IOTWeek

ONLINE EVENT

Aug 30 - Sept 3 2021

IOTForum

Cognitive Digital Twins for Resilience & Sustainability

Kostas Kalaboukas - Gruppo Maggioli

The key drivers

Circular Supply Chains

Product modularity, Personalization and circularity by design - Product as a Platform

Source: Harvard Business Review

Products to platforms: making the leap, Harvard Business Review, 2016.

Data Driven Supply Chains

Data driven supply chains with a value of $100 billion in improved operations

Source: World Economic Forum

Share to Gain: Unlocking Data Value in Manufacturing, WEF White Paper, Jan 2020

Agility and Localization

Complex, flexible, connected and inter-dependent relationships, where knowledge flows

Source: Deloitte

Deloitte University Press: Business Ecosystems come of age, 2017

New Logistics Delivery Models

On-demand and faster deliveries /
Cross-border logistics and information sharing

Source: PostEurop

PostEurop Market Forum workshop (Ljubljana, Feb 2019 and Split, September 2019) in the context of COG-LO H2020 project

Acceleration of working automation

Increased investments are expected in automation once the coronavirus crisis passes (droids, auto-vehicles, etc.)

Source: Adecco

www.adeccogroup.com

New Market potentials

Elder people will account for about 51% of urban consumption growth, which is equivalent to more than $4 trillion" – need for personalized services

Source: McKinsey

www.mckinsey.com

Cognitive Digital Twins for Sustainable Supply chains

- A dynamic, living system of “digital twins” with cognition capabilities representing all **assets**, **operations** and **actors** involved
- Interconnected CDTs at intra- and inter- factory (supply chain)
- Different levels of cognition (from basic understanding to autonomous decision making and actuation)
- Aligning cognition at all levels (edge/fog/cloud)

Supply Chain as a network of interconnected CDTS

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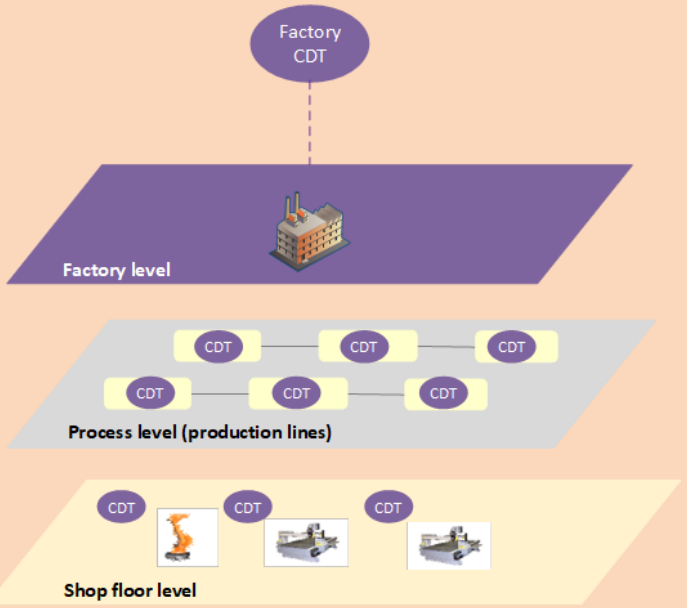
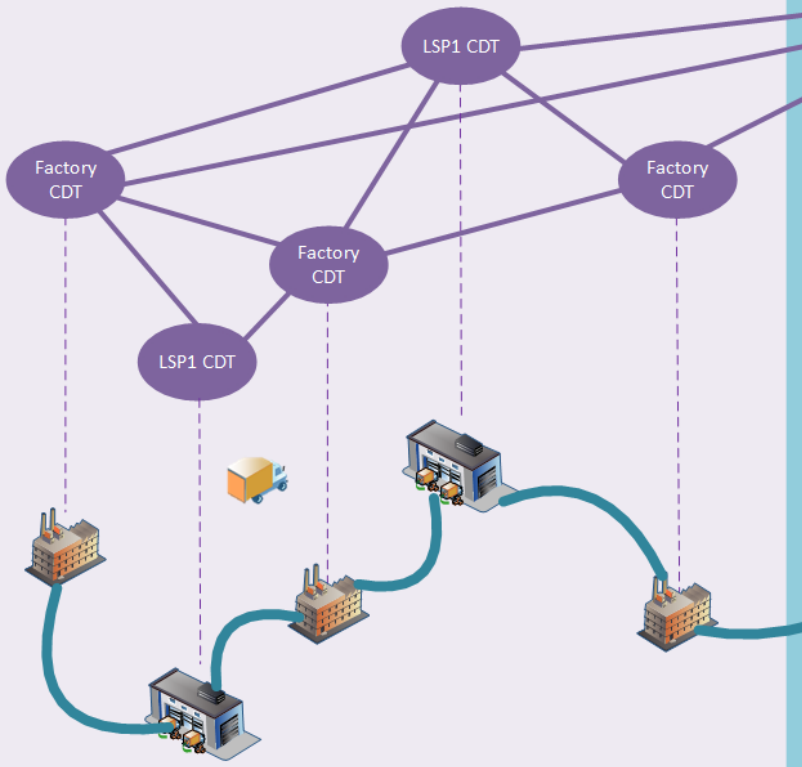
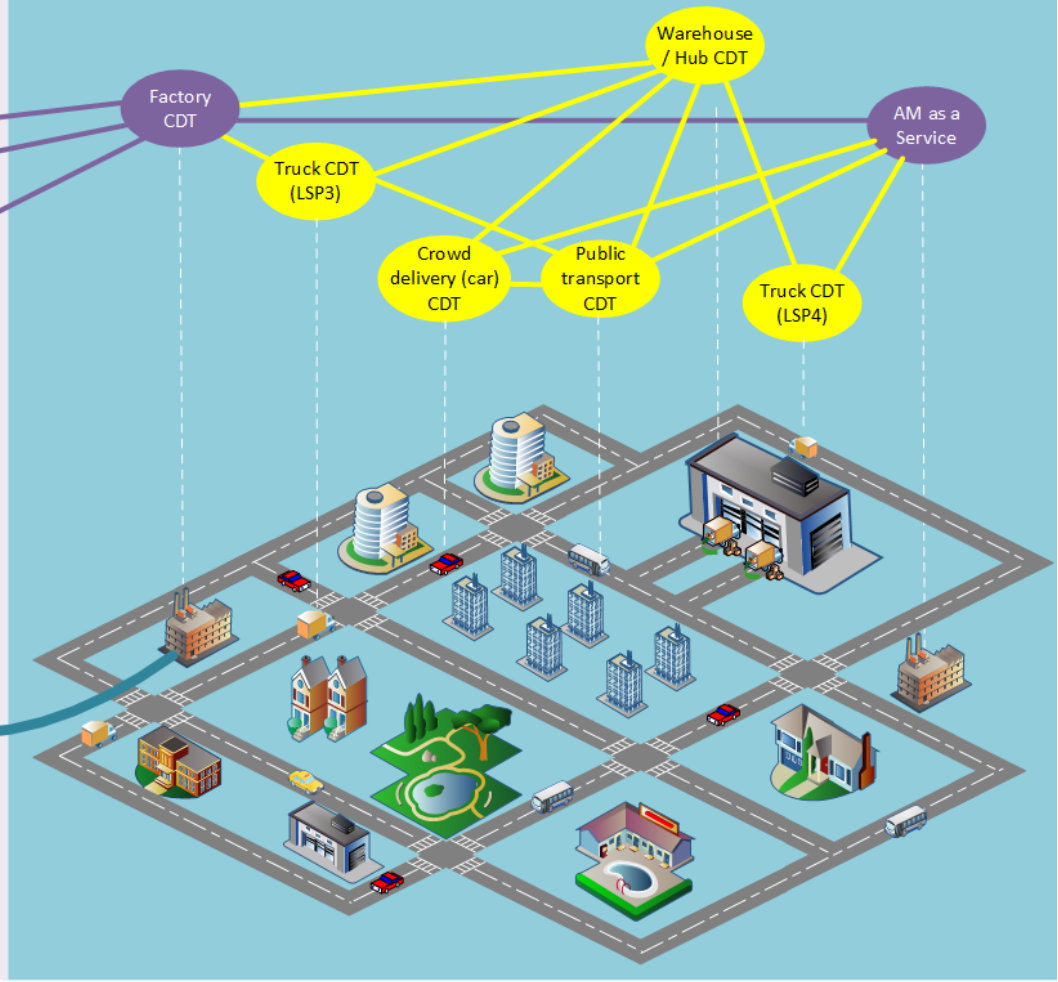
Intra-Factory view



Intra- and Inter-country materials flow



Last Mile delivery / localization and support



Cognitive Digital Twin Enablers

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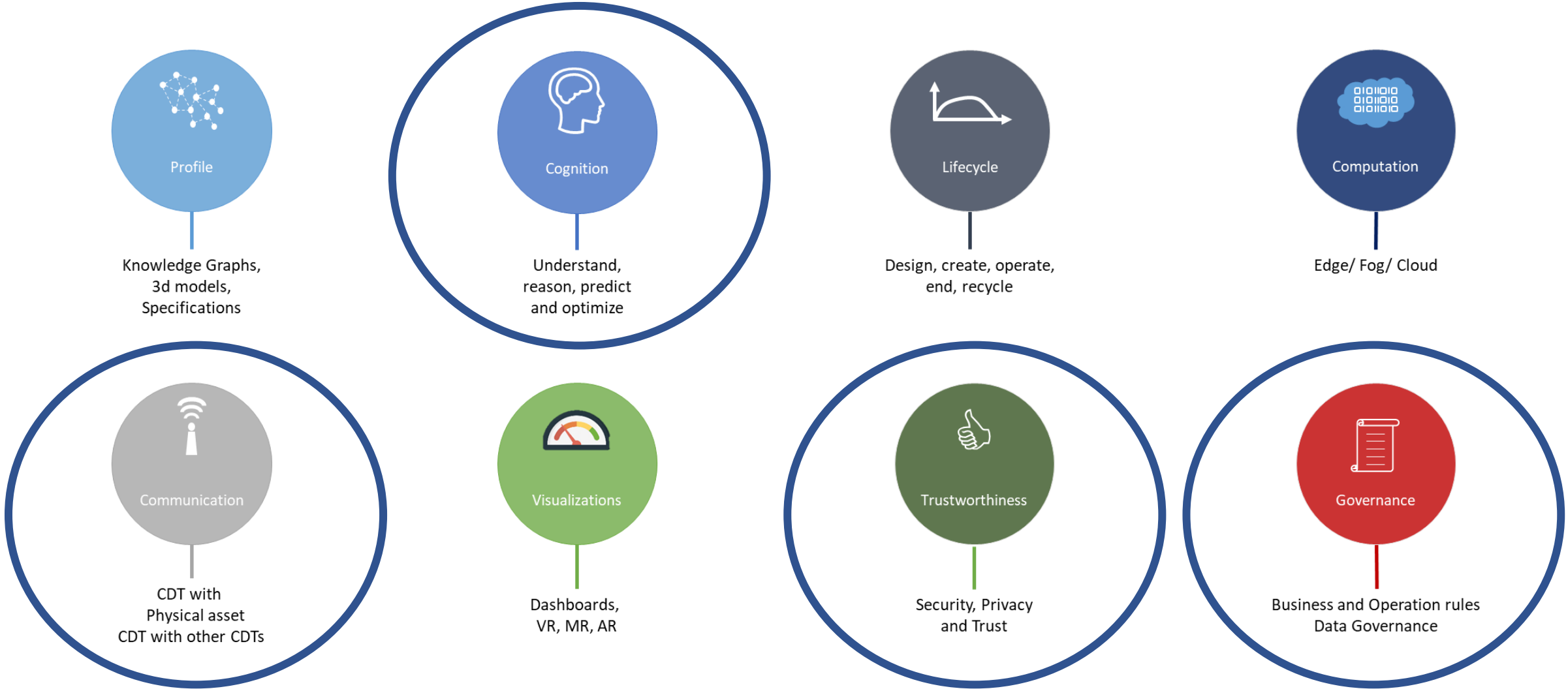
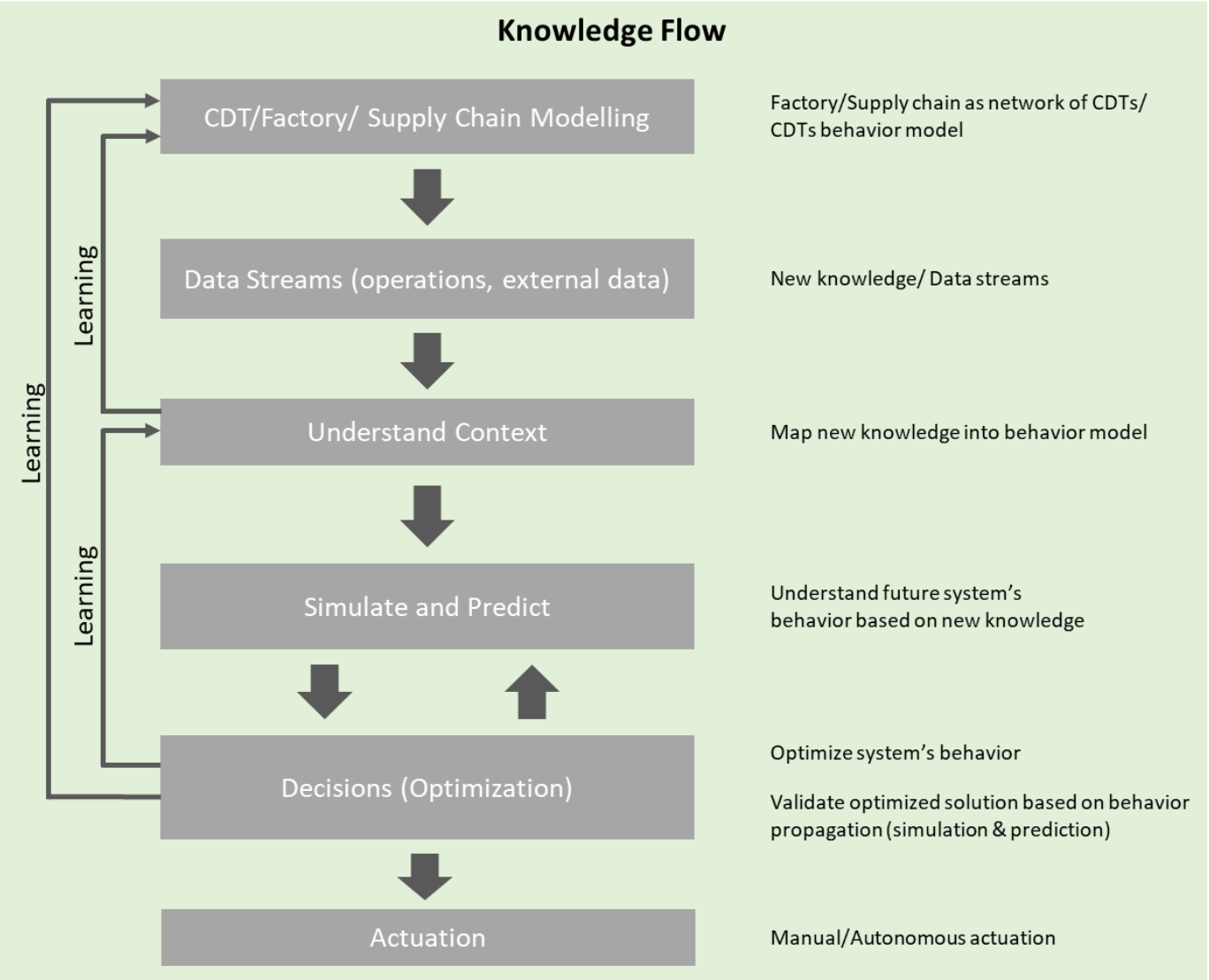


Source: Kalaboukas, K.; Rožanec, J.; Košmerlj, A.; Kiritsis, D.; Arampatzis, G. Implementation of Cognitive Digital Twins in Connected and Agile Supply Networks - An Operational Model. Appl. Sci. 2021, 11, 4103. https://doi.org/10.3390/app11094103

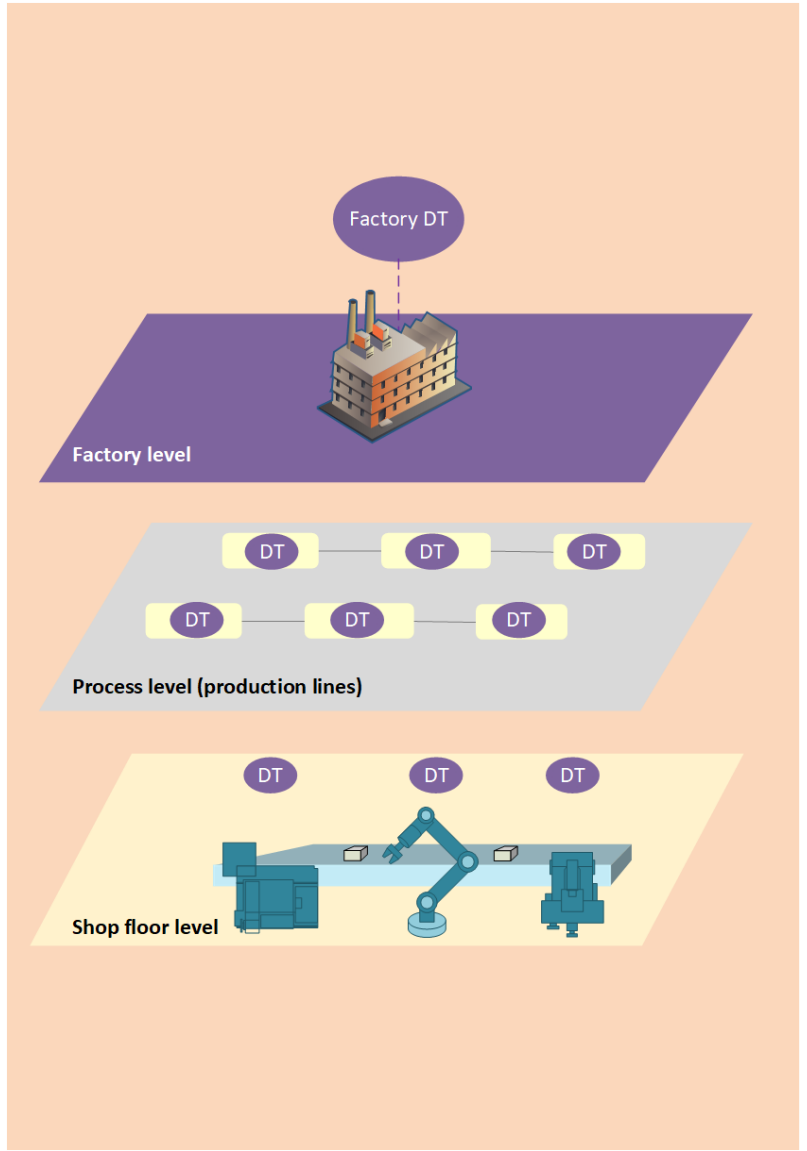
CDTs and Decision Making



Source: FactLog project www.factlog.eu

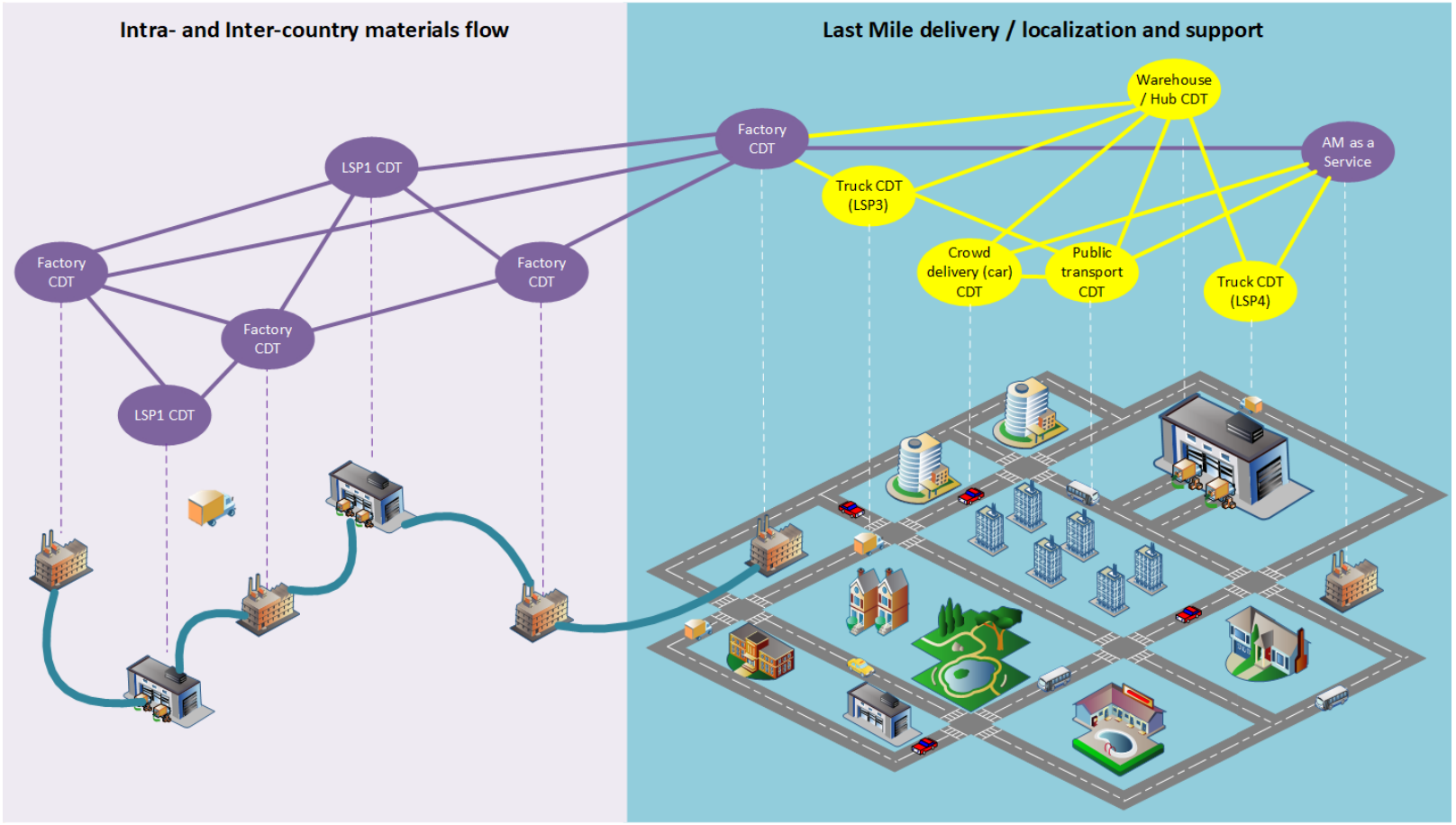
Intra-factory scenarios

- Human-Machine collaboration: CDTs supporting Operator 5.0 at shop floor
- Energy-aware machines (self identification of optimal model of operation)
- Self-configurable production lines and machines
- Proactive behavior to risk management (e.g. Hazard analysis)



Supply Chain scenarios

- Ad-hoc supply chains
- Localization
- Connected circular supply chains
- Improved stakeholders' alignment (monitoring/ events/ risks)
- Merging deliveries/ On the fly collaborations in response to ad-hoc events/requests



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Thank you!

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GRUPPO Maggioli

FACTLOG

www.factolog.eu

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