COGNITE

DATAOPS FOR POWER GENERATION:

MANAGE ARCHITECTURE COMPLEXITY & ENABLE SCALE FOR DIGITAL APPLICATIONS
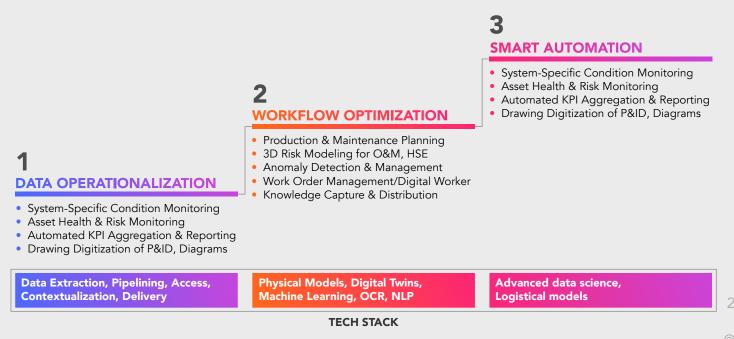
INTRODUCTION

Digital transformation in the power industry is not a new concept. For decades, ideas, technology, and resources have poured into digital programs aimed at curtailing the impending pressures caused by decreasing demand, decarbonization, and decentralization of power generation sources. This has resulted in a proliferation of new industrial data that is distributed across organizations and sites, but only truly valuable with contextualization and the proper transformations.

THE OPPORTUNITY

In light of rapidly aging assets and an experienced operational workforce that is leaving the field, CDOs, Operations, IT, and Citizen Data Scientists are focusing their attention on high-value applications that maximize operational potential and longevity while reducing costs. Through a targeted deployment of technology-enabled operations, such as workflow optimization, condition-based maintenance, process digitization, and agile working, utilities can increase plant efficiency (heat rate) by up to 3 percent, reduce the average all-in cost of generation (excluding fuel) by 10 to 20 percent for coal and 5 to 15 percent for gas, all while improving safety. [1]
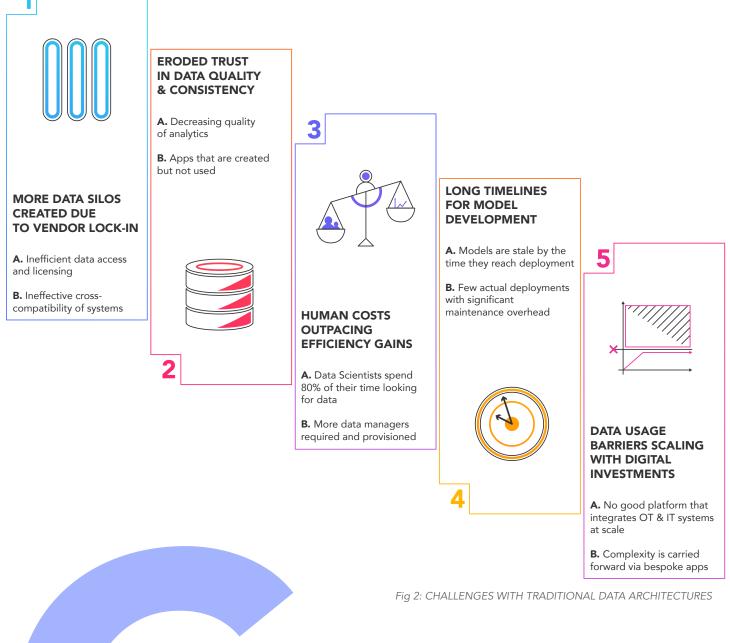
• Improving Power Forecasting and Trading Decisions

• Maximizing Operational Visibility Across Sites/Regions

• Streamlining Maintenance Planning and Wrench Time

The individual applications that serve these larger objectives are widespread and can be tiered into three progressive categories of value to the organization:

3

SMART AUTOMATION
• System-Specific Condition Monitoring
• Asset Health & Risk Monitoring
• Automated KPI Aggregation & Reporting
• Drawing Digitization of P&ID, Diagrams

2

WORKFLOW OPTIMIZATION
• Production & Maintenance Planning
• 3D Risk Modeling for O&M, HSE
• Anomaly Detection & Management
• Work Order Management/Digital Worker
• Knowledge Capture & Distribution

1

DATA OPERATIONALIZATION
• System-Specific Condition Monitoring
• Asset Health & Risk Monitoring
• Automated KPI Aggregation & Reporting
• Drawing Digitization of P&ID, Diagrams

Data Extraction, Pipelining, Access, Contextualization, Delivery	Physical Models, Digital Twins, Machine Learning, OCR, NLP	Advanced data science, Logistical models

TECH STACK

Fig 1: USE CASE PIPELINE

(1) *Unlocking the value of digital operations in electric-power generation, McKinsey & Company, October 2019.*

THE CHALLENGES

However, with so much value potential and the eagerness to explore advanced analytics, AI, and machine learning, industrial data architectures have become increasingly complex, unable to serve data consumers in a dynamic, scalable, and repeatable way. This leads to stalled digital transformation efforts, cost overruns, and inefficient use of human resources, which manifest themselves in the following ways:

These challenges are born out of data architectures that were fundamentally designed for point solutions and not with an open, holistic view that enables data utilization, prototyping, and rapid iteration for a growing portfolio of internal (Data Scientists, SMEs, Analysts) and external (System Integrators, Application Developers) stakeholders. The good news? Inflexible data architectures can be fixed with DataOps and Contextualization.

1

MORE DATA SILOS CREATED DUE TO VENDOR LOCK-IN

A. Inefficient data access and licensing

B. Ineffective cross-compatibility of systems

2

ERODED TRUST IN DATA QUALITY & CONSISTENCY

A. Decreasing quality of analytics

B. Apps that are created but not used

3

HUMAN COSTS OUTPACING EFFICIENCY GAINS

A. Data Scientists spend 80% of their time looking for data

B. More data managers required and provisioned

4

LONG TIMELINES FOR MODEL DEVELOPMENT

A. Models are stale by the time they reach deployment

B. Few actual deployments with significant maintenance overhead

5

DATA USAGE BARRIERS SCALING WITH DIGITAL INVESTMENTS

A. No good platform that integrates OT & IT systems at scale

B. Complexity is carried forward via bespoke apps

Fig 2: CHALLENGES WITH TRADITIONAL DATA ARCHITECTURES

THE SOLUTION

Liberate Your Data with DataOps and Contextualization

The fastest path to returning value starts with *getting the right data to the right user with the right context for the right problem at the right time.* Said another way, with proper DataOps, your data becomes searchable and easily accessible for developers, data scientists, and third-party applications.

What is DataOps?

A collaborative data management practice focused on improving the *communication*, *integration* and *automation* of data flows between data managers and consumers across an organization.

The goal of DataOps is to create *predictable delivery* and *change management* of data, data models and related artifacts.

DataOps uses *technology* to automate data delivery with the appropriate levels of security, quality and metadata to improve the use and value of data in a dynamic environment.

The secret to successful DataOps programs lies in investing in data contextualization. It is in this layer of the stack where meaningful relationships between data sources and types are established. This enables nonsubject-matter experts to be able to use that data for their projects. For example, turbine sensor tags and hierarchy may not make sense to analysts outside of the maintenance domain, but with proper context and mapping to P&IDs, the information becomes intuitive to nontechnical users for rapid application and model development at scale.

Cognite Delivers DataOps & Contextualization Through Cognite Data Fusion

Born from industry, Cognite offers Cognite Data Fusion (CDF) to support data consumers with highly accessible, relevant, and contextualized data from both OT and IT data sources across their organization. This empowers users to leverage AI & ML toolkits and low-code development frameworks to scale projects that are already in place or dramatically reduce the overhead and services required for new ones and quickly bring business value back to their organizations. *Learn More*

Cognite Data Fusion Benefits

1. Expands the breadth of applications that can be developed internally or with partners

2. Empowers internal development teams with self-service APIs & SDKs

3. Accelerates app development and time to value with a robust data model

4. Expands app lifecycle and sustainability with rich data pipelining and aggregation

5. Democratizes embedded subject-matter expertise with data access and contextualization

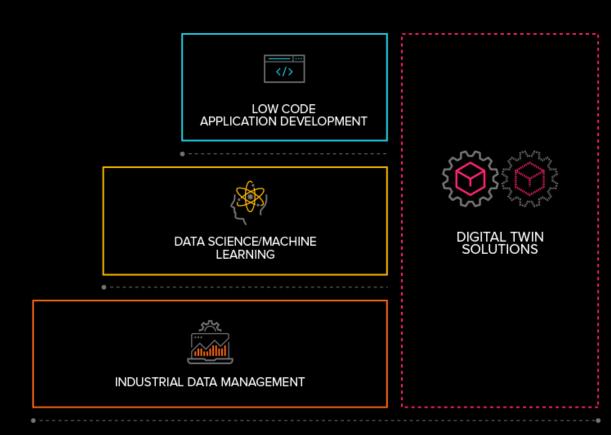## Cognite Data Fusion Stands Apart from Other Data Management Vendors

- IT & OT Data Contextualization

- 3D & Unstructured Data

- Open Frameworks & Toolboxes

- Hybrid AI

- Digital End-to-End Solutions

- Performance and Scale

Cognite Data Fusion is already delivering real value to industrial customers

Case 1: DataOps enabled Hafslund E-CO to optimize turbine startup sequences, reducing downtime and enabling a more efficient response to fluctuating grid demand. *Read More*

Case 2: Cognite Data Fusion contextualized operational data from four different Aker BP source systems into a unified dashboard, saving 15 hours weekly on maintenance review of critical equipment. *Read More*

LEARN MORE AND SIGN UP FOR A DEMO

Fig 3: DATAOPS WITH COGNITE DATA FUSION

ALL ABOUT COGNITE

STAVANGER

OSLO

VIENNA

AUSTIN

HOUSTON

Our Company

Cognite is one of the fastest-growing software providers in the field of industrial digitalization. With 350 employees from more than 40 different countries, our interdisciplinary team combines world-class software competence and deep domain expertise. Cognite's offices include Oslo and Stavanger, Norway; Austin and Houston, Texas; Palo Alto, California; Tokyo, Japan; Vienna, Austria; and Singapore.

Cognite was founded to enable heavy-asset industries to generate value from their digital transformations by overcoming the obstacles of data trapped in silos, data type disconnectedness, data quality variance, the chasm between proof-of-concept and production (business value), the rigidness and slowness of legacy software development approaches, and the limited ability to leverage pre-existing data logic and flows.
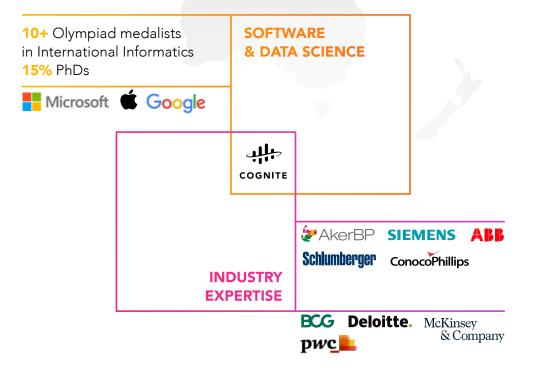
Our Mission

At Cognite, we make industrial data more valuable than ever. Empowering users with contextualized data as a service, delivering industrial AI at scale to unlock the power and value of your data.

The key to industrial digitalization lies in data liberation. Heavy-asset industries already have data. Now they need software to collect, clean, and put it to use. A resource to transform the data into information and stimulate a thriving ecosystem of industrial applications.

Embrace change and take control of your industrial transformation opportunity today. Empower your industrial data consumers to build, operationalize, and scale both models and applications with Cognite Data Fusion, the leading industrial DataOps software.

Solution Architects & Marketing

R&D

TOKYO

A Unique Global Team that Combines Software with Deep Industry Expertise

10+ Olympiad medalists in International Informatics
15% PhDs

Microsoft Google

SOFTWARE & DATA SCIENCE

COGNITE

AkerBP SIEMENS ABB
Schlumberger ConocoPhillips

INDUSTRY EXPERTISE

BCG Deloitte. McKinsey & Company
pwc

To learn more, get in touch with our sales team.

SARAH LEXOW
Senior Director, Sales & Business Development - EMEA
sarah.lexow@cognite.com
+47 911 55 348

ROBERT TRI
SVP of Business Development - North America
robert.tri@cognite.com
+1 650 799 0300

MARIA JOHNSEN
Account Development Representative in Sales
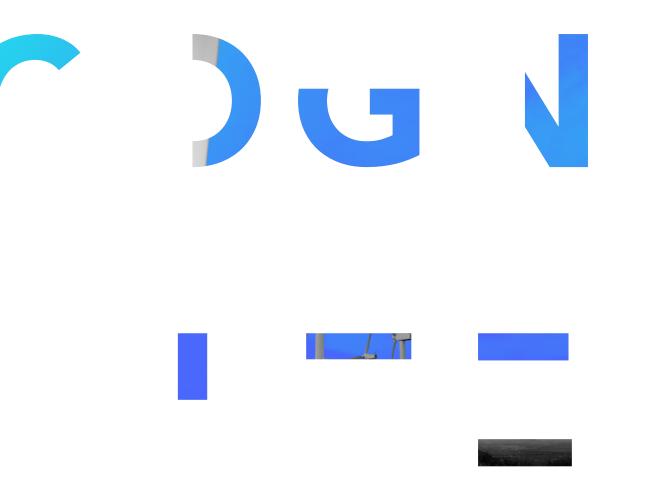mariac.johnsen@cognite.com
+47 902 93 200

INGAR LANDET
VP of Customer Success in Power & Utilities
ingar.landet@cognite.com
+47 958 77 530

JONAS HERTEL
Director of Customer Success in Power & Utilities - EMEA
jonas.hertel@cognite.com
+47 990 36 465

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