

Data Sharing using PLCS

Enabling the Digital Thread
through life

Nigel Shaw
Eurostep

GLOBAL PRODUCT DATA INTEROPERABILITY **S U M M I T** 2017



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My name is Nigel Shaw

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- Managing Director of Eurostep Limited since 1995
- Previously with British Aerospace, Leeds University
- Degrees in Geophysics and Computation
- Involved in STEP since 1986
 - Chaired Editing Committee for first release
- Chair of ProSTEP Round Table. 1995-1998
- Technical Lead for PLCS Inc. 1999-2005
- Eurostep PM for CRESCENDO, CONGA and TOICA
- Eurostep PM for our work with SAVI
- Standards geek, believer and analyst
- Interoperability challenger

-eurostep-



First STEP with Standards

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- **Standard for the Exchange of Product Model Data**
 - ISO 10303 coming from ISO TC 184/SC 4
 - Industrial automation systems and integration —
Product data representation and exchange
 - Started in 1984, first release 1995
 - Original problem:
 - Industry's geometric data locked into CAD Systems
 - Later problem:
 - Industry's data locked into CAD/PDM/PLM and many more systems



STEP for Exchange

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STEP is a tried and trusted means to exchange CAD snapshots

Geometry is a small part of the bigger picture
It needs context.

AP203, AP214 provide assembly structures, as does AP242

PLCS – Product Life Cycle Support – AP239

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The Key Business Problem:

How to keep the *information* needed to operate and maintain a product *aligned* with the *changing product* over its *life cycle*?

*Product Definition
Information*

Product

Transportation

ISO 10303-239

Consumables

*Maintenance
Schedules*

Feedback

Software

Tools

Spares

*Test
Equipment*

Training

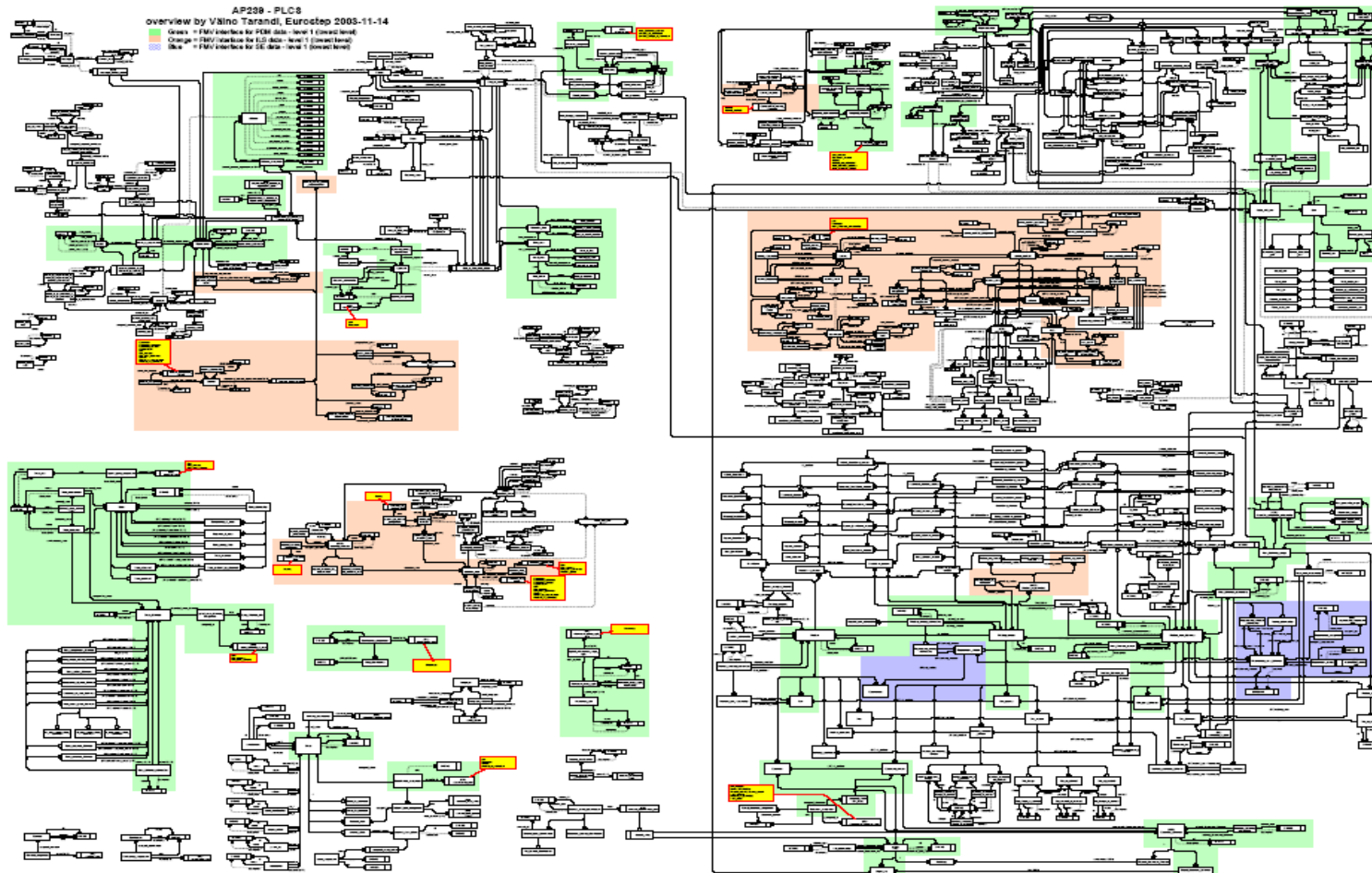
*Support
Facilities*

*Storage
Requirements*

PLCS – Product Life Cycle Support – AP239

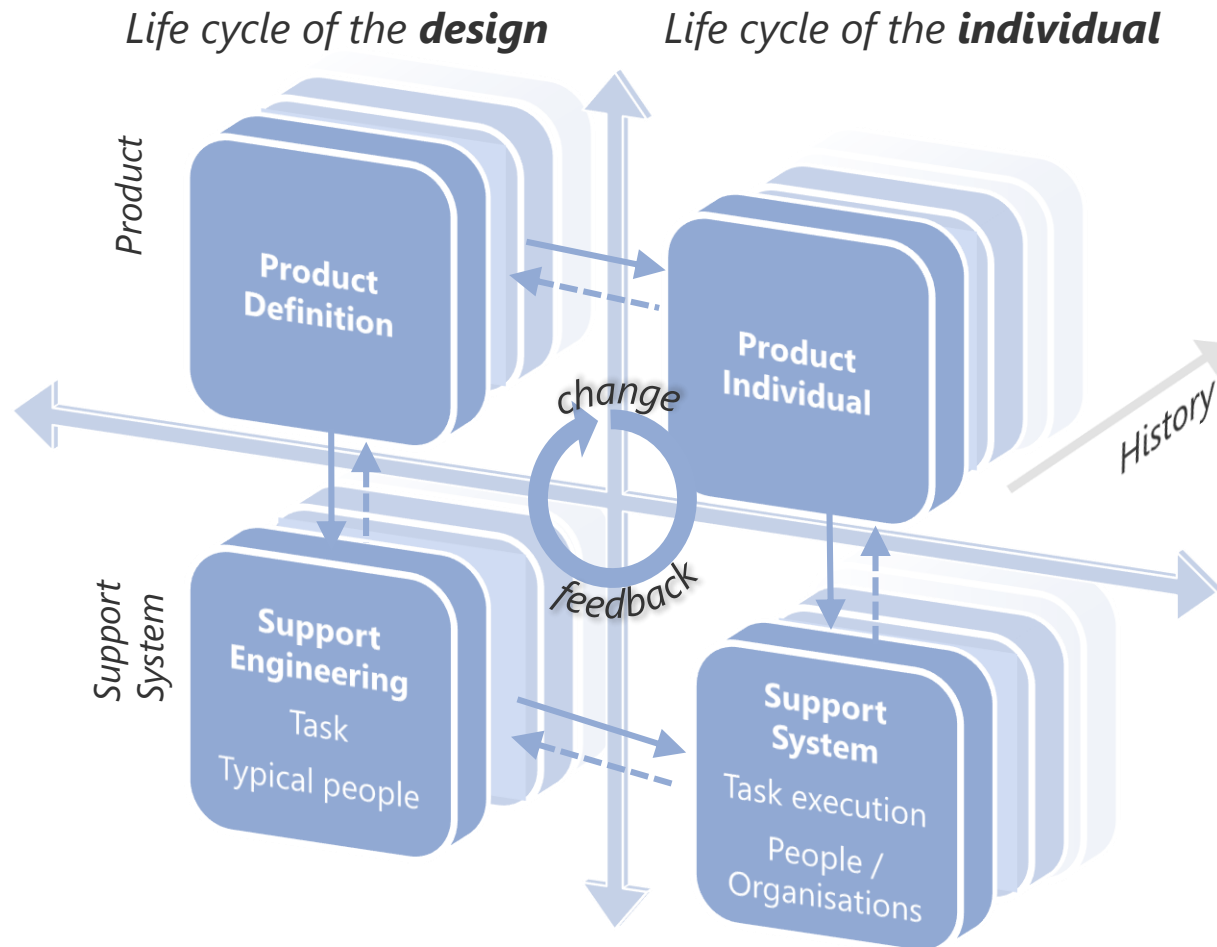
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A Rich and Capable Data Model – with many re-useable patterns



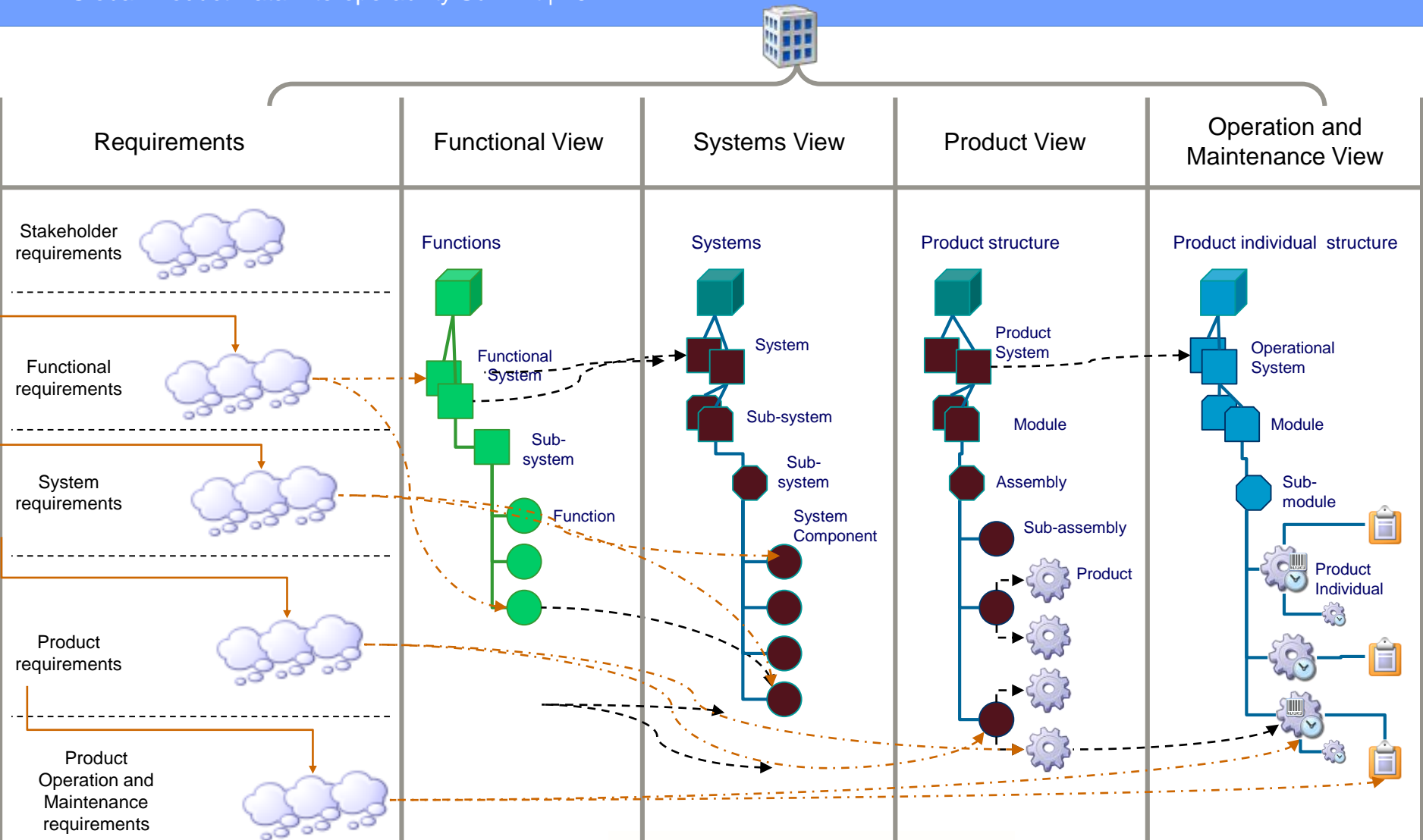
PLCS - Separation of design & individual + Histories

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Requirements, Breakdowns and Traceability

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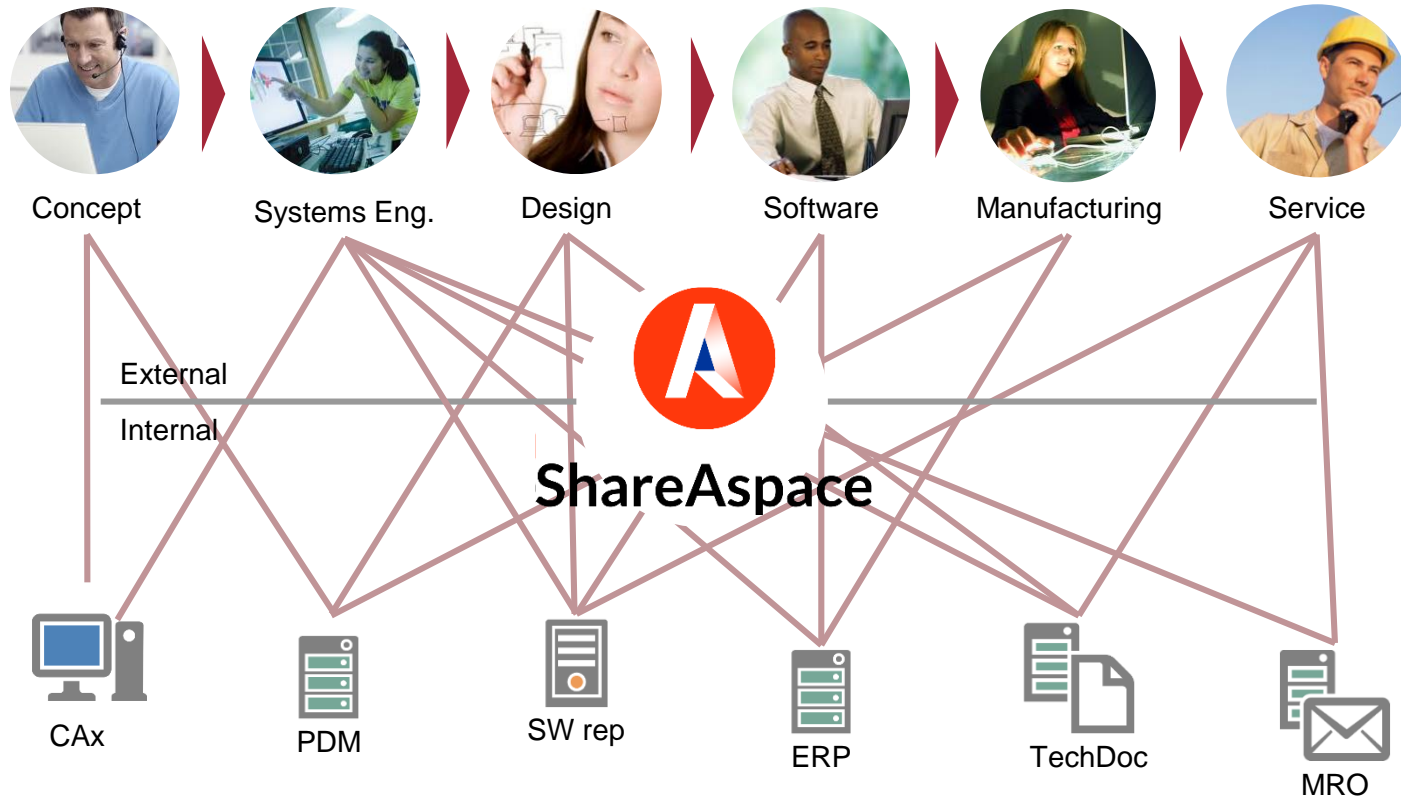
Eurostep and Standards

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- **Eurostep is committed to using standards**
- **ShareAspace is based on implementing standards**
 - Information standards for data capabilities
 - **PLCS and AP242**
 - Technology standards for development
 - **OAUTH, REST, HTML5**
- **Eurostep is currently active in standards development**
 - **PLCS and AP242 Harmonization**
 - **MoSSEC**
 - **LOTAR for MBSE**

The problem space

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Using PLCS in practice

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Aerospace & Defence



Automotive



Energy



Infrastructure



Using PLCS in practice – Renault

As presented at
PDT Europe 2016

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2017.05.24 16:26 Renault RNO 85.16 -0.74%

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Our Group sells and services vehicles all around the world and in each segment

- RENAULT EUROPE PASSENGER CARS
- RENAULT INTERNATIONAL PASSENGER CARS
- RENAULT COMMERCIAL VEHICLES
- RENAULT ELECTRIC VEHICLES
- RENAULT SPORT
- DACIA
- RENAULT SAMUNG MOTORS

45 MODELS sold under **3 BRANDS** in **125 COUNTRIES**


2 170 644
vehicles sold in 2015

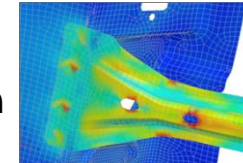
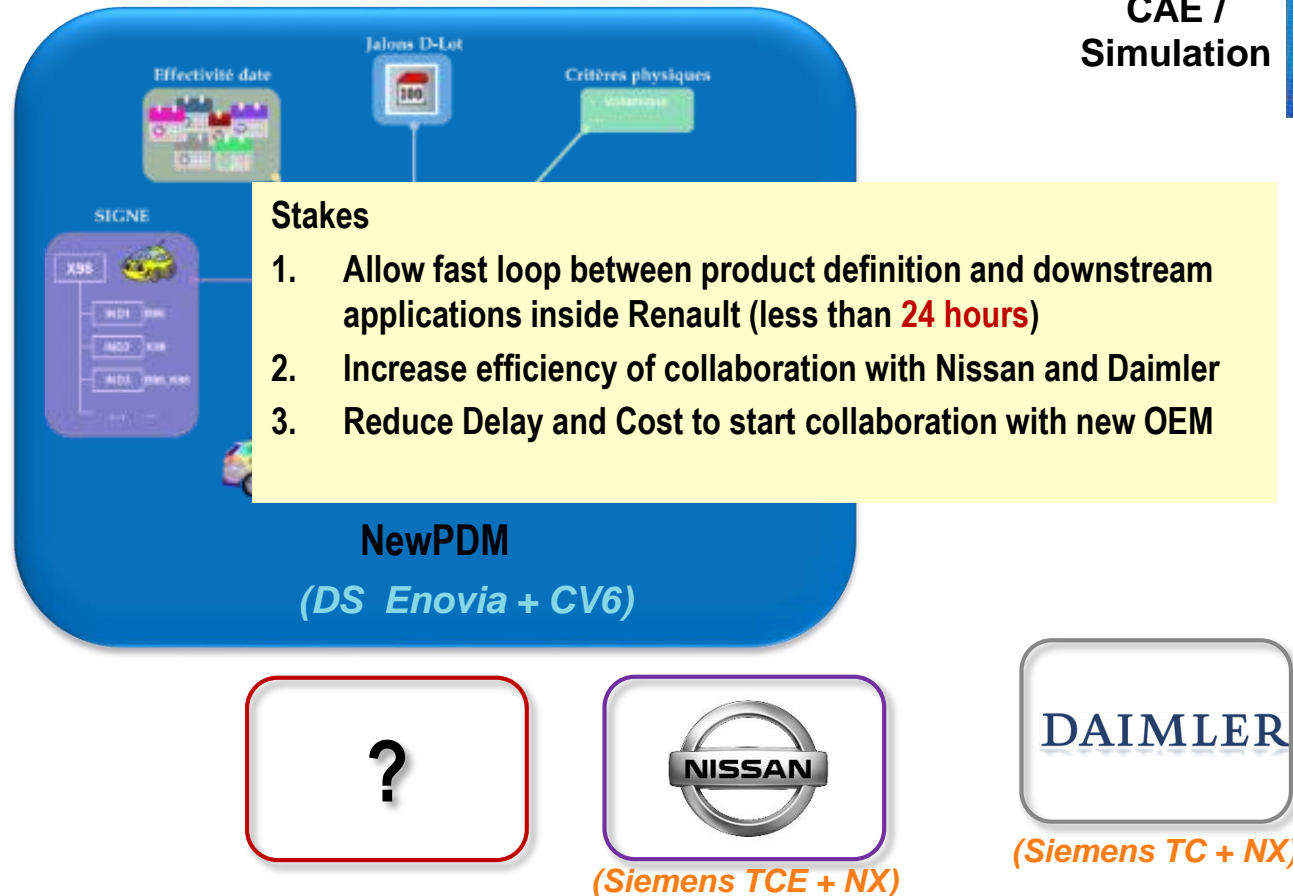

550 920
vehicles sold in 2015


80 028
vehicles sold in 2015



03 OEM COLLABORATION

DMU Data Exchange request in a complex landscape



Realistic rendering
(Lumiscaphe)



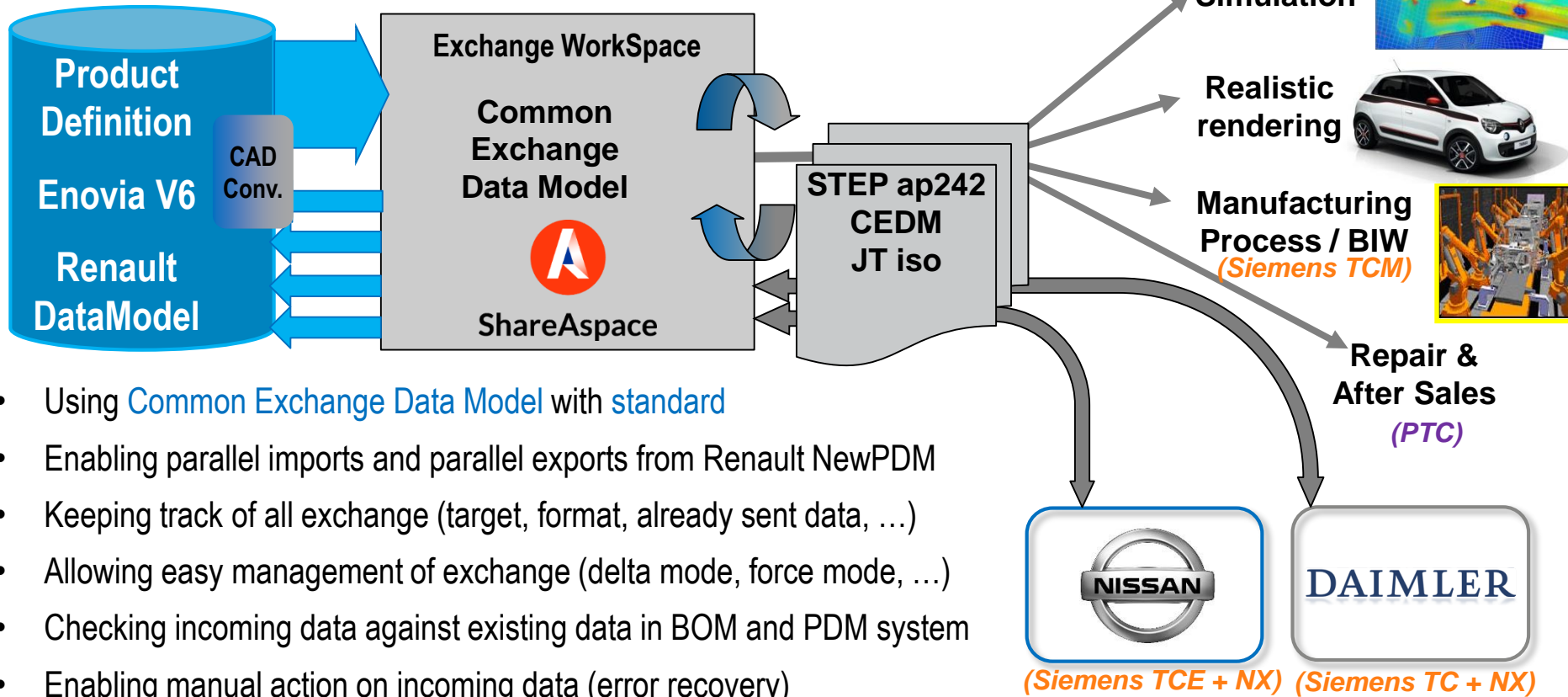
Manufacturing Process / BIW
(Siemens TCM)



Repair & After Sales
(PTC)

04 IMPLEMENTING STANDARD

Create an Exchange Workspace



**Going to a Smart, fully Configurable Digital Mockup,
created Breakthrough for Vehicle engineering.**

**Now Renault is on the way to adapt all downstream applications
to this new capability, keeping digital continuity.**

**Alliance and strong partnership makes mandatory
to exchange fast and reliably**

This will be achieved using Standard in all our exchanges.

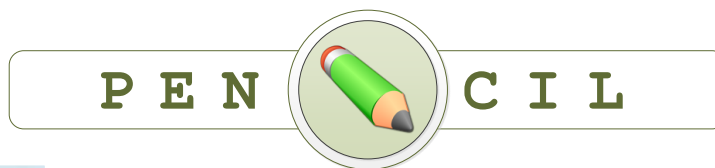
Using PLCS in practice – French Ministry of Defence

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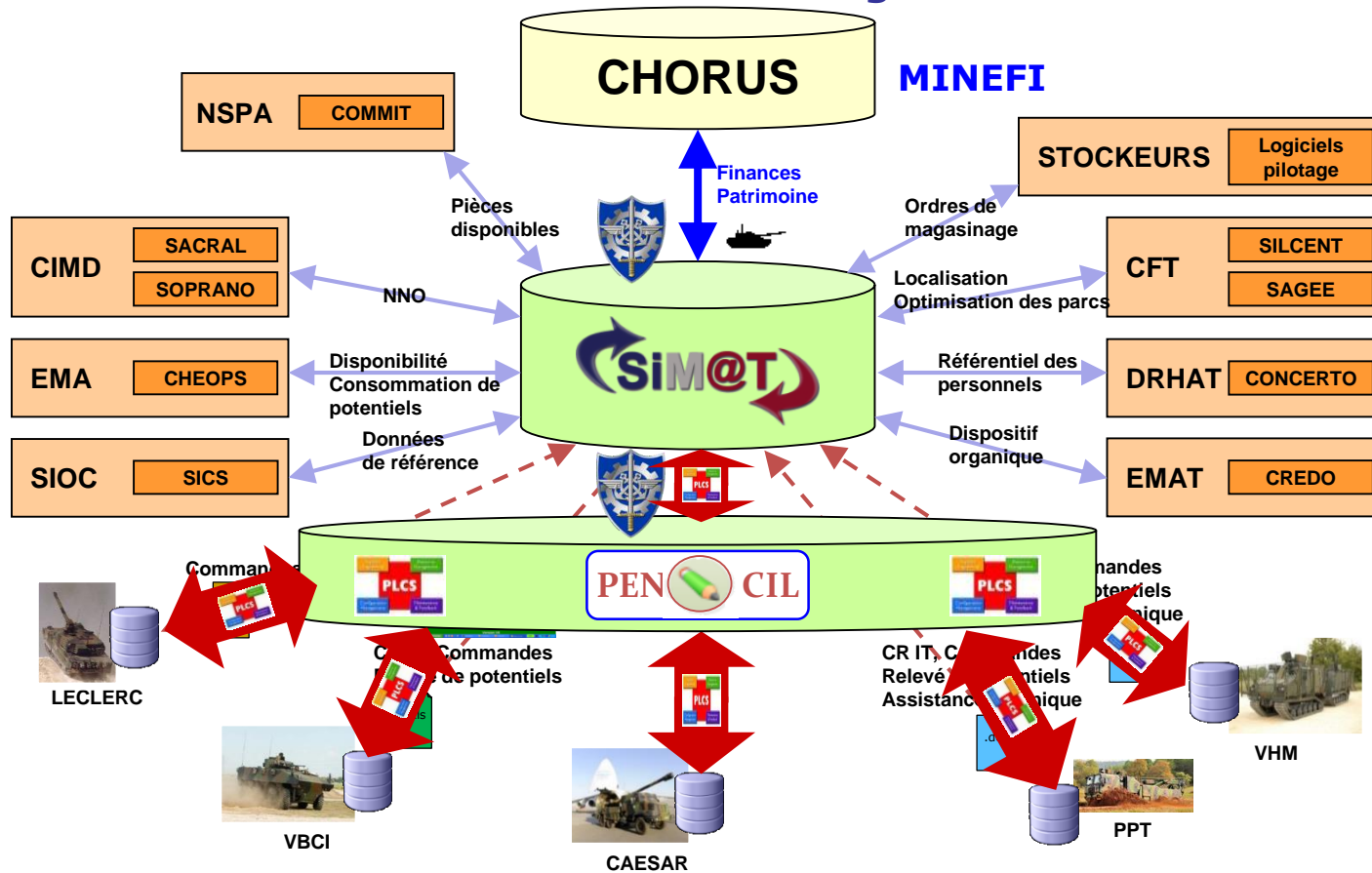


A standards based solution for the French Ministry of Defence
to share Land Systems product data with manufacturers

PENCIL : Plateforme D'Exchange Normalisée et Centralisée d'Information Logistique



Généralisation de PENCIL & intégration dans SIM@T





DEX SIMMT, messages and associated workflow

DEX		Message		OEM	SIMMT
N°	Title	N°	Title		
1	ProductConfigurationDelivery	Composed by 5 messages			
2	InServiceProductStructureUpdate	1	InServiceProductStructureUpdate		
3	ProductLifeRecordUpdate	1	LifeRecordUpdate		
4	SparePartOrder	1	SparePartOrder		
		2	OrderReceiptAcknowledgement		
		3	SparePartDeliverySlip		
		4	ProofOfDelivery		
5	TechnicalEvent	1	TechnicalEventInit		
		2	TechnicalEventUpdate		
		3	TechnicalEventApproval		
		4	TechnicalEventClosure		
6	MissionStock	1	MissionStockDelivery		
		2	MissionStockReturn		



Benefits of PENCIL

➤ On data to be exchanged

- Today
 - No global vision of exchanged data
 - Differences between visions (manufacturers / Administration)
- PLCS :
 - forces to define in a clarified way all exchanged data
 - offers a generic and precise frame for data identification
 - quickly allows to identify the missing data and to converge on a common definition for all the actors`

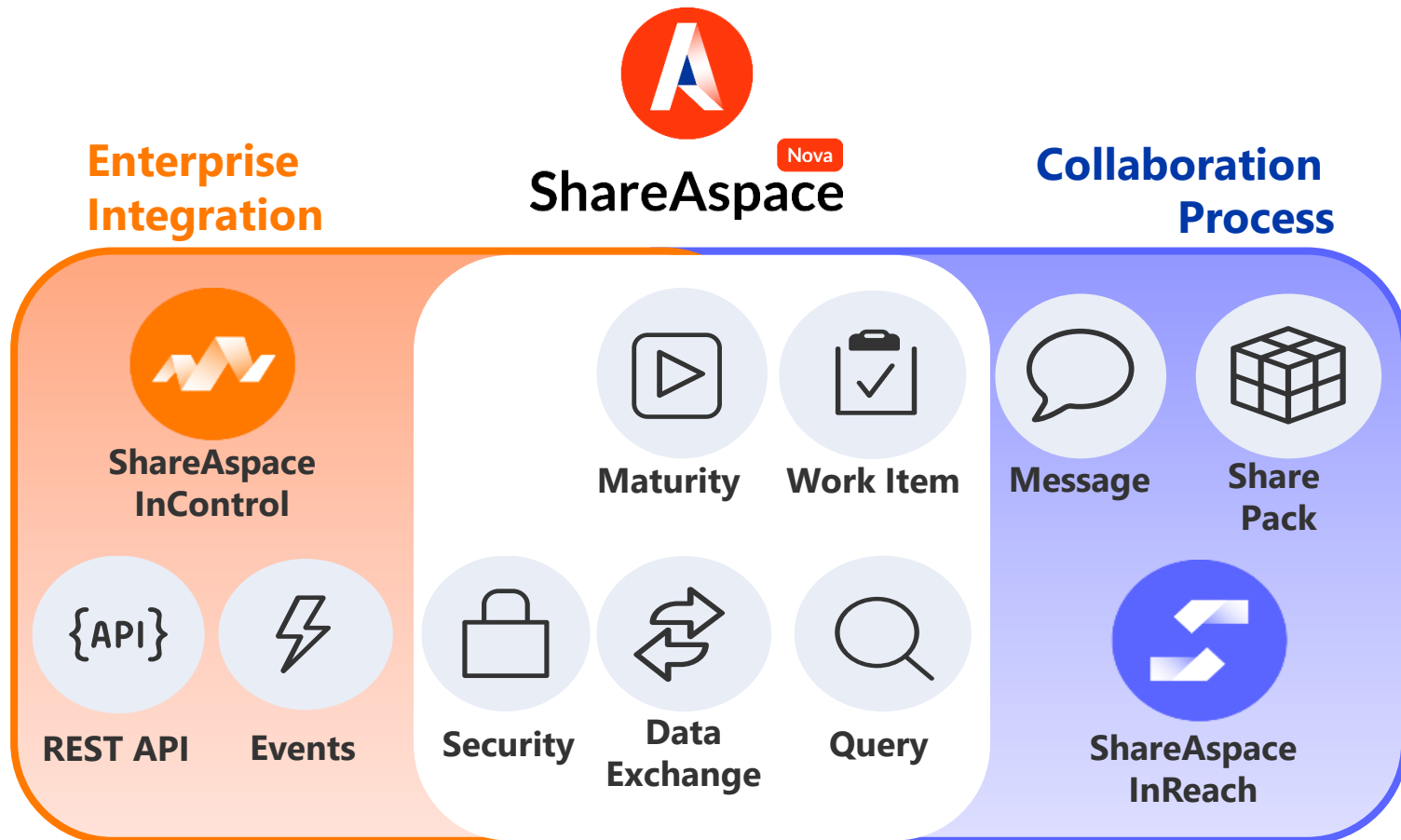
➤ On contracts

- Nowadays, every contract is specific
- PLCS allows to manage programs uniformly :
 - by using generic business processes
 - by handling contracts specificities



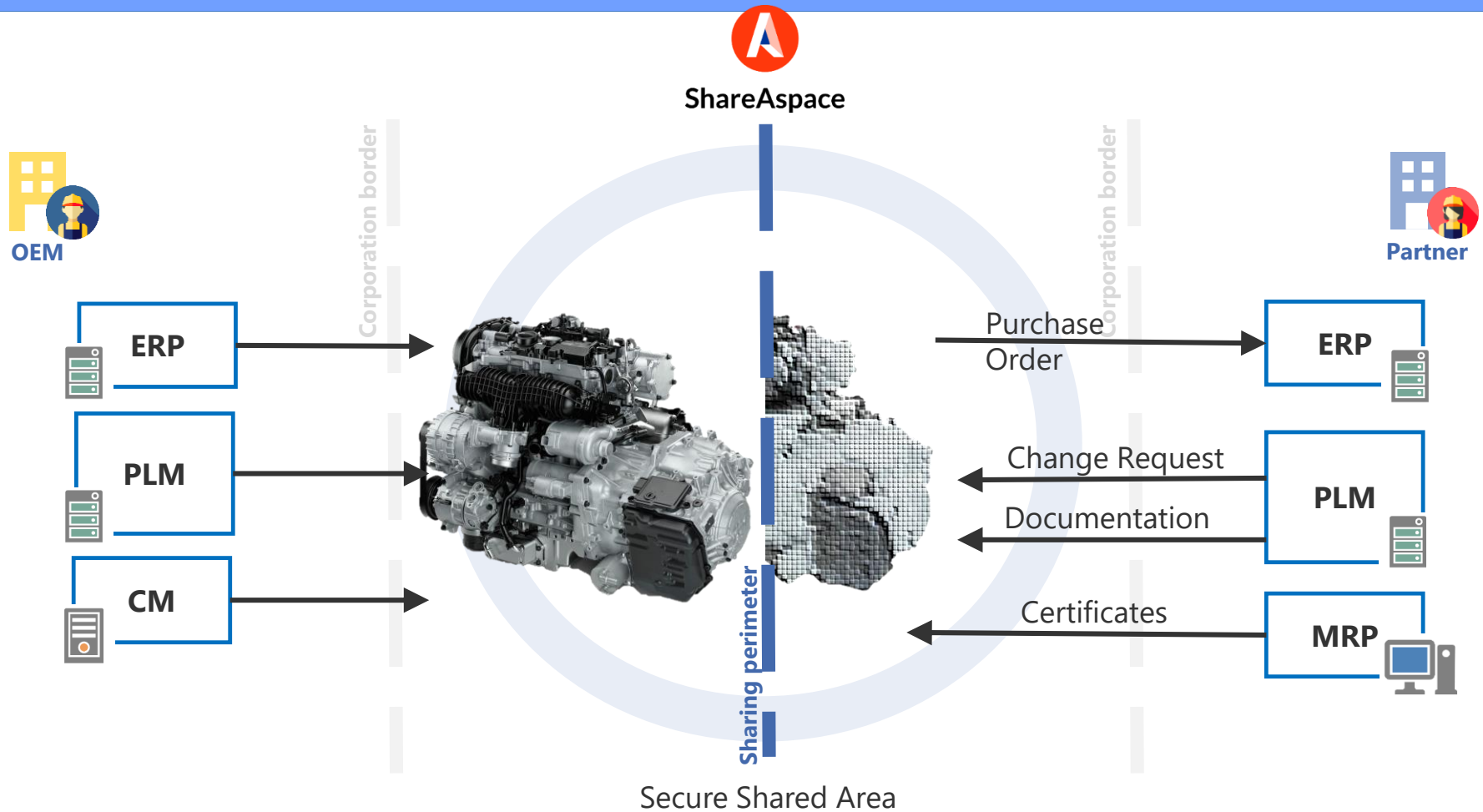
Collaboration needs more than a rich data model

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Sharing information

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Handling Complexity of Product Data Across Companies

• Volvo Cars - Irene Gustavsson





External cooperation – historical view

1927 Owner:
Volvo AB



1999 Owner:
Ford Motor Company

2010 Owner:
**Zhejiang Geely Holding Group,
Daqing and Jiading Province**

1991 - 2004 **VDL Nedcar**
Common prod dev; Common plant



2004 – 2008 (2015) EUCD
Common prod dev, Common plant



2001 – 2008 (2013) C1
Common prod dev; Common plant



2013 - CMA **CEVT**
Common prod dev

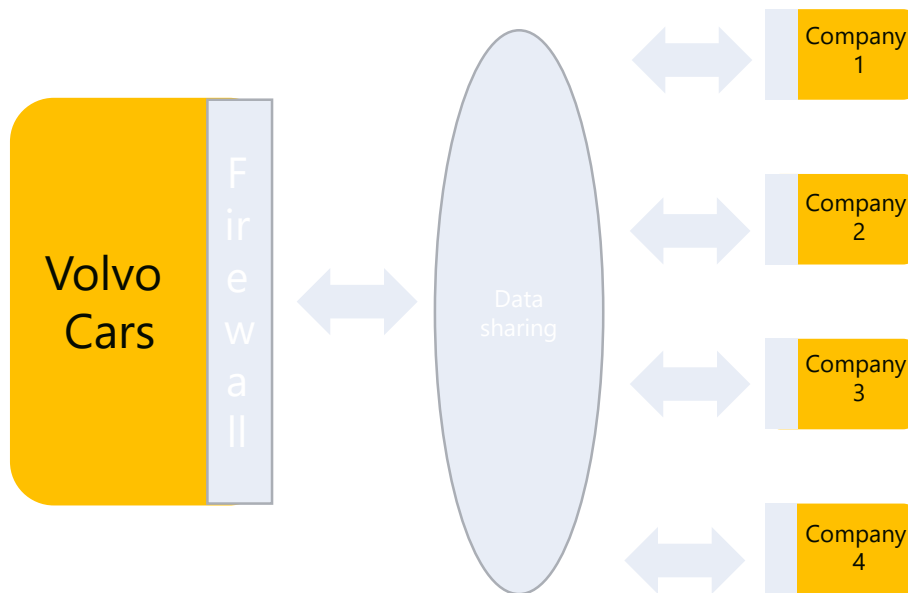


Future – Need for flexibility

- More connections within Geely and its subsidiaries.
- Complex outsourcing of larger assignments.
- Technology sharing with other OEM:s and system suppliers.
- Time to market - new joint ventures must be given a quick start-up based on relevant product data.
- Maintain flexibility, decommissioning of Ford dependencies was a huge IT-project.



Technical principles

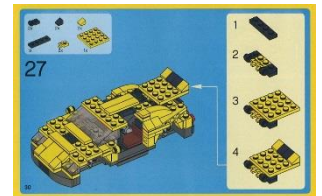


- **One interface** to Volvo Cars system means that step 1 in any new collaboration is done.
- The cloud service can handle the **flexibility** needed in terms of capacity in line with projects.
- The cloud service (or separate installation outside the firewall) creates a **safe area for data sharing** as there are no risk for partners accidentally being able to access other Volvo Cars internal resources.



Summary

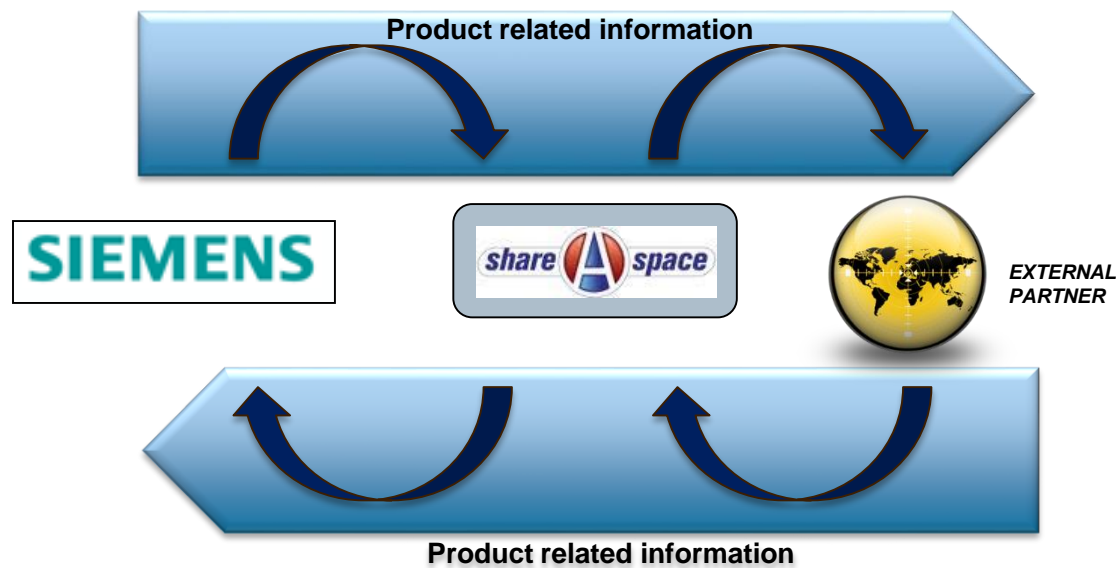
- **Experience has proved the importance of integration at an early stage in larger project.**
- **Integration should not be built into the internal structure, it takes away flexibility.**
- **A large portion of collaborative data is important here and now. Long term only a limited part of that data will need to be saved.**
- **Building brick by brick from the ground is proven to be the best foundation.**



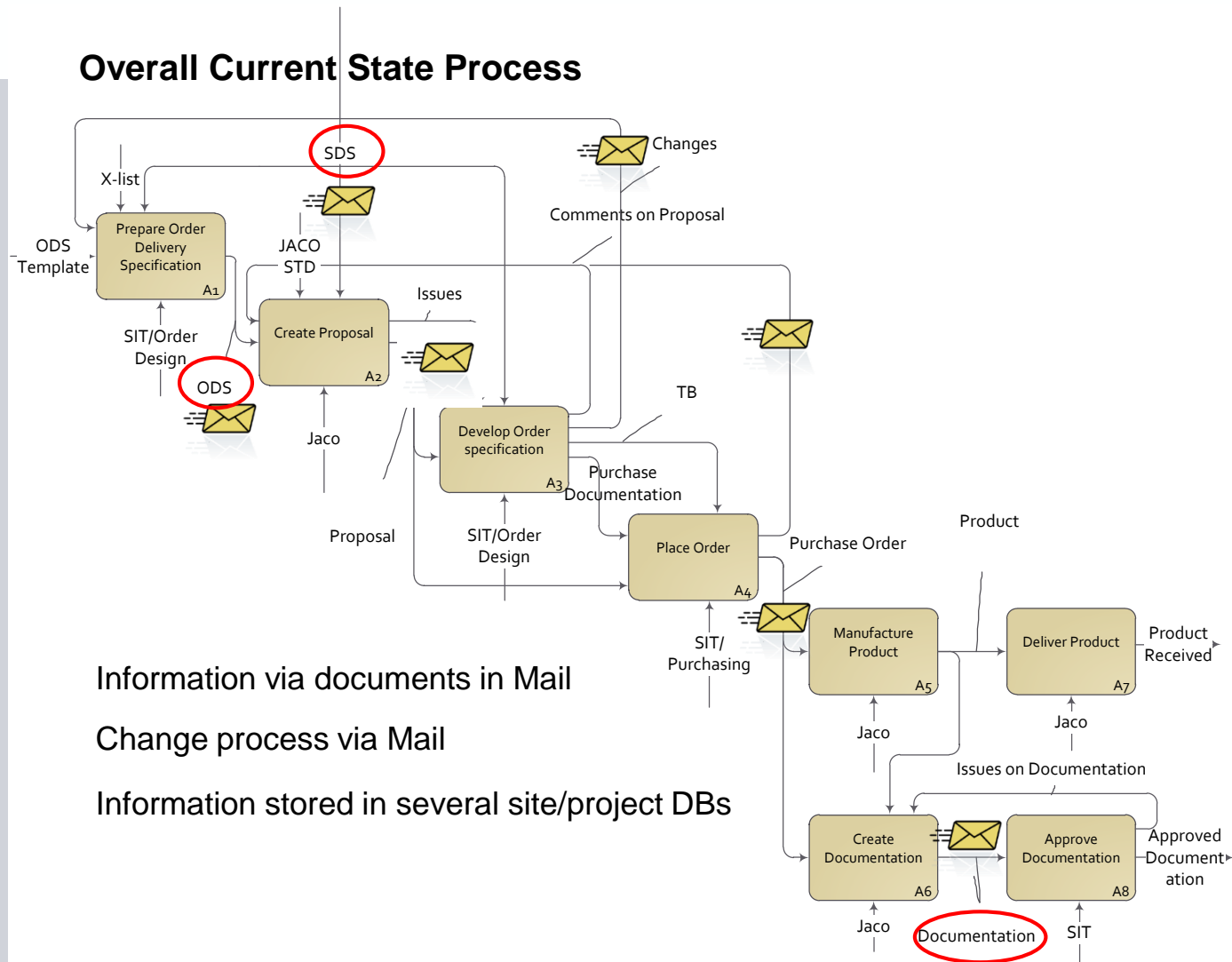
Kristofer Thoresson

Siemens Collaboration with Suppliers and Customers

External collaboration



Overall Current State Process

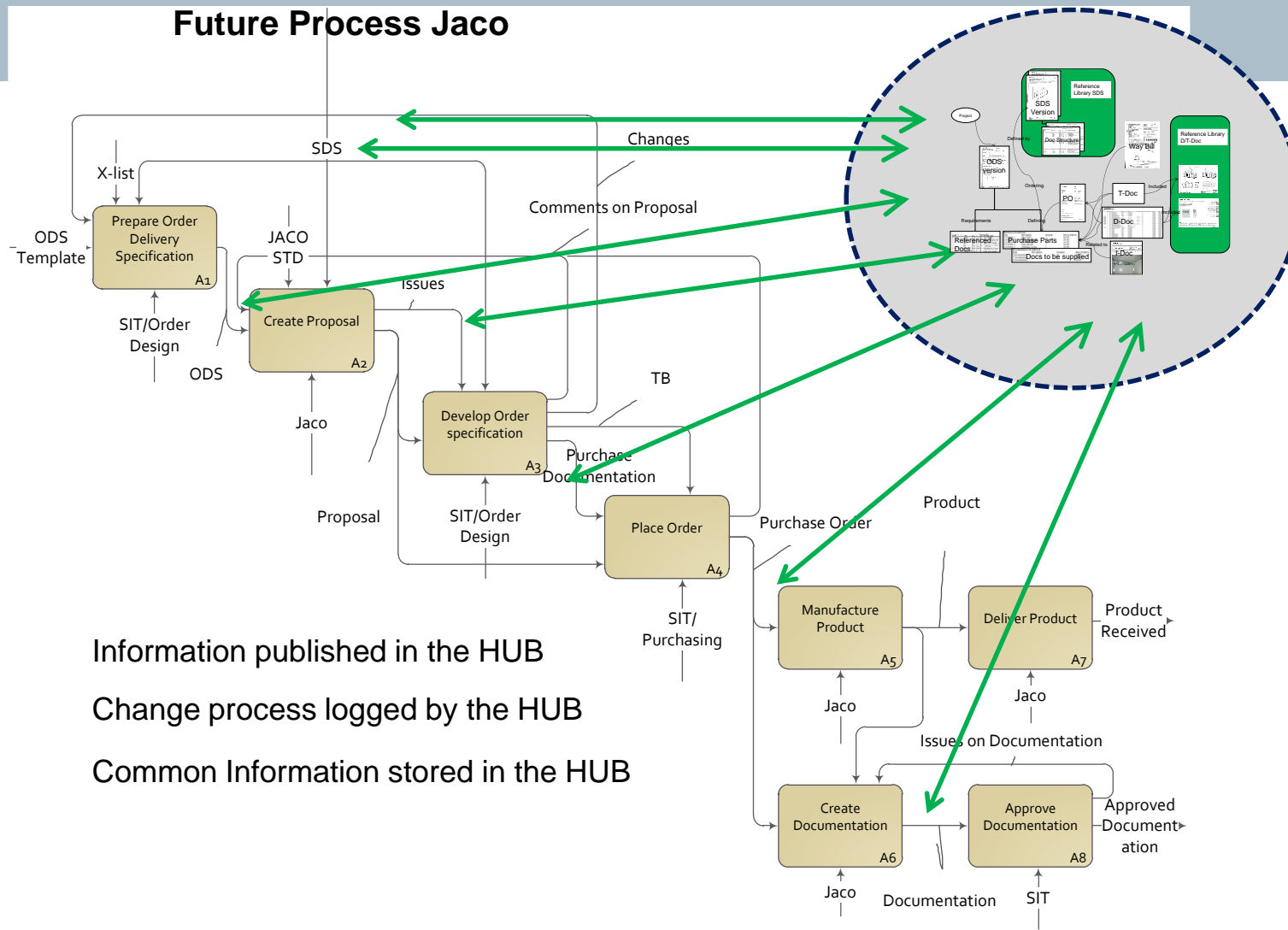


Information via documents in Mail

Change process via Mail

Information stored in several site/project DBs

Future Process Jaco



Levels of Information – a path way to support and follow

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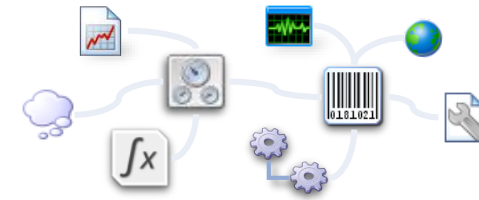
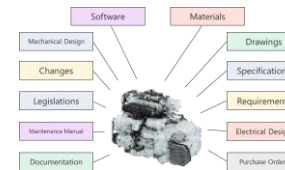
Share Information

Functionality

- System-hub-system integration that enables suppliers to develop and own information

Main Benefits

- Lean information handling of development
- Lean information handling of spare part info
- Functionality can be reused for customer integrations



Share BOM

Functionality

- System-hub-system integration that enables OEM to publish info

Main Benefits

- Lean information handling for suppliers
- Detailed item and component info
- Change control on detailed level
- Spare part info will be available



Share Documents

Functionality

- Web portal that enables suppliers to retrieve and upload docs

Main Benefits

- Easy to introduce a new supplier
- Single point for supplier information management
- Change control and transparency



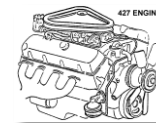
Share Files

Functionality

- Web portal that enables users to retrieve and upload files

Main Benefits

- Easy to introduce a new supplier
- Single point for supplier information management



Eurostep's current largest project – for

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WHAT IS ANDA?



AN IT SYSTEM FOR ASSET AND TRANSPORT NETWORK DATA FOR THE SWEDISH ROAD AND RAILROADS



PARTLY REPLACES OLD SYSTEMS AND ADDS ADDITIONAL FUNCTIONALITY FOR MORE EFFICIENT INFORMATION HANDLING



ENABLES NEW PLANNING, MAINTENANCE AND TRAFFIC CONTROL PROCESSES



ANDA Objectives

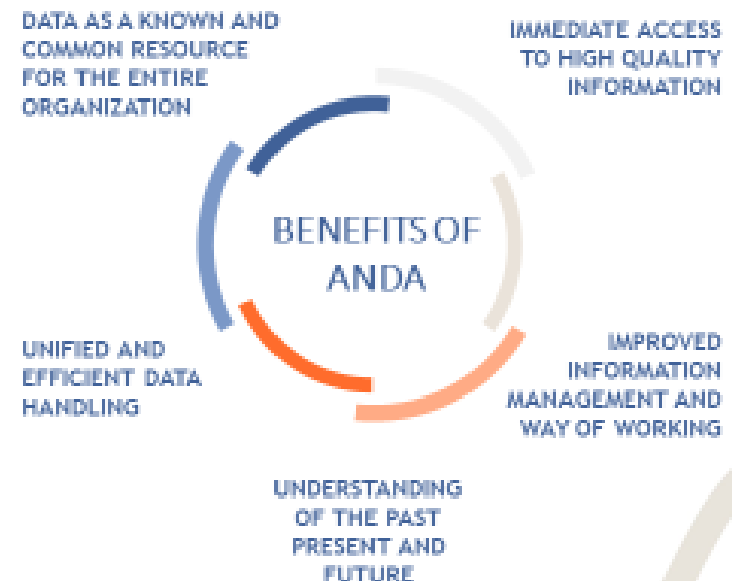
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THE GOAL OF ANDA IS TO IMPROVE DATA QUALITY, INFORMATION HANDLING AND INFORMATION MANAGEMENT ACROSS THE ORGANIZATION

CURRENT SITUATION



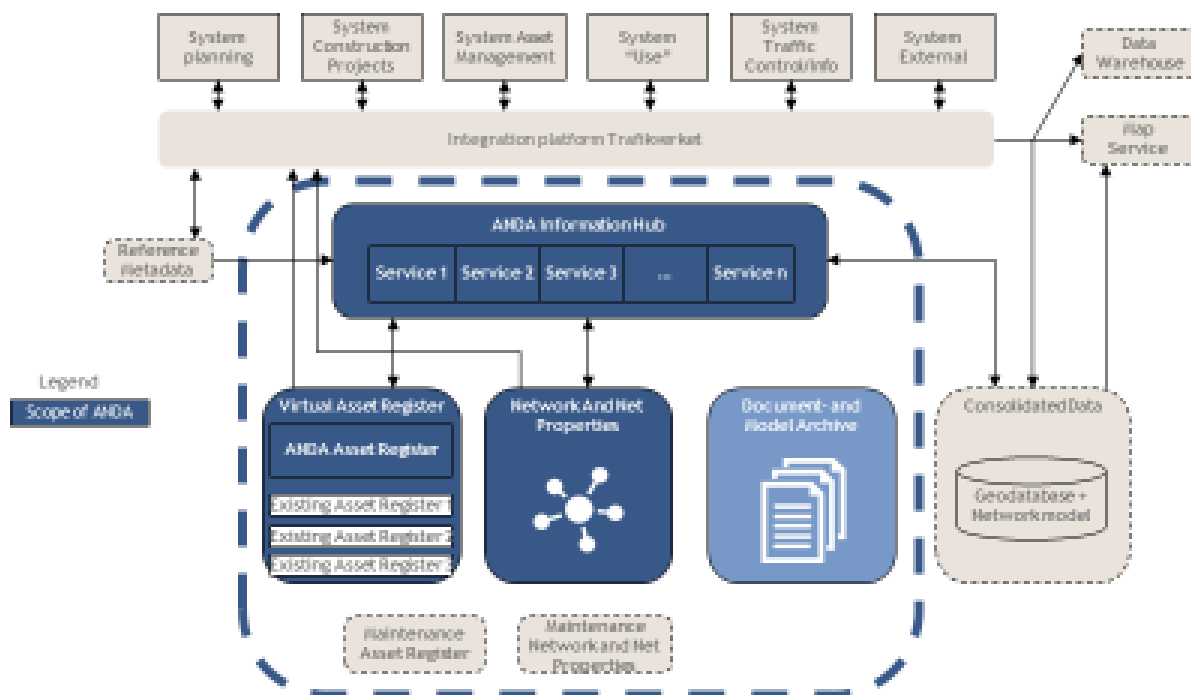
VISION & GOAL



Logical Architecture

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LOGICAL VIEW OF THE SYSTEM

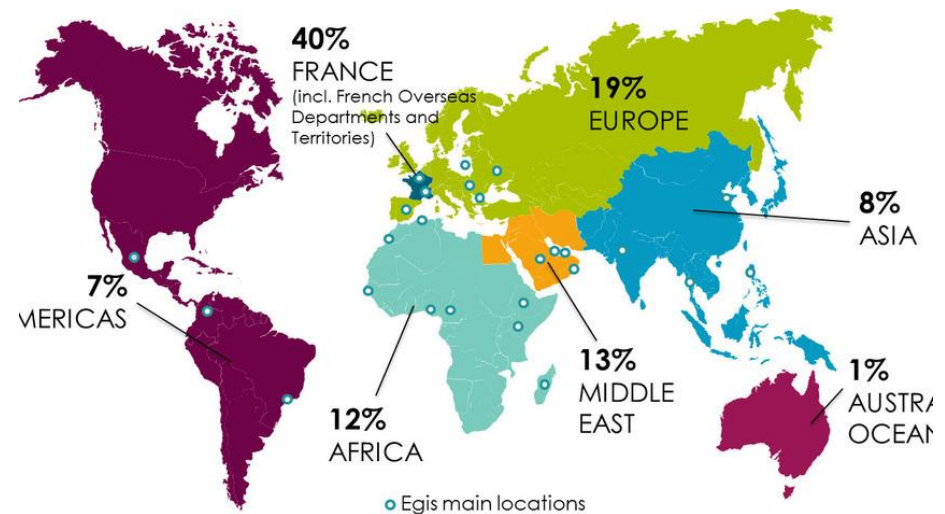
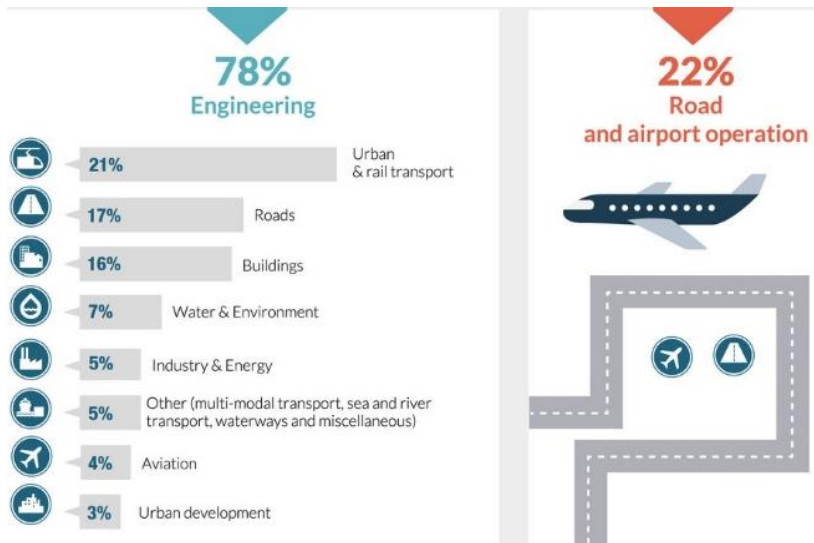


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Sharing data across AEC projects

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- EGIS is an international Engineering & Facilities Management company
- 1Billion € Turnover – 13K employees



Challenges to manage large infrastructure projects

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- The infrastructure is designed and built in parallel with several other distinct projects – which depend from different builders and customers.
- These projects interfere each other and may conflict – necessitating to adapt designs, to postpone tasks, ... and may generate delays, extra costs and even legal action.
- The challenge is to detect these conflicting projects as soon as possible, to assess the potential impact, to identify action to fix the conflicts, and to monitor the actions up to end of each action.

The solution developed by Eurostep is to support the collaboration process between all the stakeholders to agree on the issues, to fix an action plan, to share all the data and documents needed to fulfill tasks and to monitor process till the closure.

What is the Digital Thread

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- Digital thread is a communication framework that connects traditionally siloed elements in manufacturing processes and provides an integrated view of an asset throughout the manufacturing lifecycle.

[<http://searchmanufacturingerp.techtarget.com/definition/digital-thread>]

- The digital thread refers to the communication framework that allows a connected data flow and integrated view of the asset's data throughout its lifecycle across traditionally siloed functional perspectives.

[<http://www.industryweek.com/systems-integration/demystifying-digital-thread-and-digital-twin-concepts>]

PLCS – Product Life Cycle Support – AP239

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The Key Business Problem:

How to keep the *information* needed to operate and maintain a product *aligned* with the *changing product* over its *life cycle*?

*Product Definition
Information*

Product

Transportation

ISO 10303-239

Consumables

*Maintenance
Schedules*

Feedback

Software

Tools

Spares

*Test
Equipment*

Training

*Support
Facilities*

*Storage
Requirements*

PLCS Objective – Digital thread through the life cycle

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The Key Business Problem: *, simulate, manufacture*
How to keep the *information* needed to operate and maintain a product *aligned* with the *changing product* over its *life cycle*?



Needed for a Digital Thread

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- Distinguish between designs and actuals (individuals).
- Different BOM views (such as as-designed, as-manufactured and as-maintained) of a product, including the actuals, and link/trace between them.
- Different breakdown views (such as physical and functional breakdowns) of a product and link between them and to different BOM views.
- Different properties and record their values over time or against different views.
- Requirements, their allocation, tracing, Verification and Validation.
- Recording of processes and other actions applied to the product (or done by the product).
- Handling subsidiary products such as tools and equipment and their use and properties.
- Associated documents and other information, such as CAD and simulation models, related to the product and any subsidiary products.

Already included in PLCS

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- ✓ Distinguish between designs and actuals (individuals).
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A Dog is for Life, not just for Christmas

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In 1987 the Dogs Trust, a UK Charity, came up with the slogan:
A dog is for life, not just for Christmas



It has been very successful ...

Success breeds Imitation

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Who am I to break the trend...

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europstep

A Digital Thread
is for Life,
not just for
Manufacturing

Aircraft data
is for
Life + 10,
not just
for Life
And yes...
you're gonna have
to use standards!

Contact

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