

02 / CONNECTING THE SHOP FLOOR TO DECISIONS

See the plant clearly. Operate proactively.

Connects equipment data and monitors performance, quality and energy on one unified operations platform.

IoT/CPSmart capability documentation exists; the dashboards, assistant and apps in this kit are design prototypes not yet connected to real equipment.

[Case study](#) · [screenshots](#) · [role-based apps](#) ↗

SOLUTION BRIEF / 09.2026

Problem & audience

Plant directors and the maintenance, production, quality and energy teams.

- Machine data and shift reports are out of sync; downtime root causes are hard to trace.
- Reactive maintenance after failures causes disruption and is hard to plan.
- Energy use and quality defects are not tied to individual lines or batches.

Solution modules

MODULE 01

Monitoring & OEE

Tracks machine state, output, downtime and reasons; computes OEE by the definition the plant approves.

MODULE 02

Condition-based maintenance

Analyses vibration, temperature and failure history; flags anomalies and raises inspection requests.

MODULE 03

Quality & safety

Connects quality checks via data/cameras at suitable points; operators verify alerts.

MODULE 04

Energy & dashboards

Tracks power by equipment, shift or product; reports trends and abnormal consumption points.

Process & data

Sensors / PLC →

Edge gateway →

Data platform →

Analytics & alerts →

Verify / maintain

Data to prepare

- Asset register, OT network diagram and existing device protocols.
- Shift data, good/defective output, downtime and maintenance history.
- Energy norms, metering diagram and system access rules.

Proposed architecture: data sources → connection & permission layer → processing / rules → business UI → logs & measurement. Infrastructure details are fixed after discovery.

Deliverables

- Site survey, measurement-point catalogue and OT/IT connection architecture.
- Gateway, dashboards and alert set within the pilot equipment scope.
- Connection-loss test suite, operating guide and system maintenance schedule.
- Case study with screenshots, a workspace and sample apps for three roles; module/permission matrix and handover flow.

Delivery conditions

The customer names a process owner, provides data cleared for use and a systems contact. CTC Smart Tech and the business team agree scope, test set, change handling and operating responsibility.

Infrastructure, equipment, licences, third-party integration and AI running costs are determined separately by discovery. This document is not a quotation or SLA commitment.

Pilot & acceptance criteria

1. Choose one line or equipment group and survey the measurement points.
2. Connect read-only, check data quality and time sync.
3. Build dashboards and tune thresholds with operations staff.
4. Cross-check on site; accept and plan the roll-out.

METRIC	HOW IT IS MEASURED
Data coverage	Share of active measurement points and valid records versus expected.
OEE	Availability × Performance × Quality; recording method agreed before the pilot.
Useful alerts	Share of alerts verified as correct; time from detection to handling.
Energy	kWh per product unit, compared within the same product and operating conditions.

Fix the pass threshold, sample size and measurement period before the pilot. These metrics are a proposed evaluation frame, not actual results or a performance commitment.

Governance & control

- Early phases favour read-only connections, OT/IT network separation and role-based accounts.
- Internet loss requires an edge buffer; retention time and sync mechanism are part of acceptance.
- Forecast models need quality history; no lead-time commitments before measurement.

Apply least privilege, data separation, action logs, retention/deletion rules and recovery. Test wrong-permission access, missing data and service interruption before handover.

CTC SMART TECH / SOLUTION-DESIGN CASE STUDY

Industrial IoT · Plant Operations

A design case study based on the Industrial IoT and CPSSmart profile: monitoring measurement points, verifying alerts, assigning maintenance and closing the loop.

Evidence status

IoT/CPSmart capability documentation exists; the dashboards, assistant and apps in this kit are design prototypes not connected to real equipment.

Sample UIs use synthetic data. Existing DocAgent screenshots have record/partner/figure data redacted. No real customer or employee results are used for illustration.

Collect

Log timestamp, equipment, measurement point and signal quality.

Verify

Operations receives the alert and checks data reliability.

Assign

Create an inspection request for the right technician.

Maintain

Record the checklist, on-site result and evidence of work.

Close the loop

The manager checks the result before closing the alert.

01 / UI & DATA SOURCES

See where the work gets done.



Role-based business
workspace.

System overview

Operator

Maintenance technician

Plant manager

Business assistant

PROPOSED PROTOTYPE
Synthetic data, no real customer
or employee information.
Not connected to production
systems.

CTC Plant Operations

PROTOTYPE

SOURCED WORK · PEOPLE DECIDE

From equipment signals to maintenance action.

Industrial IoT · Plant Operations

03

Illustrative measurement points

01

Alert to verify

00

Equipment control commands

Work queue

Synthetic data

Equipment	Measurement point	Sample signal	Status
DEMO-PUMP-01	Temperature	78 °C / sample threshold 75 °C	Awaiting confirmation
DEMO-MOTOR-02	Connection state	Illustrative data ready	Monitoring
DEMO-METER-03	Power	Metering cycle to reconcile	Monitoring

Open sample record ...

Flow by role

- Operator**
Review alerts and measurement-point quality.
- Maintenance technician**
Receive the assigned work order.
- Plant manager**
Track handling status and owners.

Decisions have an owner

No real sensor connection, no machine-operation instructions, no PLC/SCADA writes.

Sources & versions

SENSOR-DEMO v1

Simulated point: 78 °C with an illustrative 75 °C threshold. Not a recommended threshold for real equipment.

WORK-DEMO v1

Sample work order; on-site verification follows the plant-approved maintenance procedure.

POLICY-DEMO-OT

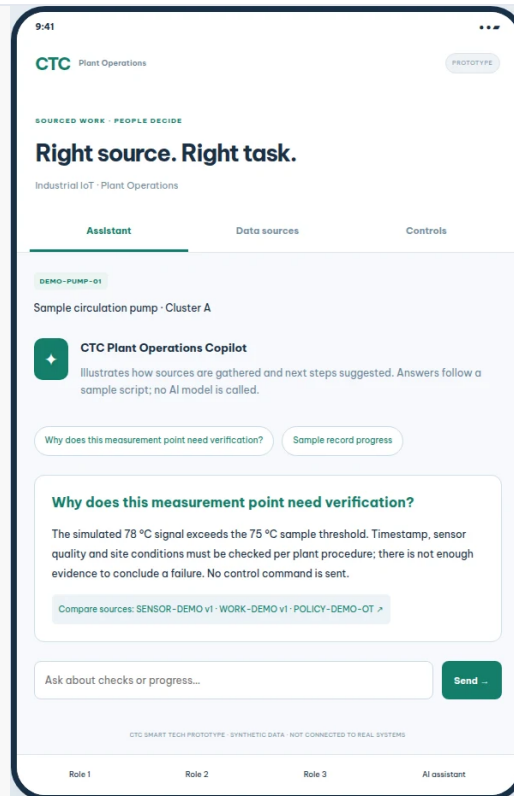
The prototype only tracks state; no PLC/SCADA connection and no control commands.

Prototype session log

Proposed prototype

Plant Operations workspace

Prototype dashboard with simulated records; states and process follow the solution design.



Proposed prototype

Plant Operations assistant

Why does this measurement point need verification? Sourced simulated scenario; no LLM call.

02 / ROLE-BASED APPS

Every role has a clear workflow.

The apps focus on frequent tasks. In production they share the APIs, file codes, permission policy and history of the business platform.

SHIFT & ALERTS

Operator

- Review alerts and measurement-point quality.
- Acknowledge receipt during the shift.
- Forward the inspection request to maintenance.

[Record-handling screen ↗](#)

FIELD WORK

Maintenance technician

- Receive the assigned work order.
- Confirm the inspection per the on-site procedure.
- Record the result and hand over for manager review.

[Record-handling screen ↗](#)

RISK & RESOURCES

Plant manager

- Track handling status and owners.
- Check maintenance results before closing an alert.
- Summarise causes and improvements.

[Record-handling screen ↗](#)

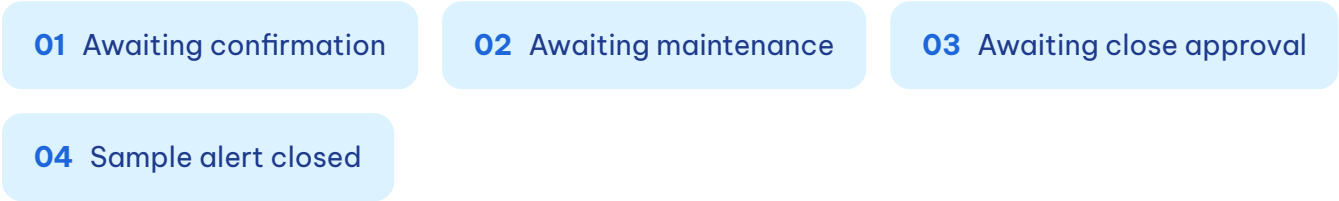
Module mapping & permission limits

ROLE	MODULE	SCOPE
Operator	Monitoring → Alerts → Maintenance request	Acknowledges and reports state; cannot change thresholds or control machines.
Maintenance technician	Work order → Checklist → Inspection result	Assigned work only. Cannot close alerts before approval.

ROLE	MODULE	SCOPE
Plant manager	Dashboard → Maintenance → Close approval → Audit log	Approves state within scope; OT control changes need a separate procedure.

03 / A PROTOTYPE FLOW YOU CAN TRY

From input to an evidence-based decision.



The first role completes the checklist and submits evidence; the next role records an evidence-based result; the approver confirms or returns with a reason. The sample session logs every step.

Prototype boundary

No real sensor connection, no machine-operation instructions, no PLC/SCADA writes.

Sample state is stored in the same browser, separated per solution. There is no authentication, multi-user backend, cross-device sync, push or LLM connection. Those must be built and accepted before real operation.

Sources to compare, not automatic conclusions.



The simulated 78 °C signal exceeds the 75 °C sample threshold. Timestamp, sensor quality and site conditions must be checked per plant procedure; there is not enough evidence to conclude a failure. No control command is sent.

DEMO sources are synthetic data for simulation. Real business documents must be collected with usage rights, versioned and quality-checked.

Pilot & acceptance roadmap

1. Survey measurement points, protocols and the OT/IT boundary.
2. Connect read-only; check timestamps, missing data and buffering.
3. Run trial alerts; cross-check with operations/maintenance.
4. Accept the confirm-handle-close loop and recovery capability.

Conditions to verify

- Alerts store source, time and measurement-point quality.
- No closing without an inspection result.
- Delayed / disconnected data shows the correct state.
- The monitoring flow never generates control commands.

Agree scope, baseline, sample size, confirming person and operating responsibility before the pilot. Demos do not replace acceptance results or performance commitments.

Reference direction: CTC Smart Tech Industrial IoT & CPSSmart capability profile. Details are compiled from existing documents and source code; new UIs are clearly marked as proposed designs.

Frequently asked questions

Do we need to replace all machinery?

We first survey what existing PLC/SCADA can expose; sensors are only added where points are missing.

How soon do we get predictive maintenance?

It depends on data quality and failure history. Start with alert thresholds, then upgrade once enough data has accumulated.

Basis of this document

Reference: CTC Smart Tech Industrial IoT & CPSSmart capability profile. IoT/CPSSmart capability documentation exists; the dashboards, assistant and apps in this kit are design prototypes not yet connected to real equipment. The process, pilot and acceptance sections in this kit are proposed designs to be confirmed per project.