



contact@nexa.com.tn

NEXA : ENGINEERING & PRODUCT

PFE Program 2027

SECURE AND CONTEXT-AWARE INDUSTRIAL DATA INTEGRATION





— PFE PROGRAM 2027

Secure and context-aware industrial data integration

Three coordinated end of studies projects. One shared engineering outcome: connect industrial data to the right machine and operating context, and make it useful to Nexa through a secure, repeatable integration path.

The shared project

Build and validate a secure path from an industrial machine or control system into Nexa: collect approved data through Nexa Edge, protect its transfer and access, and connect each signal to its asset, meaning, units, operating state, and maintenance history.

— THREE WORKSTREAMS

01 Data Engineer

Contextualize machine data and connect it to assets and maintenance events.

02 Security Engineer

Map platform and integration risks; define and verify practical security controls.

03 Industrial IT Specialist

Connect PLC/SCADA data to Nexa Edge using approved, read-only methods.

The projects are scoped separately for supervision and assessment, but designed to fit together in one integrated demonstration.



— THE COMMON CHALLENGE

One connected industrial data flow

Industrial teams often have machine signals, asset registers, alarms, work orders, manuals, and production information in different systems. A reading becomes useful only when Nexa can identify its source, the machine and component it describes, its units and operating conditions, and whether the reading is trustworthy. The integration must also respect the customer's IT/OT boundaries and security requirements.



Program objective

Deliver a documented, tested, and secure integration prototype that turns approved industrial signals into contextualized information Nexa can use for operational visibility and future maintenance intelligence.



— SHARED PROJECT STAGES

Connect. Protect. Contextualize. **Demonstrate.**

1

Connect

Read approved PLC, SCADA, or existing system data through an authorized route.

LEAD CONTRIBUTION

Industrial IT Specialist

2

Protect

Define boundaries, access, transfer, logging, and evidence requirements across edge and cloud.

LEAD CONTRIBUTION

Security Engineer

3

Contextualize

Validate and map signals to assets, components, units, states, alarms, and work history.

LEAD CONTRIBUTION

Data Engineer

4

Demonstrate

Show traceable data in Nexa with its source, timestamp, context, and quality status.

LEAD CONTRIBUTION

All three



WORKSTREAM 01

Data Engineer

Industrial data contextualization

Build the information layer that explains what each industrial signal means and connects it to the correct machine, component, operating context, and maintenance record. The goal is data Nexa can interpret consistently across different machines and sites.

YOUR PROJECT

- 1 Define a practical data model for assets, components, signals, units, sources, timestamps, operating states, alarms, and data-quality status.
- 2 Build or improve Python and SQL transformations that normalize incoming telemetry and preserve its original source and time.
- 3 Map signals to asset-register information and, where available, alarms, production events, work orders, preventive tasks, and parts records.
- 4 Design validation checks for missing or stale readings, duplicates, timestamp problems, counter resets, unit mismatches, and implausible values.
- 5 Create a small contextualization prototype and document a repeatable onboarding method for a newly connected machine.



— DATA ENGINEER

Expected deliverables



Industrial data model and signal dictionary

Definitions for asset/component, signal meaning, unit, source, sampling, expected range, and quality status.



Working transformation pipeline or prototype

Reproducible ingestion and normalization using an agreed test dataset or authorized connection.



Contextualized demonstration

At least one agreed machine or test asset with mapped signals and links to relevant operational records where available.



Data-quality report and onboarding guide

Documented validation results, known gaps, and steps to add a new machine or signal.

PROFILE AND SKILLS

Final-year engineering or equivalent master's student in data engineering, computer science, software engineering, or a related field. You should be comfortable with Python, SQL, data modeling, and data transformation, and interested in time-series data and industrial operations.

USEFUL EXPERIENCE

PostgreSQL

pandas

REST APIs

AWS

Docker

OPC UA

MQTT

Modbus

Maintenance datasets



WORKSTREAM 02

Security Engineer

Platform security and compliance readiness

Assess how industrial data moves between the customer environment, Nexa Edge, the Nexa cloud platform, and authorized users. Help the team identify security gaps, prioritize practical controls, and maintain evidence that can support customer security reviews.

YOUR PROJECT

- 1 Map data flows, trust boundaries, identities, and sensitive information across the web and mobile applications, APIs, cloud services, AI services, and edge connections.
- 2 Create a threat model that considers tenant separation, customer IT/OT boundaries, edge devices, credentials, and data transfer.
- 3 Review authentication and authorization, role-based access, API protections, secrets handling, encryption, audit logs, backups, dependencies, and deployment practices.
- 4 Run only approved security checks in authorized test environments; document findings with severity, evidence, and a practical remediation path.
- 5 Map relevant controls to an agreed security baseline and applicable privacy obligations. Identify evidence and owners for each control.



— SECURITY ENGINEER

Expected deliverables



Threat model and data-flow diagrams

Documented assets, boundaries, threats, assumptions, and risk scenarios.



Prioritized risk register

Findings with severity, evidence, recommended treatment, owner, and status.



Security baseline and evidence checklist

Controls, current state, evidence needed, owner, and next action.



Selected implemented controls

A scoped set of fixes or automated checks reviewed with the engineering team, plus a concise incident and access-review recommendation.

PROFILE AND SKILLS

Final-year student in cybersecurity, computer science, networks, or cloud engineering. You should understand web/API security, identity and access management, Linux, and networking, and be able to write clear technical findings and work with software engineers.

USEFUL EXPERIENCE

AWS

OWASP guidance

IAM

Security testing

DevSecOps

Privacy engineering

Security frameworks

Scope note: This PFE supports security improvement and compliance readiness. It does not promise certification or a formal compliance audit. Testing is limited to systems and environments Nexa explicitly authorizes.



— WORKSTREAM 03

Industrial IT Specialist

PLC and machine integration with Nexa Edge

Study and validate a safe, repeatable way to collect useful machine data for Nexa. Work with industrial and software teams to understand available interfaces, map the required signals, and document the customer-side prerequisites for commissioning.

YOUR PROJECT

- 1 Survey the machine, PLC, SCADA, historian, and available customer-approved interfaces; recommend a connection route based on the site's constraints.
- 2 Configure and test read-only collection through Nexa Edge using OPC UA and, where supported and authorized, Siemens S7 or Modbus TCP.
- 3 Prepare a tag inventory covering signal name, source, meaning, unit, operating range, update behavior, and known limitations.
- 4 Validate timestamps, units, signal changes, buffering, reconnect behavior, and data availability using a test bench or authorized machine connection.
- 5 Document responsibilities and steps for Nexa and customer IT/OT teams, including network access, accounts, firewall rules, and acceptance checks.



— INDUSTRIAL IT SPECIALIST

Expected deliverables



Connection proof of concept

A working, read-only connection to an agreed test setup or authorized machine using Nexa Edge.



Tag inventory and mapping proposal

Signals described with source, meaning, units, behavior, and quality notes for the Data Engineer.



Commissioning and network guide

Clear prerequisites and sequence for customer IT/OT and Nexa teams, with a network/data-flow diagram.



Test report

Results for normal operation, disconnection/reconnection, buffering where supported, and known limitations.

PROFILE AND SKILLS

Final-year student in industrial IT, automation, electrical engineering, mechatronics, or computer engineering. You should be familiar with PLCs, industrial networks, SCADA, and troubleshooting, and be willing to document and coordinate technical work across teams.

USEFUL EXPERIENCE

Siemens PLCs

OPC UA

Modbus TCP

Industrial Ethernet

Python

Factory commissioning