated Monitoring & Control Using Cloud over Irrigation & Ventilation Systems



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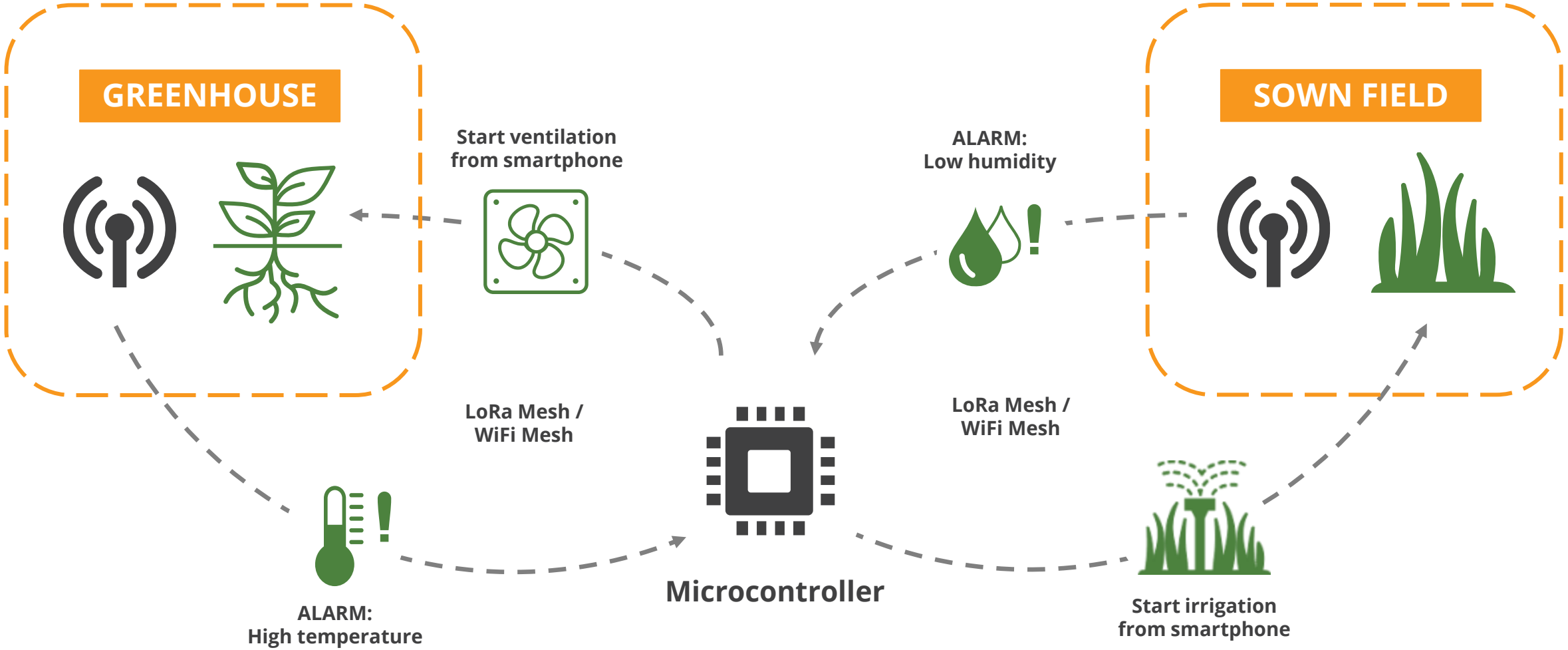
Use Case: Autonomous Local Monitoring & Control without Internet over Irrigation & Ventilation Systems



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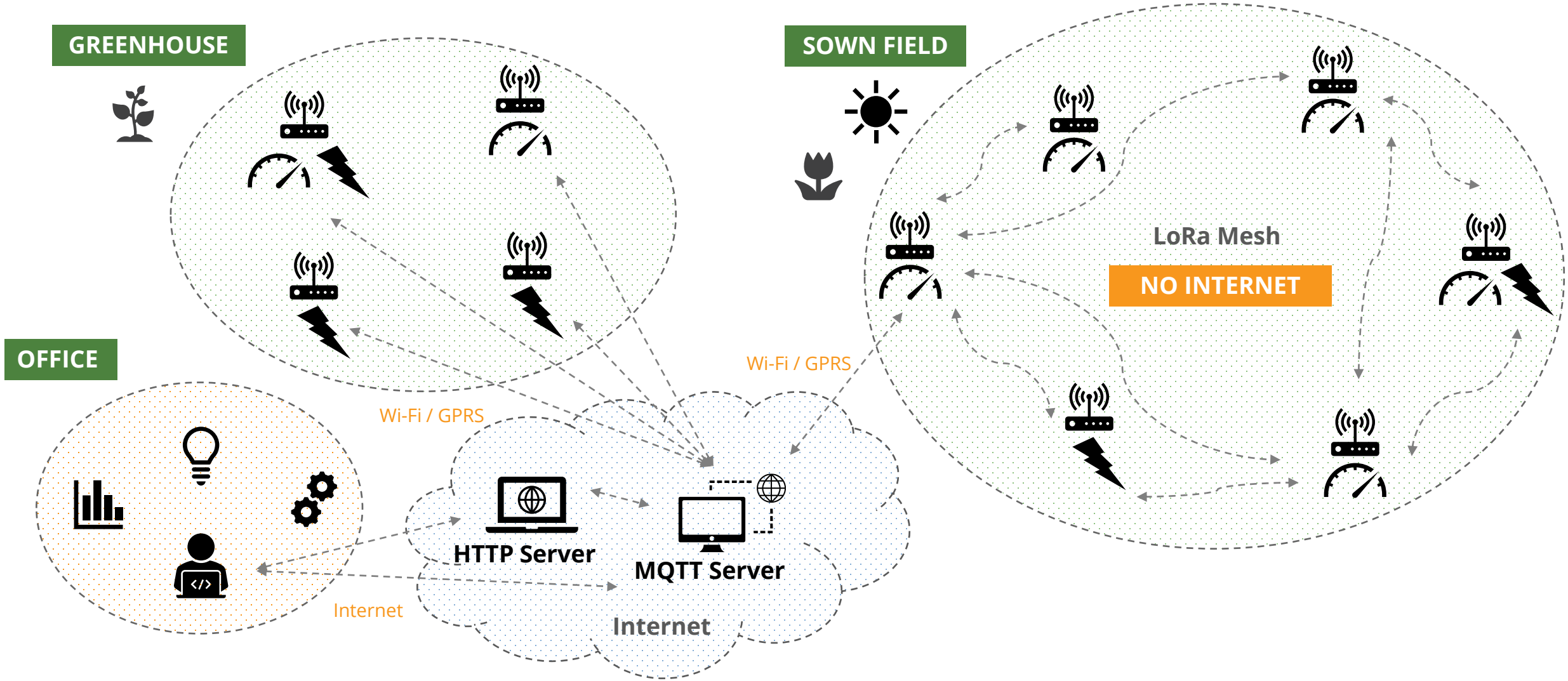
Technical Scheme: GRAS for Sown Field & Greenhouse



GRAS

Microcontroller with integrated wireless/GPRS

Sensor

Action / Automation

Monitoring/ Statistics

Data processing

Making decisions

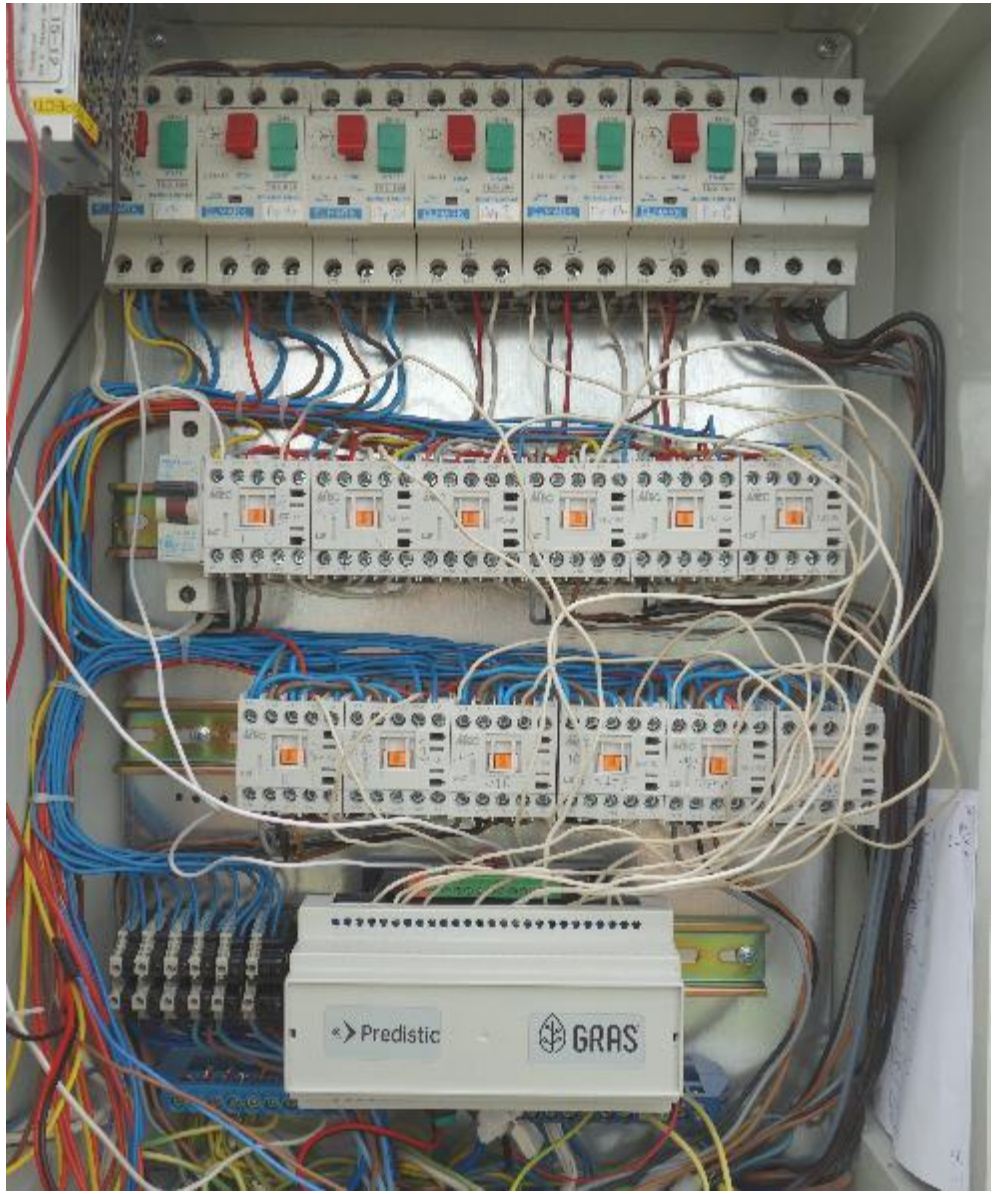
Our Advantages

MORE THAN JUST A METEO STATION

- In addition to standard meteo stations' functionality, GRAS also offers control over existing farming systems using **actuators**
- GRAS can work in **self-sustained mode**, i.e. without human interaction/control or without Internet; in Mesh; in Cloud; or in arbitrary combination

CUSTOM SOLUTION

- **Customization** for each farm or partner: We can configure networks of Microcontrollers and Sensors based on customer requirements
- GRAS can be easily customized to support almost **all available sensors** on the market and can be configured to read sensor data as requested by clients
- Our modules are not fixed: Clients can order **only those sensors and components that they need**



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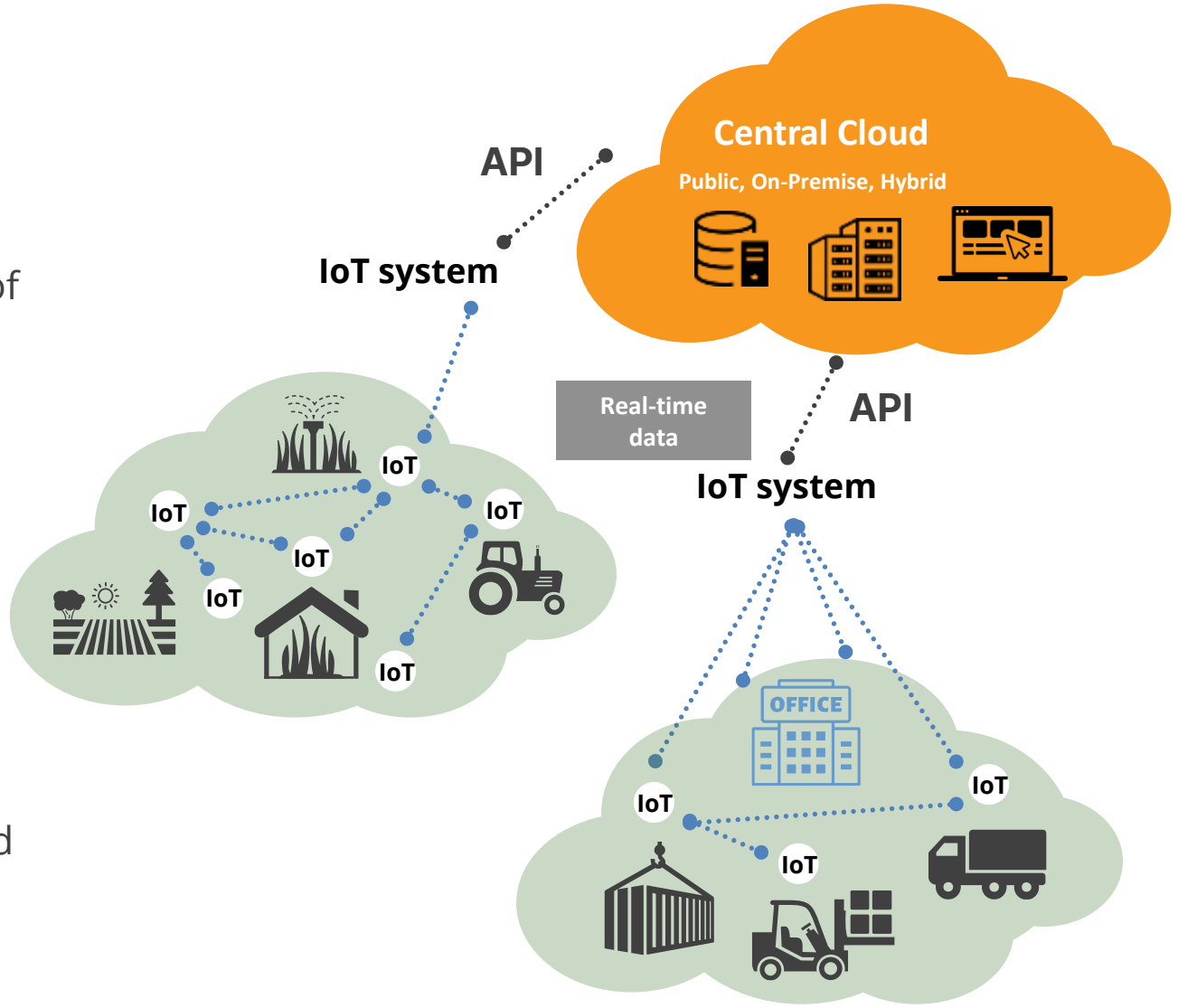
Our Advantages

RESILIENCY & SCALABILITY

- GRAS can work even in areas with **no Internet coverage**
- GRAS can **keep sensitive data secure** and out of public Internet
- The system can be configured with **any number of sensors and actuators**, and they can be changed anytime
- We can modify or update the functionality of the attached IoT devices on the fly, **with no system downtime** and with minimal efforts
- Multiple **communication channels**: WiFi, GPRS, WiFi Mesh, LoRa Mesh or NBIoT

NO EXPENSIVE HARDWARE

- Farmers can use their own **computer, tablet or smartphone** to monitor and control sensors and systems
- Clients can select a **cloud** service, or host the solution on a **personal budget device**



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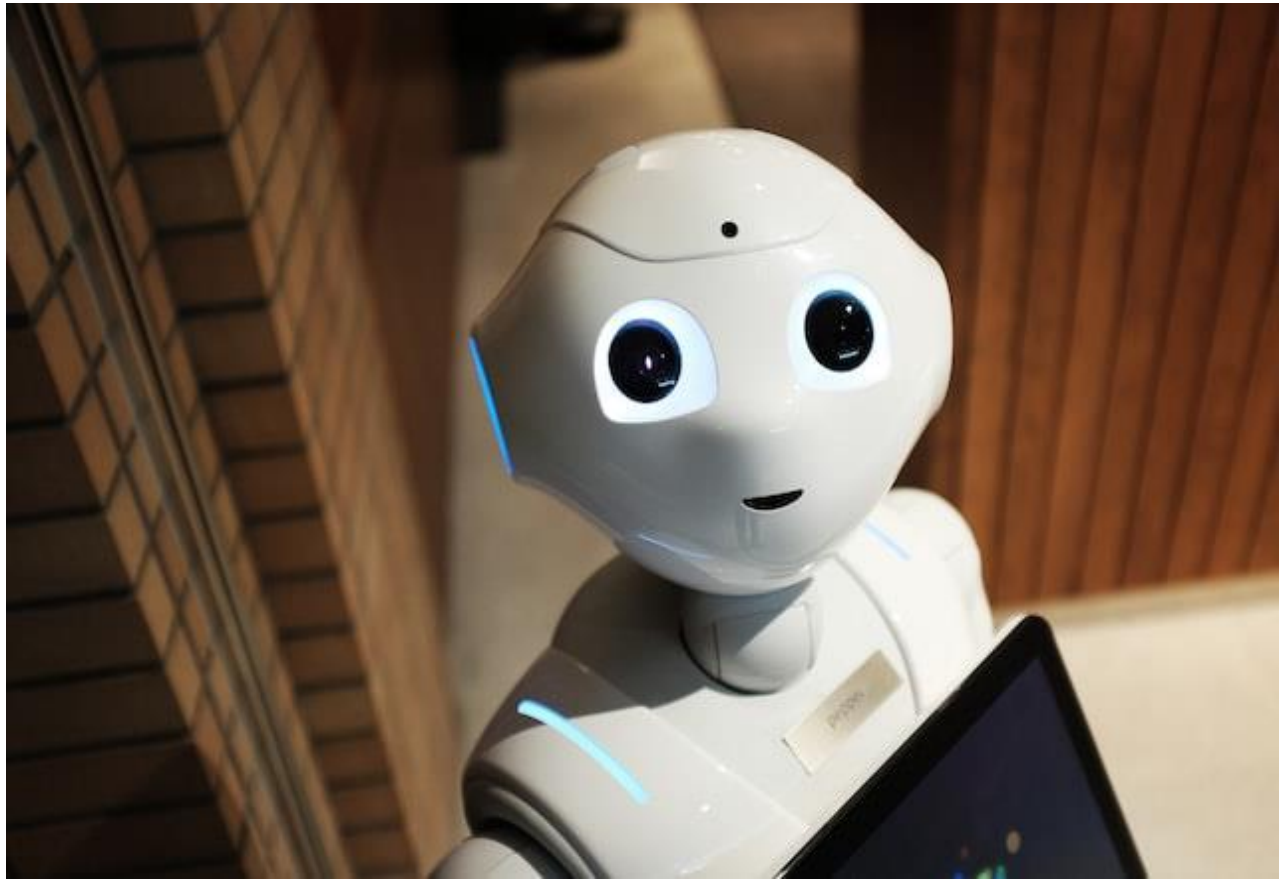
Additional Services: Artificial Intelligence (AI)

Possibility to add Machine Learning, Machine Vision & Artificial Intelligent features for:

- Analyzing sounds
- Plant disease detection
- Detection of pests and weeds
- Plant/animal malnutrition
- Livestock health monitoring
- Automatic weeding
- Grading and sorting of produce
- Analyzing data and presenting intelligent results
- Consolidating complex data from multiple sources (weather forecasts, drone images, satellite images, 3rd party systems)
- Autonomous complex decision making
- Predictive maintenance



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Our Offer

Our Smart Farming Platform & custom services include everything from Smart components to complete custom Smart Farming Systems:

- **IoT-Enabled Sensors** with custom interface for connecting to other Farm Management systems
- Powerful **IoT Programmable Controller** with Configuration Manager installed as firmware
- Custom **Meteo Stations** as requested by clients, incl. basic to very complex functionality
- Orchestrating **swarms of Smart Farming IoT Devices**: self-sustained (offline) or connected to Internet
- Designing and building **complete custom Smart Farming Systems**, including control over farming infrastructure
- **Machine Learning** and **Artificial Intelligence**
- **Data interoperability for easy integration** with other Farm Management systems
- **Gathering real-time data** to feed higher level farming systems, ESG reporting tools, etc.
- **Technology transfer** to producers of Hydroponics, Agridrones, Agrirobots, other agriculture equipment
- **White label** solutions
- We are open to working with both end clients and all smart farming partners across the **supply chain**

GRAS

MEET OUR TEAM

M.Sc. Pavlina Dimitrova

Managing Partner

I believe in our team and what they do. The future belongs to IoT and we will prove it.

M.Eng. Jasen Kolev

Security & Infrastructure Manager

My goal: Provide the best possible infrastructure and security for our implementation team and future clients

Eng. Nencho Minchev

IoT & Technology Developer

Being an engineer, my passion is transforming source code into something which can be seen or touched

Elena Boevska

Business Development Manager

Sustainability is the next big thing and we would like to be a part of it

With a total of 100+ years in IT, we are more than ready to face the challenges of the future

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Smart farming solutions

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