SWARUP SOFTECH

WEATHER MONITORING SOLUTIONS

SYSTEM OVERVIEW

IoT Weather Monitoring System Overview

A practical overview of field sensing, edge data acquisition, secure connectivity, multi-site dashboards, SCADA integration and lifecycle support.

Industrial sensors | Edge data logger | SCADA | SQL | Secure cloud

SS-WMS-OV-01

WEATHER INTELLIGENCE

One platform from field sensors to remote decisions



An IoT weather monitoring system converts site conditions into reliable operational data. A complete solution combines correctly exposed sensors, industrial edge logging, local storage, secure communication, live dashboards, alarms, SQL history and engineering reports. The objective is not simply to display weather values: it is to deliver trusted, traceable and actionable information to plant, infrastructure and research teams.

01 Live visibility

Current values, device health, trends and site connectivity from any authorized location.

02 Operational resilience

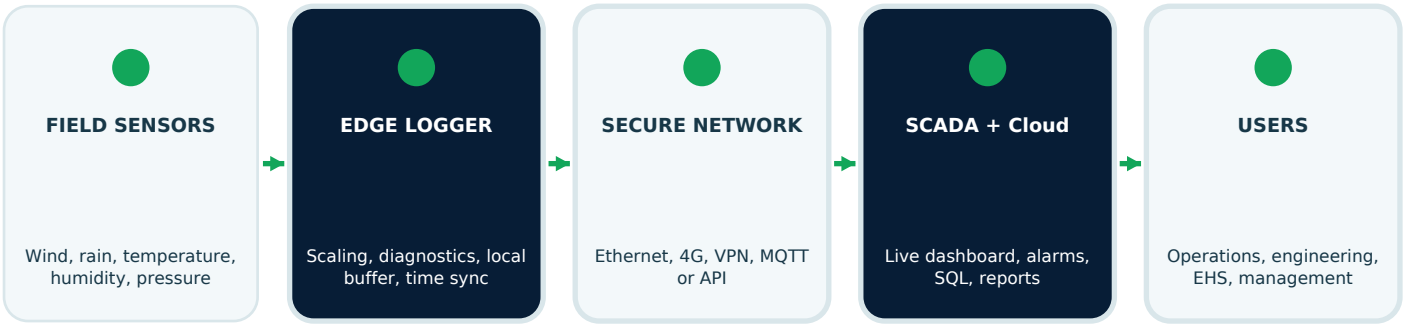
Local buffering and store-and-forward logic preserve data during network interruption.

03 Open integration

Modbus, MQTT, SQL, REST API and project-specific interfaces connect existing systems.

SYSTEM ARCHITECTURE

A layered design for dependable weather data



The edge layer should continue measuring and storing data even when the wide-area connection is unavailable. When communication returns, buffered records synchronize using original timestamps. This design prevents gaps, avoids dependence on permanent cloud connectivity and supports both local SCADA and centralized multi-site monitoring.

01 Local operations path

Sensors connect to the edge data logger through analog, pulse or RS485 interfaces. The logger performs scaling, quality checks, averaging and local storage. Live values can be mapped to a plant PLC or SCADA using Modbus TCP, OPC UA or SQL according to the existing automation architecture.

02 Remote monitoring path

A secure gateway publishes selected values, diagnostics and timestamps to the cloud platform. Authorized users receive dashboards, alarms, scheduled reports and exports. VPN, encrypted transport, role-based access and audit records protect operational data.

Recommended principle: keep measurement and safety-critical logic at the edge; use cloud services for visibility, analytics, collaboration and long-term reporting.

EDGE HARDWARE

Serviceable industrial data acquisition



01 Field interface

Analog voltage/current, pulse, digital status and RS485/Modbus channels with surge protection, isolation and clearly documented terminals.

02 Edge computing

Time synchronization, engineering-unit scaling, diagnostics, averaging, quality flags, local database and store-and-forward synchronization.

Layer	Typical functions	Engineering outputs
Sensors	Measurement and self-diagnostics	Value, unit, quality, calibration
Logger	Sampling, scaling, buffering	Timestamped records and health
Gateway	Routing and secure publishing	Connectivity and synchronization
SCADA/Cloud	Visualization, alarms, reports	Trends, exports, audit history

PROJECT EXECUTION

From site survey to reliable handover

01 Site and application survey

Confirm parameters, exposure, mounting height, obstructions, cable routes, power, network and service access.

02 Detailed engineering

Freeze sensors, ranges, interfaces, panel architecture, tag list, data rate, alarm logic and reports.

03 Factory acceptance

Verify wiring, scaling, simulated inputs, local storage, communication, dashboard views and documentation.

04 Installation and commissioning

Check orientation, earthing, shielding, time sync, reference values, network recovery and user access.

05 Training and handover

Provide drawings, configuration backup, calibration certificates, SOP, spare list and support contacts.

06 Lifecycle support

Schedule cleaning, calibration, battery checks, enclosure inspection, firmware backup and data-quality review.

WHERE IT CREATES VALUE

Common industrial and infrastructure applications

01 Solar power plants

GHI, POA irradiance, module temperature, wind, soiling context and performance reporting.

02 Factories and utilities

EHS, cooling, process context, operations alarms and plant-wide SCADA integration.

03 Rainfall and water

Event intensity, accumulation, watershed networks, dam sites and threshold alerts.

04 Agriculture and research

Microclimate history, irrigation decisions, trials, APIs and high-resolution datasets.

05 Smart infrastructure

Distributed stations, map dashboards, remote health, centralized reports and public-service alerts.

06 Remote assets

Solar-powered edge stations, 4G communication, offline buffering and low-maintenance operation.

Ready to plan your IoT weather monitoring system?

REQUEST A PROPOSAL