



# **Metals Production Management 4.0**

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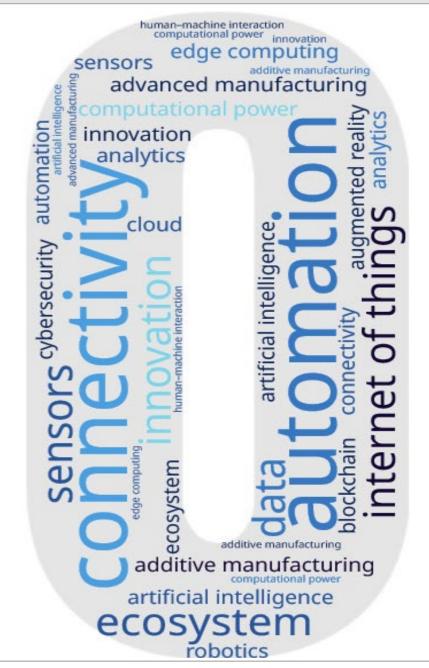


## Industry 4.0









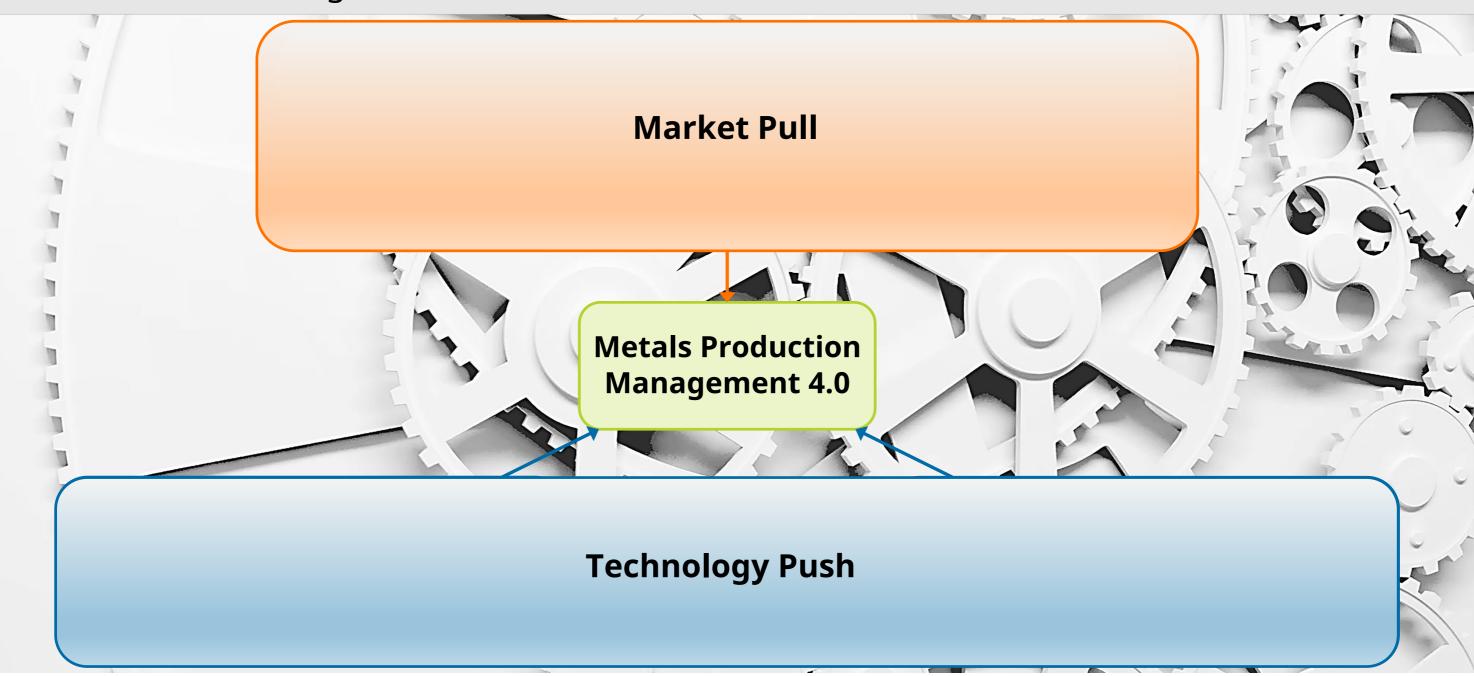






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# Production Management 4.0



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**Management 4.0** 

#### **Connectivity**

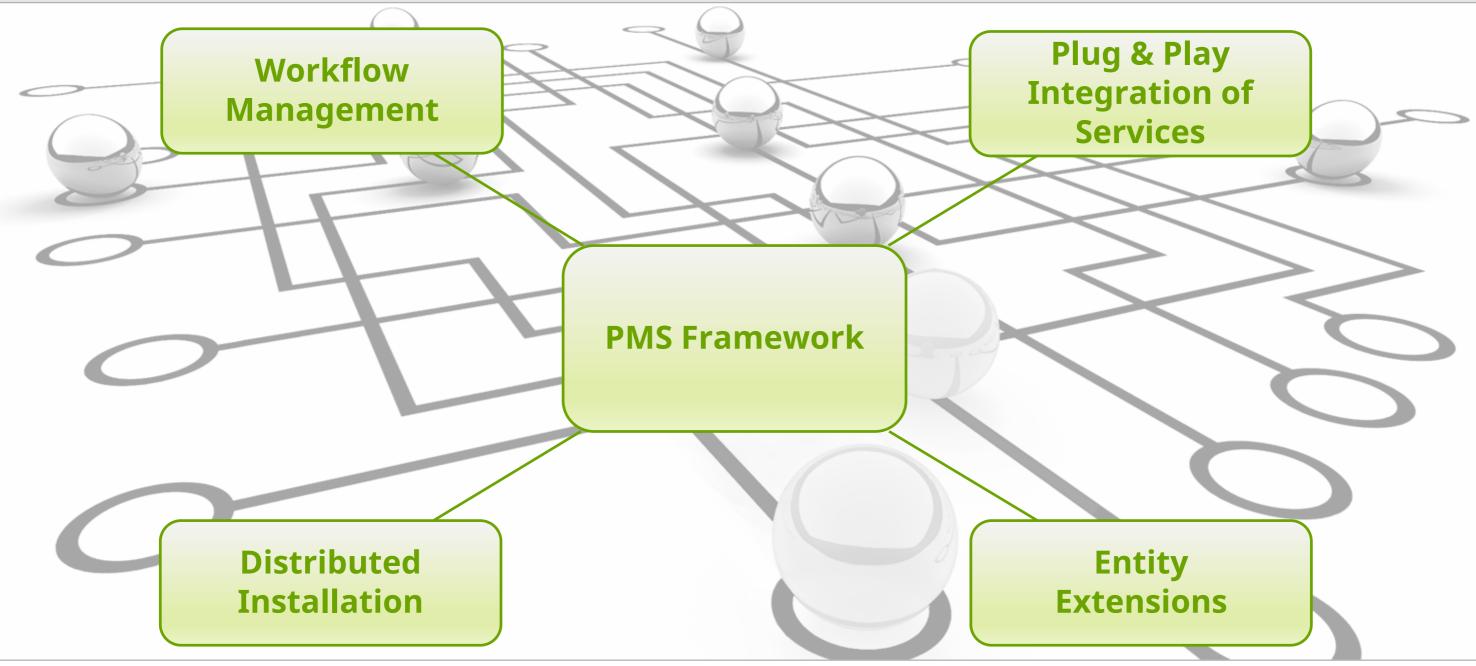
Within the factory: Automation, Sensors, Internet of Things

With the outside world: Cross-site, Suppliers, Vendors, Customers, Logistics

#### **Analytics**

Data Science and (explainable) Artificial Intelligence / Machine Learning Simulation & scenario management

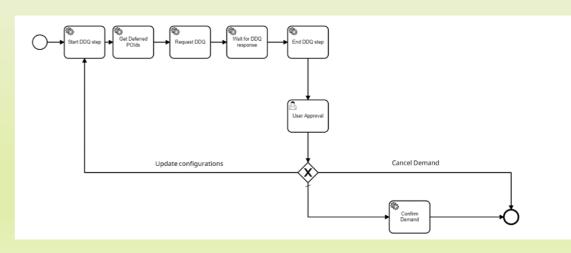




Workflow Management

Plug & Play
Integration of
Services

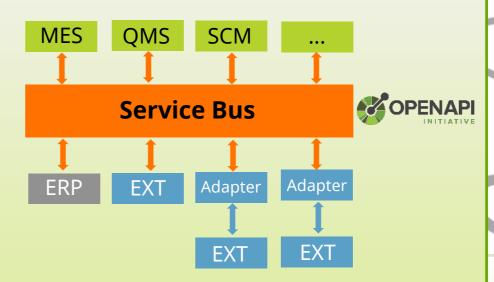
- Flexible modelling of end-to-end business processes
- Orchestration of software service and human interactions
- BPMN interface for business users
- Use pre-defined best-practice workflows
- Easy customization
- Tracking of workflow status



Workflow

**Plug & Play Integration of Services** 

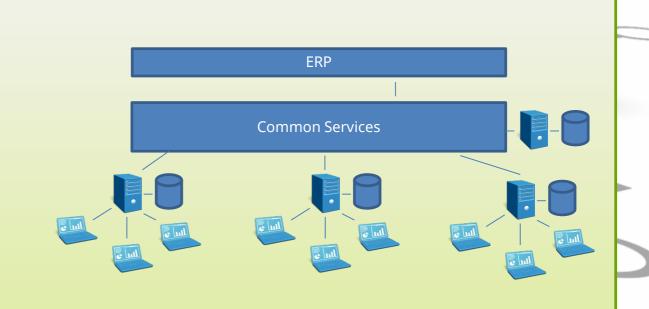
- Service Bus: Technical infrastructure for synchronous and asynchronous communication
  - Commands for direct service calls
  - Events for asynchronous information posted and consumed by registered services
- Integration of external services
  - Services in any programming language can register their APIs
  - Adapters available







- (Almost) No downtime
- Rolling / decopled updates of services
- Easy replacement of functionality
- Scaling: component instances in parallel
- More independent development of new features



# Distributed Installation



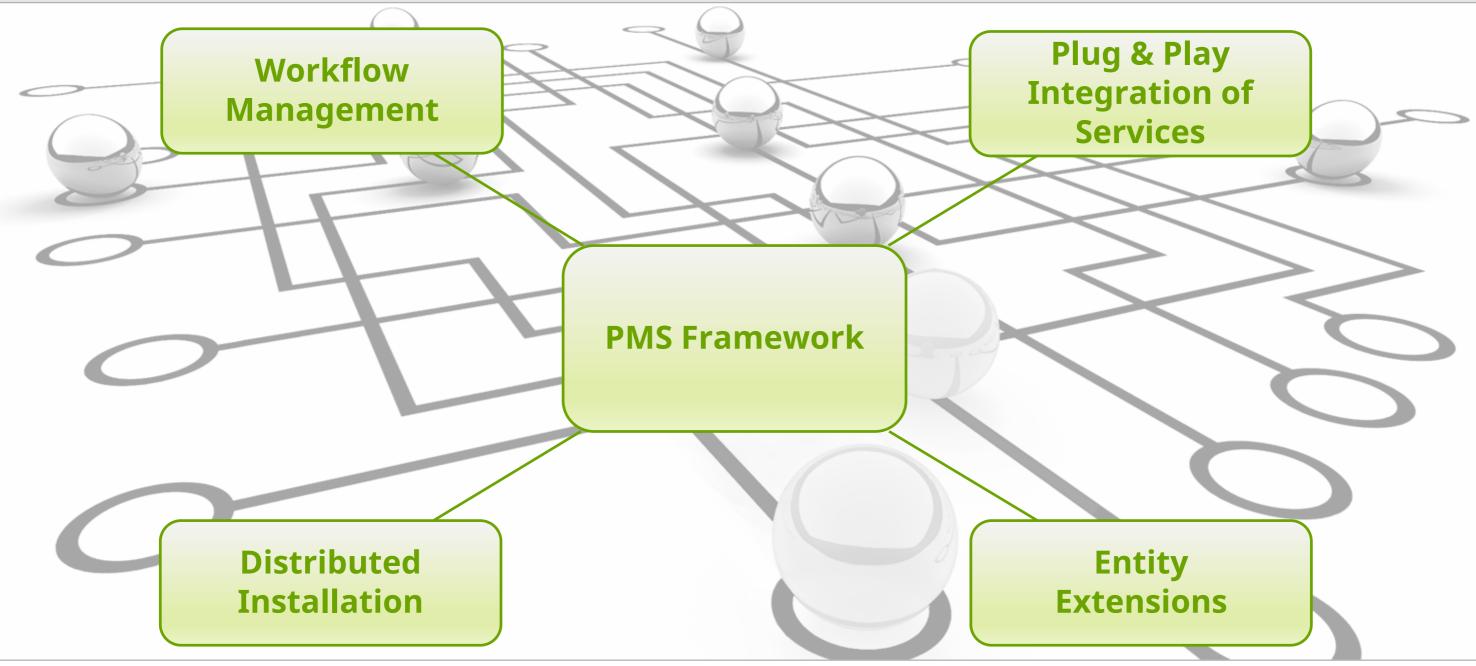


- Extension Mechanism of the data model allows
  - system integrators to enhance the scope of a solution as per their needs
  - customers to implement business specific use-cases
- Static extension: Add an entity by programming, requiring recompilation and re-deployment (product/project level)
- Dynamic extension: Add an entity at run-time as part of the system's configuration by an advanced end user

Distributed

**Entity Extensions** 

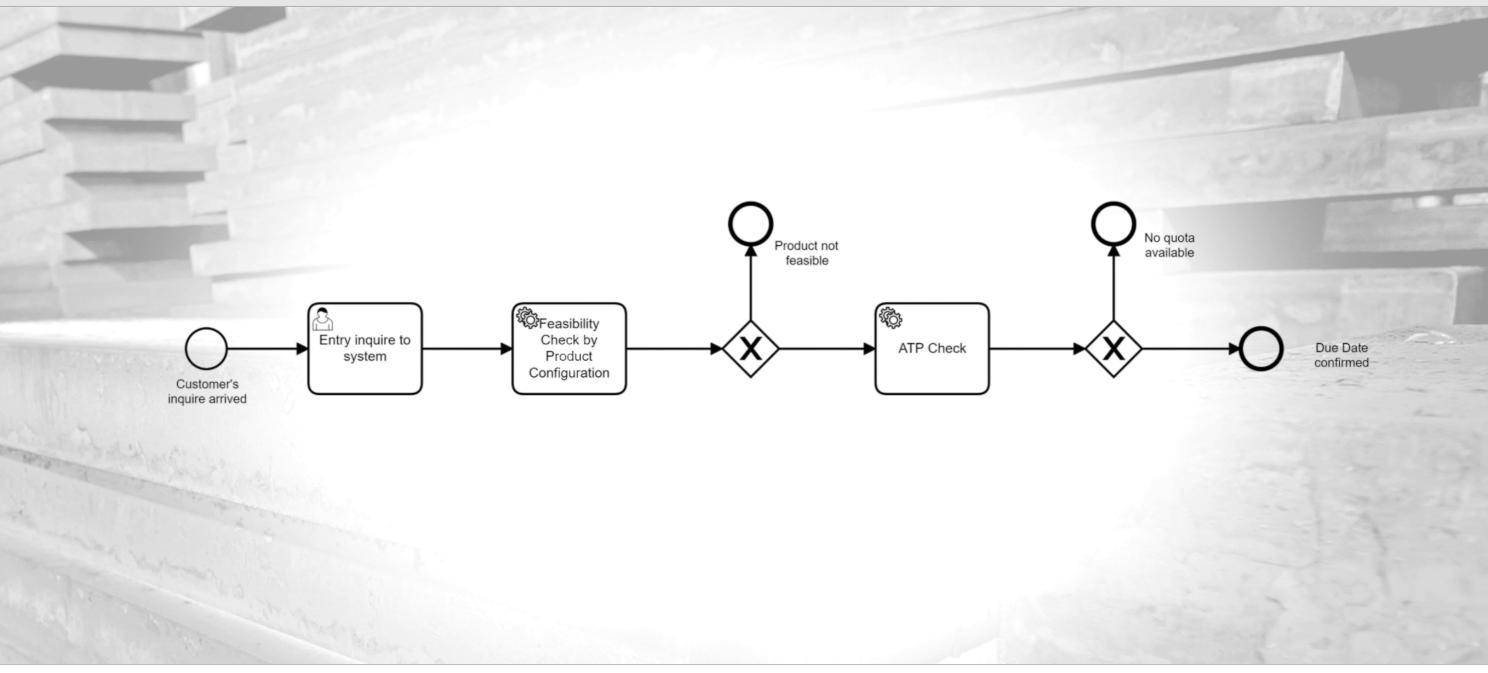




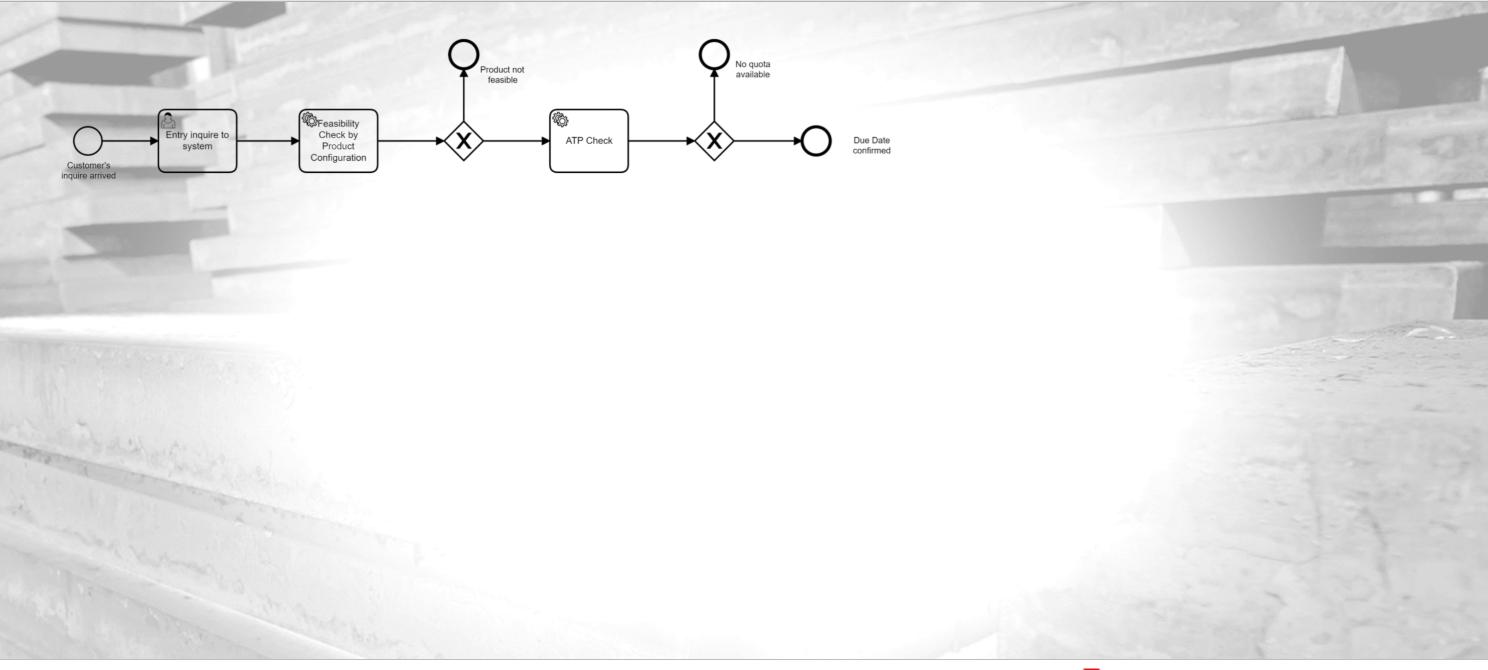
# Metals Production Management 4.0



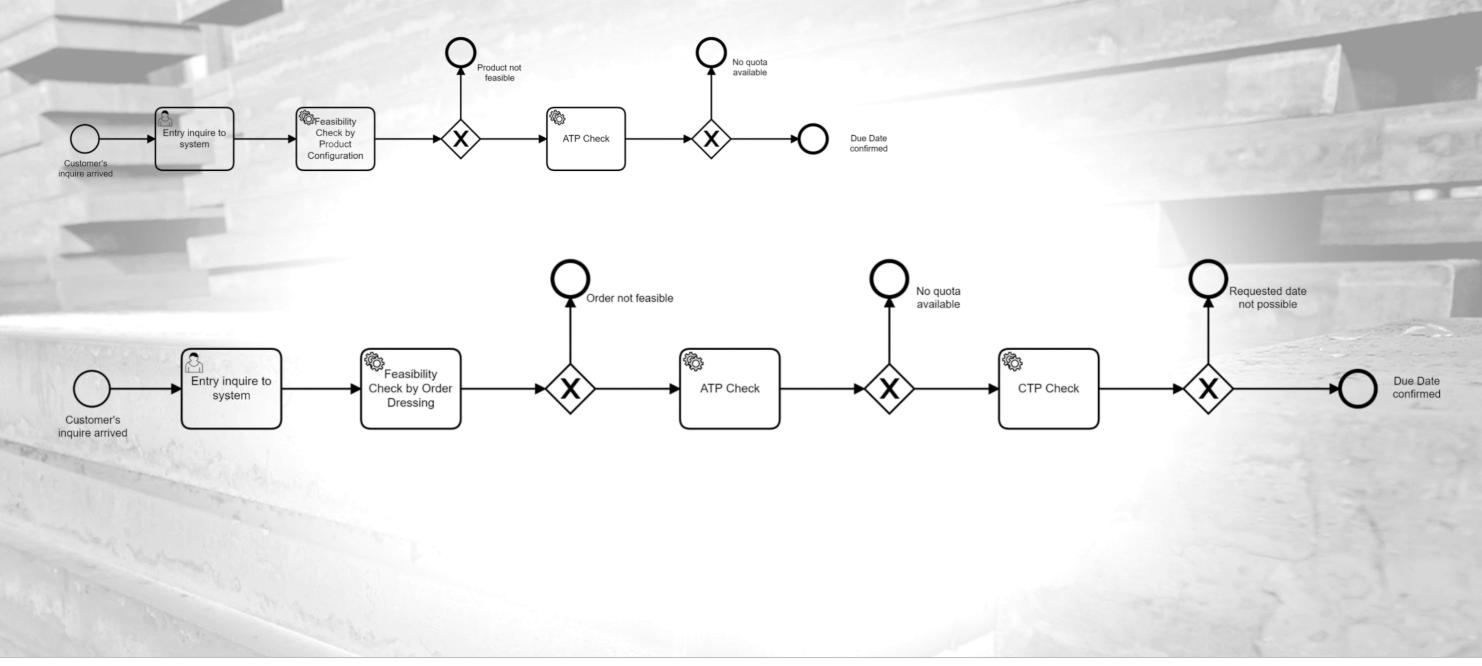
# Due Date Quoting: Workflow Adaption



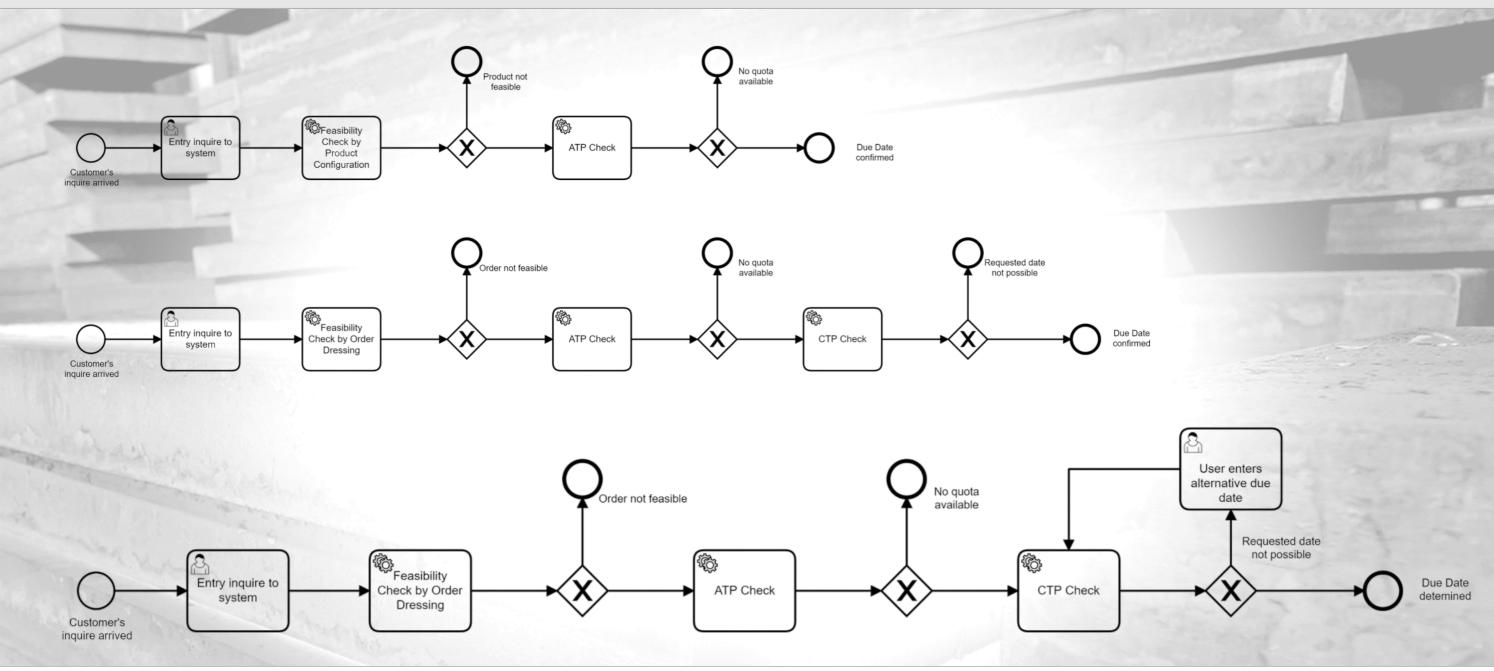
# Due Date Quoting: Workflow Adaption



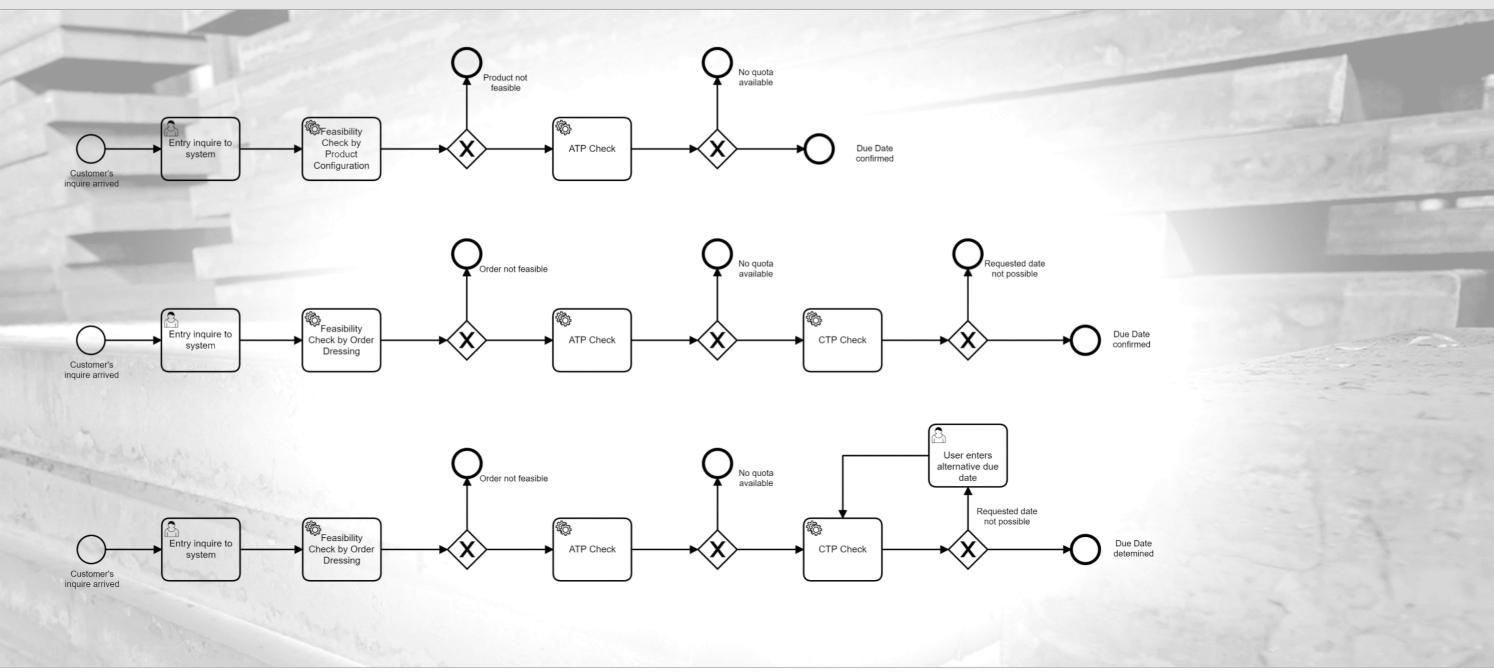
# Due Date Quoting: Workflow



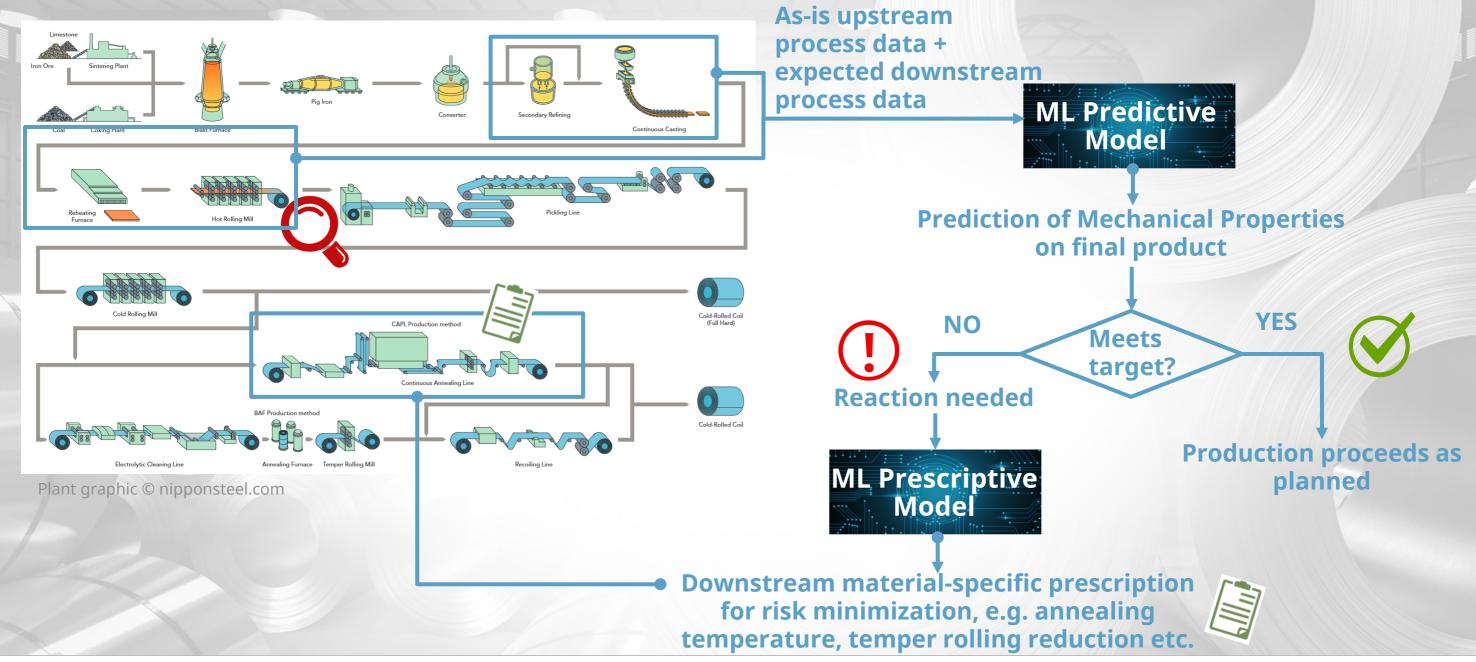
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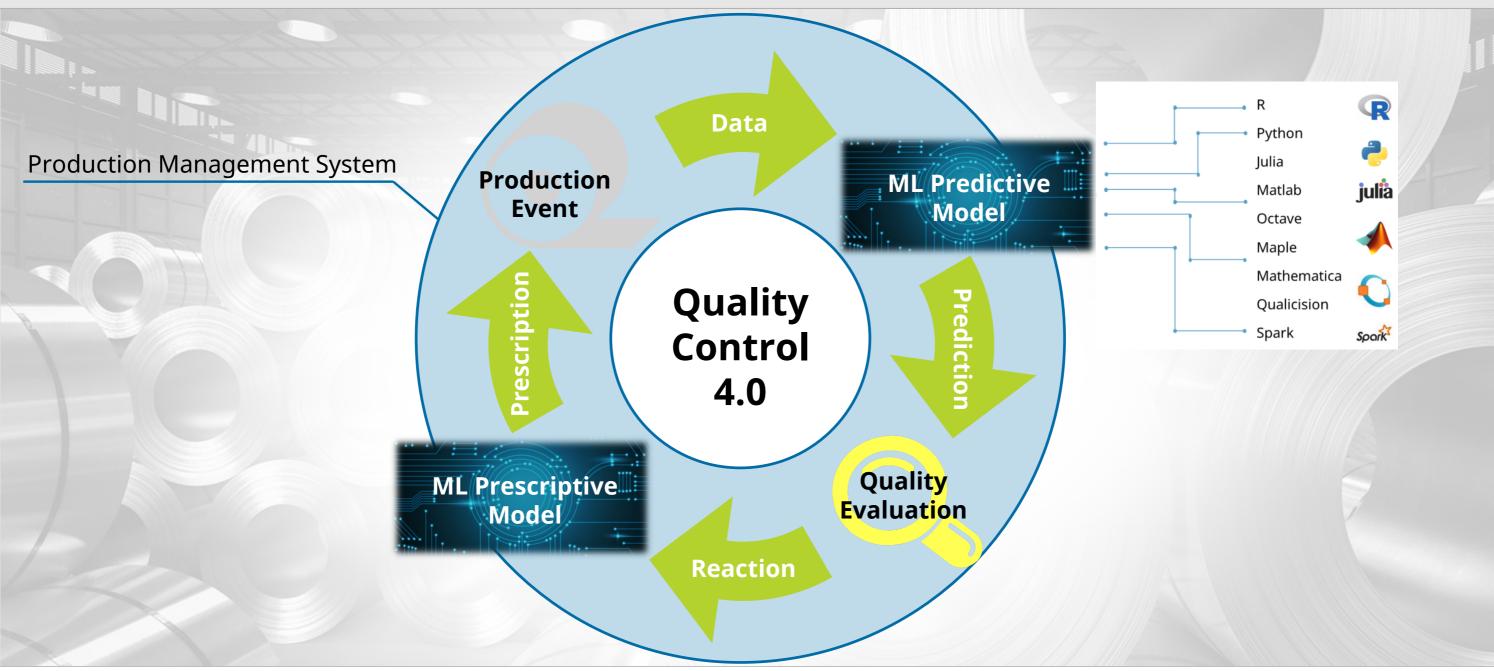
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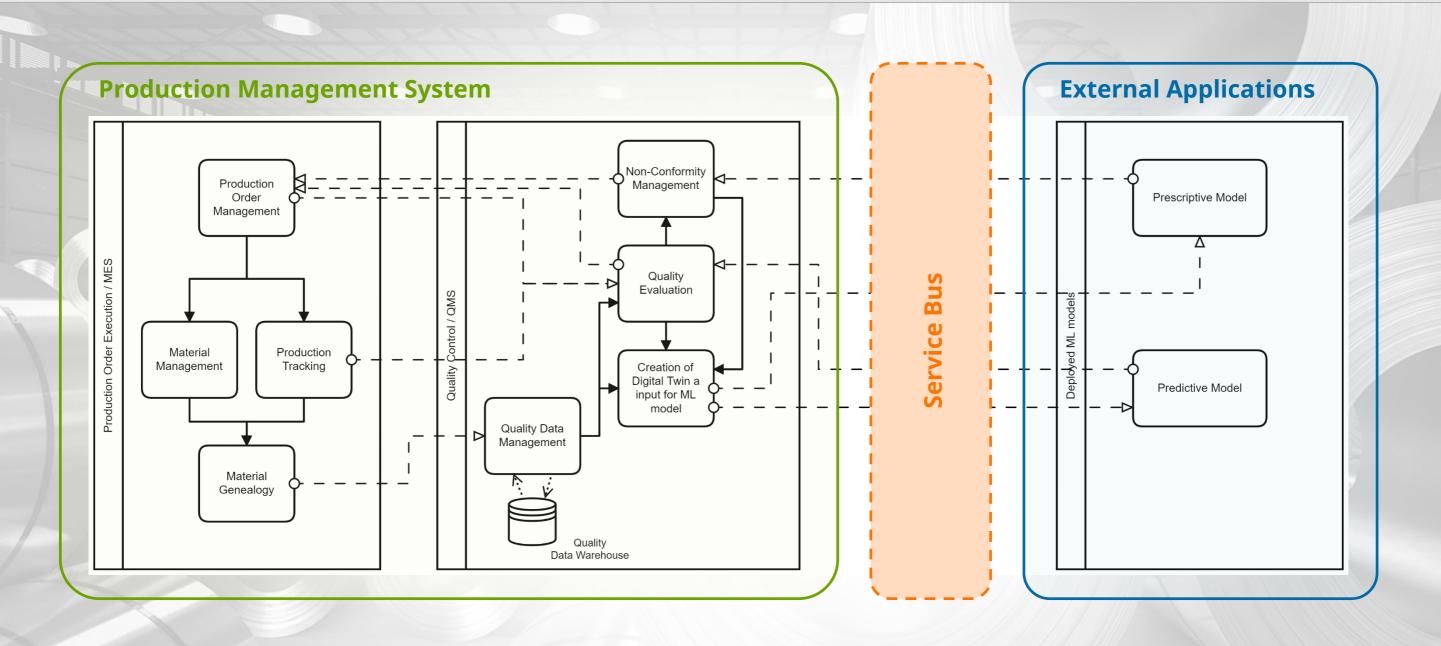
# Predictive-Prescriptive Quality Control with ML: Example



# Predictive-Prescriptive Quality Control with ML: Generic Concept



# Predictive-Prescriptive Quality Control with ML: Architecture



# Thank You for Your Attention!





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