
BUILD UP
The European portal for energy efficiency
and renewable energy in buildings
WEBINAR

COGITO

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The European portal for energy efficiency and renewable energy in buildings

Online Webinar

Digital Tools for Workflow Management

25 May 2023
11:00 AM - 12:00 AM

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Agenda

11:00 - 11:05: Welcome, BUILD UP

11:05 - 11:20: Project overview and Q&A – *Dr. Frédéric Bosché (UEDIN)*

11:20 - 11.50: Digital tools for Workflow Management and Q&A
- PMS - *Damiano Falcioni (BOC)*
- WODM – *Martin Straka (Novitech)*
- SLAM & BCSC - *Dr. Panagiotis Moraitis (QUE)*
- WOEA - *Martin Straka (Novitech)*

11:50 – 11:55: Poll via slido, BUILD UP

11:55 – 12:00: Wrap up & conclusions, BUILD UP

Thursday 25th May

Digital Tools for Workflow Management
Introduction

Dr. Frédéric Bosché

UEDIN

COGITO

CONSTRUCTION PHASE
DIGITAL TWIN MODEL

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 958310

COGITO Project Partners

HYPERTECH energy labs

UCL

DTU Technical University of Denmark

THE UNIVERSITY of EDINBURGH

BOC www.boc-group.com

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UNIVERSIDAD POLITÉCNICA MADRID POLITÉCNICA

QUE TECHNOLOGIES

Novitech NEW INFORMATION TECHNOLOGIES

ASM

ferrovial construction

OLYMPIA ODOS

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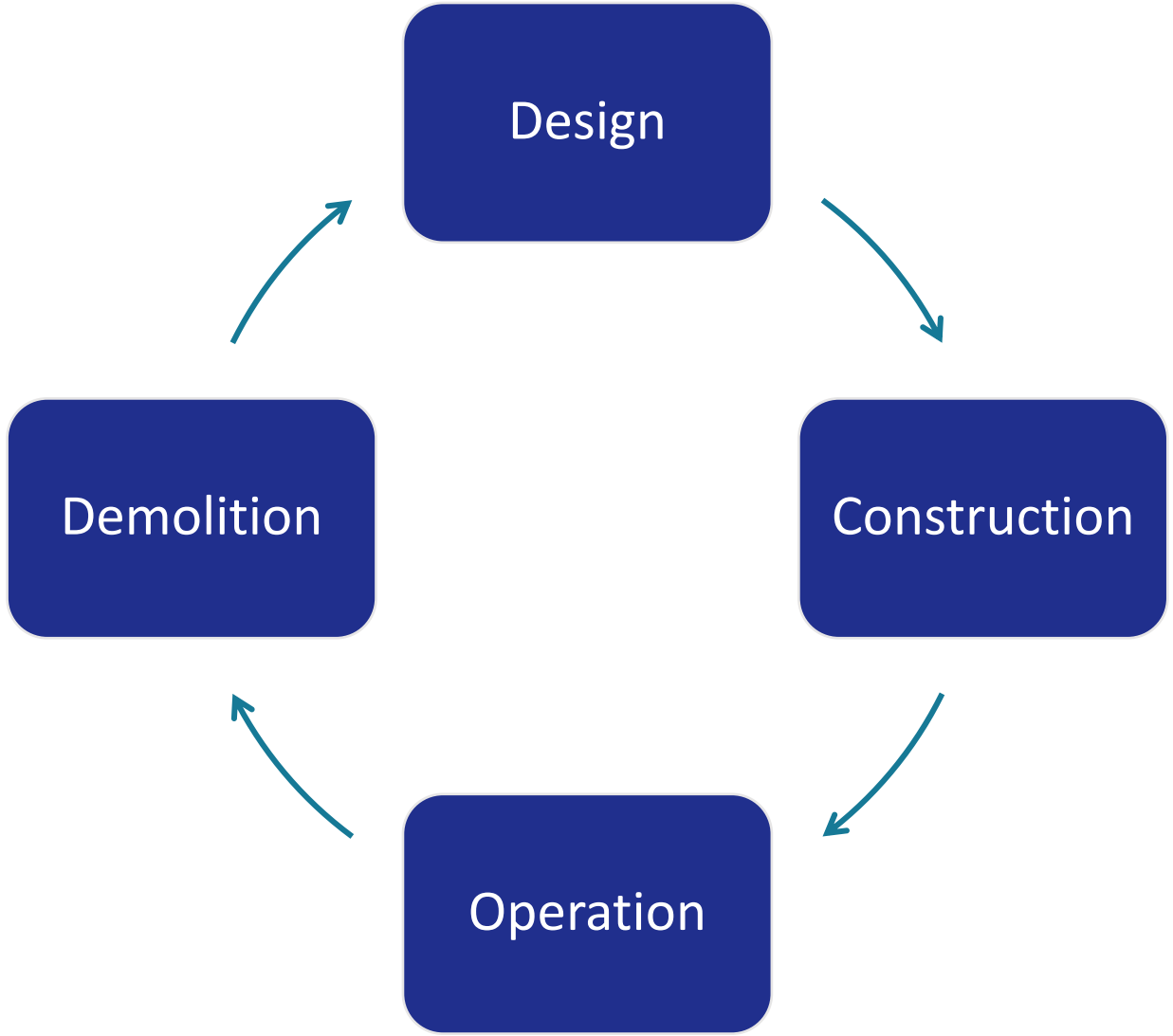

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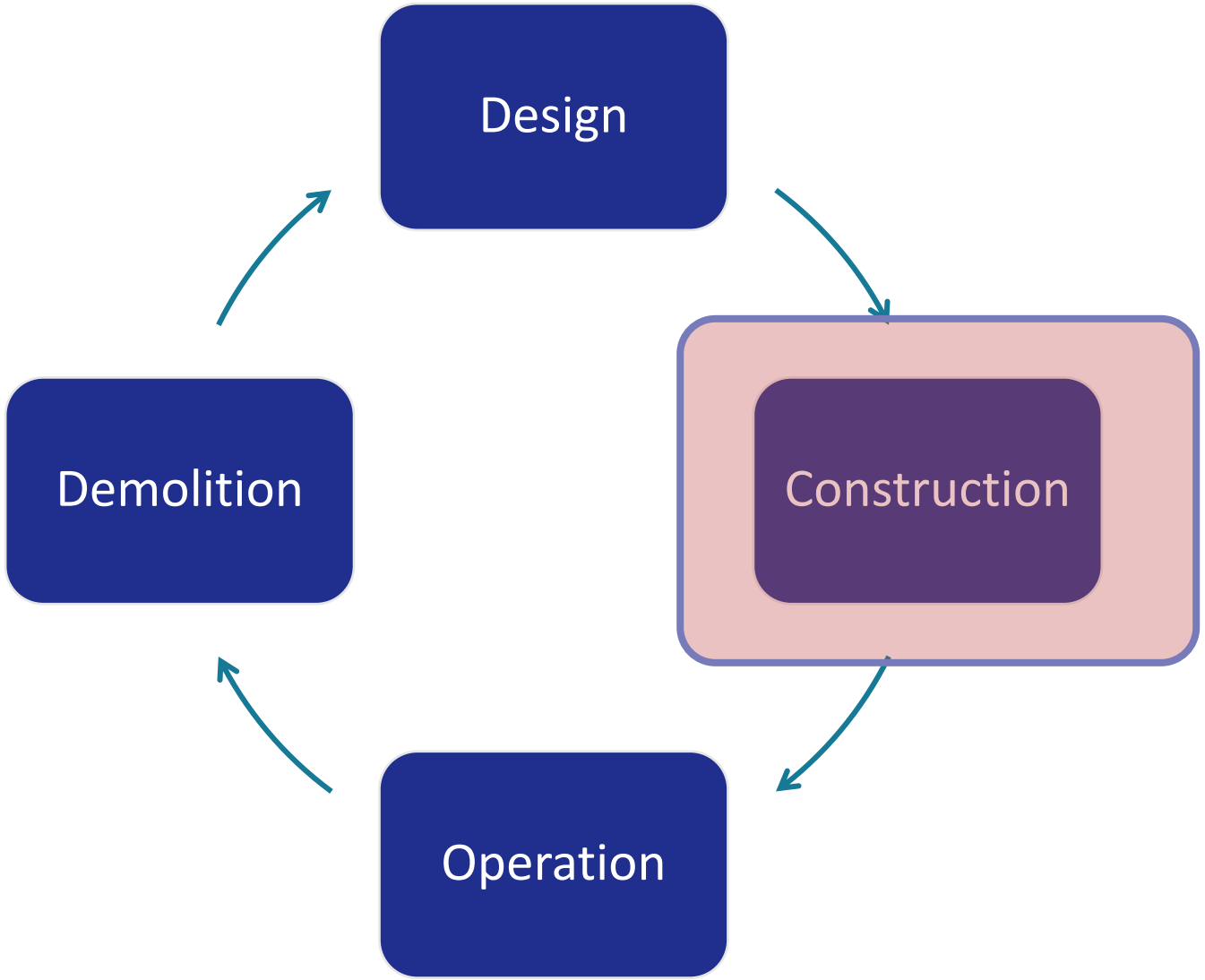

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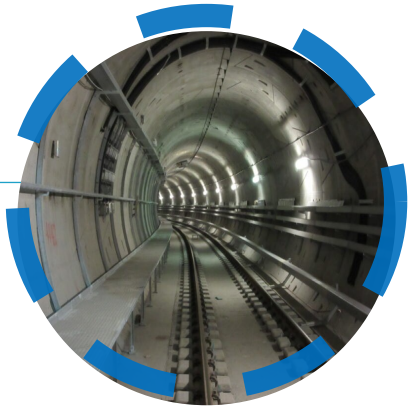
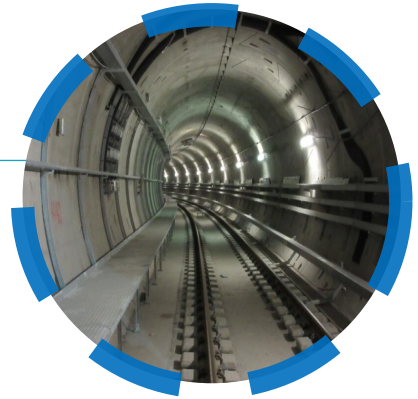
COGITO: Construction 4.0



- **Digital 4.0 methodology** encompassing:

COGITO: Construction 4.0



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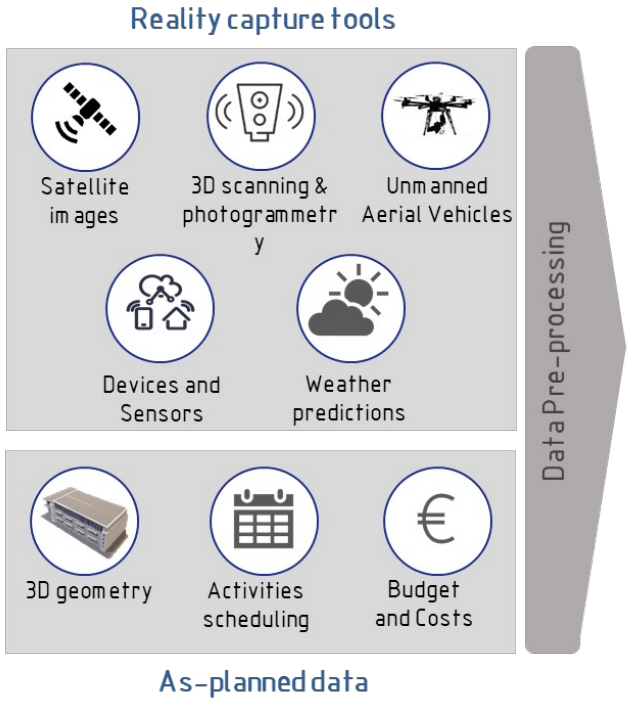

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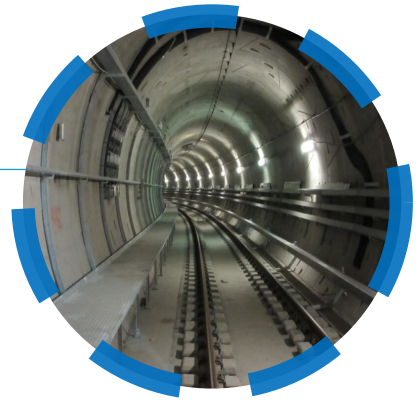

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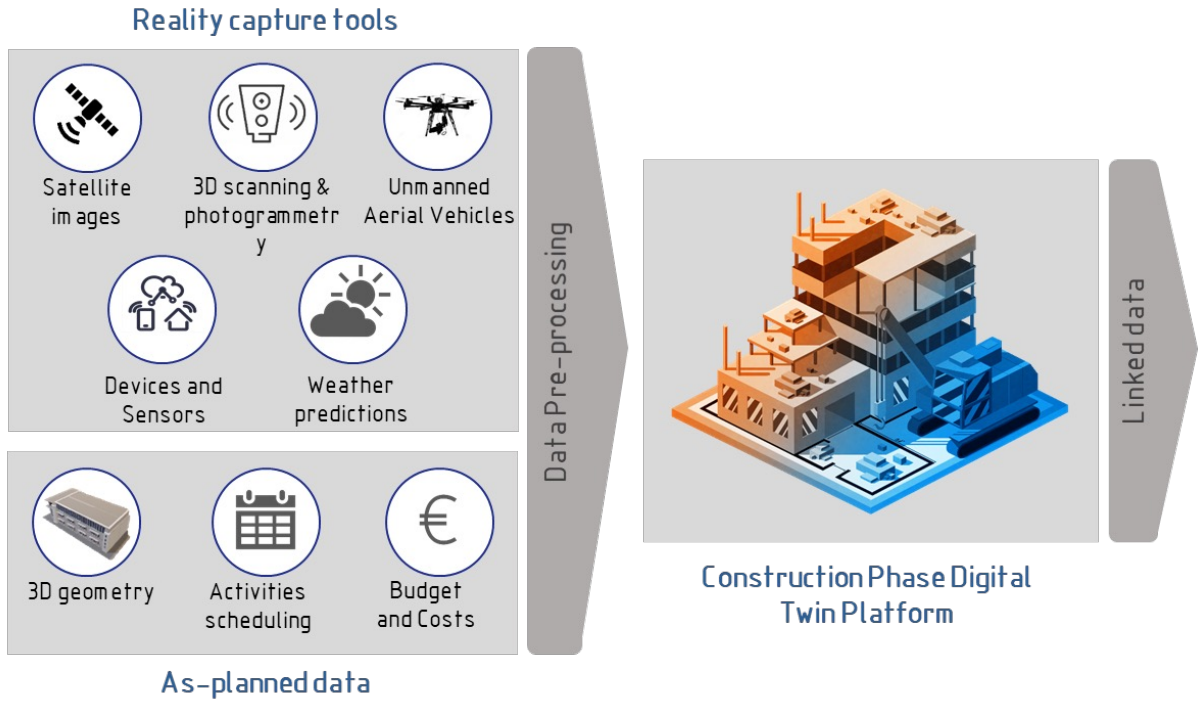

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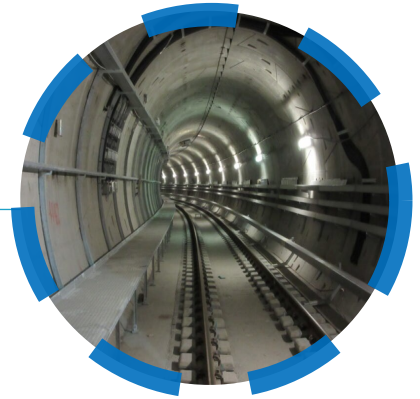

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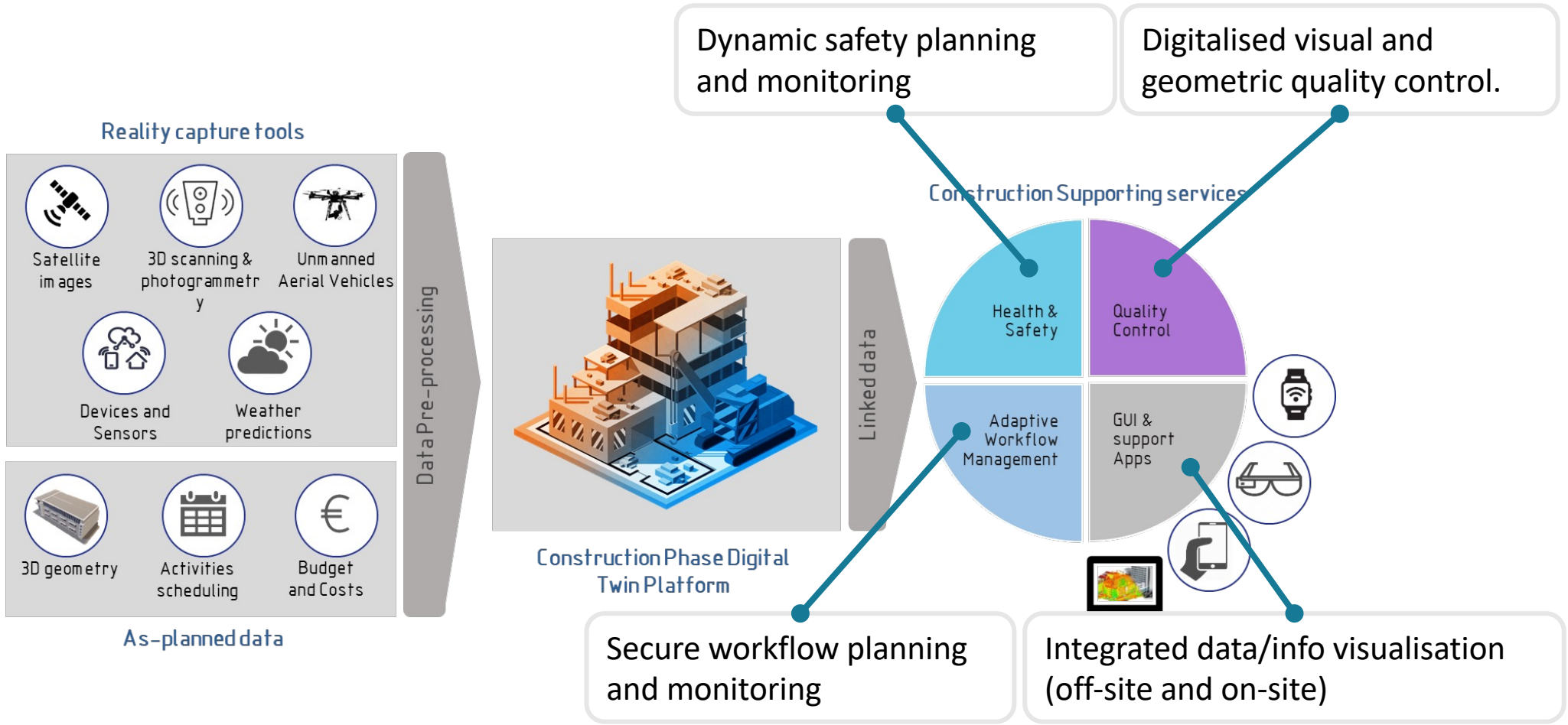

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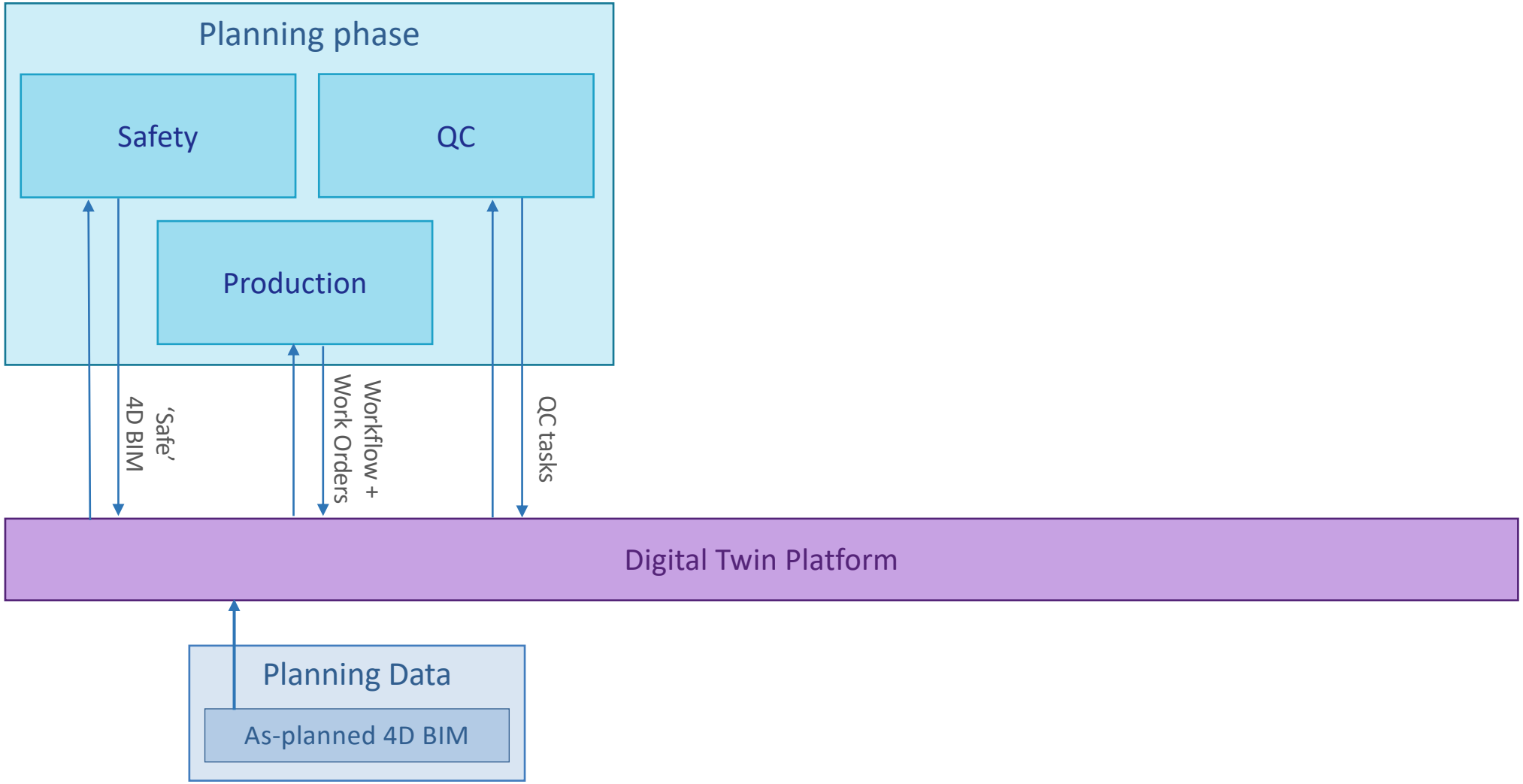
COGITO Solution in a Nutshell

Digital Twin Platform

COGITO Solution in a Nutshell



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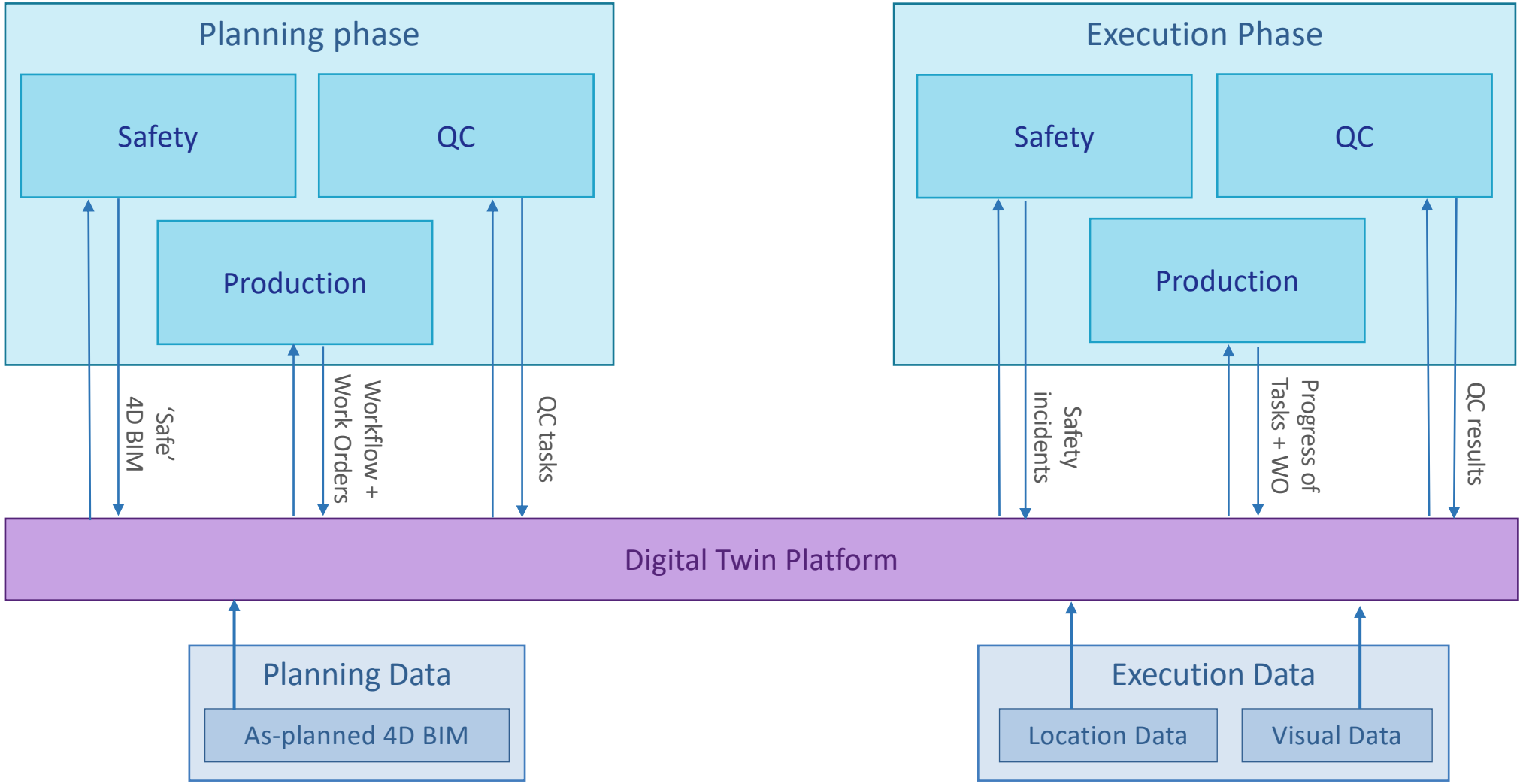

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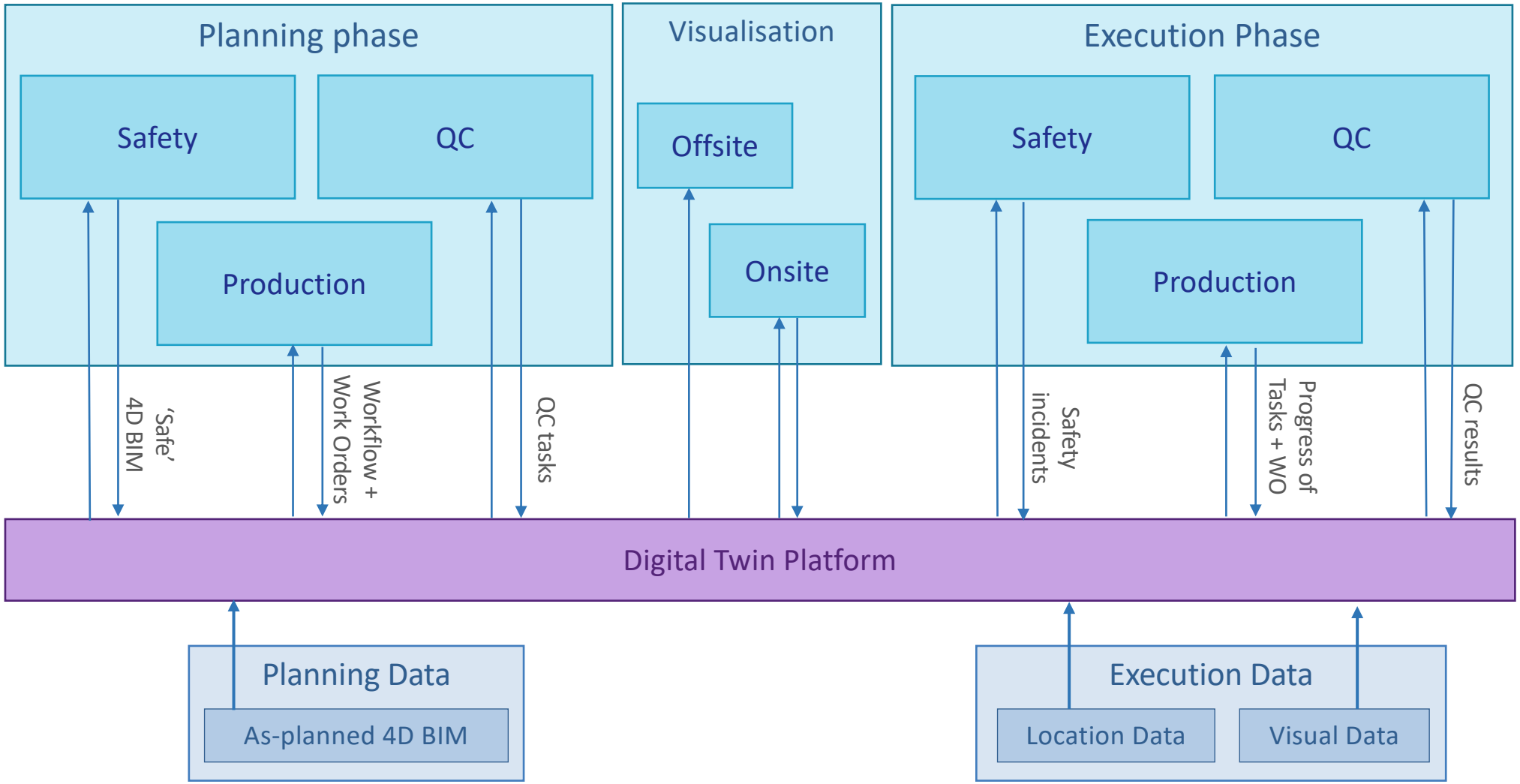

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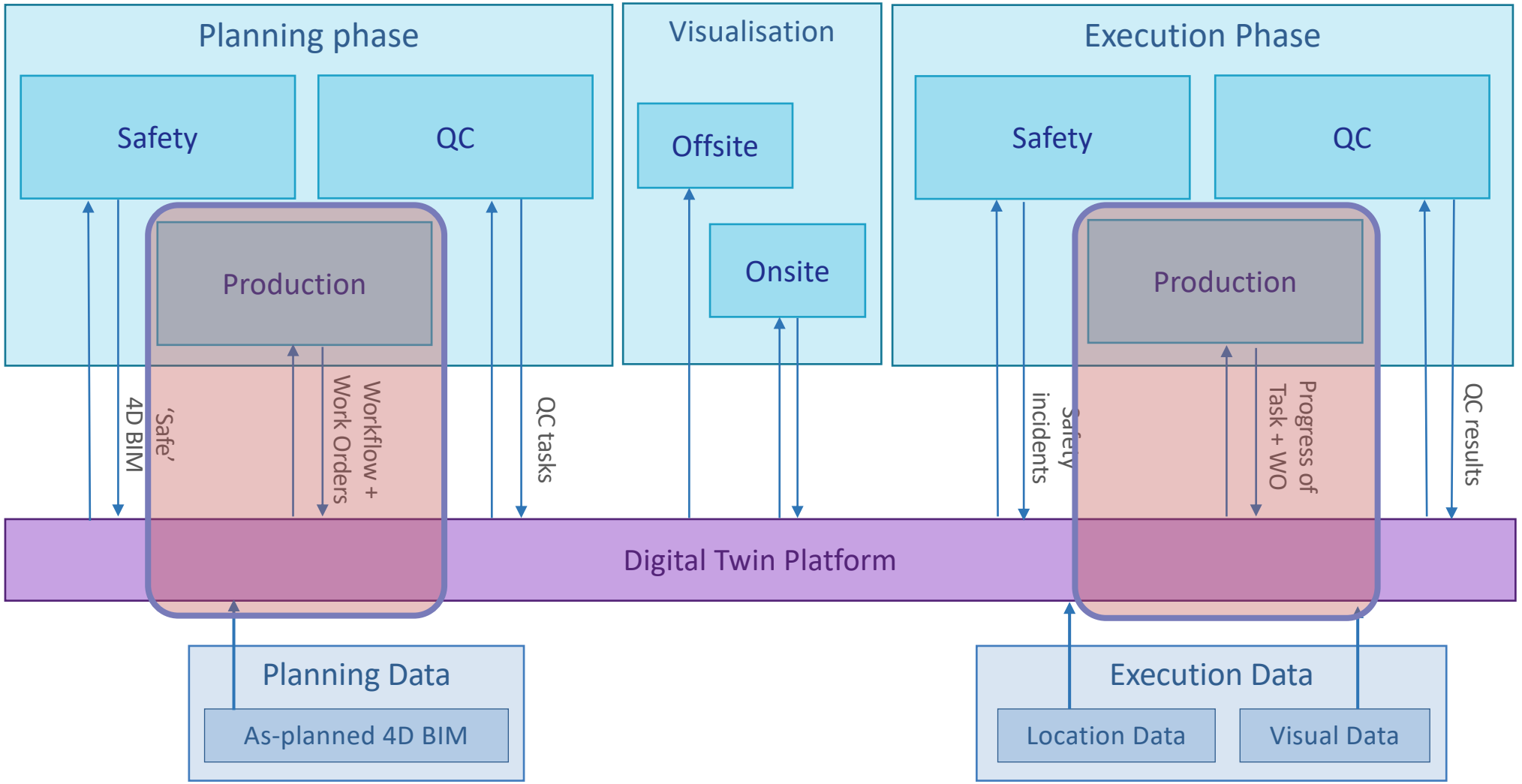

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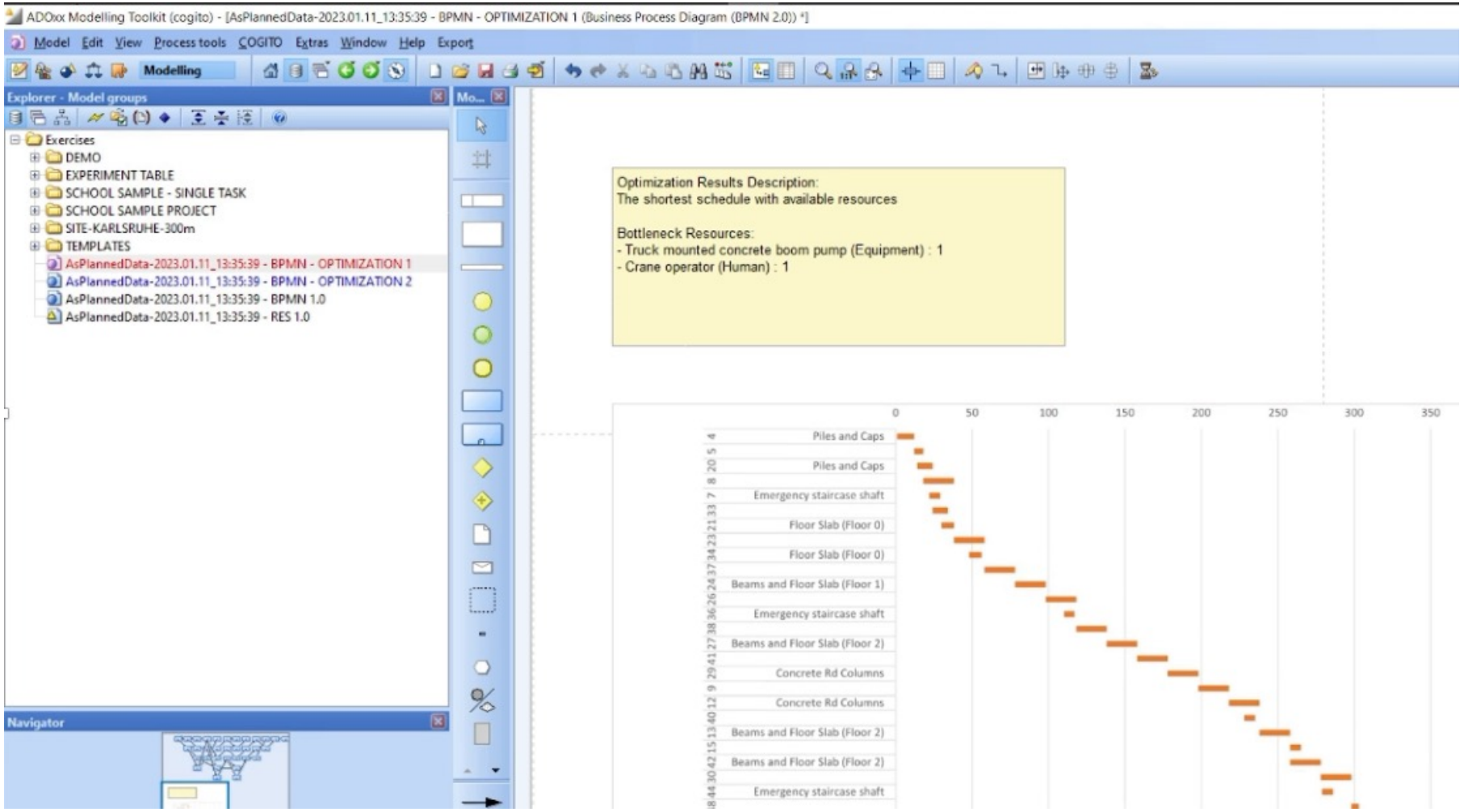
COGITO Solution in a Nutshell

Modelling and Simulation tool (PMS)



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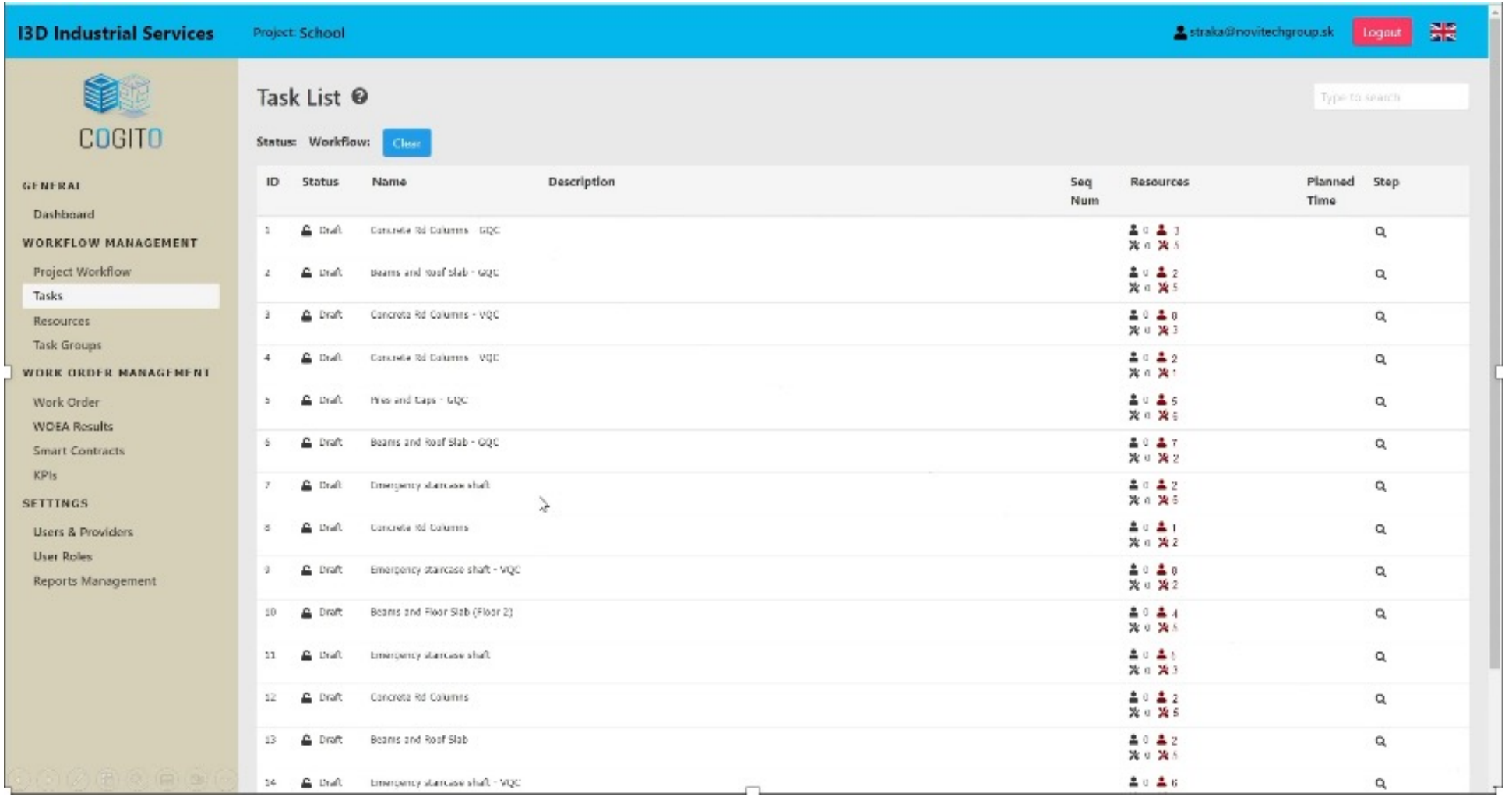
COGITO Solution in a Nutshell

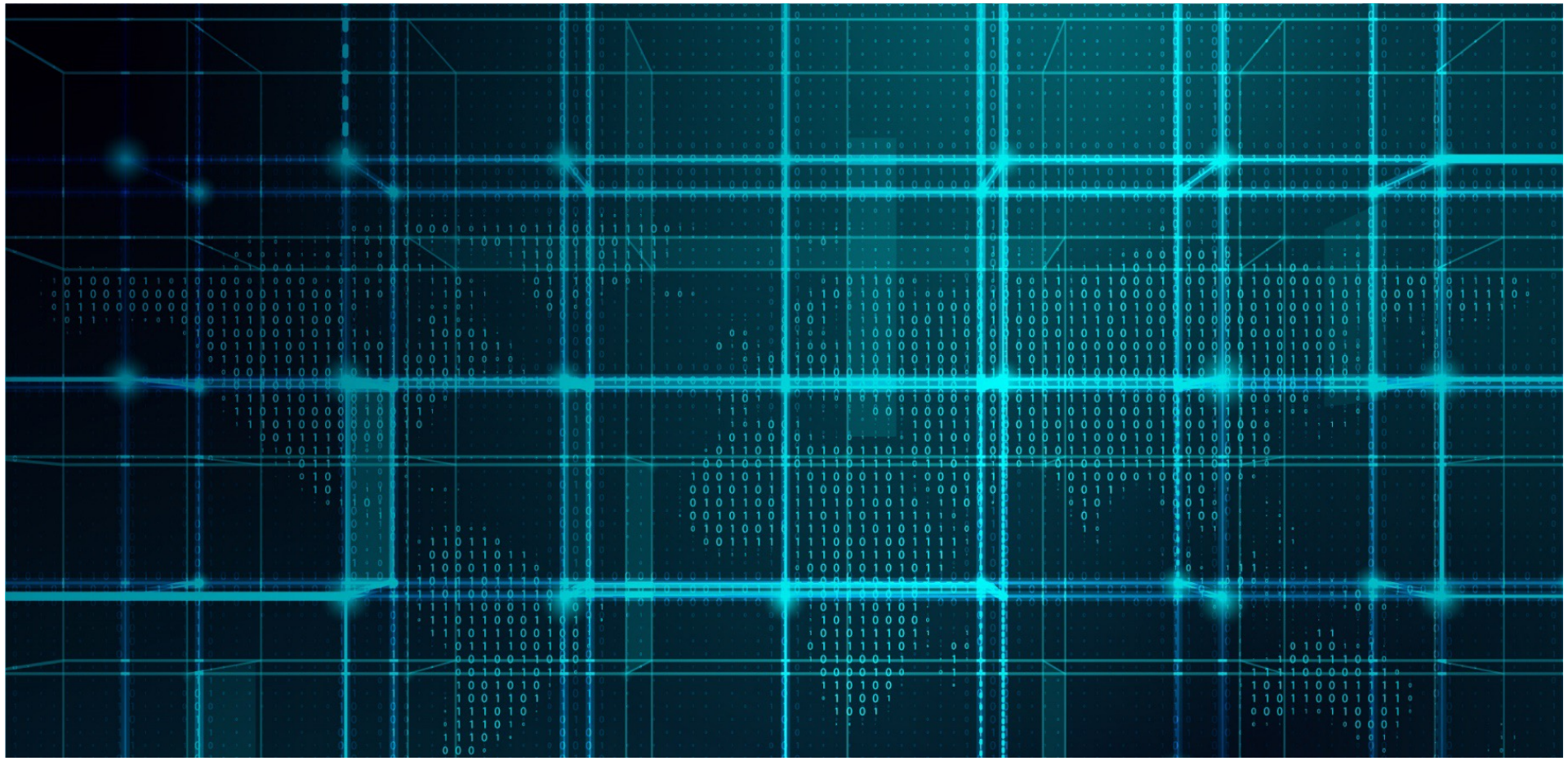
Work Order Definition and Monitoring tool (WODM)



COGITO Solution in a Nutshell

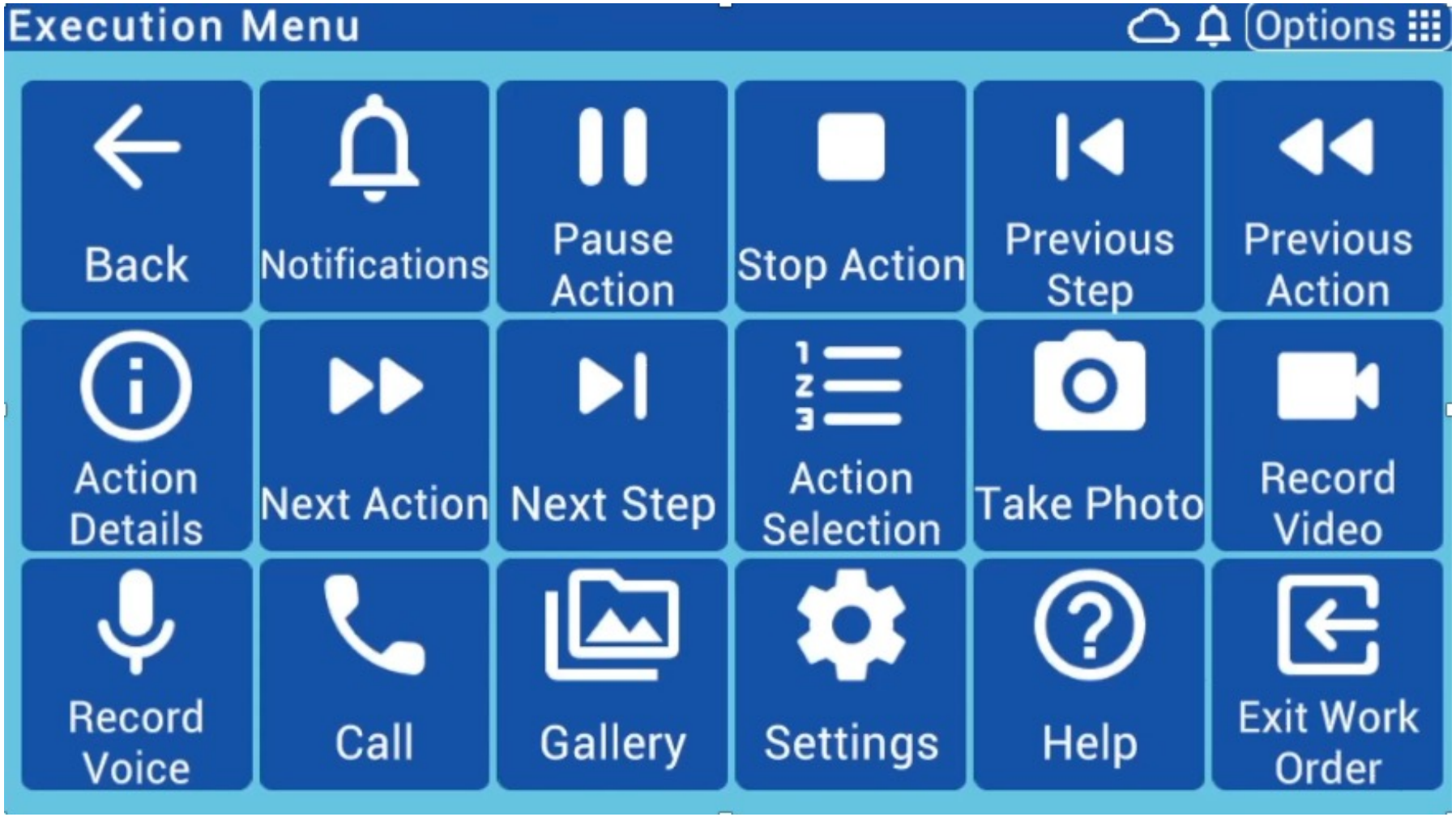
QUE TECHNOLOGIES

SLA Manager & BlockChain Smart Contract

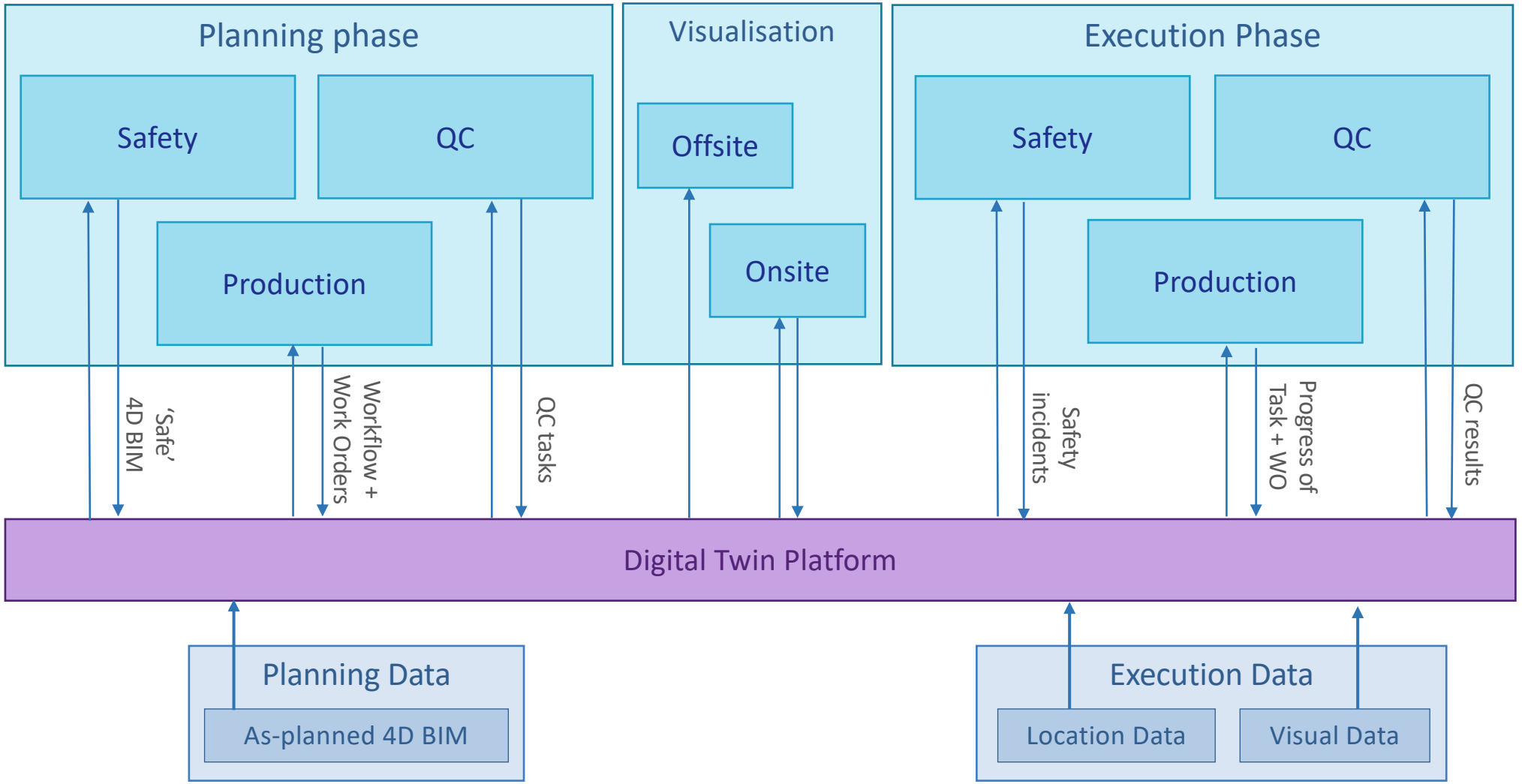


COGITO Solution in a Nutshell

Work Order Execution Assistance tool (WOEA)



COGITO Solution in a Nutshell



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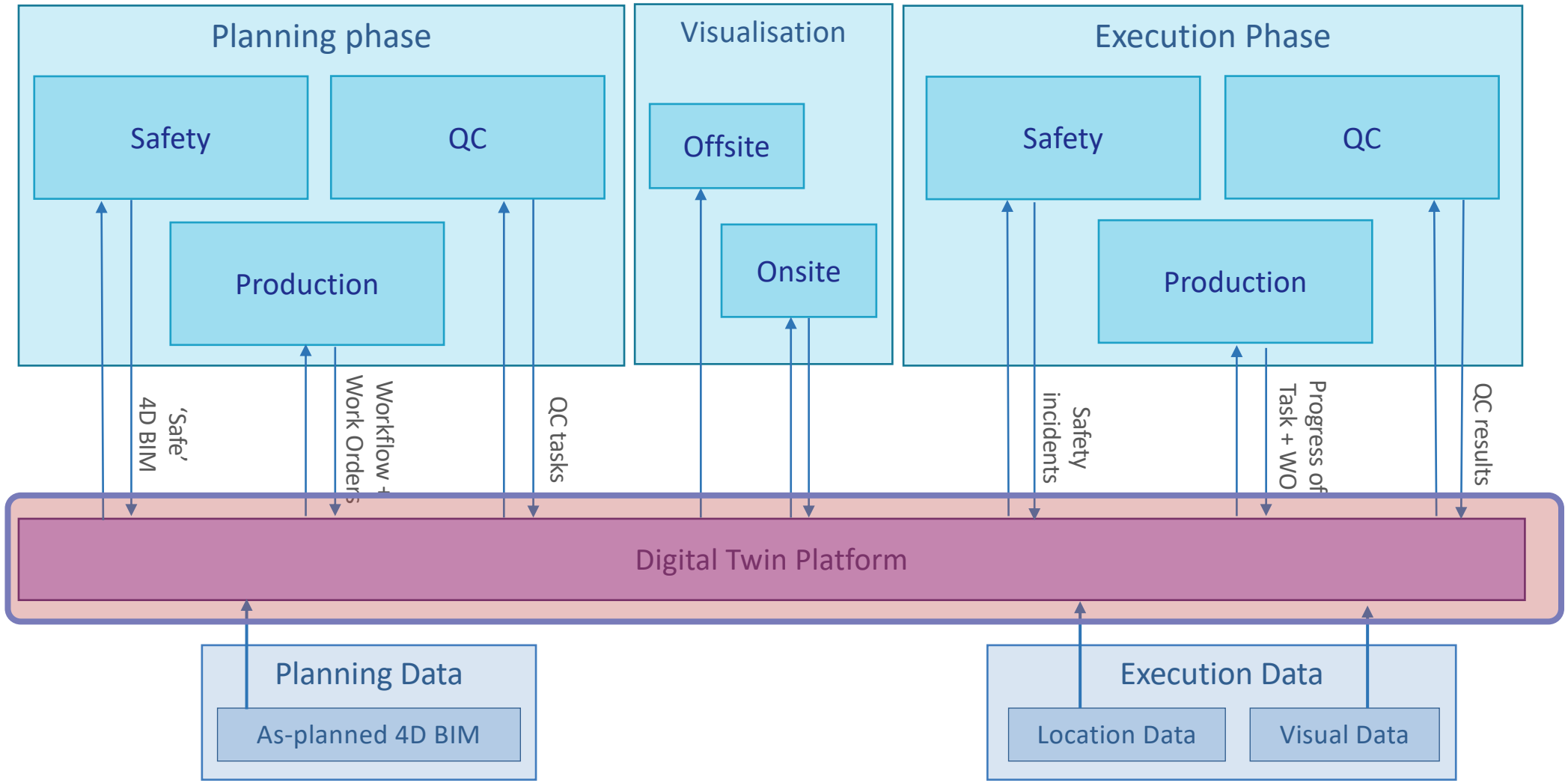

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Ontology Network

- Relevant information domains:

Product + Building / Infrastr. Asset

Ontology Network

- Relevant information domains:

Product + Building / Infrastr. Asset

Process + Schedule / Workflow + Resources

Ontology Network

- Relevant information domains:

Product	Building / Infrastr. Asset
Process	Schedule / Workflow
	Resources
Reality capture	Visual
	Location (IoT)

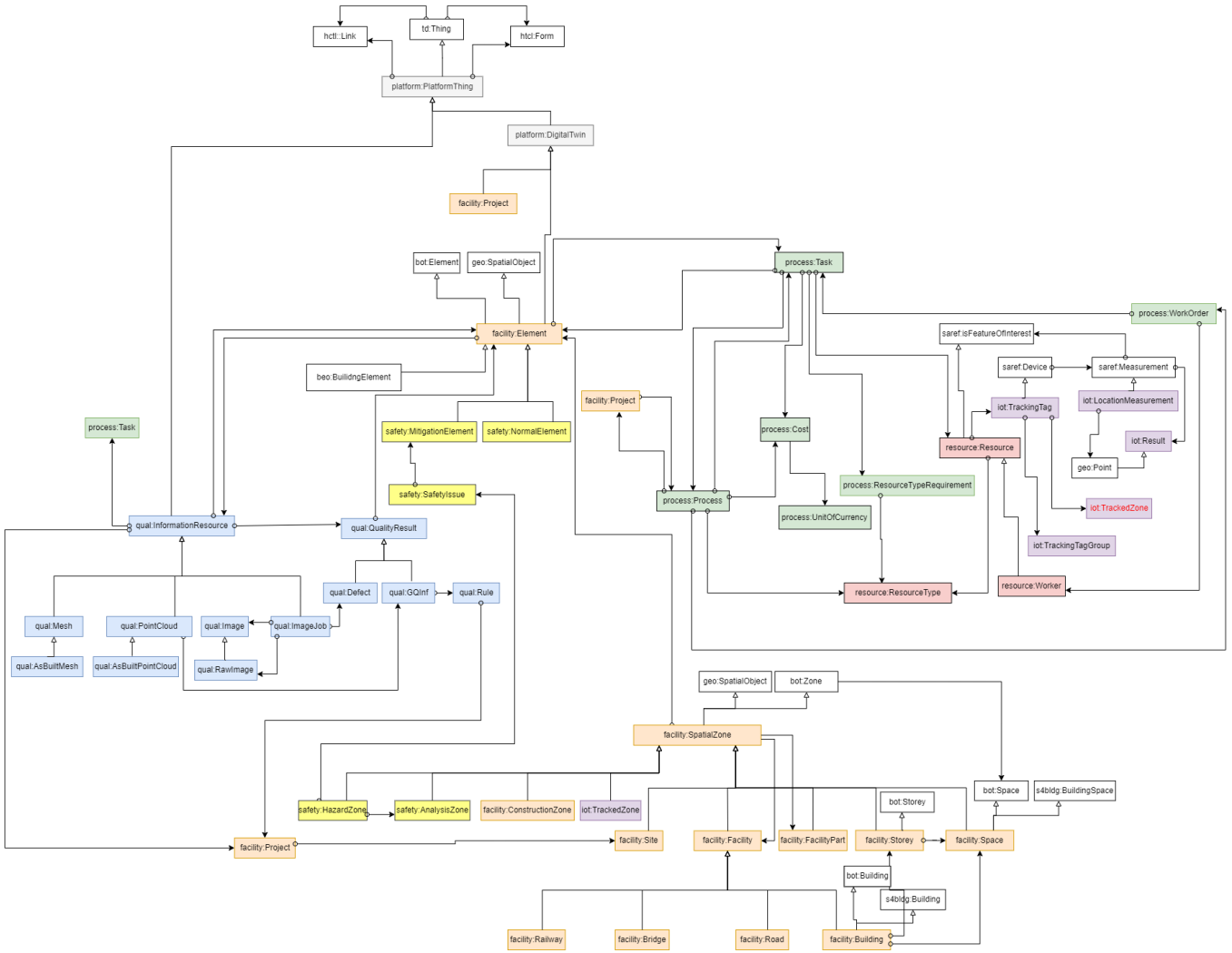
Ontology Network

- Relevant information domains:

Product	Building / Infrastr. Asset
Process	Schedule / Workflow
	Resources
Reality capture	Visual
	Location (IoT)
Applications (Use Cases)	Workflow
	Health & Safety
	Quality Control

Ontology Network (as of April 23)

- 7 Ontology Modules:
  - Product:
    - Facility (orange)
  - Process:
    - Workflow (green)
    - Resources (pink)
  - Sensing:
    - IoT (purple)
  - Applications:
    - Quality (blue)
    - Safety (yellow)



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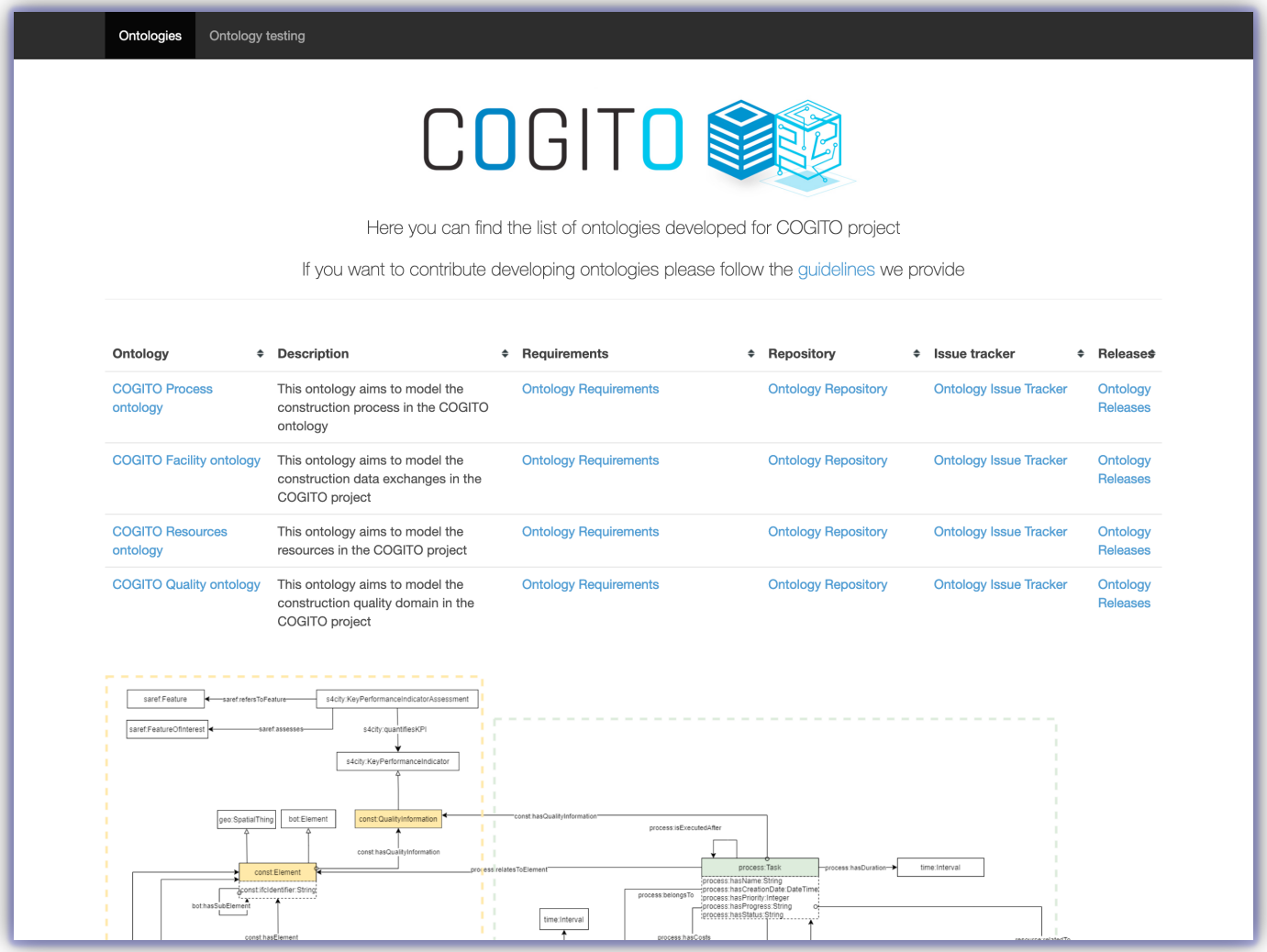

https://cogito.iot.linkeddata.es/

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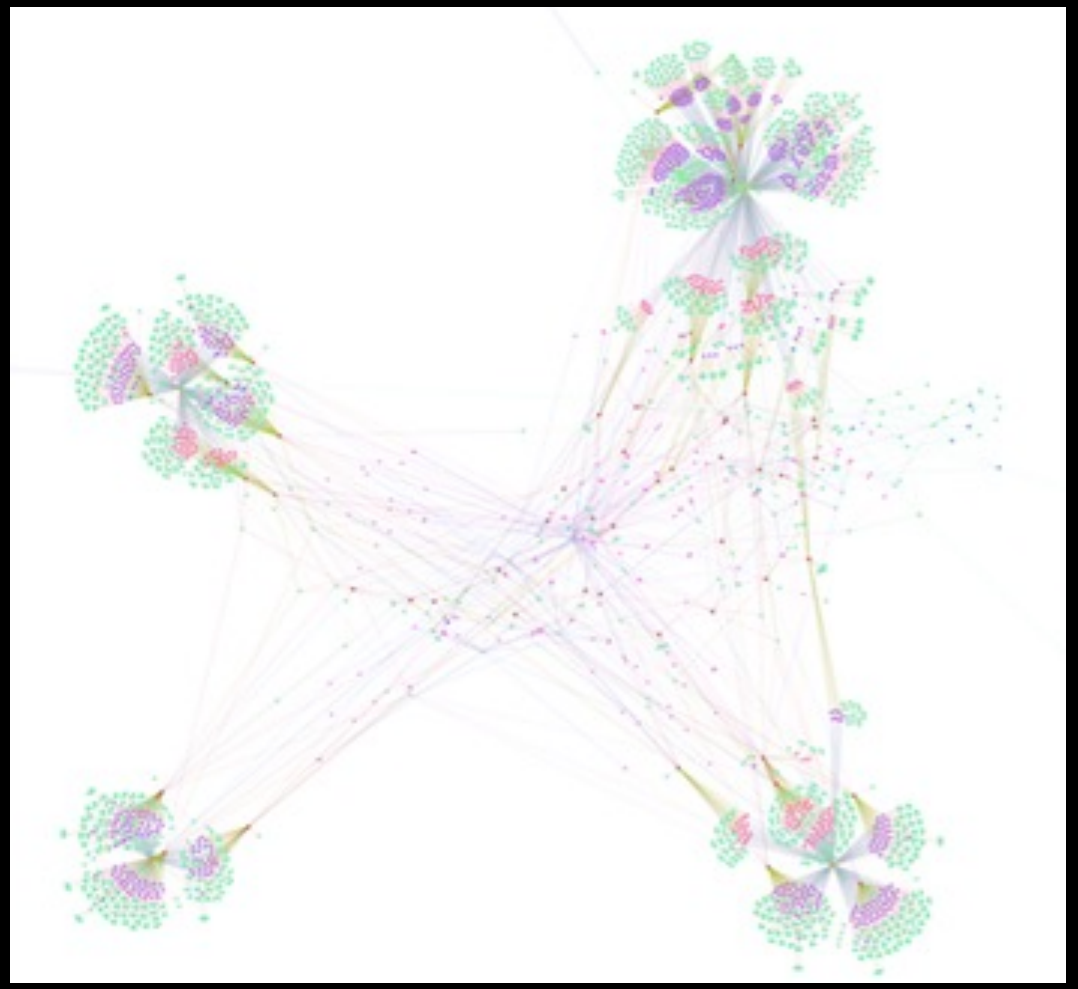
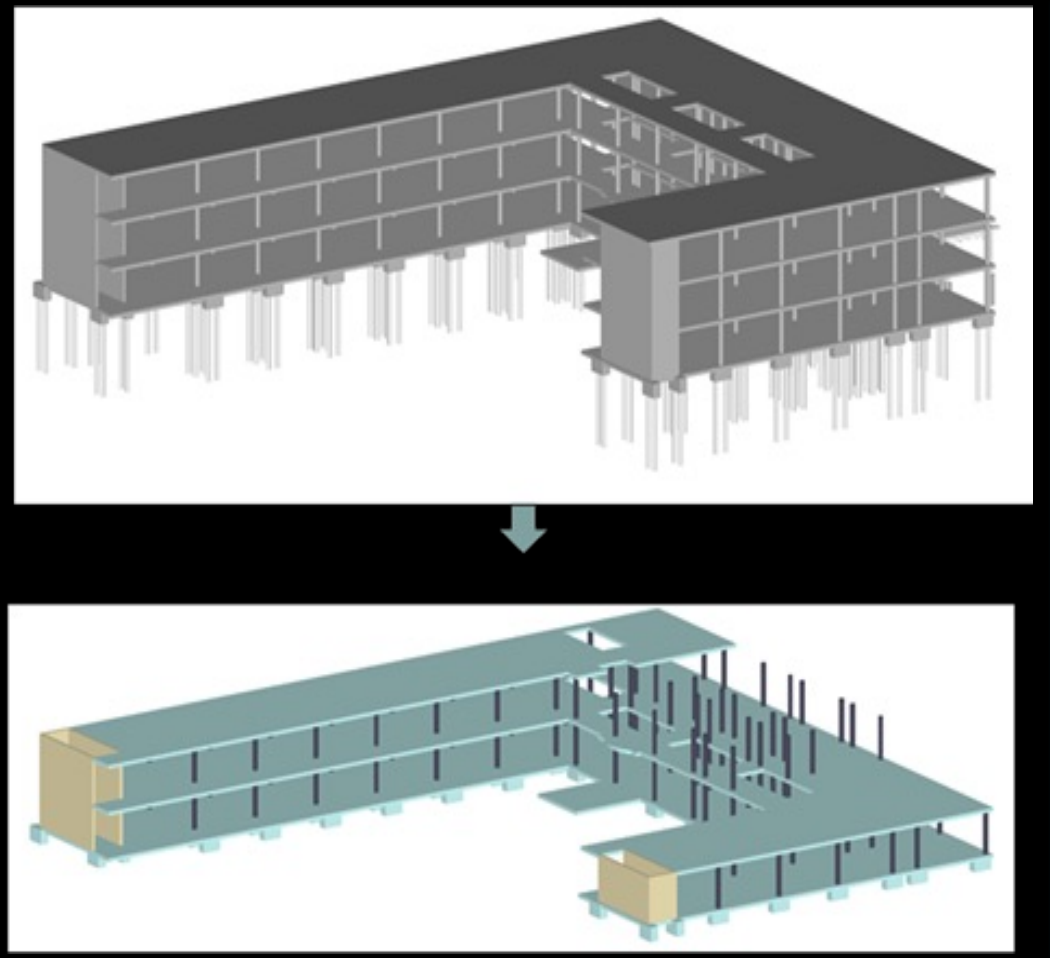
Knowledge Graph



Visual representation of the knowledge graph generated by the DT Platform



BIM model generated by DTP's "4Dsnap" BIM query module during runtime

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Questions & Answers

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Digital Tools for Workflow Management
PMS Toolkit

Damiano Falcioni

BOC-AG

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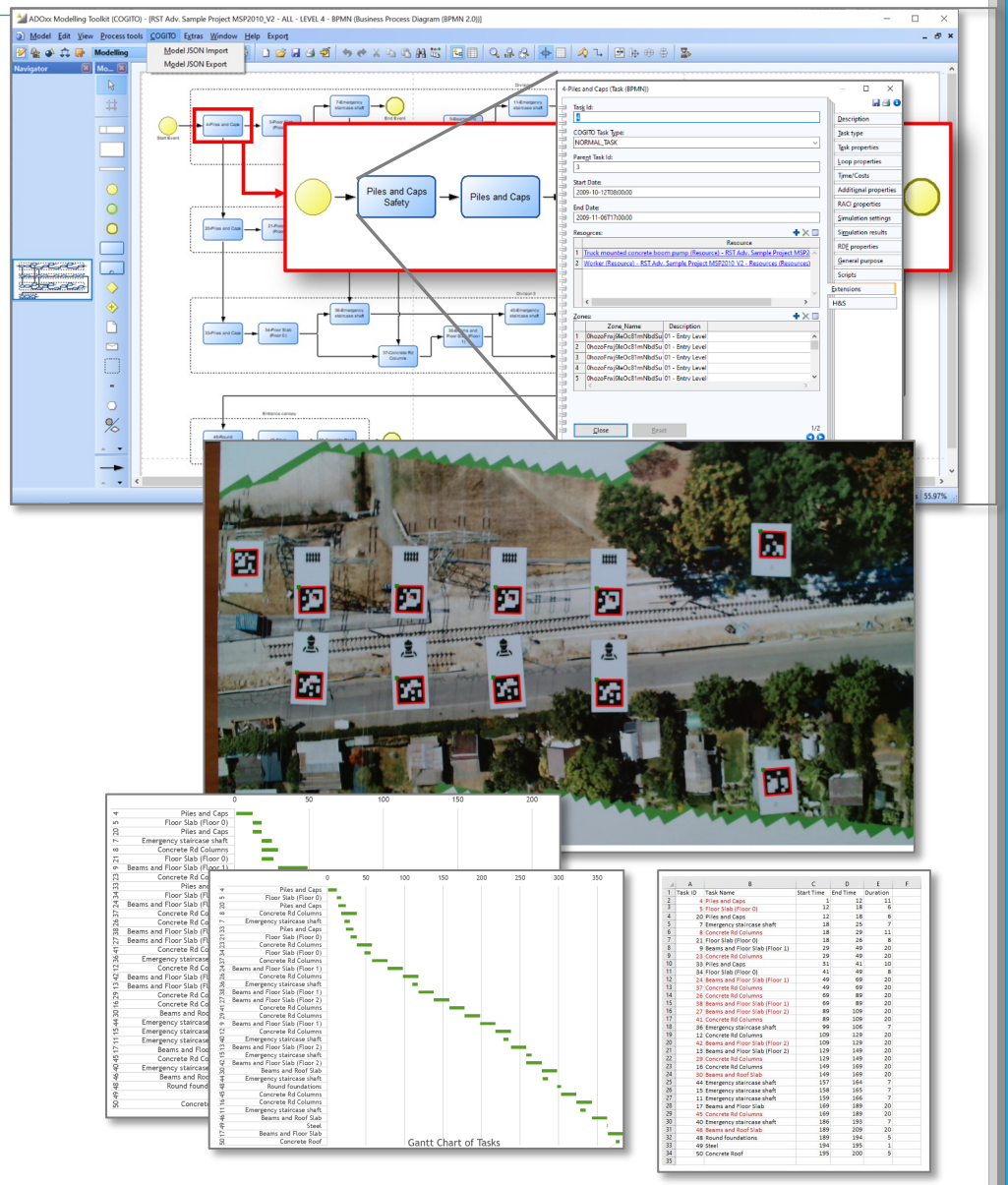
PMS in a nutshell

- PMS – Process Modelling and Simulation
- Collaborative reasoning on use case and requirements
- Refinement of scheduled activities with:
  - Resources needed/available
  - BIM Element
  - Quality control and safety activities
- Identification of optimal schedule where:
  - Tasks can be carried out in parallel
  - Optimal number or resources are allocated
  - Alternative schedules based on user preference are proposed
  - Bottleneck resources are identified
  - Flexibility of each task schedule is calculated
- Validation of the final schedule before execution



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Digital Tools for Workflow Management
WODM

Martin Straka

NT

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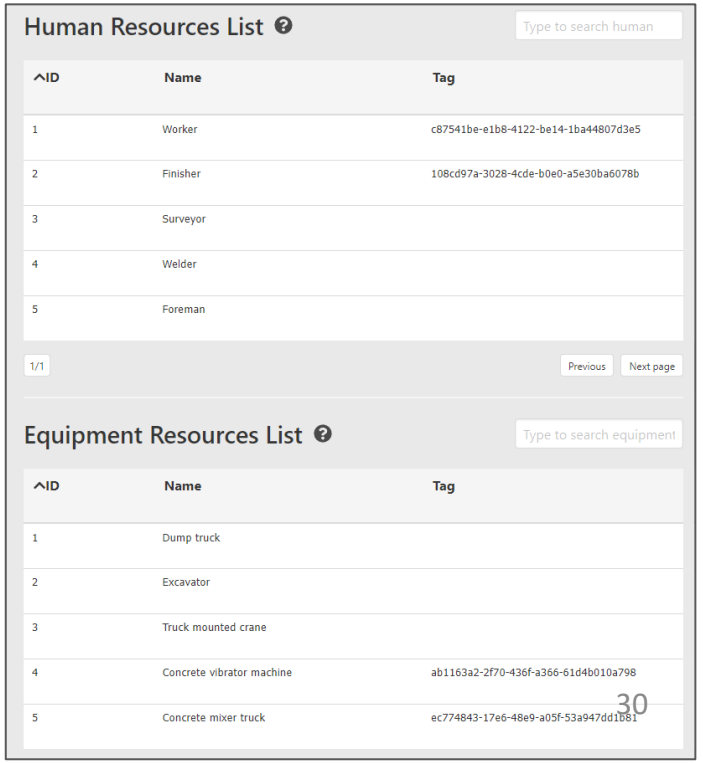
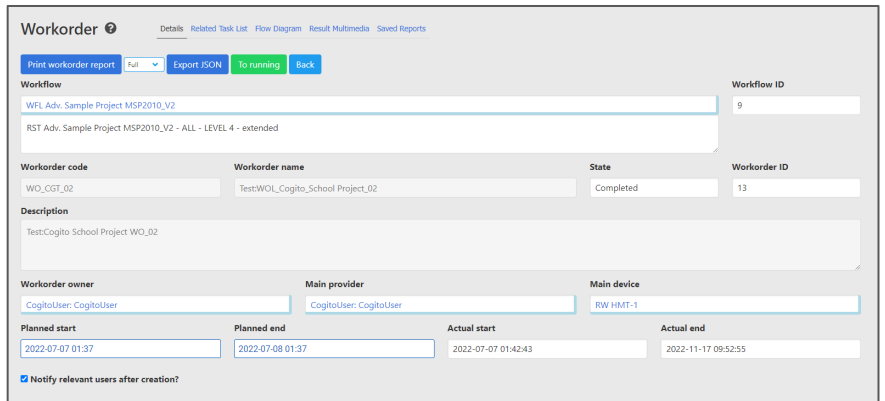
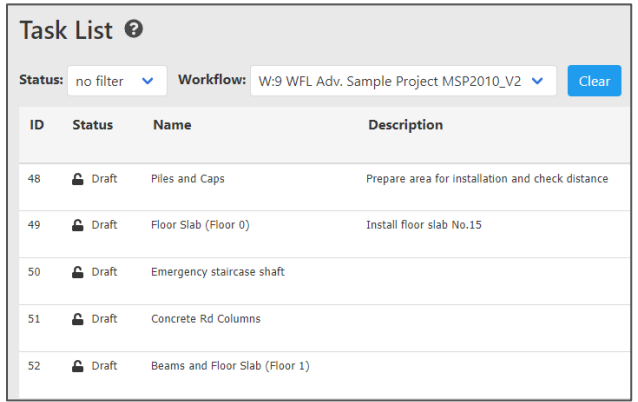
WODM in a nutshell

Work Order Definition and Monitoring tool

- WODM is a tool providing:
  - service to create executable work processes based on PMS-generated workflows imported from DTP
  - service to assign resources to tasks
  - service to create SLAs with assigned KPIs and tasks
  - service to execute workorders and follow changes provided by PMS
- WODM has a UI providing:
  - Assigning of resources to tasks
  - Definition of SLAs and KPIs for tasks
  - Overview of the task and work order progress
  - Reporting of workorder results and captured multimedia







Digital Tools for Workflow Management
BCSC

Dr. Panagiotis Moraitis

QUE

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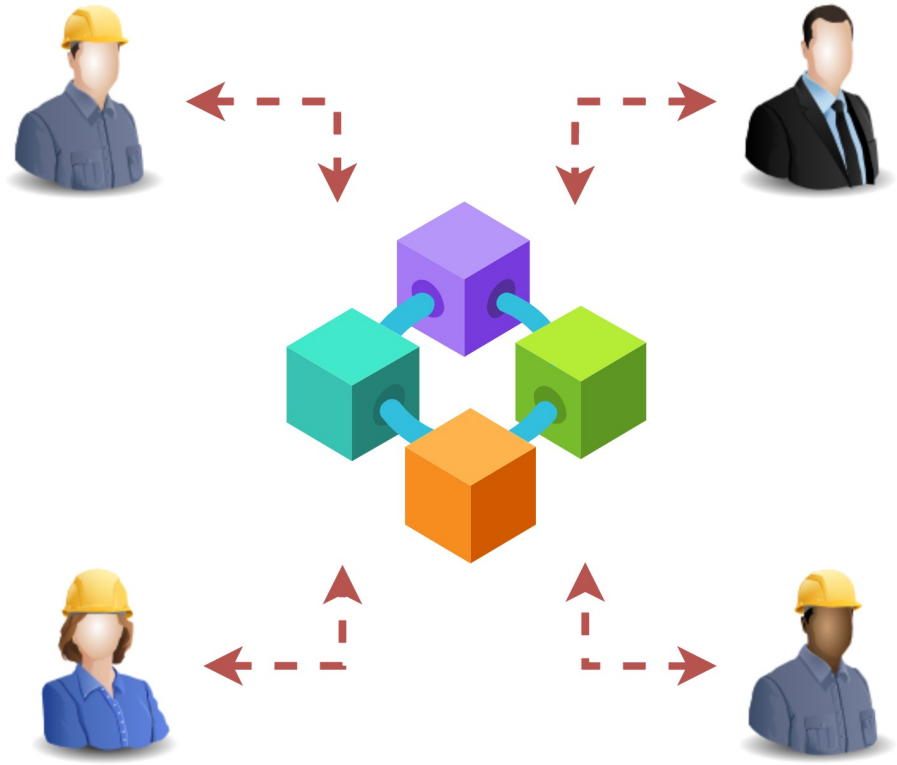
Blockhain Platform in COGITO

- Blockchain and Smart Contracts can be utilized to **enhance transparency** and provide the **trusted means** to verify the completion of construction tasks.
- It will communicate progress information securely and reliably and it will act as **a single source of truth** in order **to reduce the trust gap** between the involved stakeholders.
- From a **technical point of view**, this approach offers an outstanding advantage in terms of **security.**
- It will **simplify** and **speed up** timely procedures reducing delays and potential conflicts.



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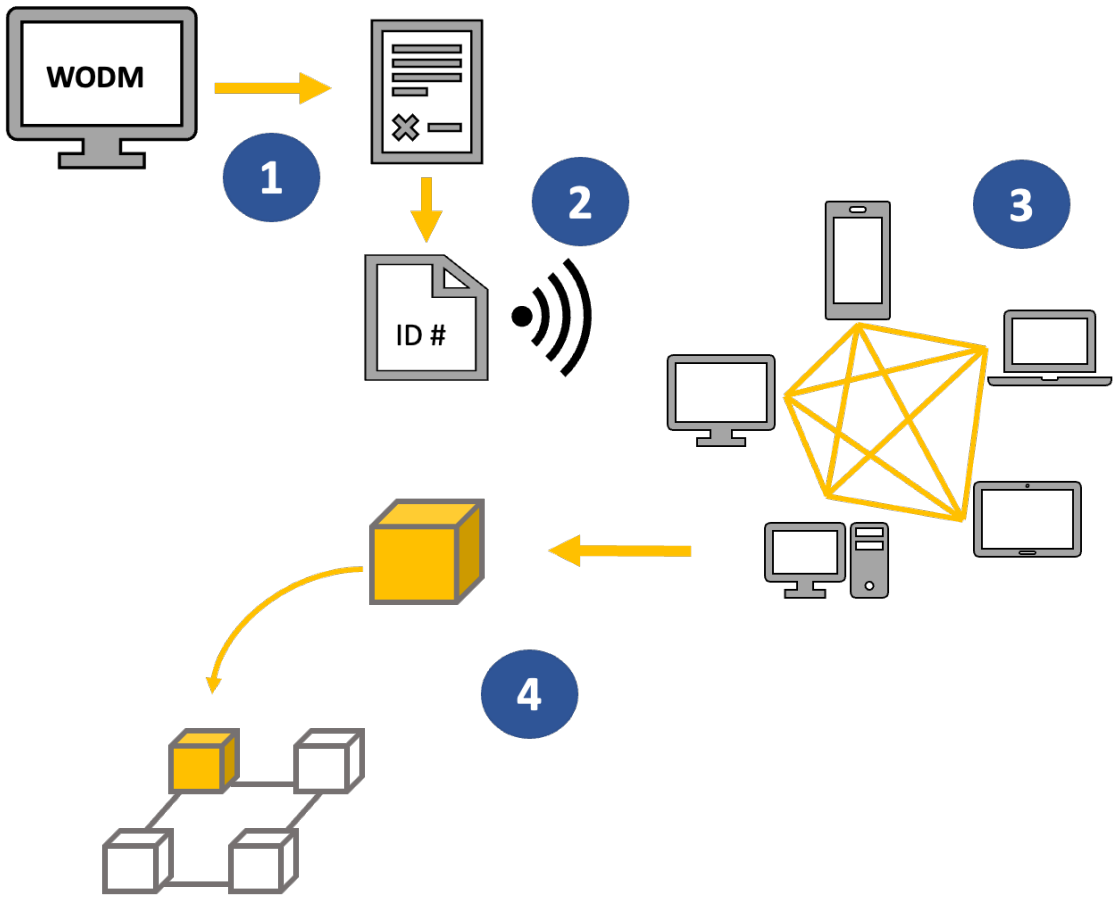
Smart Contracts in a nutshell

- SLAM – Service Level Agreement Manager
- BCSC – Blockchain – Smart Contracts
- A tool that provides measurable and quantifiable KPIs to the WODM.
- Translates Work Orders to Smart Contract ready SLAs and deploys them on a Blockchain Network.
- Receives updated KPI values that monitor the progress of each task registered with the specific Work Order.
- Stores these values on the Blockchain and calculates the overall SLA performance.



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Achieved so far

- A set of **predefined**, **measurable** and **quantifiable** KPIs to enhance transparency and provide the **trusted means** to verify the completion of the construction tasks.
- A Data Model that bundles together **stakeholders**, **tasks** and **KPIs** into machine readable and smart contract ready SLAs.
- The **SLA Manager**, the component responsible for organizing and providing the **SLAs** and **KPIs** to the WODM tool.
- **Blockchain and Smart Contract (BC-SC)** platform, the component responsible for running the Blockchain offering a highly secure and tamper proof system to store data.
- **BC-SC** platform provides also Smart Contract functionality to securely and reliably calculate task progress **eliminating the trust gap** between the involved parties.

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DIGITAL TWIN MODEL

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Digital Tools for Workflow Management
WODM & WOEA

Martin Straka

NT

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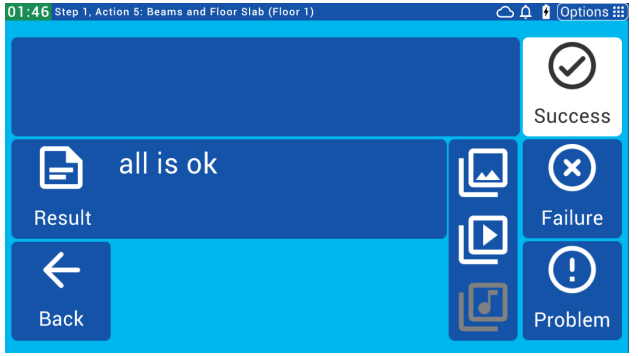
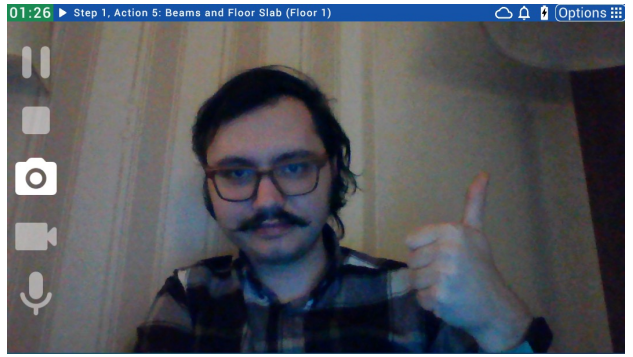
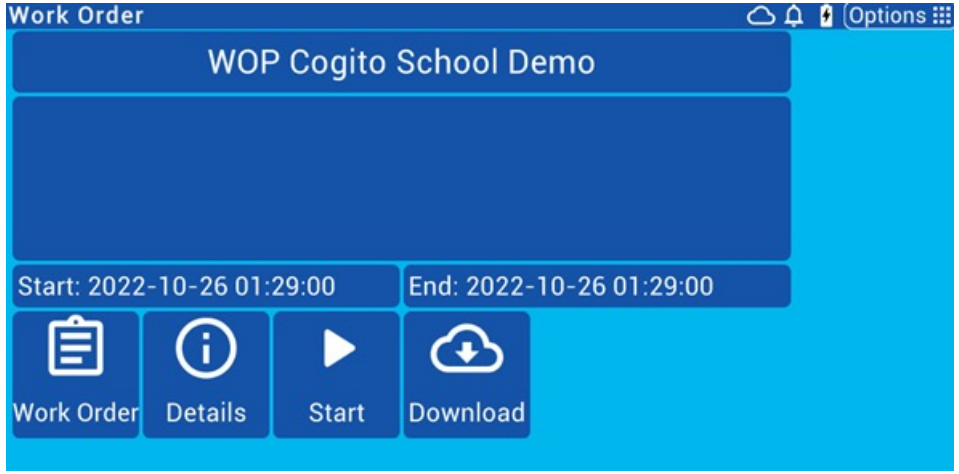
WOEA in a nutshell

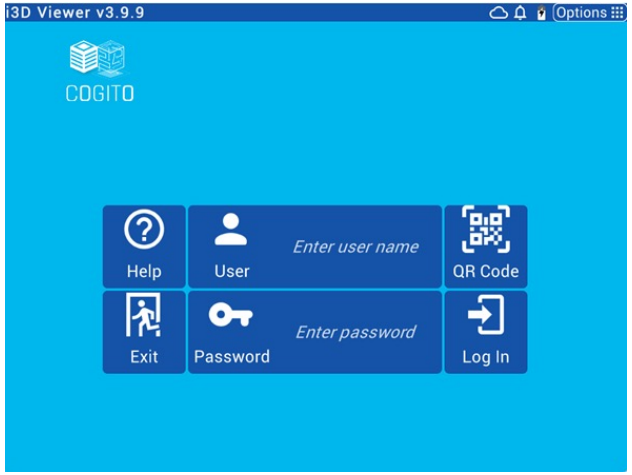
Work Order Execution Assistance tool

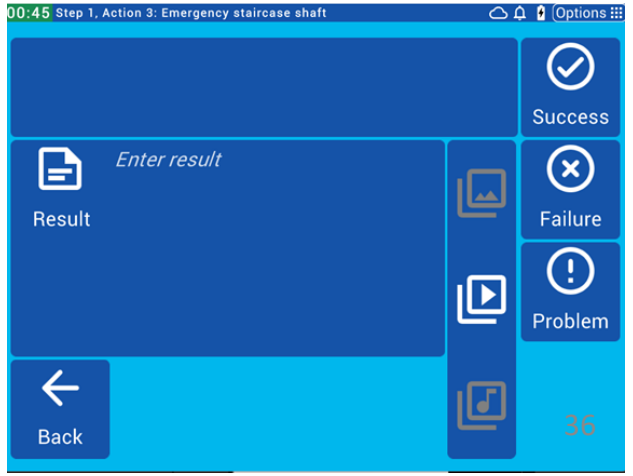
- WOEA is an on-site application for execution of work orders.
- The main users of WOEA are workers, Surveyors, and Foremen
- The application is available for android devices, for best results smart glasses like Realwear HMT-1 are preffered.
- Application guides users to execute and report tasks in work orders and provides these results to WODM including any captured pictures, voice records and videos.











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Questions & Answers

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Thursday 25th May

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Thank you!


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