

The Industrial AI Layers

Cheat Sheet

**Includes an AI-ready self scoring
test under 10 minutes!**

Data-to-Action Architecture

The six-stage end-to-end framework for enterprise intelligence and autonomous execution



Sources: Preserve Authoritative Systems

The source layer begins with the systems already running the organization.



OT Side

May include PLCs, DCS, SCADA, sensors, robotics, CNC systems, machine vision, and historians.



Operations Level

May include MES/MOM, quality, maintenance, scheduling, and warehouse systems.



Enterprise & Engineering

ERP, PLM, CAD, procurement, supply-chain platforms, and document repositories.

Core Architectural Principle

An AI architecture should not casually duplicate or redefine the authority of those systems. It must always know where the authoritative information lives.

Connectivity: Create Controlled Pathways

Connectivity makes info usable beyond its original system (OPC UA, MQTT, APIs, gateways). But connected does not mean unrestricted.

LEVEL 01

Read Access

AI can inspect data to provide insights and visibility without modifying the source.

LEVEL 02

Recommended

AI proposes a response or setpoint optimization for explicit human approval.

LEVEL 03

Workflow

AI can trigger a predefined, sandboxed enterprise process automatically.

LEVEL 04 (HIGH RISK)

Control Action

AI directly influences or executes changes in an operational system or physical process.

Oversight & Risk Mandate

These pathways represent increasingly significant levels of risk. The closer AI gets to physical action, the more important identity, authorization, validation, fail-safe behavior, and human oversight become.

Context: Transform Signals into Operational Meaning

Context is arguably the most important layer for Industrial AI.

Structured Signals

A raw vibration reading tells a model very little. It must be associated with a specific motor, operating load, product, and maintenance history.

Unstructured Context

Critical information lives in maintenance manuals, service reports, engineering drawings, and quality investigations that never appear in standard time-series databases.

Data Sovereignty

Whether using centralized, federated, or distributed patterns, any architecture can succeed provided that interfaces, identities, metadata, and ownership are clear.

Manufacturing Data Platform Principle

Value lies in making info usable in context. SEIDOR's AI Stack Starter establishes secure access to knowledge, while IoT Bricks & Delfos connect telemetry as requirements grow.

Governance: Decide What AI is Allowed to Know and Do



Governance should not be added after successful pilots; it is a fundamental part of the core architecture.

For each AI capability, the organization should be able to answer:

01 / DATA ACCESS

What information can the model access?

Where can that information be processed?

02 / MODEL IDENTITY

Which models are approved?

How are identities and permissions enforced?

03 / EVALUATION

How is model output evaluated?

Can the system initiate actions automatically?

04 / HUMAN AUDIT

Which actions require human approval?

Can decisions be fully reconstructed and audited?

NIST AI Risk Management Framework & Manufacturing Context

Provides structure across design, deployment, and use. In manufacturing, these principles must operate alongside cybersecurity controls and OT safety boundaries—tightly interconnecting governance, data sovereignty, and architecture.

Models and Agents: Select the Right Intelligence

There is no single "Industrial AI model." Different operational problems require distinct techniques and architectures.



PREDICTION

Machine Learning

Used for forecasting, anomaly detection, and predictive maintenance.



PERCEPTION

Computer Vision

Used for inspection, dimensional analysis, and visual verification.



KNOWLEDGE

Gen AI & RAG

Enables engineering knowledge access, maintenance support, and natural dialogue.



OPTIMIZATION

Physics Models

Handles process tuning, scheduling, yield improvement, and physical simulations.



AUTONOMY

AI Agents

Reasons across multiple sources and coordinates complex workflows.

Architecture & Digital Twins

A digital twin is highly valuable for simulation, virtual commissioning, or state modeling, but it is not a prerequisite to becoming AI-ready. Architecture must always follow the actual operational problem, not the terminology currently receiving the most market attention.

Action: Close the Loop Carefully

AI produces value when information changes a decision or action.

PHASE 01 / INITIALLY

Simple Alerting

The system focuses on foundational observation:

Detect → **Alert**

PHASE 02 / THEN

Assisted Decisions

The system explains context and provides guidance:

Detect → **Explain** → **Recommend**

PHASE 03 / LATER

Active Orchestration

Full reasoning leading to direct system orchestration:

Detect → Reason → Recommend → Approve → **Execute**

Architecture & Autonomy Mandate

In selected low-risk environments, some workflows may ultimately become more autonomous. The architecture should support that evolution without assuming full autonomy from the beginning.

Assess Your AI-Ready Architecture

 Take the scoring test in less than 10 minutes!

How AI-Ready Is Your Industrial Architecture?

Before adding another AI use case, assess whether your architecture is ready to scale it.

RATE EACH STATEMENT 0 = Not in place • 1 = Partially • 2 = In place

01 SOURCES	Do we know which ERP, MES, SCADA, historian, machine and engineering systems are authoritative for the information AI needs?	SCORE 0 1 2
02 CONNECTIVITY	Can AI securely access required IT/OT data through controlled, reusable interfaces rather than one-off integrations?	SCORE 0 1 2
03 CONTEXT	Can we connect raw signals with asset, process, product, maintenance and engineering context so AI understands what the data means?	SCORE 0 1 2
04 GOVERNANCE	Are data access, model permissions, evaluation, human approval and audit requirements defined before AI reaches production?	SCORE 0 1 2
05 MODELS & AGENTS	Can we select and change the right AI approach for each use case without rebuilding the underlying architecture?	SCORE 0 1 2
06 ACTION	Can AI outputs move safely from insight → recommendation → approved action within existing operational workflows?	SCORE 0 1 2

Your AI-Readiness Score

Use the score to identify where architecture—not another pilot—needs attention first.

YOUR SCORE

/ 12

Directional assessment only

0–4

PILOT-READY

Individual AI experiments may work, but scaling will likely require new integration and governance work for each use case.

5–8

BUILDING THE FOUNDATION

Core capabilities exist, but gaps across the layers may create friction as AI moves into production.

9–12

SCALE-READY

Your architecture has many of the foundations needed to reuse data, controls and capabilities across multiple AI use cases.

Your score is only the starting point.

Find the gaps between your current architecture and production-ready Industrial AI.

SEIDOR can map your current IT/OT environment against the six Industrial AI layers and identify the highest-priority gaps for moving from pilots to production—without making replatforming the prerequisite.

Readiness may vary by plant, use case and operational risk.

[GET IN TOUCH WITH SEIDOR →](#)

About SEIDOR

SEIDOR is a global technology and transformation partner helping manufacturers turn AI ambition into secure, scalable operational capability.

We combine strategy, industrial technology, data, AI, cloud, and software engineering to connect complex IT and OT environments, modernize around existing systems, and deploy AI where it can deliver measurable business and operational value. From AI readiness and governance to IT/OT integration, edge intelligence, custom AI, and agentic systems, SEIDOR helps organizations build the architecture and capabilities required to scale Industrial AI with confidence.

Also consider



SEIDOR Solutions & Technology USA
400 Concar Dr San Mateo, CA 94402

www.opentrends.us

© 2026 SEIDOR OPENTRENDS INC. Strictly confidential. SEIDOR Opentrends Inc. is a Carlyle Group company.

