IT Integration
The Challenge and the CoPro Solution
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This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 723575

**Thesis:** Model based applications provide an important contribution to optimised plant coordination solutions

**Problem:** Still a gap to integrate offline evaluated models into an online production IT System environment

**Challenge:** Reduce obstacles to realise model-based real-time solutions for plant optimisation and resource efficiency in process industry

**Approach:** IT Solution for model integration and data orchestration of distributed real-time applications in process industries incl. model management
IT Integration – The Challenge

Challenge: Reduce time and effort to bring model-based real-time applications into industrial use
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IT Integration – The Solution

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Flexible Deployment of runtime engines

Requirements:
• Reliability
• Performance
• IT-Security Compliance

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IT Integration – Use Cases at INEOS in Köln

One uniform open engineering and runtime environment to integrate:
• different kind of model-based real-time applications
• developed by different partner
• with different model development environments
• using different modeling approaches

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Uses cases – INEOS in Köln, Scheduling

The ammonia network at INEOS in Köln

Import

Model Integration and Data Orchestration

Optimizer developed by TUDO

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Uses cases – INEOS in Köln, Scheduling

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Uses cases – INEOS in Köln, Anomaly Detection

Predict as early as possible: maximum time for countermeasures

Anomaly (decomposition)

Model Integration and Data Orchestration

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Uses cases – INEOS in Köln, Anomaly Detection

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Uses cases – INEOS in Köln, Energy Management

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Uses cases – INEOS in Köln, Energy Management

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Integration and Model Management

INEOS in Köln
just for Energy Performance Monitoring:
more than 100 Models for
13 Plants
60 Plant Units
>1200 Measurements used

Support for the whole Life Cycle of model-based real-time applications is needed:

• Managing within Projects
• Change Management & Versioning
• Documentation of Scope, Authors,…
• Reporting of Model History
• Deployment to Testing or Production Environments

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IT Integration – Feasibility Studies

Production Assistance
- End User: SQL Carbon, Bonn
- Industry Sector: Mineral
- Partner: aixprocess, Aachen
- Modelling Tool: python
- Application: Online prediction of grain size distribution

Decision Support
- End User: Spenner Cement, Duisburg
- Industry Sector: Cement
- Partner: aixprocess, Aachen
- Modelling Tool: TensorFlow
- Application: Prediction of energy consumption
  Predictive maintenance of mill wear

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IT Integration – The Solution

• Ease of use and reduced engineering efforts to integrate model-based applications into heterogeneous IT- and OT- system environments

• Contribution to push model-based real-time solutions in industry

• Nearly all presented use cases will remain in productive operation

• Thanks to all who made the funding possible and thanks to all CoPro partner

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