AMAP meets Catena-X

Catena-X – A Standardized Data Ecosystem for Data Chains along the Automotive Value Chain

Catena-X Automotive Network e.V.
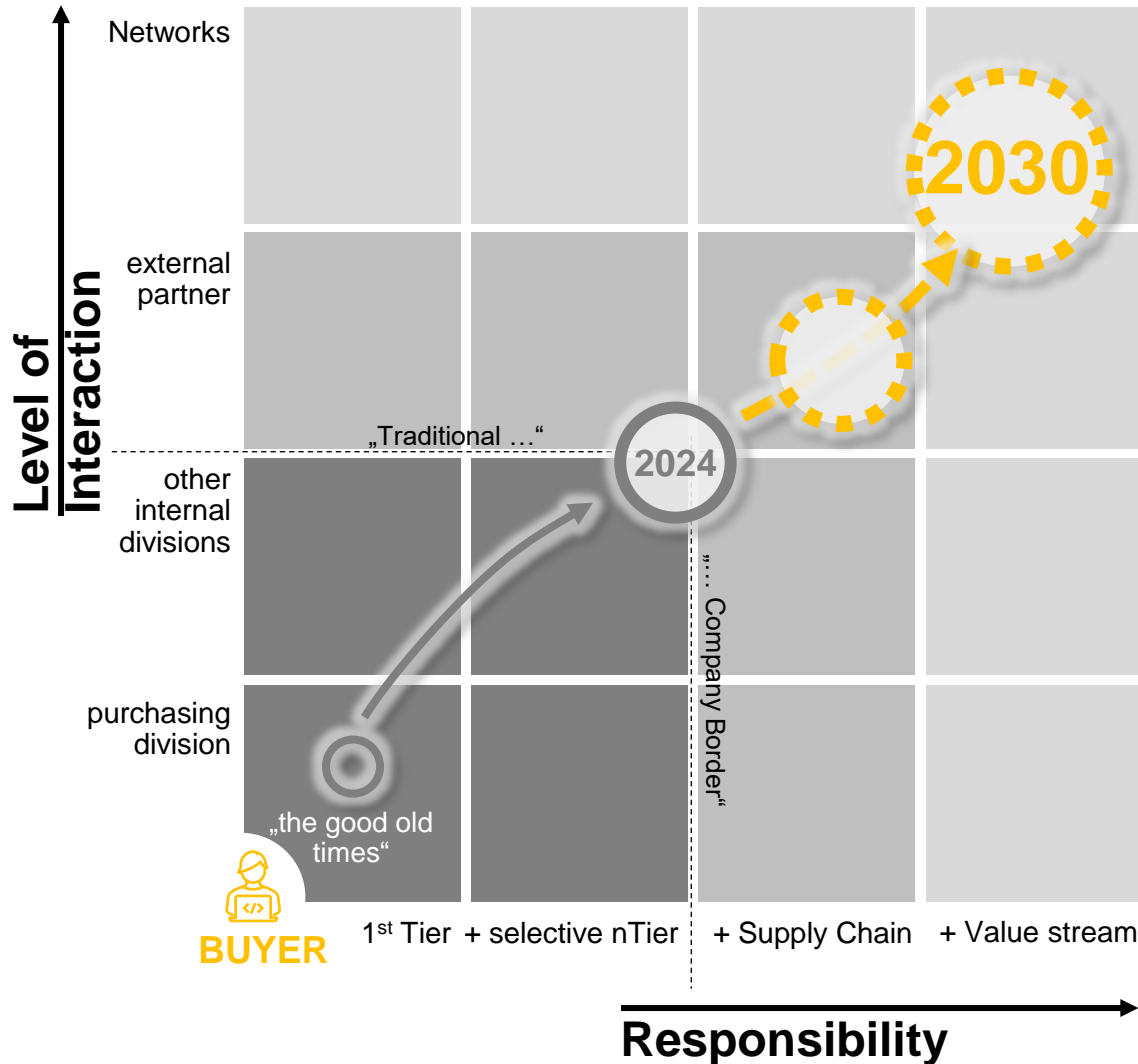
Anja Misselbeck
Managing Director

20th June 2024

01 Introduction to Catena-X

What changed over the past years, where are we heading to?

Level of Interaction (vertical axis)
- Networks
- external partner
- other internal divisions
- purchasing division

"Traditional …"

2024

2030

"…. Company Border"

"the good old times"

BUYER

Responsibility (horizontal axis): 1st Tier | + selective nTier | + Supply Chain | + Value stream

Selected additional tasks

- Access to critical material & resources (e.g. via circularity)
- Optimization of entire value chain processes (e.g. for circularity, compliance)
- Pro-active & targeted risk-mgt. (de-carbonization, supply performance, ESS, quality,..)
- Adopt to and comply with an upcoming global **regulatory tsunami** → while maintaining control over your sensitive data (e.g. IP) and distinction

Tasks and responsibilities increased over the past 20 yrs.

e.g. Purchasing department of a company

- Internationalization
- Sourcing: Local content & selective nTier relations
- Risk management & geopolitical changes
- Supply Chain Compliance
- …

Snapshot on Sustainability

Corporate Sustainability Reporting Directive

1047 data points to report whereas **50%** are value chain performance

trusted data

includes

Product Passes, e.g. 🔋 Battery Pass

107 data points to report whereas **52** data points reflect primary data, including **sensitive** and **verified data**

Just the beginning of an upcoming, global **Regulatory Tsunami**

+ Trusted / verified

+ Self-Sovereignty (e.g. IP)

+ Global & multi-Tier collaboration

+ Scalability / Archive

Material Compliance (general / not verified)	**Digital Battery Pass** (trusted / unique ID / scaleable)	**Digital Product Passes** (trusted / unique ID / scaleable)
Amount / Company **Thousands**	**Millions**	**Billions**
today	2025 - 2027	2027 - 2030
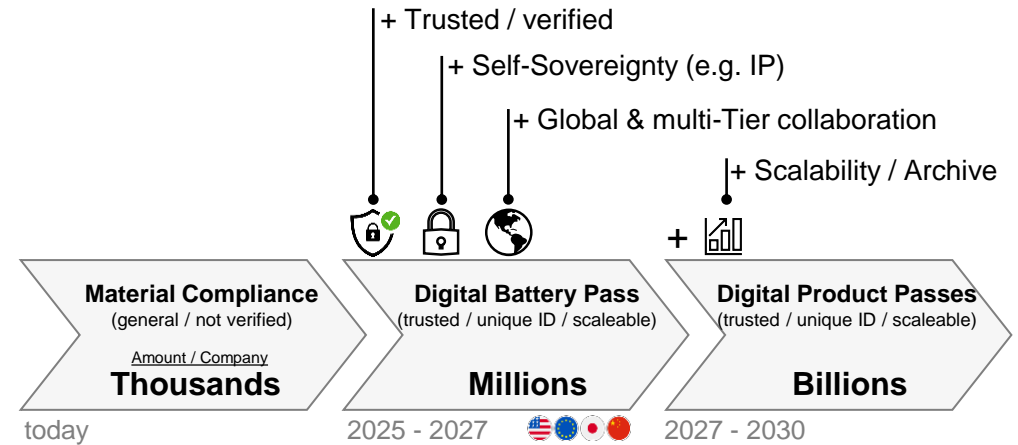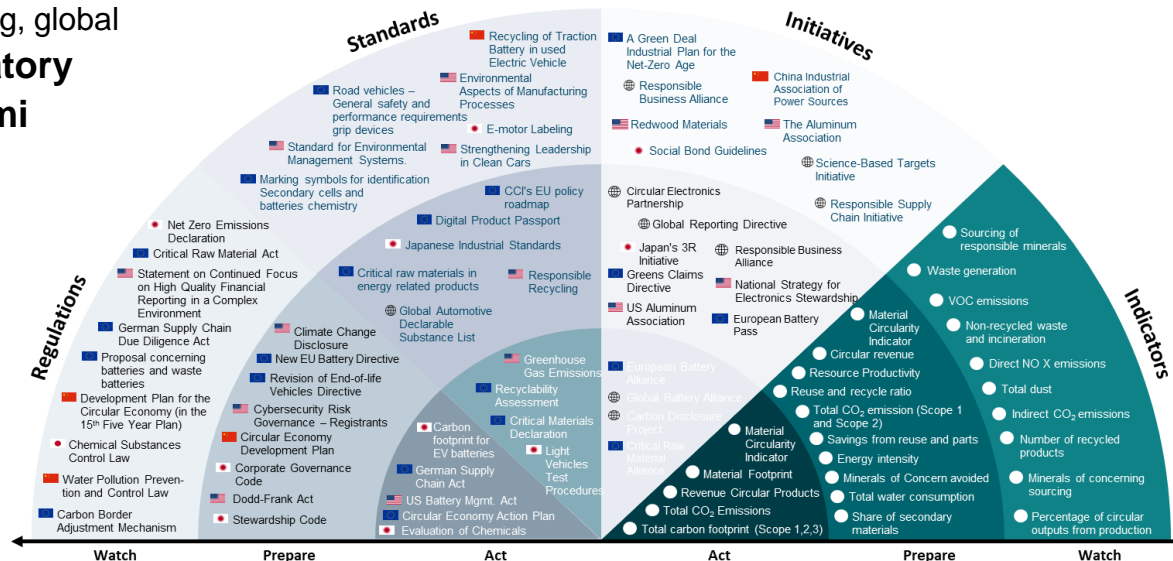
Catena-X was found

… to tackle our industries most pressing issues, together.

TRUSTED SUSTAINABILITY

Report Product Carbon Footprint (incl. primary data) — *as of 2025 annual report*

Scale Circularity with Product & Battery Passports — *as of 2024 / 25*

Environmental & Social Governance

RESILIENT SUPPLY-CHAINS

Master Data Services & Certificates

Ensure Material Flow with Demand / Capacity Mgt. — *today*
- Short
- Long-Term

COMPLIANT & EFFICIENT PLM

Traceability of Parts & Contain non-compliant parts

Live Quality Loops & Analysis — *today*

Behavior Twins
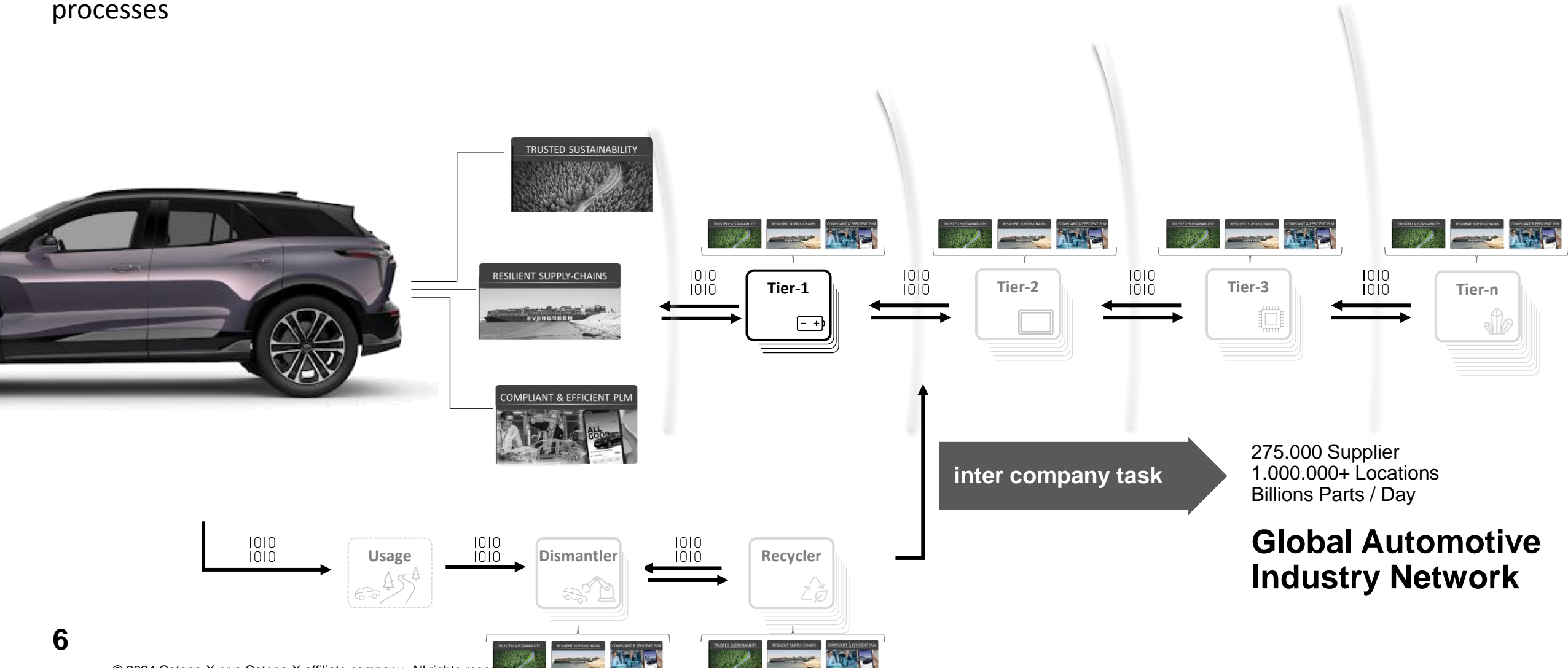
5

Access to a Data Driven Value Chain for every partner

Leverage significant cost, value and compliance benefits via trusted and sovereign end to end business processes

inter company task

275.000 Supplier
1.000.000+ Locations
Billions Parts / Day

Global Automotive Industry Network

Catena-X seeks to develop an open, collaborative ecosystem for data exchange along the value chain with strong principles.

Catena-X data ecosystem

Tier-n   Tier-3   Tier-2   Tier-1   OEM   Field   Dismantler
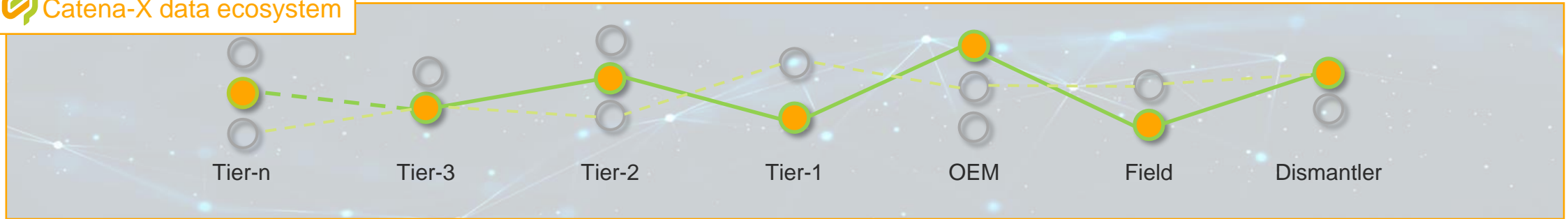
#DataSovereignty

Decide about the use of your data

#DataSecurity

Data exchange via secure connector

#Interoperability

Common standards allow different systems to work together

#FreedomOfContract

Collaborate with partners of choice only

#GovernanceFramework

Unified policies, authorizations and monitoring

The full range of principles can be found on the Catena-X Website.

Catena-X is <u>not a database</u> to store and collect data but an <u>open ecosystem</u> to share data in a better way – <u>standardized, secure and simple</u>.

What do Apple and Catena-X have in common: KITs!

KITs = Ecosystem Builders
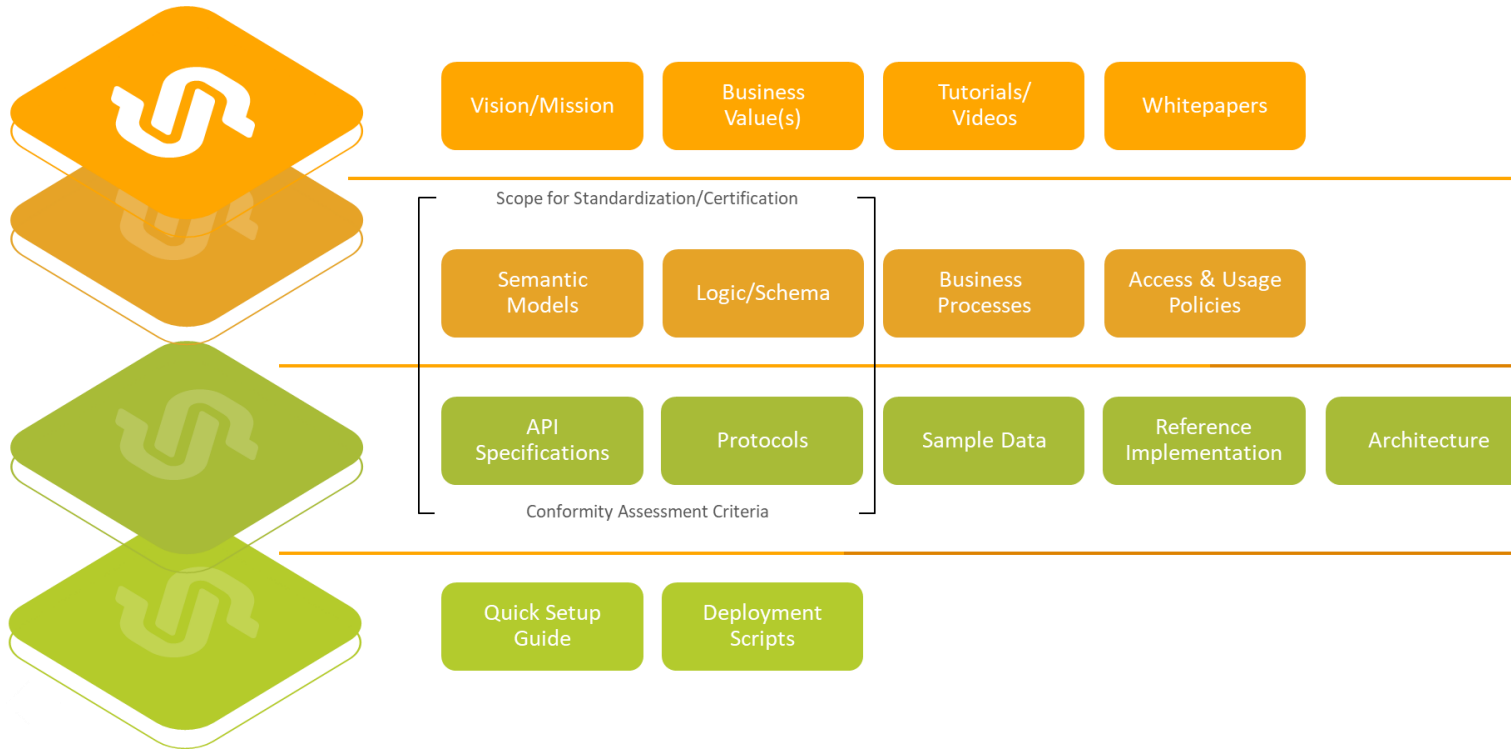# Blueprint & foundation of each Business Solution.

Available KITs with RELEASE 23.12 (12/23)

One dedicated KIT per Business Problem

Vision/Mission	Business Value(s)	Tutorials/ Videos	Whitepapers

Scope for Standardization/Certification

Semantic Models	Logic/Schema	Business Processes	Access & Usage Policies

API Specifications	Protocols	Sample Data	Reference Implementation	Architecture

Conformity Assessment Criteria

Quick Setup Guide	Deployment Scripts

Publicly available under: https://eclipse-tractusx.github.io/

Connector v0.2
Integration of SSI (Step 1)

Business Partner v0.2
Sharing Member – Gate API

Digital Twin v0.1
Decentralized Registry

Traceability v0.2
Update Decentralized Registry & Unique ID Push

Behavior Twin v0.1
Remaining Useful Life

Quality v0.1
Early Warning & Root Cause Analysis

DCM v0.1
Early Bottleneck-Detection

OSim v0.1
Semantics

Eco Pass v0.1
Product Pass APIs & Reference Implementation

PCF v0.1
PCF Rulebook 2.0 & Tutorials

Circularity Preview

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n-Tier Business Process Collaboration with Catena-X
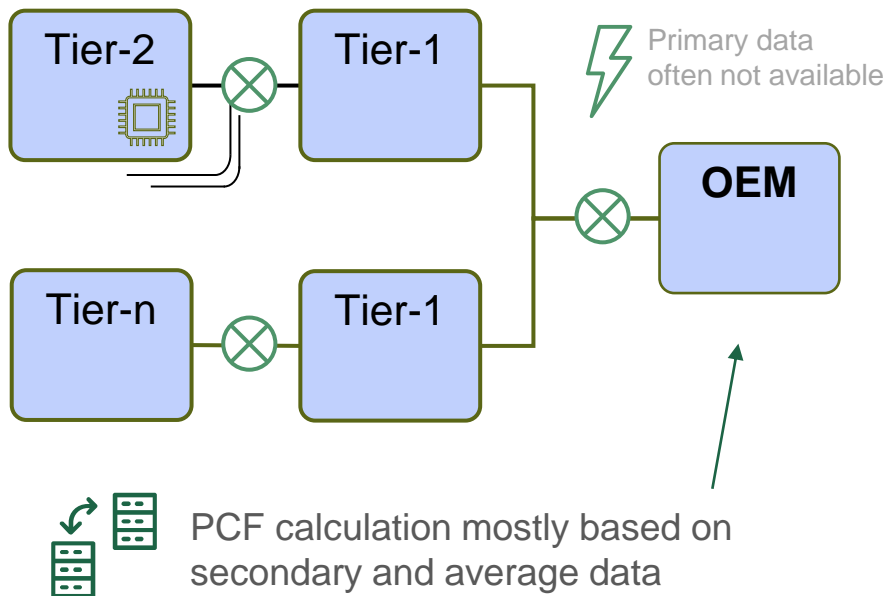
How it works (simplified example)

	KITs / Standards
Foundation for Self-Sovereignty & Interoperability	
3 Business Apps	• Semantic • Logic • Policy
2 Shared Services	• …
1 Network	• Trust • Identity • Connector

Catena-X
Your Automotive Network

Neutral Governance → Association:
www.catena-x.net

Battery Pass

Business Process

My Sub Supplier → **MY SUPPLIER** → **MY COMPANY** → **MY CUSTOMER** → **…**

Business Process

Optional:
helps me to navigate through my options and opportunities

Advisory Partner

Grants network access and issues a verified digital identity (→ TRUST)

onBoarding Partner

e.g Cofinity-X
www.cofinity-x.com

chooses a certified interoperable application / services from…

Marketplace

e.g

MANUFACTURE 2030 · SAP · IBM · SIEMENS · SUPPLYON
Microsoft Dynamics 365 · cockpit · FRED · T Systems
SOVITY · DatafabriQ

implements and performs conformity assessment

Currently **there is no** generally accepted methodology for capturing primary data along the supply chain.

STATUS QUO

CHALLENGE

Tier-2 — Tier-1

Primary data often not available

Tier-n — Tier-1 — OEM

PCF calculation mostly based on secondary and average data

Limited specific information on Product Carbon Footprint in the supply chain. No transparency regarding actual process efficiency or actual energy usage.

Inconsistent methodology/standards for **PCF[1]** calculation.

No standard for Verification of **PCF[1]** Values.

[1] **PCF = Product Carbon Footprint**

Catena-X captures PCF along the supply chain by recording and aggregating primary data from every partner involved.
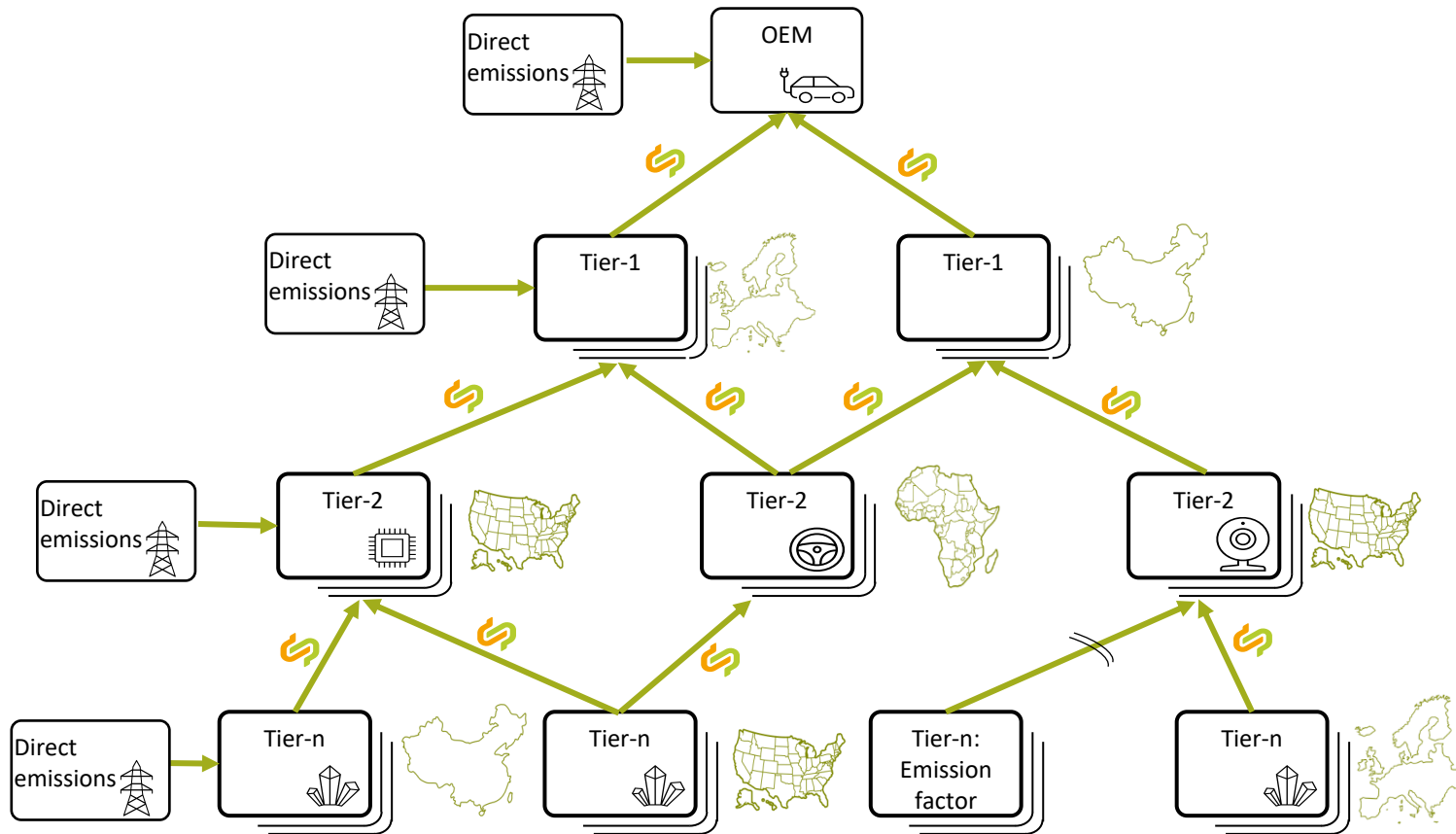
- **Comparability** of calculation standards
  - Methodology
  - Fall-back data in ramp-up

- **Acceptance of verification** and data quality across different industries and different regions

- **Compatibility** of technical standards and data models

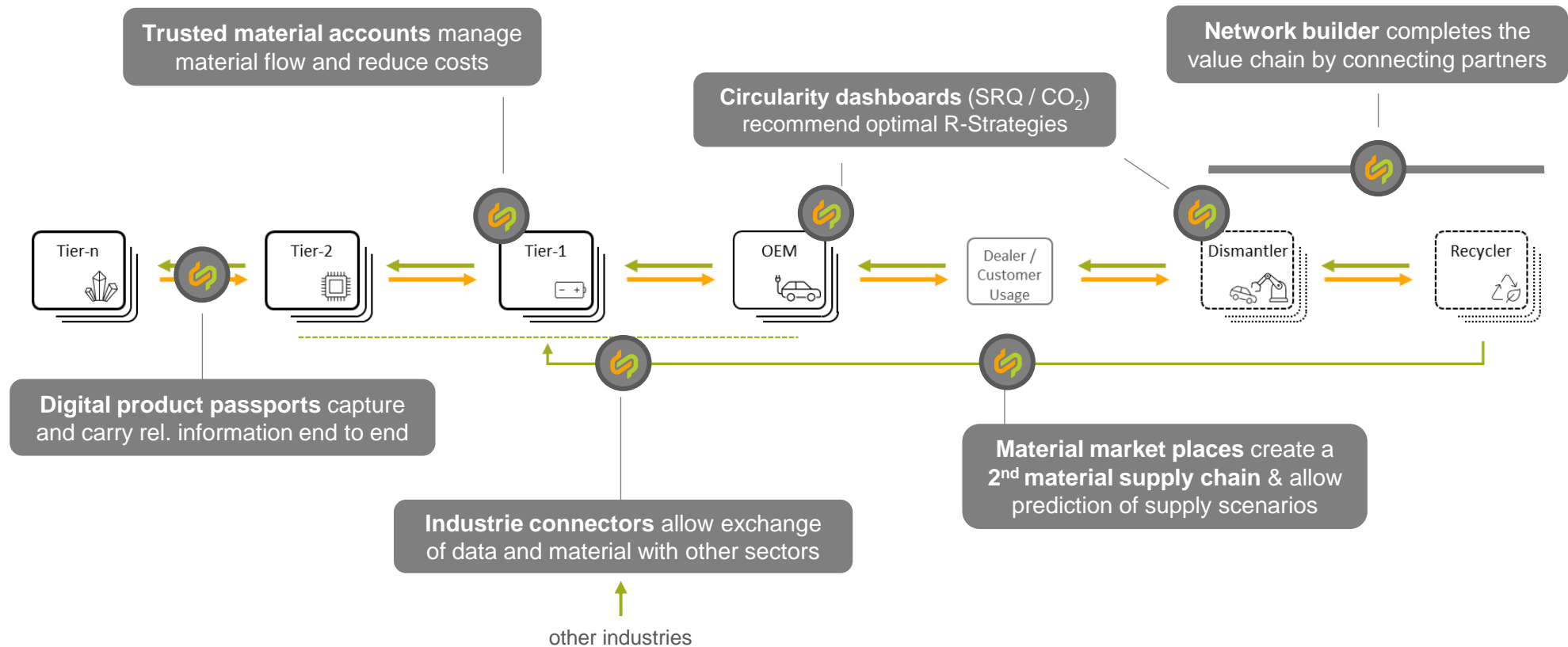- **Aligned Governance** and evolution of standards and data models

Circular Economy

Fast Facts

100 billion
tons of material resources
consumed annually

< 9%
of resources are
recycled or reused

~ 30%
secondary material
ratio per vehicle

$4 Trillion
demand for battery
materials up to 2050

>30.000
to be connected industry
partners (to close loops)

Catena-X Standards & Artifacts

Connect partners, streamline flow of information and create solution portfolio to enable scalable value derivation

Trusted material accounts manage material flow and reduce costs

Circularity dashboards (SRQ / CO_2) recommend optimal R-Strategies

Network builder completes the value chain by connecting partners

Digital product passports capture and carry rel. information end to end

Material market places create a **2nd material supply chain** & allow prediction of supply scenarios

Industrie connectors allow exchange of data and material with other sectors

Tier-n Tier-2 Tier-1 OEM Dealer / Customer Usage Dismantler Recycler

other industries

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Example
Digital Product Passport (DPP)

Example: EU Battery Passport (simplified)

multi-Tier exchange of sensitive, verified and massive amounts of data sets a new baseline to re-think the status quo.

First life — **Battery Pass**

Battery Pass

EV battery value chain	Miner	Refiner	Precursor & CAM producer	Cells and modules manufacturer	Pack producer	OEM	End-user	Re-user Re-manufacturer Re-purposer	Collector Dismantler	Recycler

Static upstream data — *Dynamic and static downstream data*

Attribute category

Battery materials and composition **11**	**comparison: current scope of IMDS** +3			+6	+2					
Carbon footprint **7**	+1				+5	+1				
Circularity and resource efficiency **20**			+8	+1	+7	+4				
Compliance, labels & certifications **6**					+6					
General battery and mfct. Information **9**					+7	+2				
Performance and durability **50**			+2		+17	+3	+28			
Supply chain due diligence **4**	+4									

Total sum of attributes 107 (referring to https://thebatterypass.eu)

● Attribute added ▬ Data creation/ added ▬ Data created in previous steps

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Sustainability is one,
but not the only reason for a new operating model.

None of us
can solve these industry
challenges **alone.**

In order to succeed,
we all eventually have to
shift our activities into
an interoperable,
collaborative, trusted and
self-sovereign
business ecosystem.
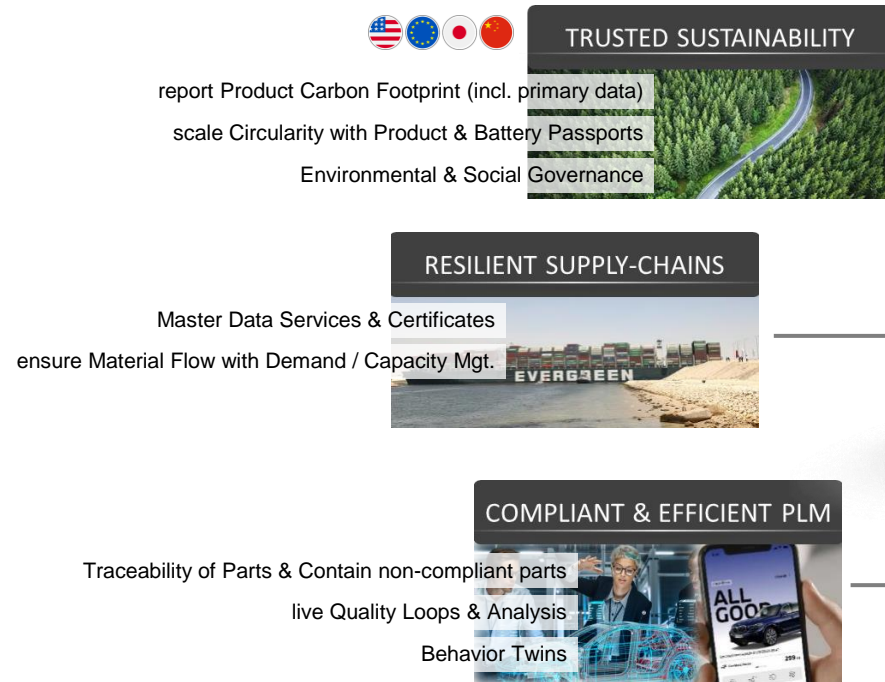
TRUSTED SUSTAINABILITY

report Product Carbon Footprint (incl. primary data)

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RESILIENT SUPPLY-CHAINS

Master Data Services & Certificates

ensure Material Flow with Demand / Capacity Mgt.

COMPLIANT & EFFICIENT PLM

Traceability of Parts & Contain non-compliant parts

live Quality Loops & Analysis

Behavior Twins

02 The association Catena-X Automotive Network e.V.
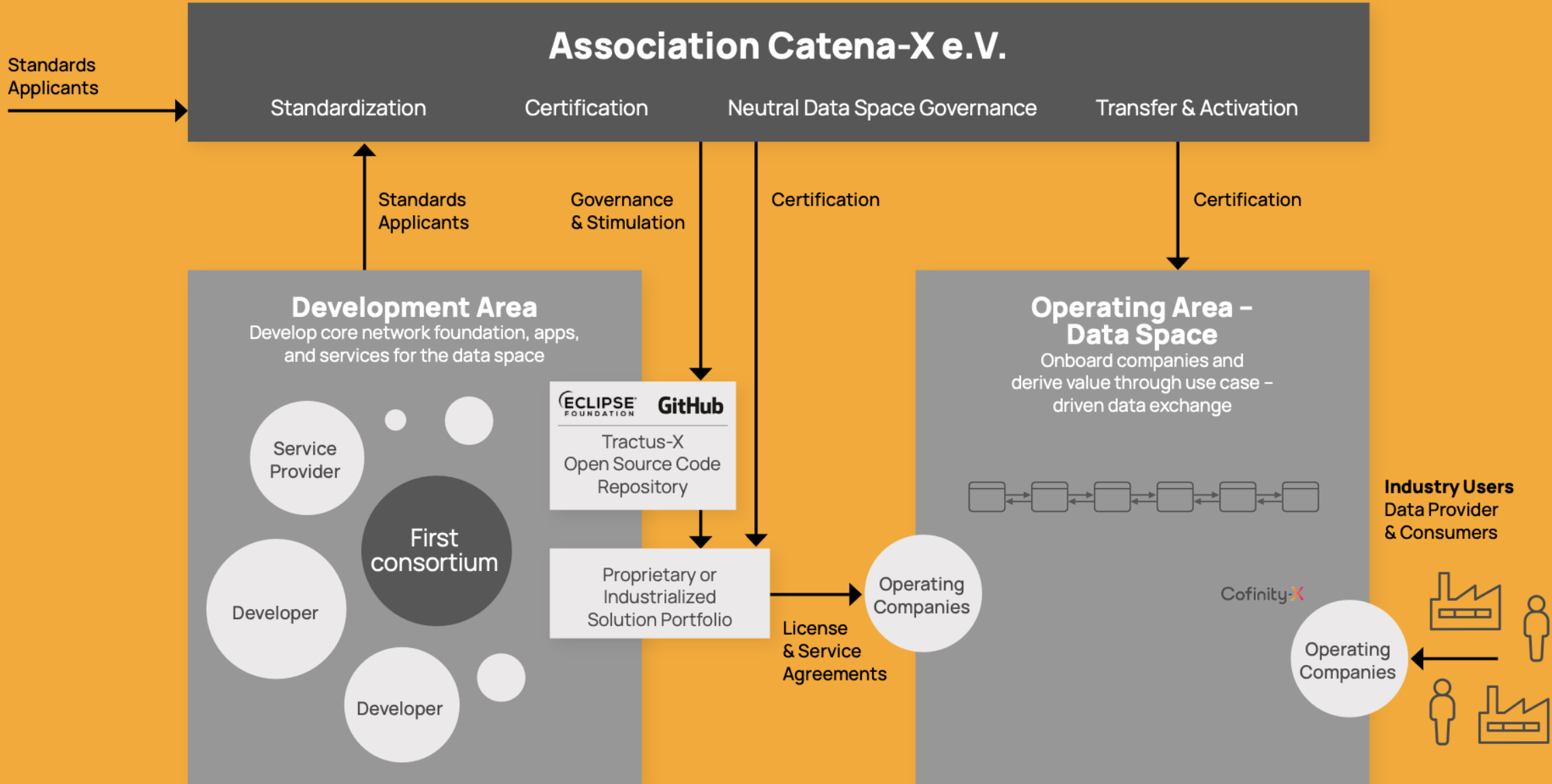
It only works with a global and collaborative approach.

KICK START - TEAM to build and launch the initial foundation; all interest groups are represented
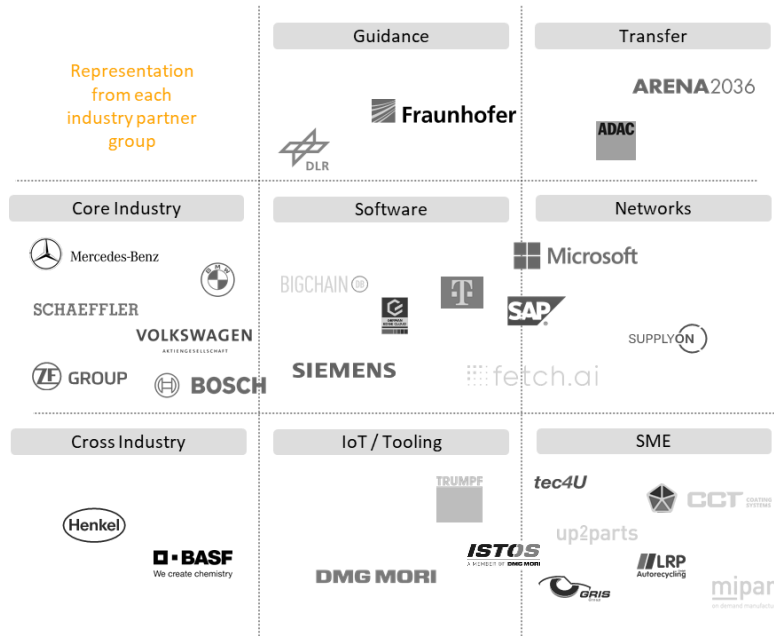
28 initial development partner started in 08 / 2021

Implementation of the **CX HUB-CONCEPT** empowers regional adoption and ensures flow of data across regions

182 global partner in Catena-X association (06/2024)

examples of international Catena-X members; for a complete list click here

Catena-X has scaled to a network of 180+ partners globally – other industries follow the approach

Timeline:

- Prep Phase
- Setup neutral Governance Body "Catena-X e.V."
- Start Initial Development Phase (Consortia 1.0)
- Development Use Cases
- Strategic partnerships (GALIA, IDSA, WBCSD, etc.)
- Product Carbon Footprint Rulebook
- First Catena-X hub established in France
- Internationalization & Go-Live
- First Operating Company ("Cofinity-X")
- Catena-X Sweden hub, further hubs in prep (e.g. US, China)
- Catena-X Beta Phase
- First ever GTM Release (80x Standards, 10x KITS)
- First operational data exchange
- GoLive operational Catena-X Dataspace
- Scaling the ecosystem
- End of Catena-X Consortia 1.0
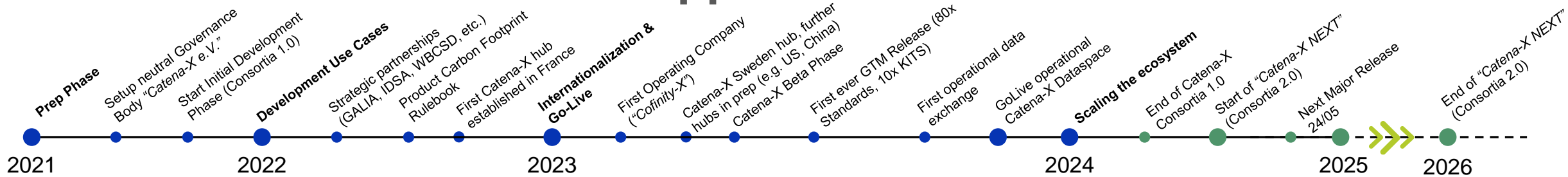- Start of "Catena-X NEXT" (Consortia 2.0)
- Next Major Release 24/05
- End of "Catena-X NEXT" (Consortia 2.0)

2021   2022   2023   2024   2025   2026

Global Acceptance & Cross-Industry Blueprint
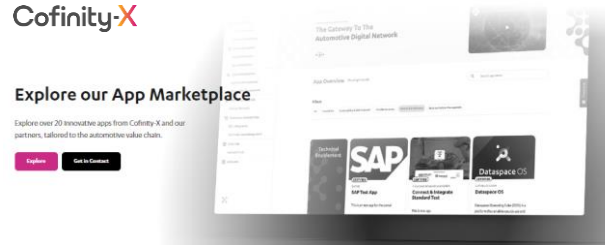
Catena-X & MX — Your Automotive Network

- Consensus of pioneers and start of a publicly funded cooperation with **28 partners in 2021** to build the network foundation**, 182 members globally** committed to Catena-X (as of: 30.06.2024)
- **Go-live of Catena-X** in 10/2023
- 80x standards, 10x KITs, 1x Gaia-X compliant Operating system defined
- Ongoing internationalization, e.g. Japan MoU with Information-technology Promotion Agency (IPA)
- **Roll-out of blueprint to other industries** (e.g., Aerospace-X, Factory-X, etc.)

Scalability & Business Operations

Cofinity-X

Explore our App Marketplace

Explore over 20 innovative apps from Cofinity-X and our partners, tailored to the automotive value chain.

- First **operating company** founded in 01/2023 ("Cofinity-X")
- **Core network services** & **marketplace offering** live via Cofinity-X
- **20+ business applications & services** at Cofinity-X marketplace listed, 40+ customers onboarded
- **30+ million raw data points** have been **exchanged via the EDC; 50,000+ digital twins** creating value every single day

Ensure Business Continuity

BMW, Mercedes-Benz, Volkswagen, ZF, Henkel, T Systems, BOSCH, SIEMENS, SCHAEFFLER, BASF We create chemistry, Fraunhofer, Cofinity-X, DRÄXLMAIER, SAP

Associated partner: Catena-X

- **High commitment from Automotive Industry** to scale & internationalize Catena-X
- **Consortia 2.0 Planning in progress** ("Catena-X NEXT") to safeguard long-run success
- GVB and TVB "Catena-X NEXT" submitted to BMWK, final feedback BMWK expected 07.2024
- **Project period:** 01.08.2024 – 30.09.2026

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![Catena-X Your Automotive Network logo]

Questions?
Get in touch with us!

Catena-X Automotive Network e.V.
Reinhardtstraße 58
10117 Berlin

info@catena-x.net

https://catena-x.net/en/

How does Catena-X create business value?

By offering multiple use cases that address day to day challenges

Quick wins and short term enabler

Regulatory must haves within the next 2 years

Traceability

- Trace components and subcomponents along the whole value chain.
- Narrow down quality issues significantly faster.

Quality Management

- Receive quality performance data from the customer.
- Root cause analysis and collaborative data evaluation.

Product Carbon Footprint

- Enablement of uniform CO2 Reporting
- Compliance with PCF regulations

Circular Economy / Product Passport

- Product information in one place (e.g., material composition & origin)
- Compliance with battery regulations

ESG Monitoring (LkSG)

- Facilitating ESG data reporting transparencey
- Compliance with supply chain due diligence regulations

Process improvement enabler

Business Partner Data Management

- Harmonized, complete & quality-checked data
- Reduction of data maintenance costs & improved data actuality

Demand & Capacity Management

- Improved planning reliability & accuracy
- Early detection of problems & ability to avoid capacity bottlenecks reducing costs

Digital Behavior Twin

- Model-based product design & innovative collaboration
- Access to solutions and evaluation procedures fir SMEs

...

Further use cases in development

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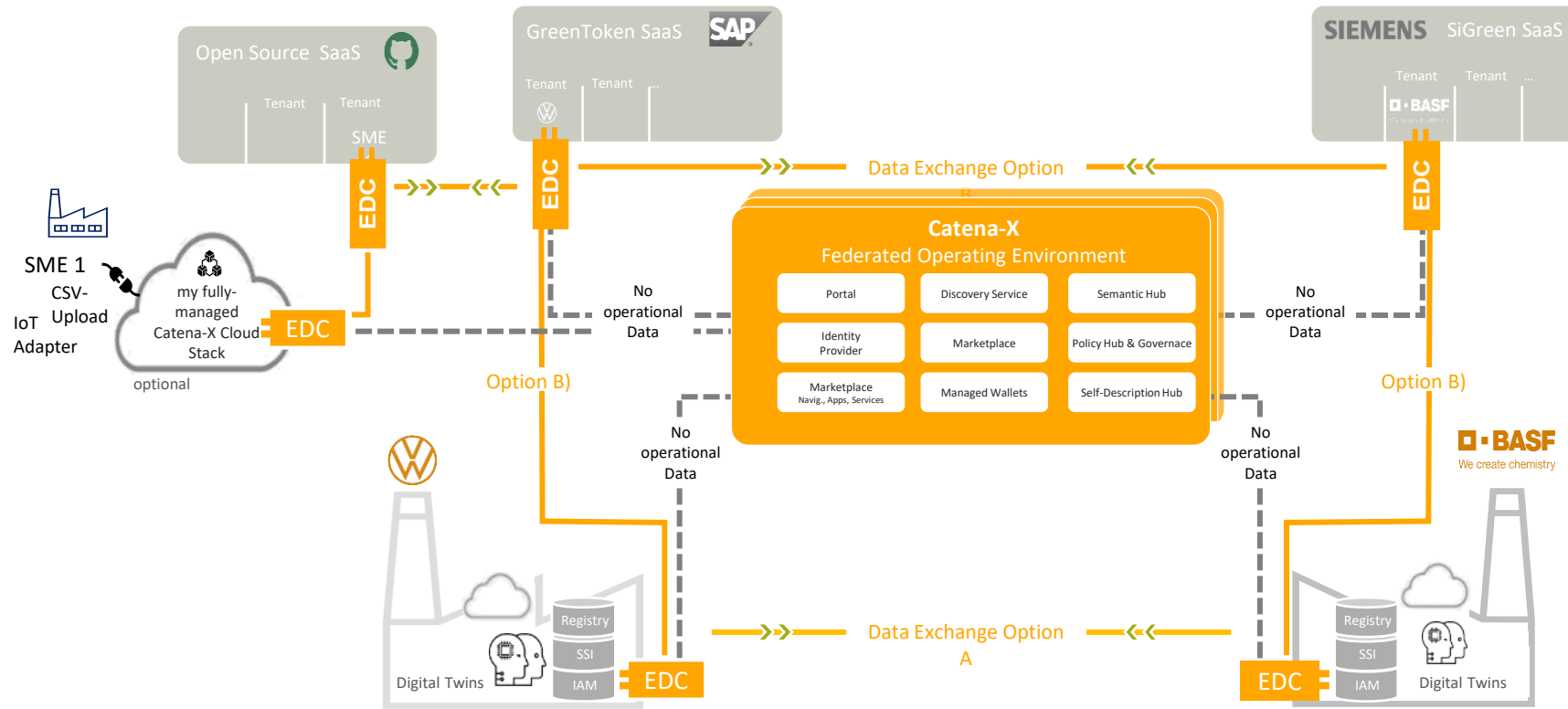# Eclipse Data Space Connector as a key building block.

- **Data is only shared directly between partners**. No central data storage.

- **Data sovereignty** and a strong open source foundation is a key for trust.

- The EDC can be become a **cross industry standard** for data exchange

- The EDC **integrates into the individual IT landscapes**.

- The EDC **bundles all functionality required for trustful data exchange**: Offering, finding and exchanging data, defining access policies, negotiating usage policies.

Catena-X Standards / Policies allow first time

Multi Vendor and self-sovereign Business Collaboration, to cover the entire value chain and dedicated company needs.

Shared **DATA SPACEs**
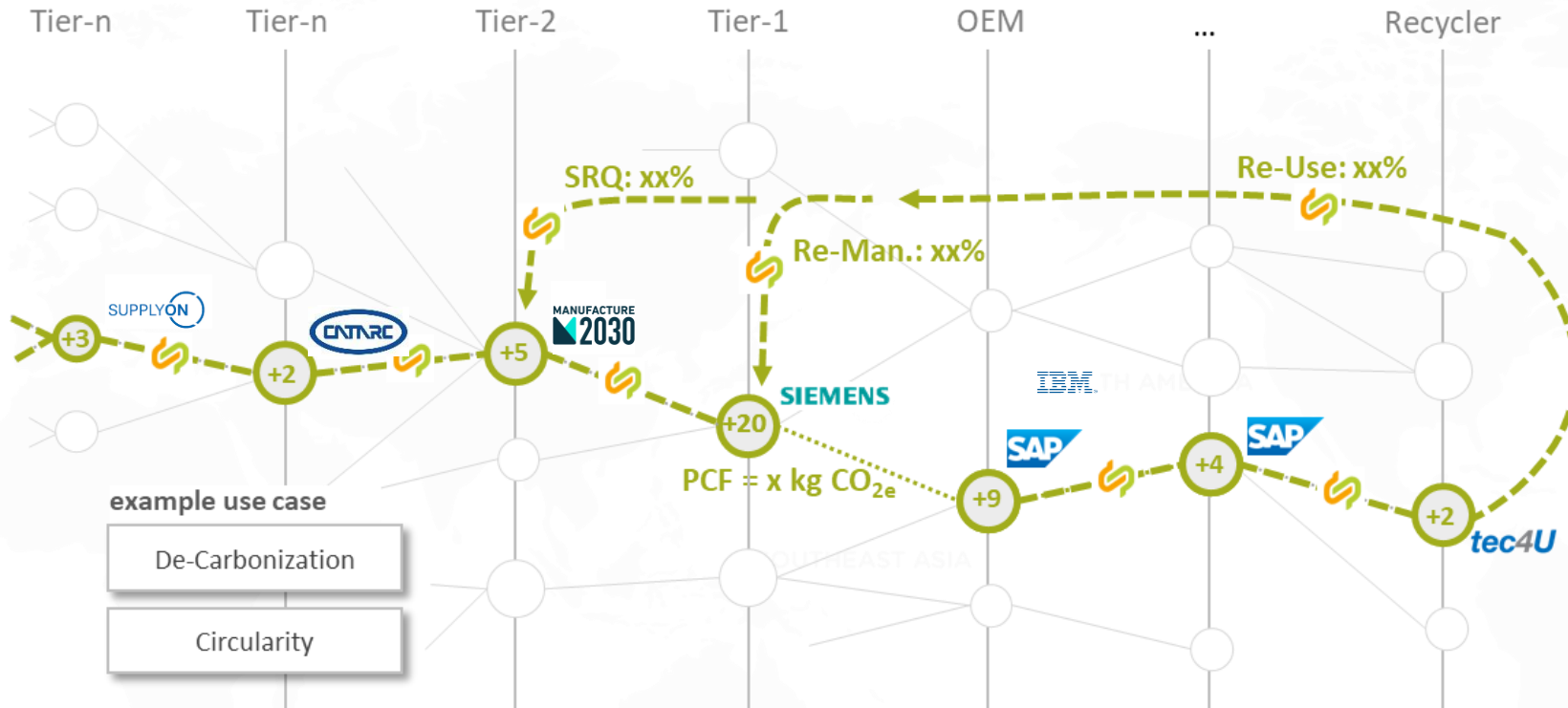
Benefits:

- compliant collaboration for all participants
- shared costs (IT / Business)
- global and broad coverage
- cross use case synergies
- no data lake
- works for sensitive data
- scalable and trusted → DPP ready
- optimize business processes end to end

If you want to…

… build & steer the initiative and shape e.g. use cases

… join the governance body

… discuss and shape standards and normative documents

… offer certification services in the ecosystem

… support the release / life cycle management

… operating a Clearing House Service in the ecosystem

… want to be part of a future-orientated community of innovators and get valuable insights

Join the association and create, develop and shape the automotive industry of tomorrow!

Catena-X e.V. – Working and Expert Groups (Apr 24)

Value Creation and Technology	Value Creation and Technology

Architect Management Committee
Ensure that the architecture blueprints effectively translate the Catena-X strategy and business objectives into a technical implementation

Industry Core Committee
Refine the objectives and KIT related to the Industry Core to foster a productive use of the current standards and principles in the supply network.

Sustainability Committee
Define a common vision, strategy, business and technical roadmap (e.g., standards and KITs) for the overall sustainability domain.

Subgroups:
o **Circularity EG**
   Develop and validate data models and transfer them into standards.
o **Digital Product Pass (DPP) EG**
   Define a common vision, strategy, business and technical roadmap for the DPP.
o **Human Rights WG**
   Define standards based on legal requirements which are to be processed in software offerings.
o **Material Accounting EG**
   Develop a standardized framework that facilitates the exchange of material data for both primary and secondary raw materials.
o **PCF (Product Carbon Footprint) Secondary Data WG**
   Enhance the quality standard of secondary data.
o **PCF Sector Guidance EG**
   Develop a methodological approach and governance process that enables Catena-X to accept sectoral guidance's as 'drop-in' standards.
o **PCF Verification WG**
   Define verification rules and procedures, design a concept for levels of PCF verification.

PLM, Resiliency & Quality Committee
Define a common vision, strategy, business and technical roadmap within the fields of PLM, quality and resiliency to foster accessibility and lower barriers for adopters.

Subgroups:
o **Behaviour Twin EG**
   Improve and establish the cooperation between the AAS and the Knowledge Agent.
o **Demand and Capacity Management EG**
   Scale up the DCM KIT, push its productive use within supply network and expand it in a value- and user-oriented approach.
o **Online Control and Simulation EG**
   Further refine OSIM KIT to ensure its productive use within supply network.
o **Traceability EG**
   Further refine Traceability KIT with focus on quality notifications to ensure its productive use within supply network.

Legende:
WG Working Group
EG Expert Group

Catena-X e.V. – Working and Expert Groups (Apr 24)

Value Creation and Technology

Network Services Committee
Further develop a common vision, strategy, business and technical roadmap for the shared network services in the Catena-X data space with Association members and external stakeholders.

Subgroups:
- **Business Partner Data Management (BDPM) EG**
  Develop, maintain, and enhance standards and requirements for managing business partner data.
- **Digitalization of Company Hierarchies EG**
  Define the concept of legal entities, their hierarchy, and connections, including sites and addresses.
- **Integration Patterns WG**
  Extend and validate the integration patterns described in the Onboarding Guide V1.

Operations & Governance

Data Space Operations Committee
Govern, maintain, and continuously update the Catena-X Operating Model, as well as all relevant subtopics as defined in the current chapters of the Catena-X Operating Model Whitepaper.

TC4S - Technical Committee for Standardization
Manage the standardization process mandatory for the Catena-X data ecosystem and check standard candidates.

TC4M - Technical Committee for Modelling
Assure quality for semantic models before their formal standardization as a Catena-X and ultimately, as an IDTA submodel template.

Subgroups:
- **Battery Pass Modelling EG**
  Improve interoperability and foster community trust, promote acceptance, and strengthen the overall solution from a standardization perspective of the Battery Pass.

Membership, Internationalization

Onboarding Committee
Develop strategies to onboard service partners (set up a handbook, create certification criteria) and SMEs (tools for self-onboarding, platforms within the SME community).

Internationalization Committee
Initiate new hubs and support their roll-out in the respective countries.

Subgroups:
- **China WG**
  Initiate a potential Chinese Hub and support its roll-out.
- **France EG**
  Support the roll-out of the French Hub.
- **Japan EG**
  Initiate a potential Japanese Hub and support its roll-out.
- **Sweden EG**
  Initiate a potential Swedish Hub and support its roll-out.
- **US EG**
  Initiate a potential US Hub and support its roll-out.

Legende:
WG Working Group
EG Expert Group

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