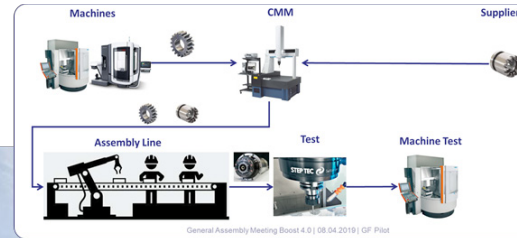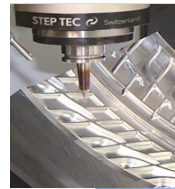# GF Smart zero-defect Factory

+GF+

"The full lifecycle data of GF spindles will be synthetized in an open warehouse, which will gradually deliver through a cognitive, smart planning system both a zero defect manufacturing factory and errorless machines"

Zero Defect Spindle Manufacturing

Factory 4.0 Big Data Pilot Motivation

• Optimize the GF spindle's component production efficiency combining machine tool predictive models and part quality control data
• Improve spindle manufacturing lead time and quality towards zero rework and no scrap operations with the development of a digital and connected assembly
• Develop and exploit an intelligent factory data management and planning system for zero defect spindle manufacturing and device operation
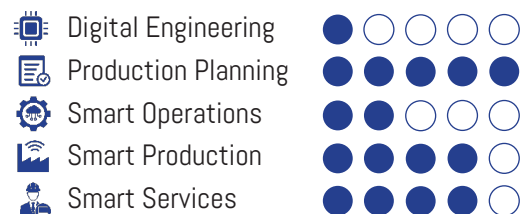
Spindle Component Manufacturing Process

• Full data sourcing and aggregation across the manufacturing line and usage phase
• Build-up of Factory KPIs monitoring and analytics tools for real-time production flow diagnostics
• Machine tool predictive maintenance and smart planning system for optimum spindle manufacturing

Competitive Advantages

• Reduction of rate of spindles rework from 10% to 0-5%
• Reduction of rate of spindle return to factory from 3-13% to 0-3%
• 10% increase of the overall equipment effectiveness
• Increase of time before maintenance of spindles from 5'000-10'000 hours to 20'000-50'000 hours

Big Data Pilot Lifecycle Scope

Digital Engineering ● ○ ○ ○ ○
Production Planning ● ● ● ● ●
Smart Operations ● ● ○ ○ ○
Smart Production ● ● ● ● ○
Smart Services ● ● ● ● ○

Big Data Pilot Site

Pilot Partners

+GF+
Machine Tool Lighthouse Factory

esi
get it right®
Big Data Analytics

EPFL
ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE
PMI Platform & QIF

innovalia
ASSOCIATION
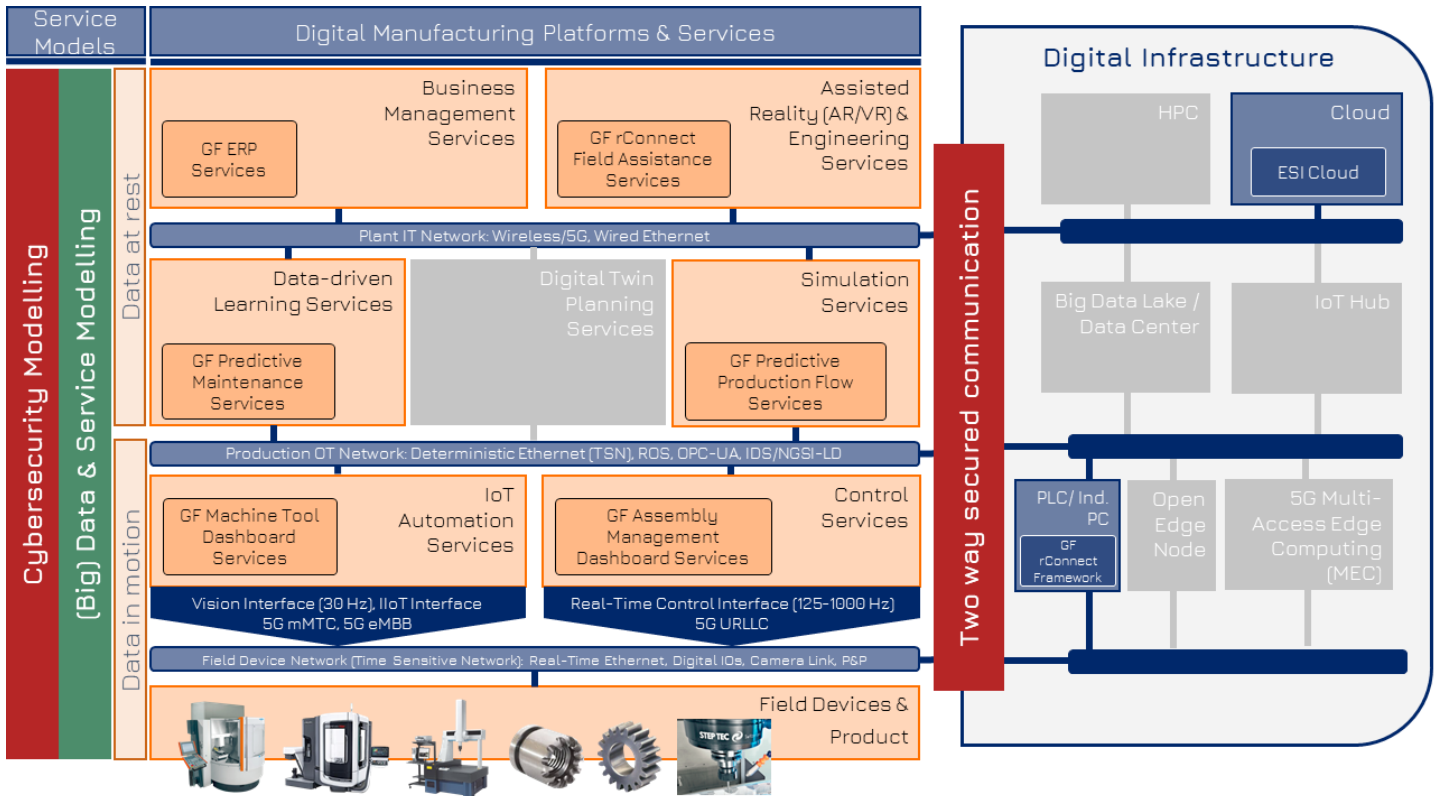Metrology

I4.0 Big Data Pilot Solution Framework

Boost 4.0 big data solution framework leverages on Big Data Europe (BDE) big data pipeline technologies, International Data Spaces Association (IDSA) specifications for data sovereignty, FIWARE NGSI-LD API for open IDS implementation and Hyperledger technologies for transaction traceability. Boost 4.0 big data platforms and technologies align to RAMI 4.0 and are integrated under the Digital Shopfloor Alliance (DSA) autonomous service framework to ensure reduced cost, time and effort in solution deployment and extensibility (https://digitalshopflooralliance.eu/).

I4.0 Big Data Pilot Features

Sector / Product: Machine Tools Manufacturing

Manufacturing Process: Machining

Big Data Analytic Techniques: Hybrid Twin and Ontology based Analytics

Big Data Platforms:
- GF rConnect
- USU and ESI

IDS-FIWARE Connectors & Standards:
- IDS-FIWARE connector
- OPC UA

Open I4.0 Big Data Pilot Pillars

INTERNATIONAL DATA SPACES ASSOCIATION

IDSA defines a reference architecture and an ecosystem, which supports sovereign exchange and sharing of data between industrial partners.

FI-WARE

FIWARE is a curated framework of open source platform components to accelerate the development of smart solutions for Industry 4.0.

HYPERLEDGER

HYPERLEDGER is an open source collaborative effort created to advance cross-industry blockchain technologies.

BIG DATA EUROPE
Empowering Communities with Data Technologies

The BDE offers an open source platform, allowing to build several Big Data components into a pipeline through a simple graphical UI.

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