

Data Spaces Interoperability Challenges and Solutions

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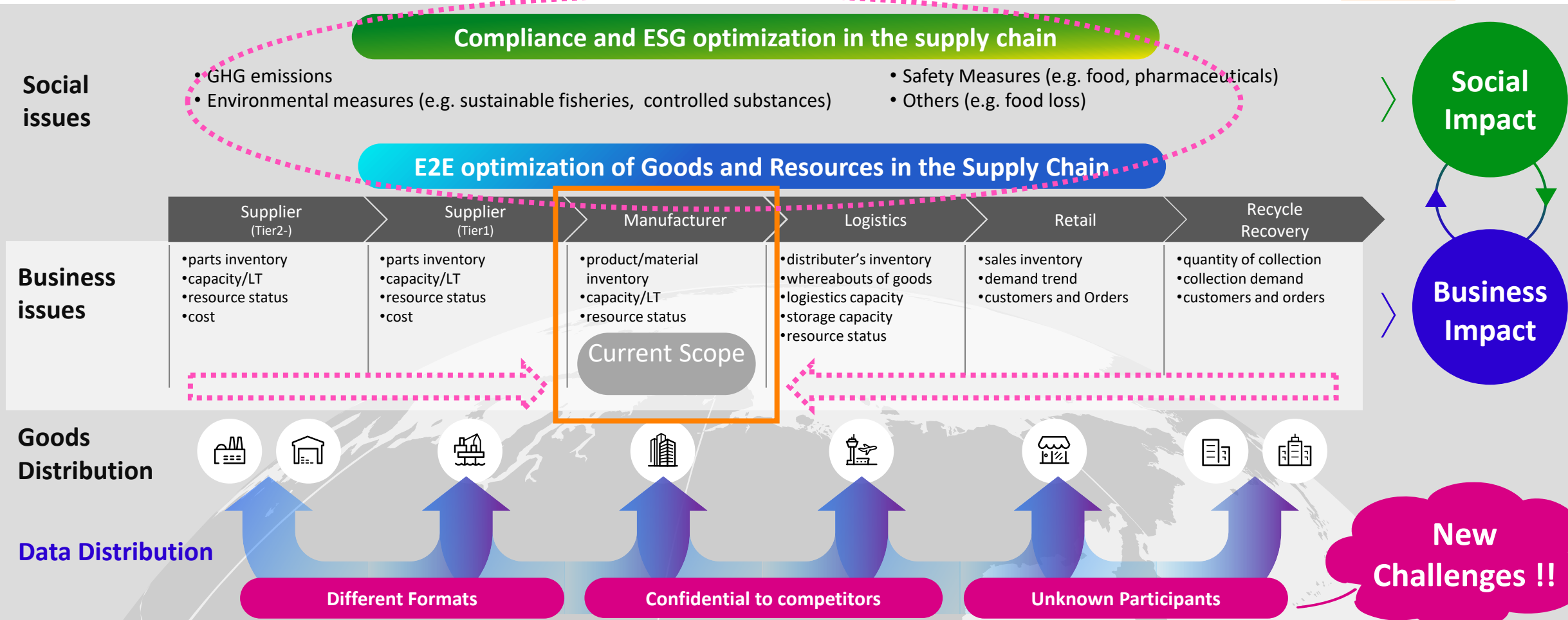


Industrial data exchange is a key to solve social issues

In addition to the goods distribution, industrial data distribution need to be established to solve end-to-end optimizations and social issues, such as GHG reduction

Current

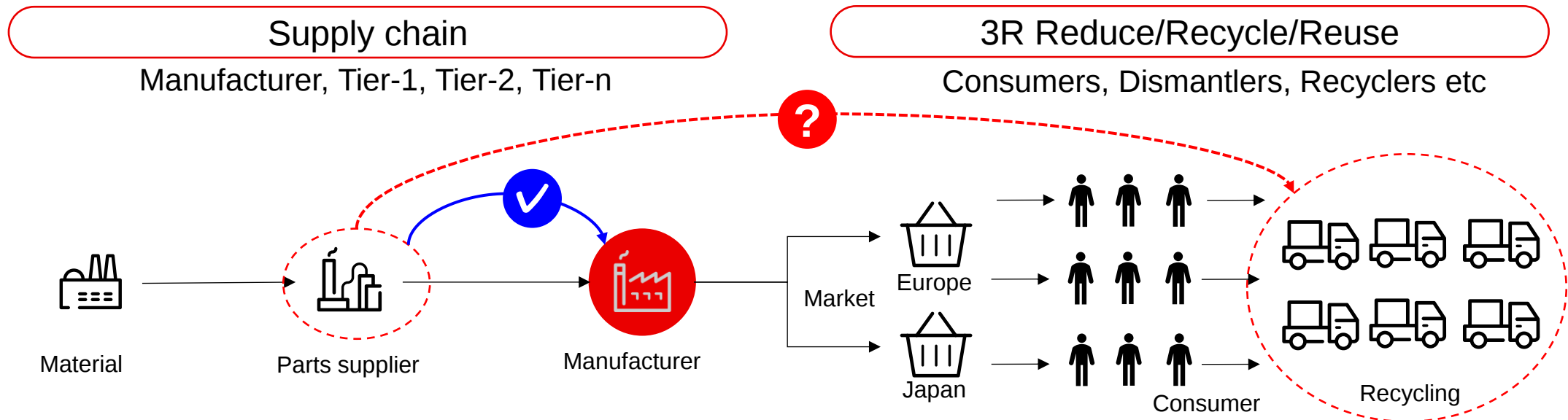
New



New Challenges for circular economy era

In supply chain, manufacturer can trust directly connected supplier's data.

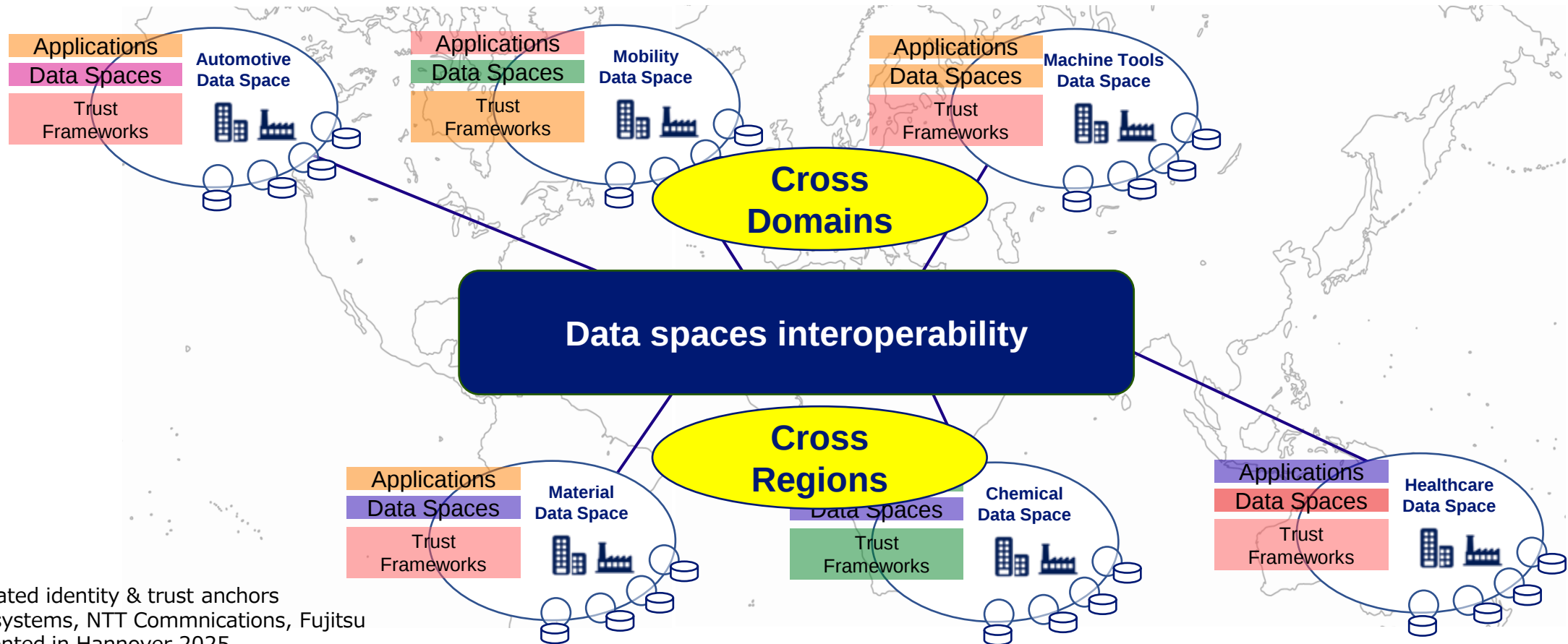
In circular economy age, we're going to face cross domain stakeholders, like dismantlers etc.



Identify and trust various participants among various industries

Challenge: multiple data spaces interoperability

Some industrial data spaces are working, but, for circular economy era ... we need to investigate and establish “Data spaces interoperability” of **cross regions** and **cross domain** industries

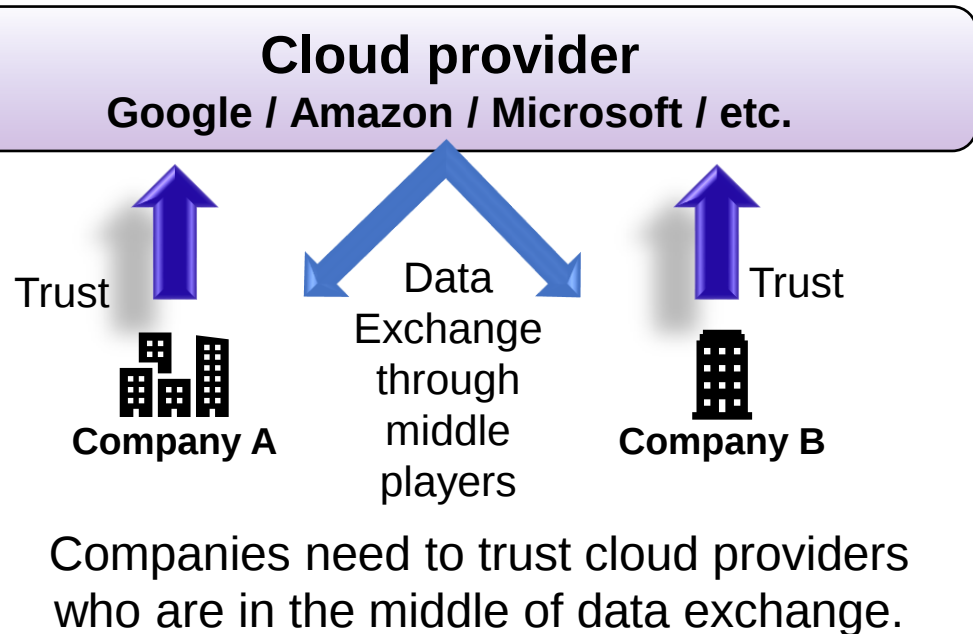


Source:
Federated identity & trust anchors
- T-systems, NTT Communications, Fujitsu
presented in Hannover 2025

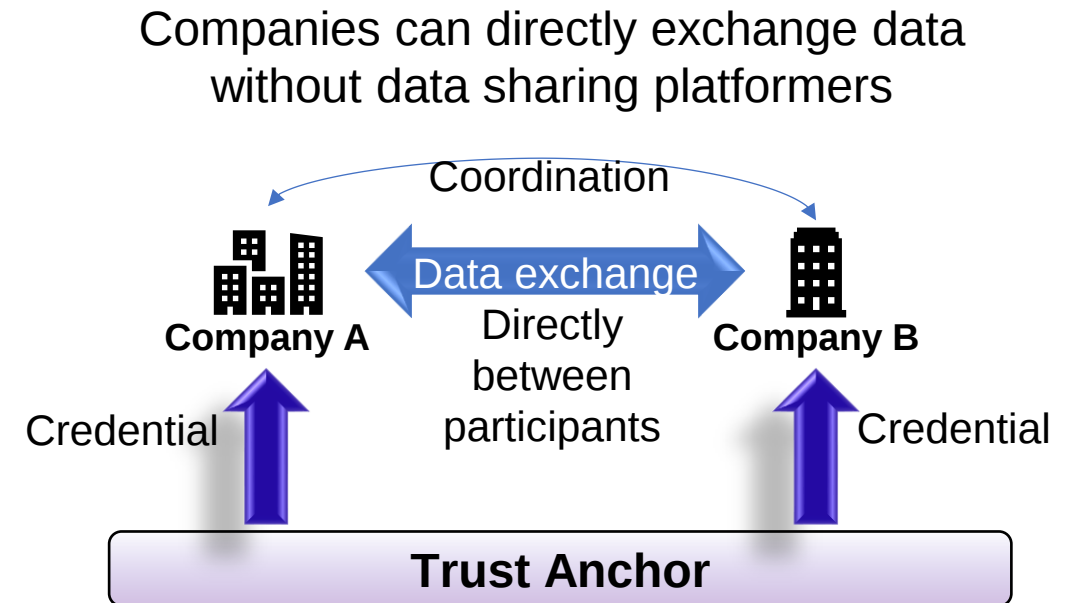
Data spaces trust infrastructure basic

For “data sovereignty”, you need trust anchor. since don't want to rely on hyper scalers

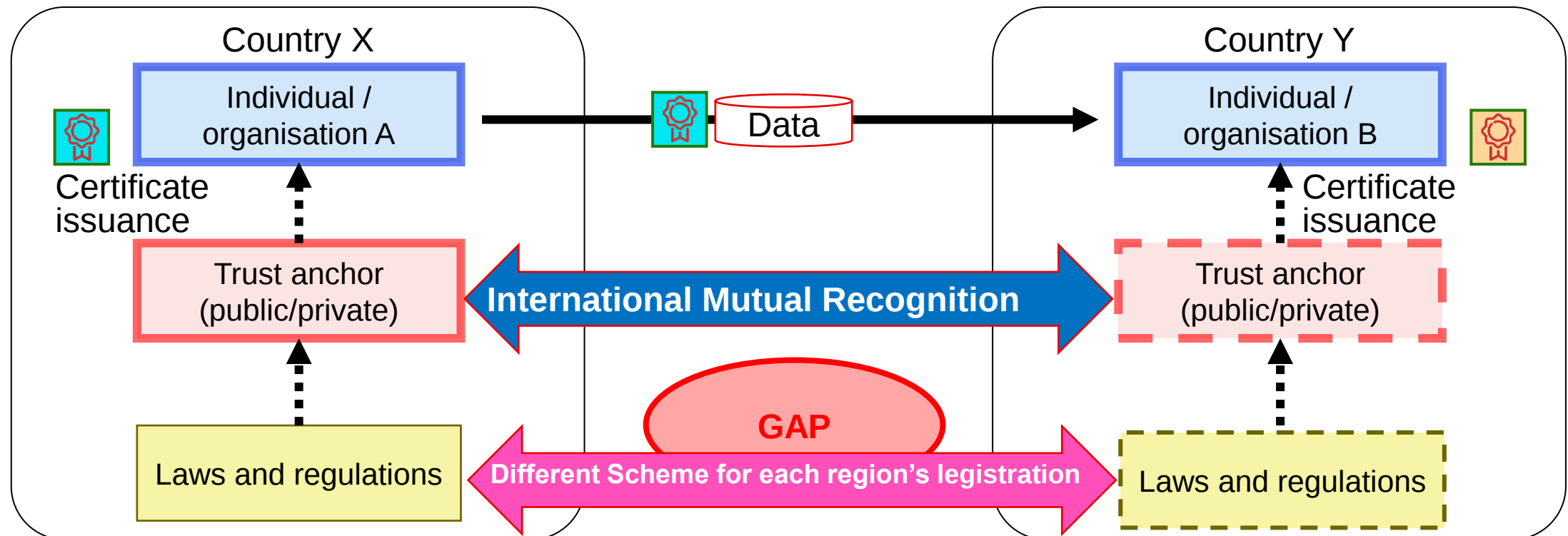
Hyperscaler model



trust anchor model

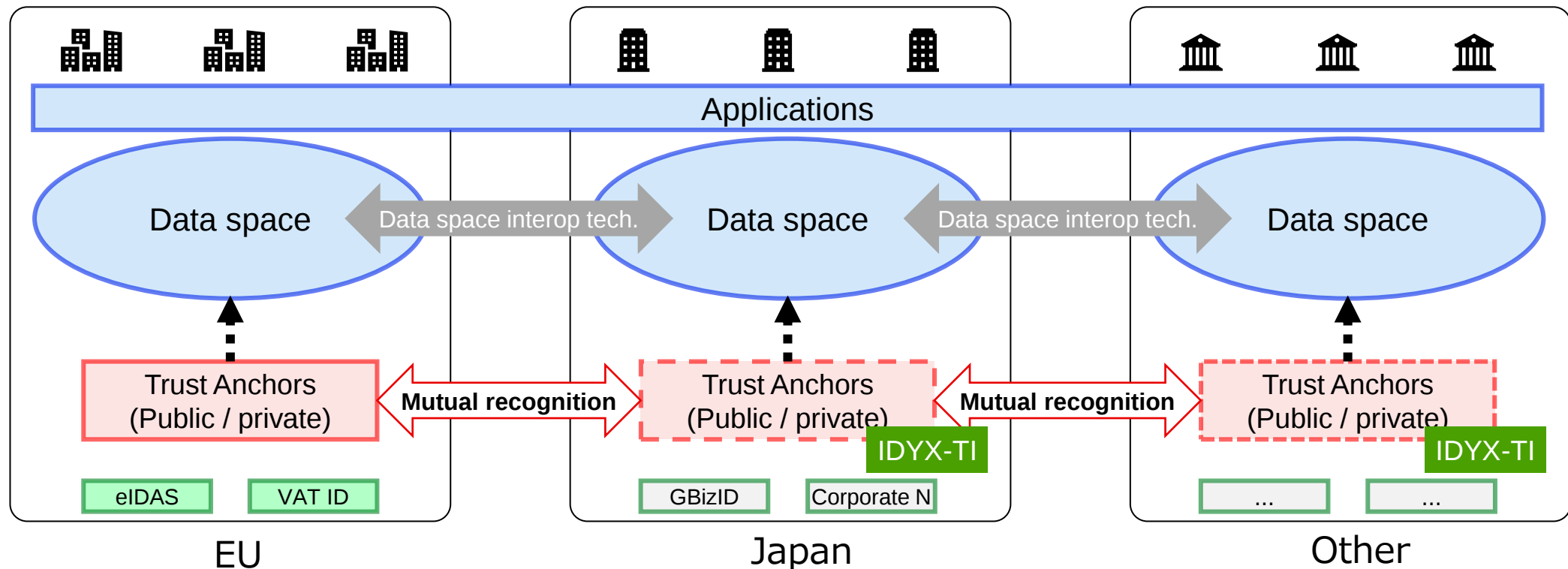


- **To expand trust model to multiple data space**, our gap analysis for different data spaces shows there are differences for each region in jurisdiction layer
- So, we need not only technical aspects, but also international mutual recognition between other region's trust anchors.



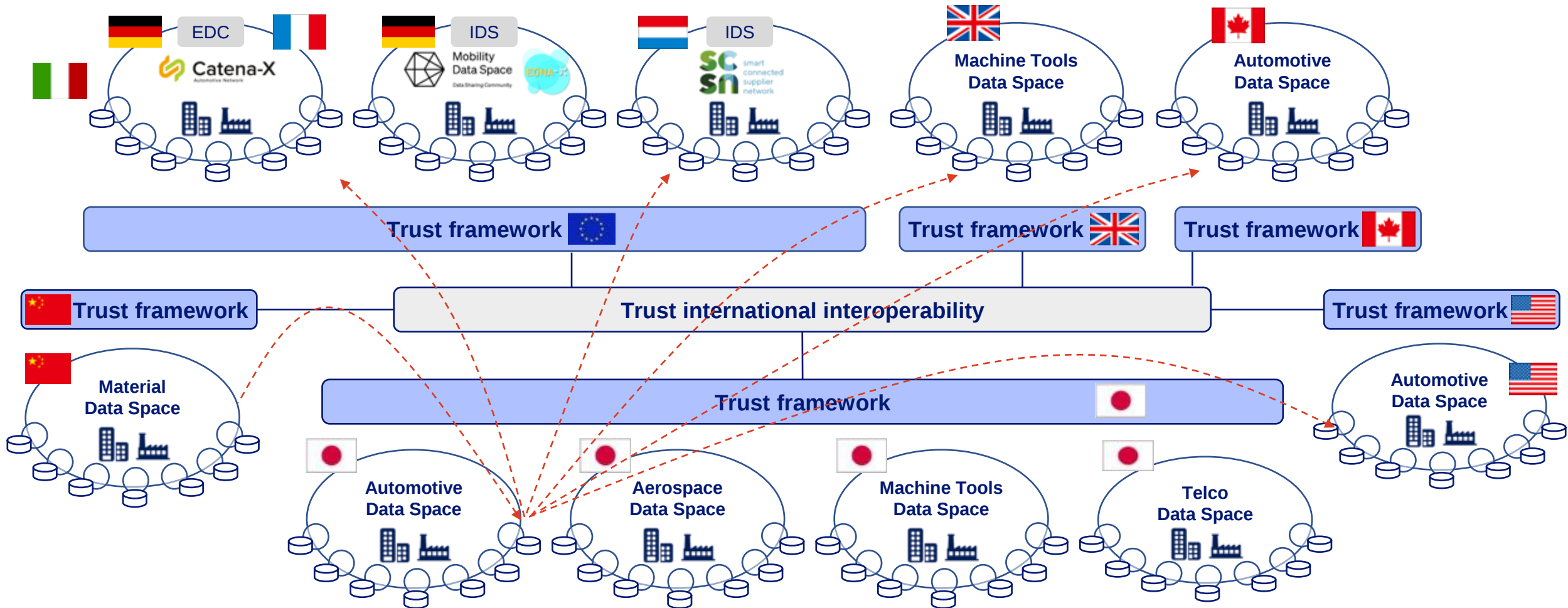
Possible Solutions: Mutual recognition with help of certificate conversion technology

- Fujitsu, NTT and T-systems are developing technologies to enable cross-boarding between different data spaces in different jurisdictions.
- As difficulties mainly come from differences of ID systems and certificates, we found certificate conversion will help mutual recognition between trust anchors



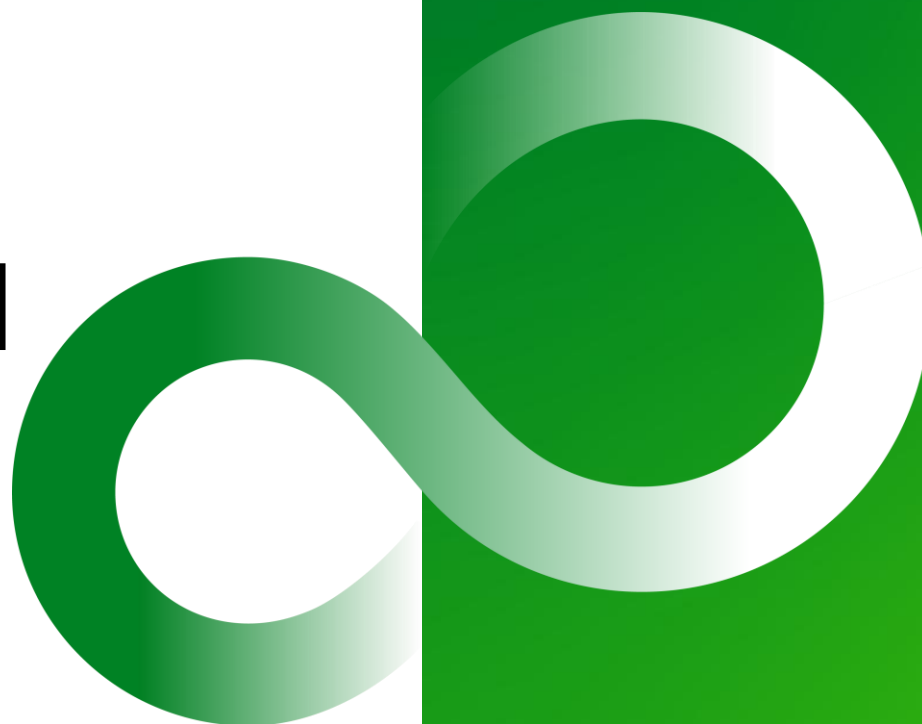
Interoperability PoC Plan

Join international interoperability PoC for Trust Anchors & Data Spaces



- Identify data spaces interoperability main issues for coming circular economy era
 - Compared to manufacturing supply chains, diverse types of stakeholders (dismantlers, recyclers, etc.) are needed for circular economy data exchange.
- Challenge: identify and trust stakeholders across regions and industries
 - Key issue: Trust stacks are different for each region, because of different jurisdictions
- Solution: Mutual recognition between trust anchors
with help of certification conversion technology
- Now: International trust anchors **technical trials**
 - Designing technical details and proof of concept implementation are jointly undergoing.
 - Please join us.
 - EU and Japan **technical experts are gathering** to tackle with these issues.
 - As **the key issue** is related **jurisdictions and mutual recognition**,
We ask more **helps from academia and governments experts across regions** and
toward the real operation of cross-region trust infrastructure.

Thank you



- DATA-EX and Catena-X : <https://arxiv.org/abs/2501.15738>

Table 4: Summary of the analysis result.

	p1) How to ensure trust in the object generation		p2) How to verify trust in operation	
	DATA-EX	Catena-X	DATA-EX	Catena-X
Participant	Onboarding Portal		JWT (issued via OIDC protocol & presented via original protocol)	VC (issued & presented via original protocol)
	Validation with DATA-EX specific standards	Validation with Catena-X specific standards		
Device	Validation with DATA-EX specific standards	Validation with Catena-X specific standards	Connector endpoint resolver and general HTTPS verification based on X.509 certificate	
	Validation with CA's common standards (e.g., Extended Validation)			
Dataset	Data model & vocabulary repository		Signable data pack- age	N/A
Data cata- log	Modified DCAT v2 format catalog cre- ation function		N/A	
Contract	N/A	Connector's con- tract negotiation API	N/A (External contract brokering ser- vice is recommended, and connector can work with it)	
Sending & Receiving Log	Centralized log management ser- vice	N/A (local log)	Centralized log management ser- vice	N/A (local log)

International trust anchors trial

EU Japan technology leading companies collaborate for international trust anchor tech. PoC.
(Hannover, Apr. 2025)

