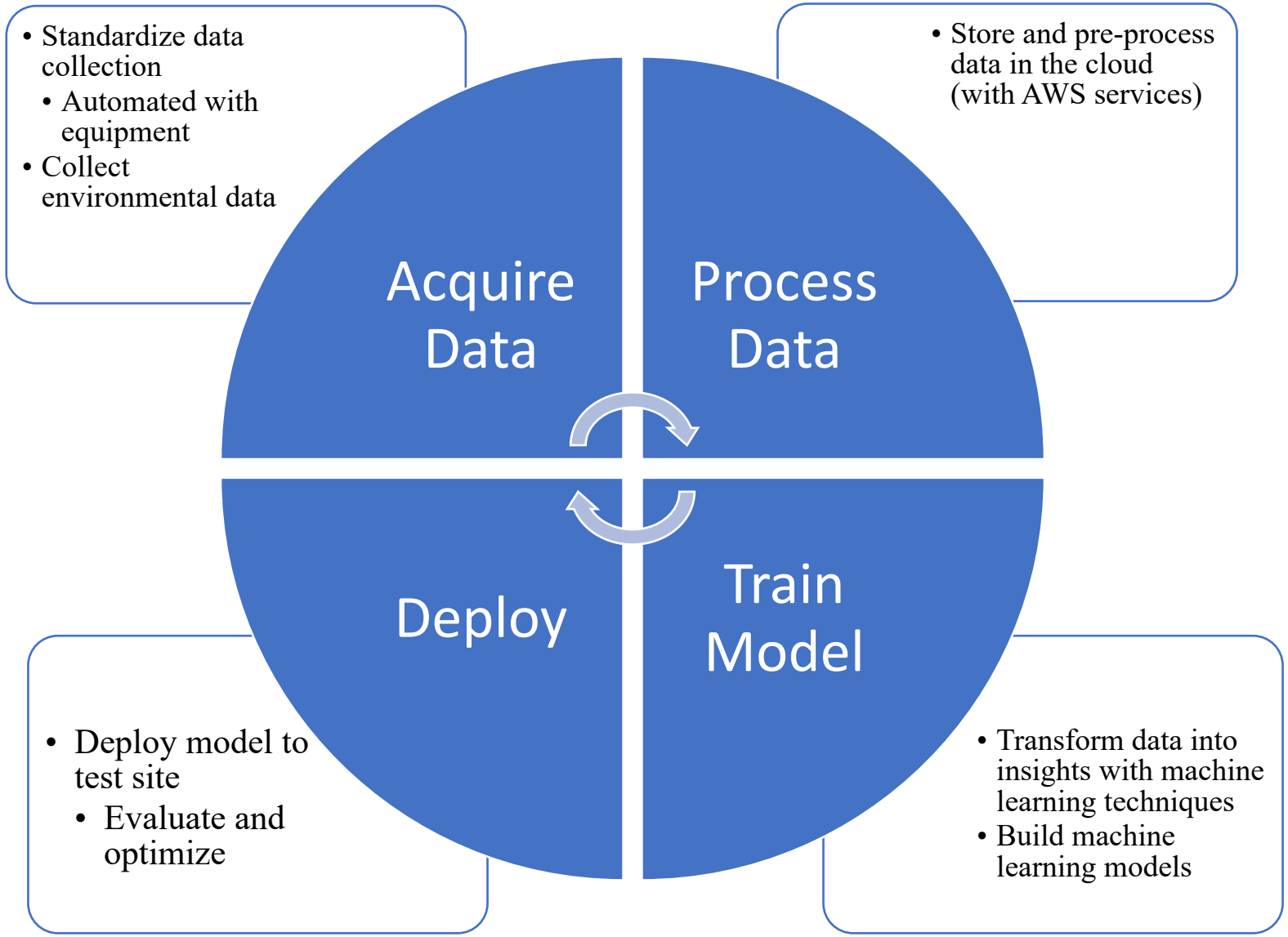
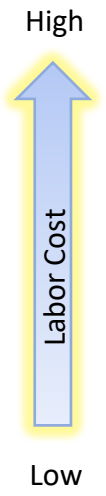
Shrimp Farm Automation

IoTEasier

Automation Process

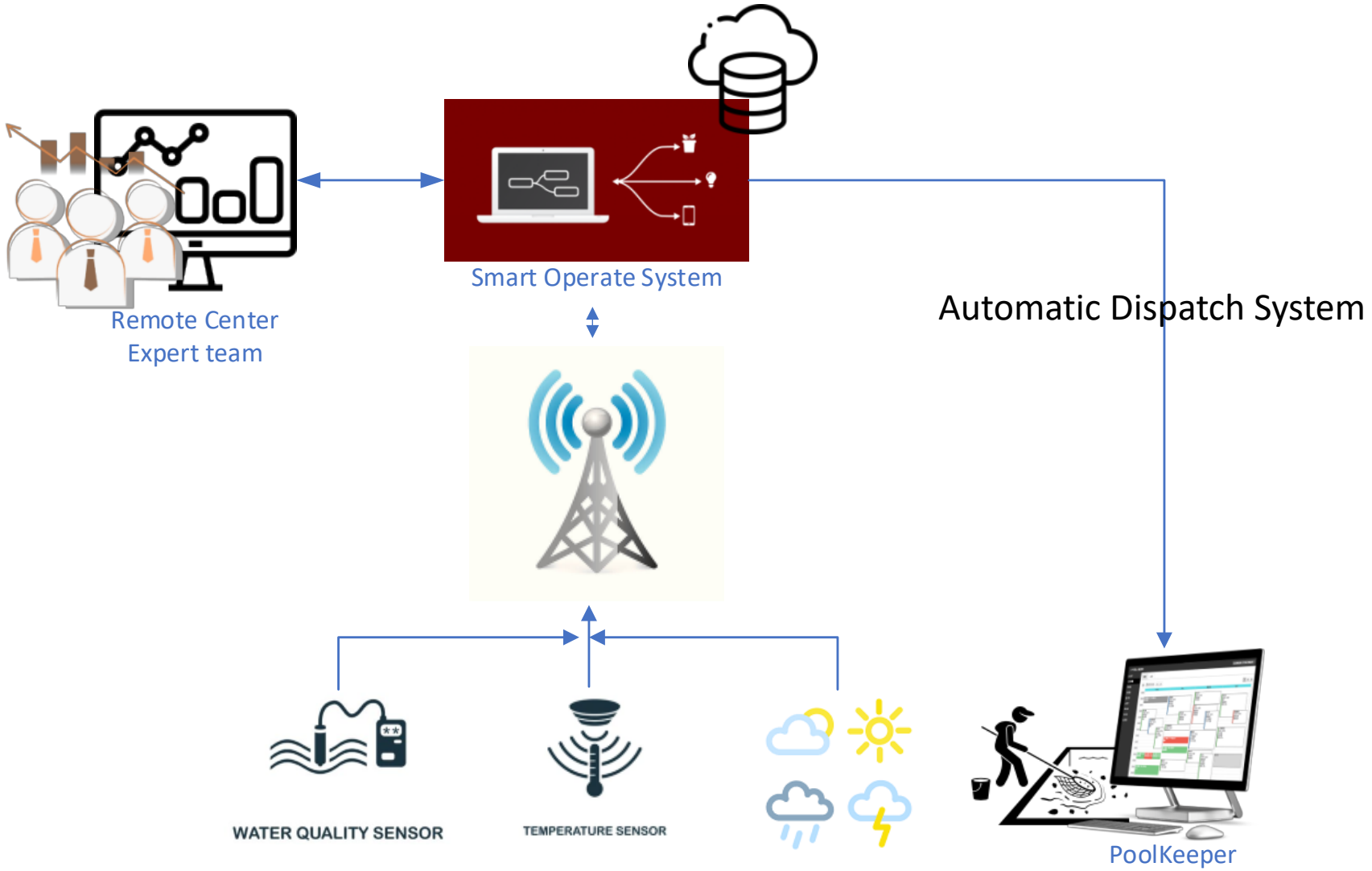


Comparison

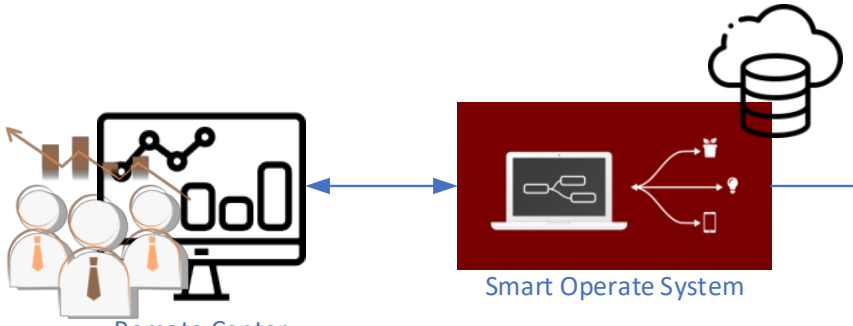


Methods	Knowledge Base	Advantages	Disadvantages
Traditional Methods	• Experience • Visual Inspection		• Labor Intensive, Prone to Human Errors, Difficult for Large Scale Deployment
Naïve Automation	• Pre-defined Thresholds	• Lower Labor Cost	• Lack of Adaptability, Prone to Human Errors
Advanced Automation	• Domain Knowledge • Precise and Real-time Measurement • Machine Extracted Insights	• Scalable, Precisive, and real-time adjustments, Lower Labor Cost	• Longer cycle, higher Entry Requirements

Automation System



Remote Center
Compile all site and environmental data so the management team can remotely monitor each site. If any sensor readings exceed predefined limits or a site keeper makes a request, the remote management team can be immediately notified and provide advice and instructions

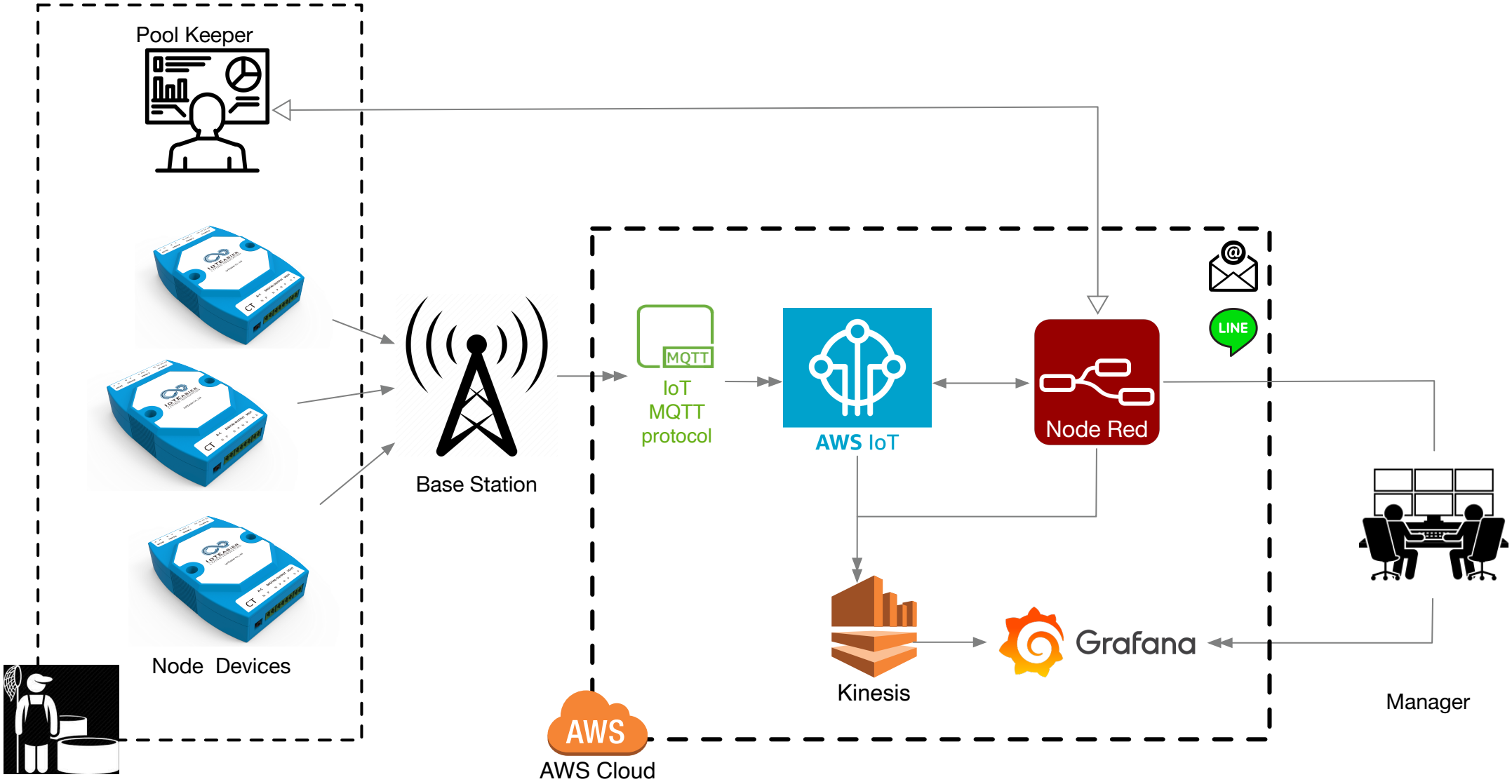


Cloud System
All data will be sent to the cloud. The automation system will also be hosted here to determine necessary operations based on the received data.
Warning – for the remote management team
Automation System – control site equipment
Site Manager Dispatch System – automatically assign tasks to site keeper

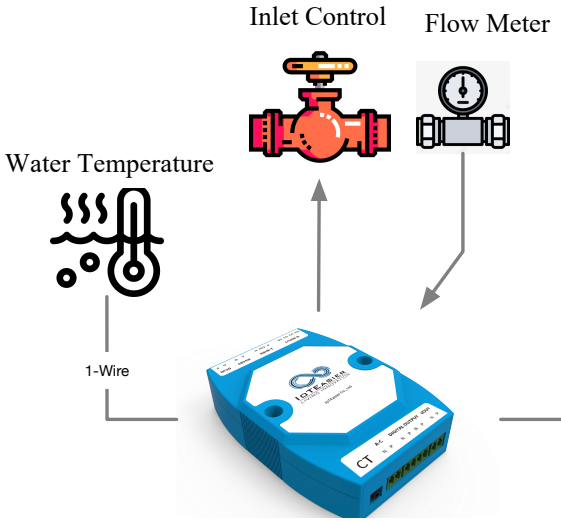
Site Equipment and Sensors
All equipment and sensors are connected to the cloud, allowing real-time communication (sending data and receiving commands). The remote center can control equipment like water wheels, valves, and feeding equipment
Environmental Data
The cloud system regularly collects weather forecasts via API for

The Dispatch System will generate a maintenance schedule for site keepers based on sensor data, scheduling daily tasks such as feeding parameters, maintenance, …

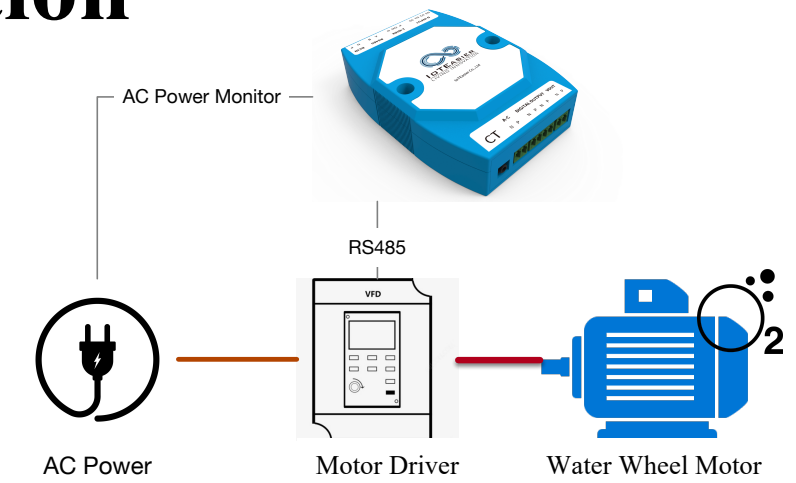
System Architecture



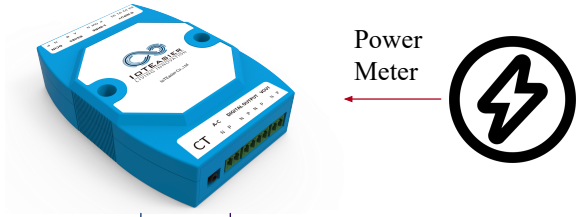
Hardware Connection

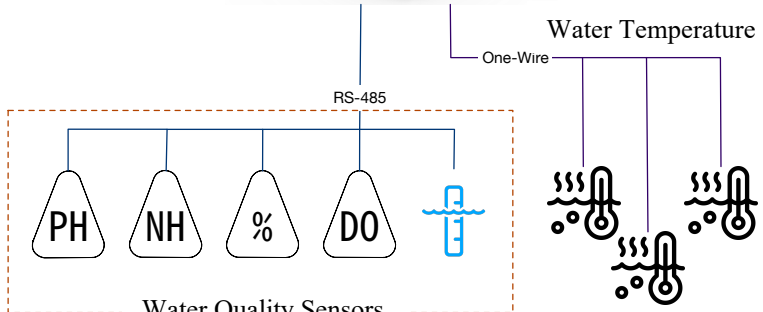


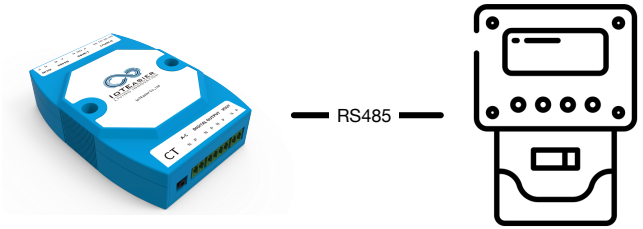
Water Valve Control



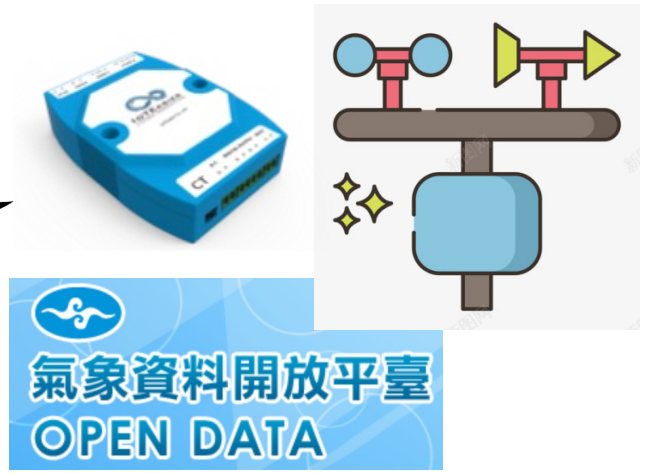
Water Wheel Control







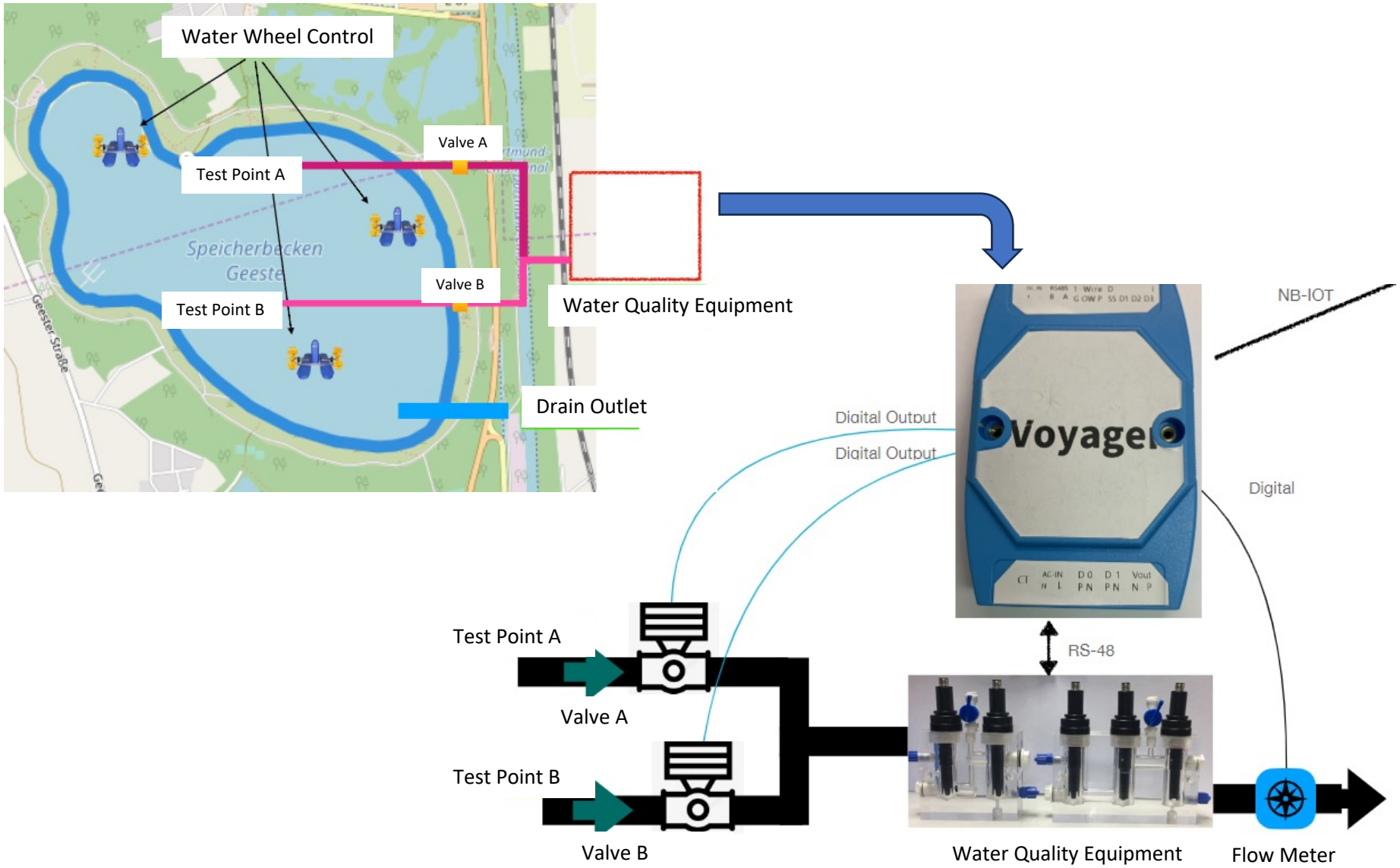
Power Monitoring



Environmental Data Collection

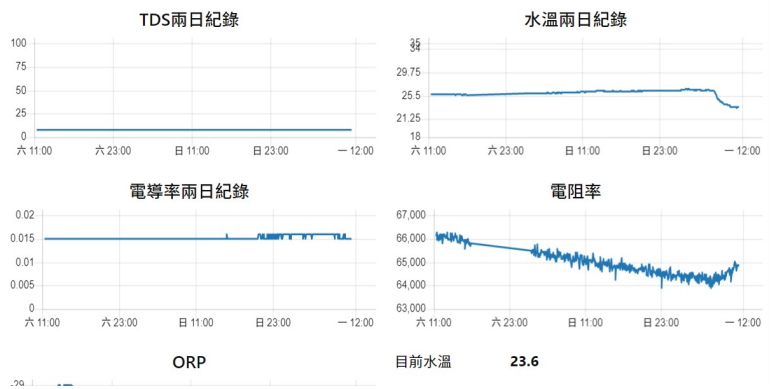
Water Quality Monitoring

- Temperature
- PH Value
- Ammonia Nitrogen
- Salinity
- Conductivity
- TDS
- Dissolved Oxygen



Remote Center

- Display collected data
  - Water Quality
  - Environmental Data
    - Weather forecasts
  - Equipment Status
- Control Panel



Water Quality Graphs

水質感測

名稱	當前數值	目標數值	3小時平均	12小時平均	24小時平均	單位
含氧量	6.760	3.5	6.64	6.65	6.67	ppm
氨氮	0.001	0.5	0.00	0.00	0.00	ppm
酸鹼值	0	7				pH
鹽度	8.012	10	8.10	8.08	8.05	ppm
TDS	7.704	100	7.79	7.77	7.74	ppm
水溫	23.600	25	25.50	26.51	26.41	°C
電導率	0.015	0.05	0.02	0.02	0.02	ms/cm
電阻率	64899.914	0	64170.23	64357.71	64605.82	Ωcm

Water Quality History

天氣狀況及預報(成功氣象站)

名稱	數值	單位
高度	92	m
風向	北	方位
風速	4.6	m/s
溫度	26.9	°C
濕度	86	%
氣壓	999.3	hPa
降雨量	-99	mm
當日最高溫度	26.9	°C
當日最低溫度	23.9	°C

Weather Data

Equipment Status & Control

Control Panel

- Automatic Control and Scheduling
  - Water wheel on/off
  - Water quality measurement (inlet/outlet control)
- Dispatch System
  - Feeding
  - Maintenance
  - Water quality control
  - Growth measurement

System Advantages

- Data-driven management processes
  - Real-time monitoring and control
  - Anomaly detection and prevention
  - Personnel management
  - Automatic generation of Traceable Agricultural Products
- Shorter learning curve for new site deployment
- Replicate aquaculture expert's experiences
- Cost management
  - Energy saving
  - Reduction in feed waste
  - Reduction in labor cost