EU-Rail Joint Undertaking

IAN CONLON
Head of EU-RAIL System Pillar

DELIVER AN **INTEGRATED EUROPEAN RAILWAY NETWORK** BY DESIGN

DEVELOP A **UNIFIED OPERATIONAL CONCEPT AND A FUNCTIONAL SYSTEM ARCHITECTURE** FOR INTEGRATED EUROPEAN RAIL TRAFFIC AND CCS/AUTOMATION

DELIVER A **SUSTAINABLE AND RESILIENT RAIL SYSTEM**

DELIVER A **COMPETITIVE, GREEN RAIL FREIGHT** FULLY INTEGRATED INTO THE LOGISTICS VALUE CHAIN

DEVELOP A **STRONG AND GLOBALLY COMPETITIVE EUROPEAN RAIL INDUSTRY**

EUROPE'S RAIL:

ONE INTEGRATED R&I PROGRAMME

Europe's Rail

SYSTEM PILLAR

OPERATIONAL CONCEPTS

FUNCTIONAL SYSTEM ARCHITECTURE

A SINGLE COORDINATING BODY FOR THE WHOLE SECTOR EVOLUTION

OPEN INTERFACES TO OTHER TRANSPORT MODES AND BUSINESSES

SYSTEM REQUIREMENT SPECIFICATIONS

INNOVATION PILLAR

TECHNOLOGICAL AND OPERATIONAL SOLUTIONS FOR SERVICES OF FUTURE

FLAGSHIP PROJECTS

LARGE-SCALE DEMONSTRATIONS

EXPLORATORY AND FUNDAMENTAL R&I

- **EUROPEAN RAIL TRAFFIC AND MOBILITY MANAGEMENT**
  - Manage and improve rail traffic at EU level
  - Adjust rail traffic management in function of the mobility demand
- **DIGITALISATION & AUTOMATION IN TRAIN OPERATIONS**
  - ATO implementation
  - Digital train operations
- **SUSTAINABLE AND DIGITAL ASSETS**
  - Integrated assets testing & life-cycle framework
  - Zero-emmission, silent rail system
- **COMPETITIVE, DIGITAL, GREEN RAIL FREIGHT**
  - New digital customer interaction & innovative rail freight services
  - Multimodal and rail freight innovation integration
- **REGIONAL RAIL SERVICES IN LOW DENSITY AREAS**
  - New system approach to regional rail services in low density areas

DEPLOYMENT GROUP

FUTURE SOLUTIONS DEPLOYED IN A COORDINATED AND CONSISTENT WAY AT EUROPEAN LEVEL, TAKING INTO ACCOUNT ALTERNATIVE ROLLOUT SCENARIOS, BEHAVIOURAL AND ORGANISATIONAL CHANGES, SYNERGIES WITH OTHER MODES OF TRANSPORT

EU-RAIL DIGITAL ENABLERS

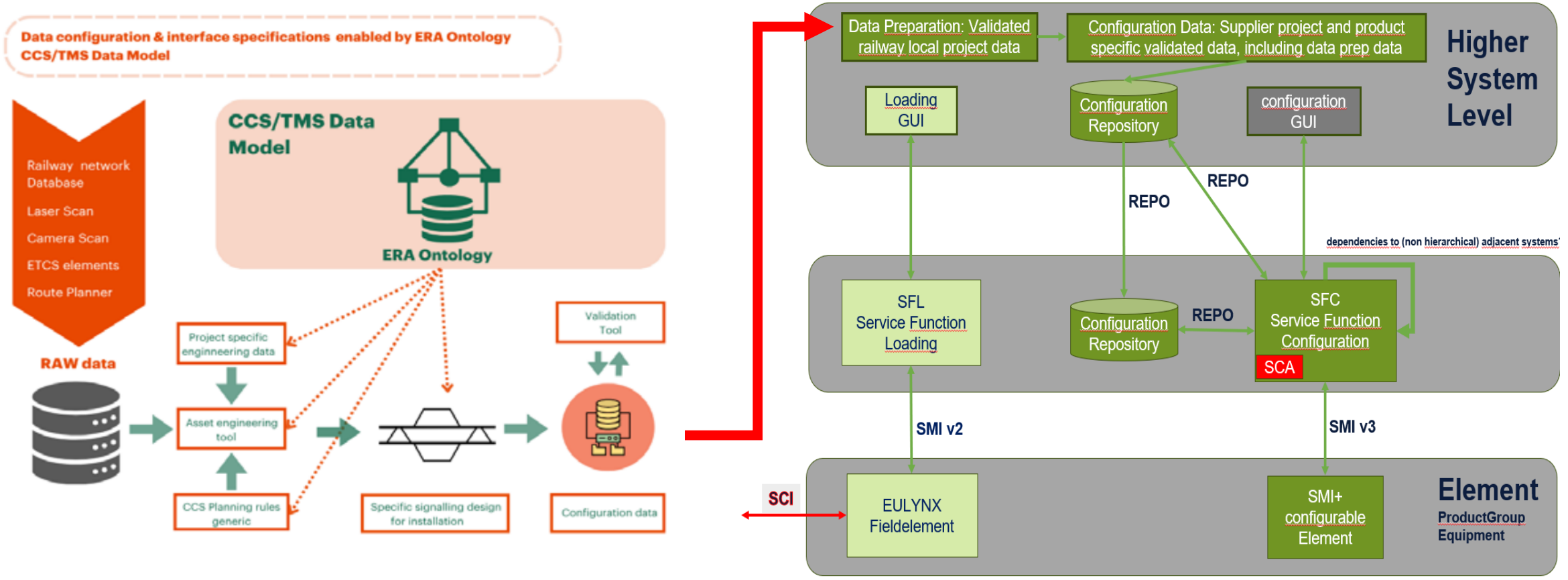
- ✓ **Dramatically increased efficiency & reduced costs for the rail design, testing and certification processes**
- ✓ **Facilitate the implementation of predictive maintenance**
- ✓ **Reduced maintenance and operation costs for the rail system**
- ✓ **Enable interoperability**
- ✓ **Introduce a de-centralised, secure rail data marketplace**
- ✓ **Rail services integration with multi-modal mobility**
- ✓ **Enhances the competitiveness and sustainability of the rail sector**

- ❖ ERA-ontology extended by CCS/TMS
- ❖ Digital Twins
- ❖ Federated Rail Data Space
- ❖ Semantic dictionary evolution

➡ **Significant value in a European approach**

ERA-ontology, extended by CCS/TMS, enables the E2E data process from raw to config data

OBJECTIVE: ERA-ontology is basis and single source of truth for data preparation and validation. Validated data enable generating configuration data, stored in configuration repositories. Service Function Configuration ensures safe, reliable and interoperable operation of digital assets & trains



Digital Twin (DT)

OBJECTIVE: DT enabler aims to organise and support the assembly, verification, validation, testing & co-simulation of complex high-order Digital Twins that are capable of digitally representing the behaviour of the physical railway system.

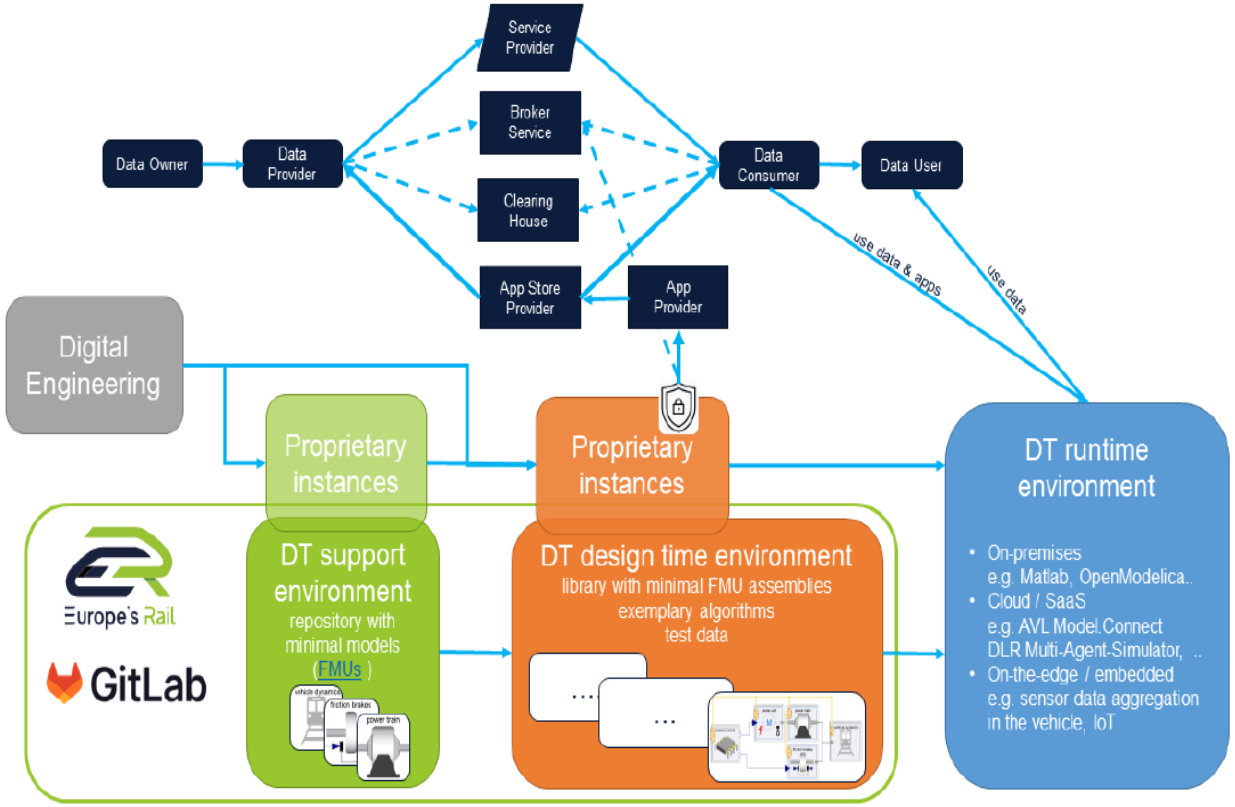
Benefits

- Increases Assets utilization and Sustainability
- Enables exchange of digital artefacts of railway assets
- Reduces operational cost through predictive maintenance
- New opportunities with AI

DIGITAL TWIN (DT)

Current Status

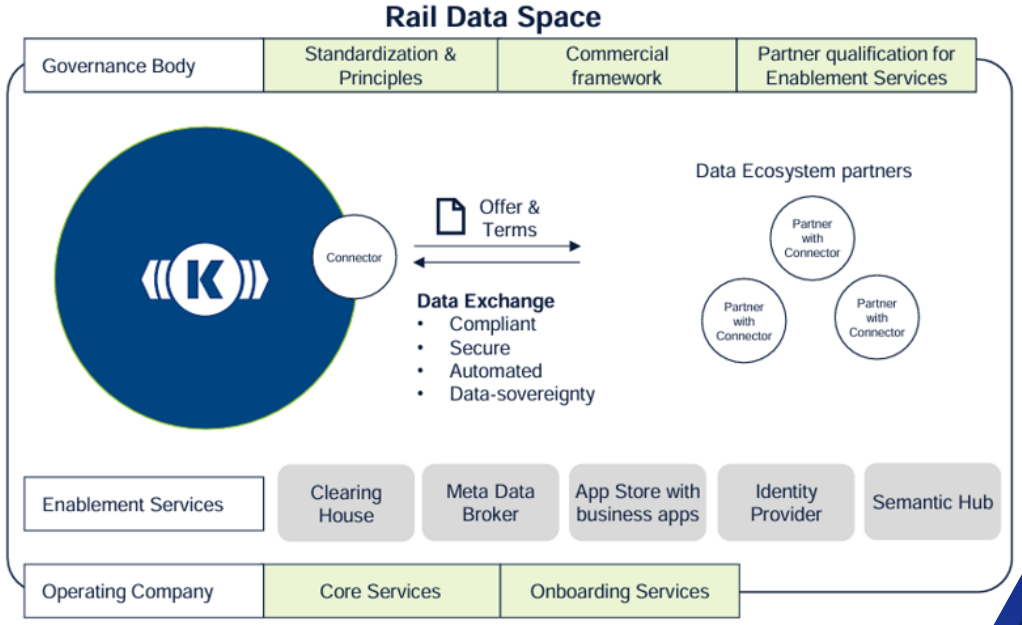
- **Preparation & implementation of DT sandbox - completed**
- **Compilation and methodological particularities assessment for selected use cases - completed**
- **Develop DT support environment - Functional Mock-Units (FMU) - ongoing**
- **DT Design time environment development - ongoing**
- **DT Run time environment development - ongoing**
- **Collaborative validation of FPs use cases using the DT environment - ongoing**



Digital Twin Environments

Federated Rail Data Spaces (RDS)

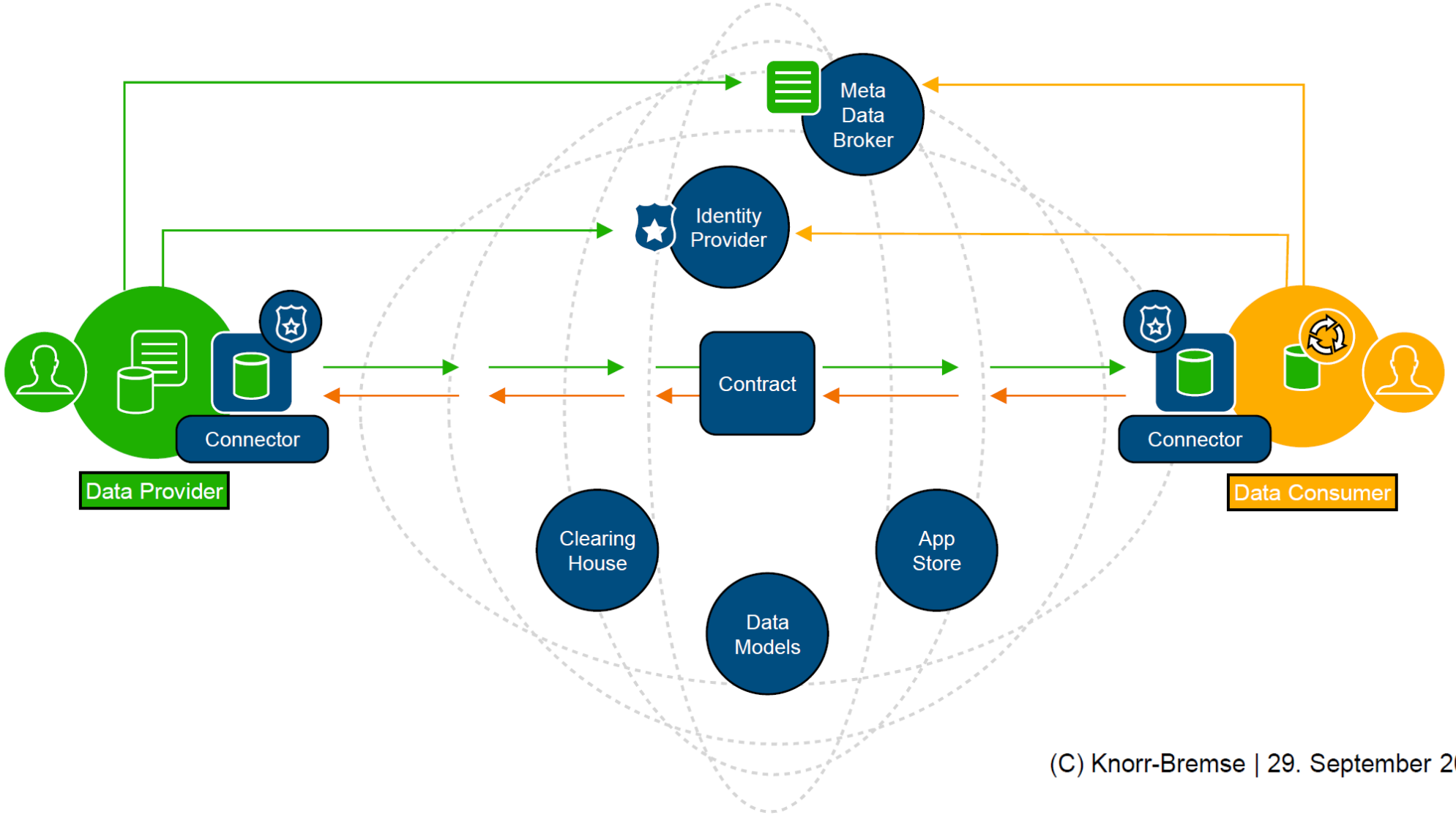
OBJECTIVE: Develop a trusted, reliable federated data space supporting a de-centralised, cyber-secure exchange and sharing of digital resources within the rail ecosystem



Benefits

- Introduces an innovative, cyber secure solution for an open rail data marketplace
- Compatibility and interoperability with other data spaces and contributing to the European Mobility Data Space
- Enhancement of competitiveness and sustainability for the rail industry

Rail Data Space Sandbox (FP1-MOTIONAL)



Federated Rail Data Spaces (RDS)

Current Status

- **RDS Sandbox Environment (Design and Set-up) - completed**
- **RDS Sandbox continuous operation - ongoing**
- **Development of Rail specific extensions - ongoing**
- **Governance Model - completed**
- **Operating model - completed**
- **Demonstrations using use cases from all Flagship Areas - ongoing**

Rail Data Space ERJU FP1 Motional Consortium

ALSTOM · DB · DLR · FERROVIE ITALIANE · THALES · KNORR-BREMSE · mermec · Jernbane-direktoratet · renfe · SNCF · voestalpine · Wabtec

Thank you

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