

WEBINAR

Unifying Digital Threads: Capella and Interoperability to support a Synchronized Source of Truth

THURSDAY, APRIL 3rd 2025

Europe :

4 PM BST (London) - 5PM CEST (Paris)

North America :

8 AM PDT (San Francisco) - 11AM EDT (New York)



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 - **Digital Thread:** cope with complex systems development
 - 02
 - **Synchronized Source of Truth:** the foundations to build an extended digital thread
 - *Use Cases #1 / #2*
 - 03
 - **Traceability and model-requirement consistency:** link your assets all across the life cycle
 - *Use Cases #3 / #4*
 - 04
 - **Model-requirement synchronization:** Unlocking Interoperability
 - *Use Cases #5 / #6*
 - 05
 - Q&A
 - Conclusion

DIGITAL THREAD: COPE WITH COMPLEX SYSTEMS DEVELOPMENT

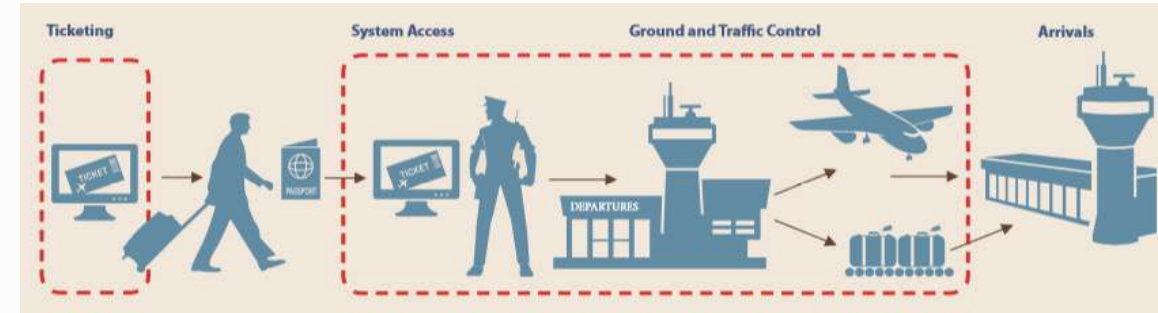


➤ **Modern SE: Increasing complexity**

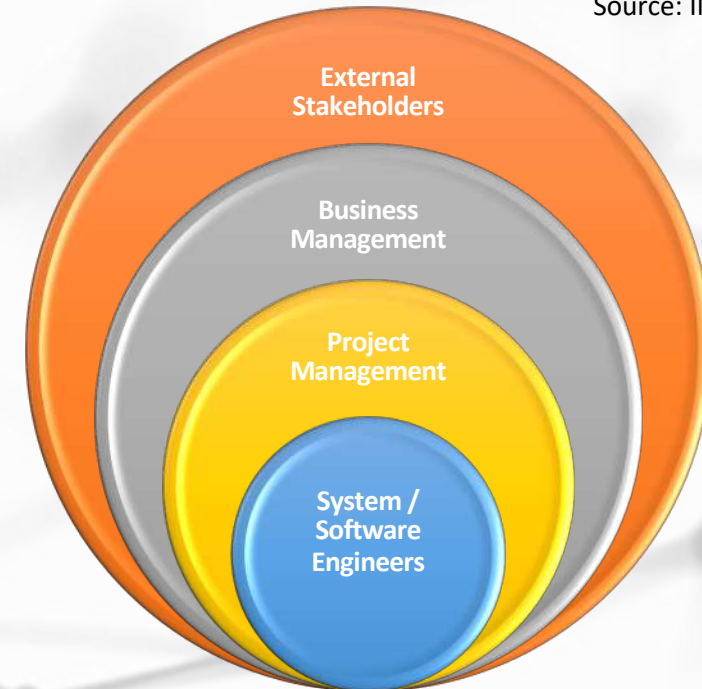
➤ Complex systems (Systems of Systems)

➤ Complex organizations

➤ Complex toolchains

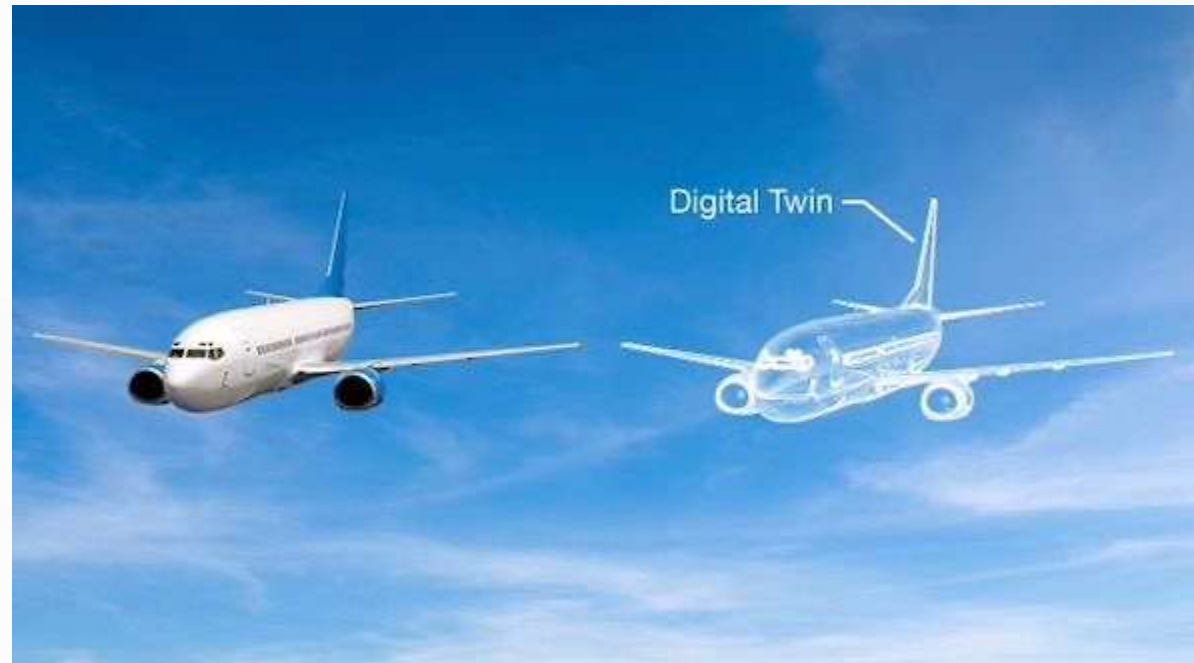


Source: INCOSE SE Vision 2020



➤ Digital Thread & Digital Twin

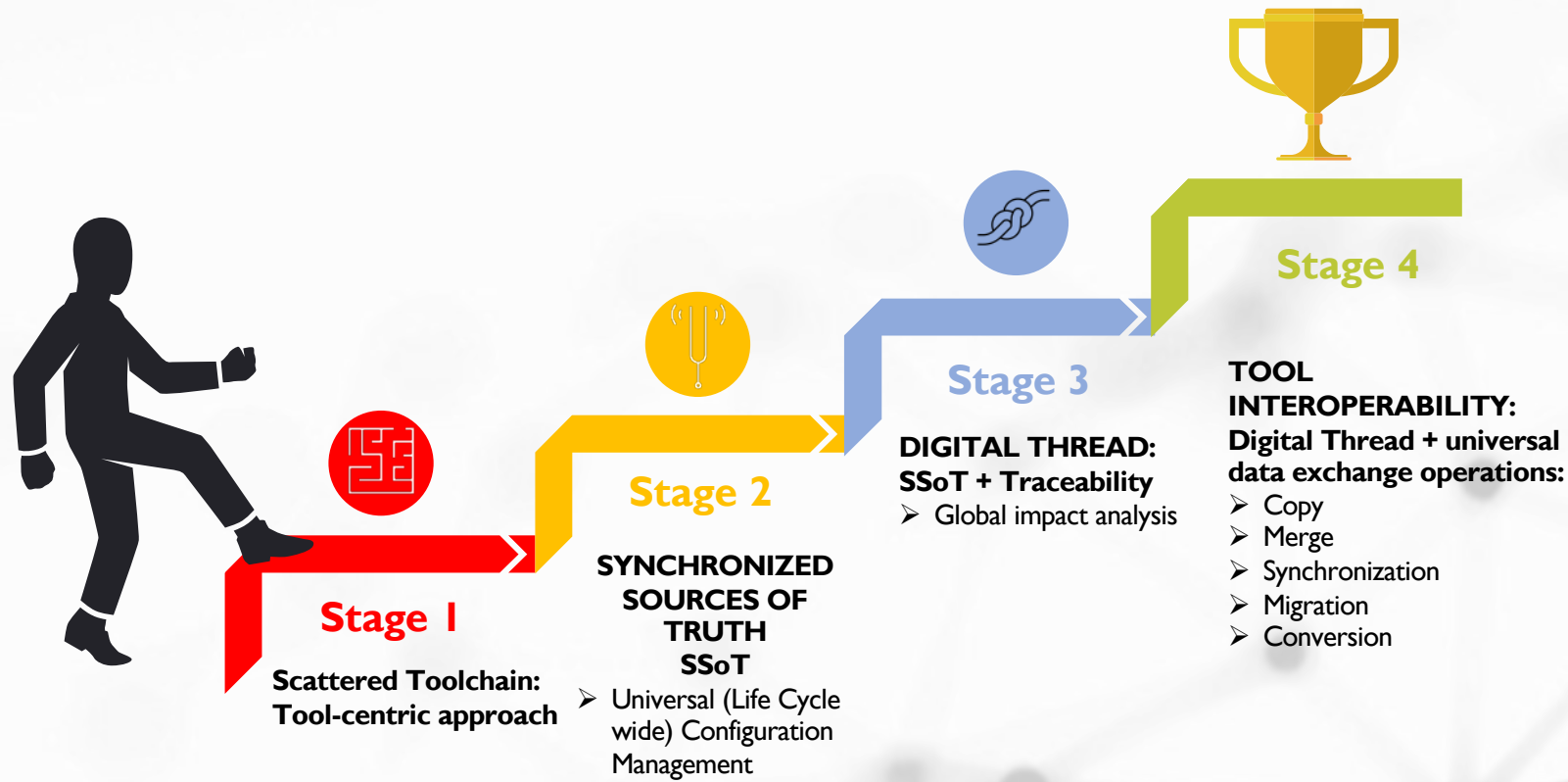
- Need to extend the digital thread beyond the physical world

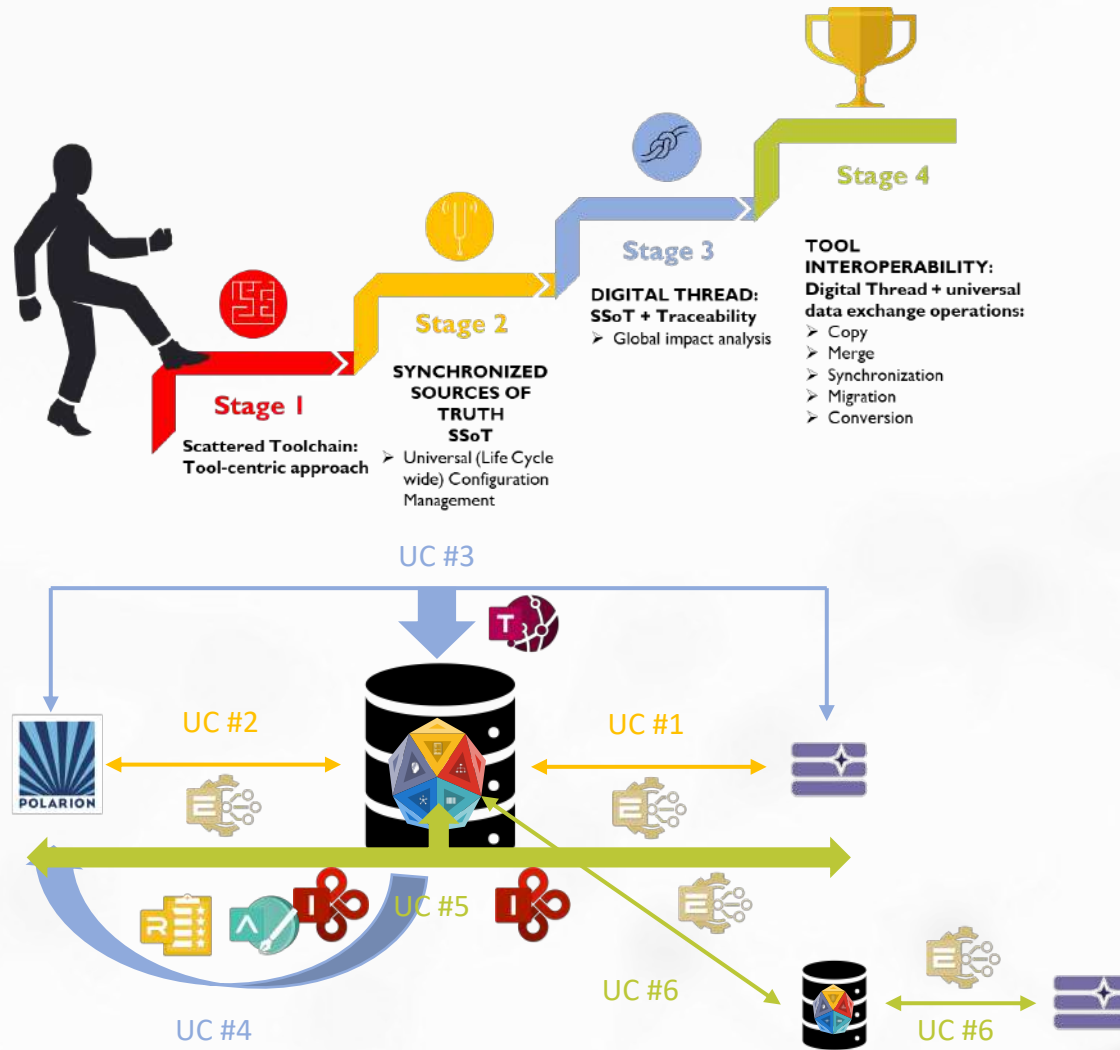


[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)

- Consequences of complex systems development
 - Multiplication of heterogeneous tools that need to be interconnected
 - Iterative processes reinforcing the challenge of change impact analysis with an extended spectrum
 - **Digital Thread for Enhanced Knowledge management** that helps anticipate :
 - Potential changes & their related **risks**
 - Make **proactive** decisions
 - **Maximize** the Opportunity / Risk ratio

➤ Path to reach an extended / universal digital thread



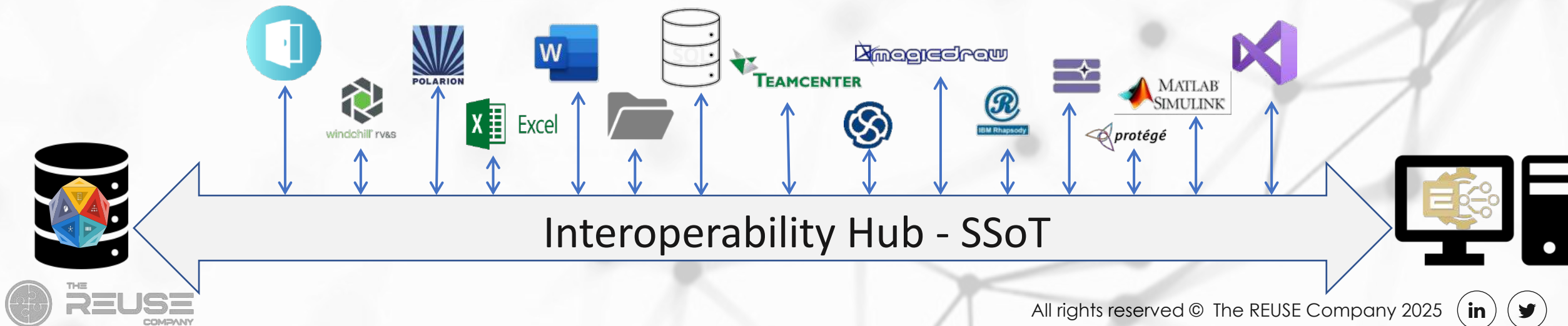


- Use case #1: Connection to Capella model
- Use case #2: Connection to Polarion project
- Use case #3: Traceability Capella – Polarion
- Use case #4: Model-based requirements engineering (model-req consistency)
- Use case #5: Model-req synchronization
- Use case #6: Remote connection

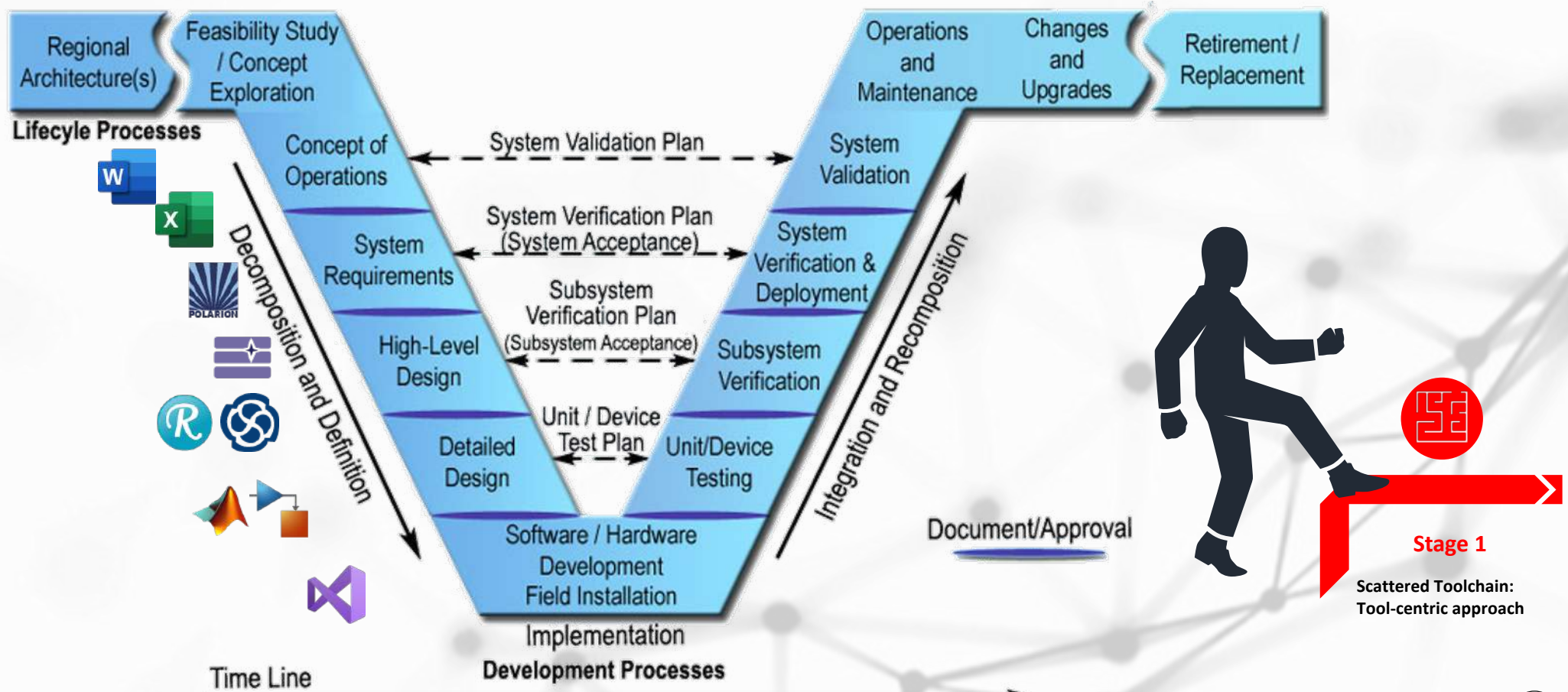
**SYNCHRONIZED SOURCE
OF TRUTH:
THE FOUNDATIONS OF THE
DIGITAL THREAD**



- SES ENGINEERING Studio implements the notion of Interoperability hub (SSoT – Synchronized Source of Truth):
 - No one-to-one connector: every tool connects to the hub. Destroying silos
 - No wipe-out approach: each individual source synchronized in SES remains the Authoritative Source of Truth (ASoT)
 - Source tools from many different disciplines: textual, modelling, code editor, testing....

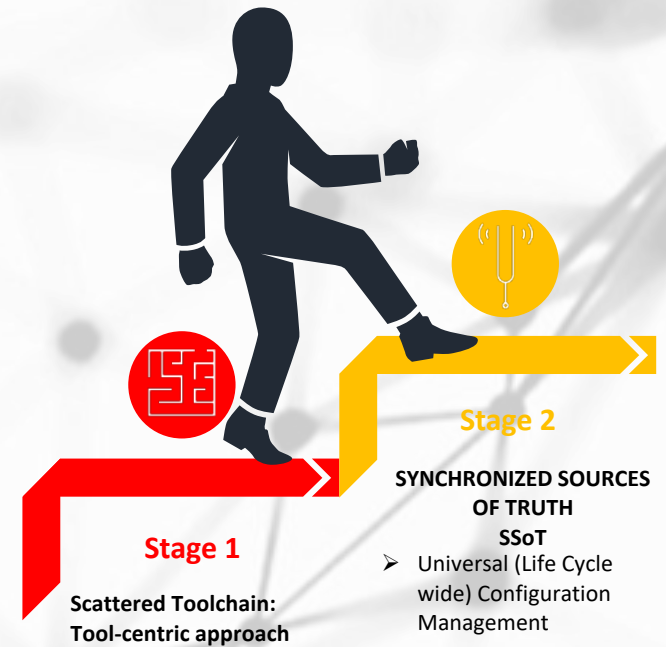
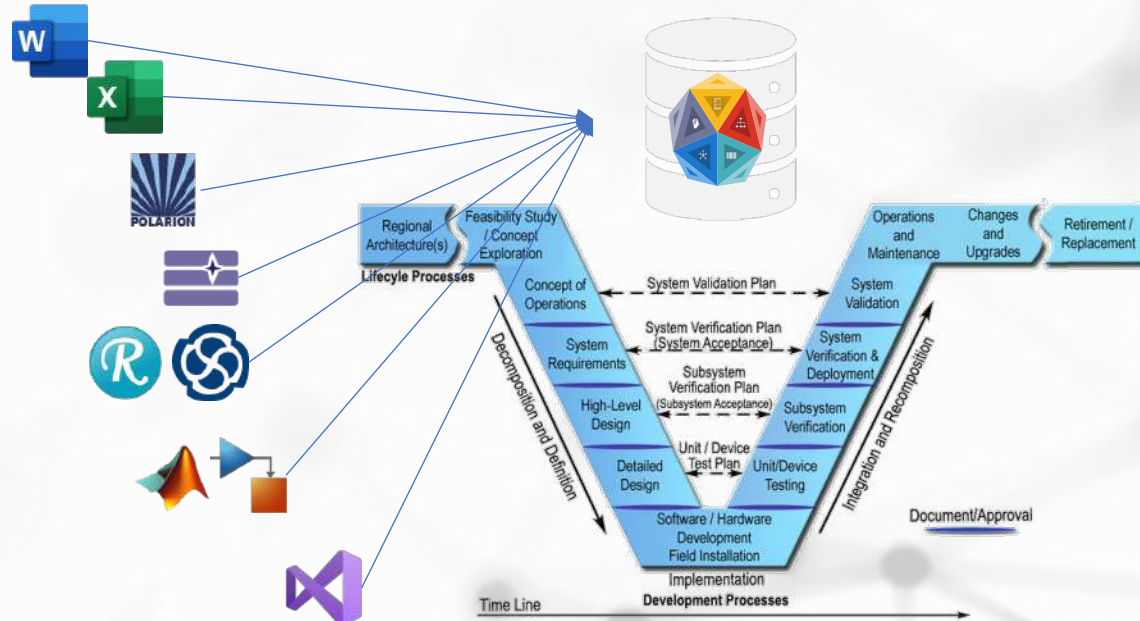


From **Stage 1**: Scattered SE tool-chain : Tool-centric approach...

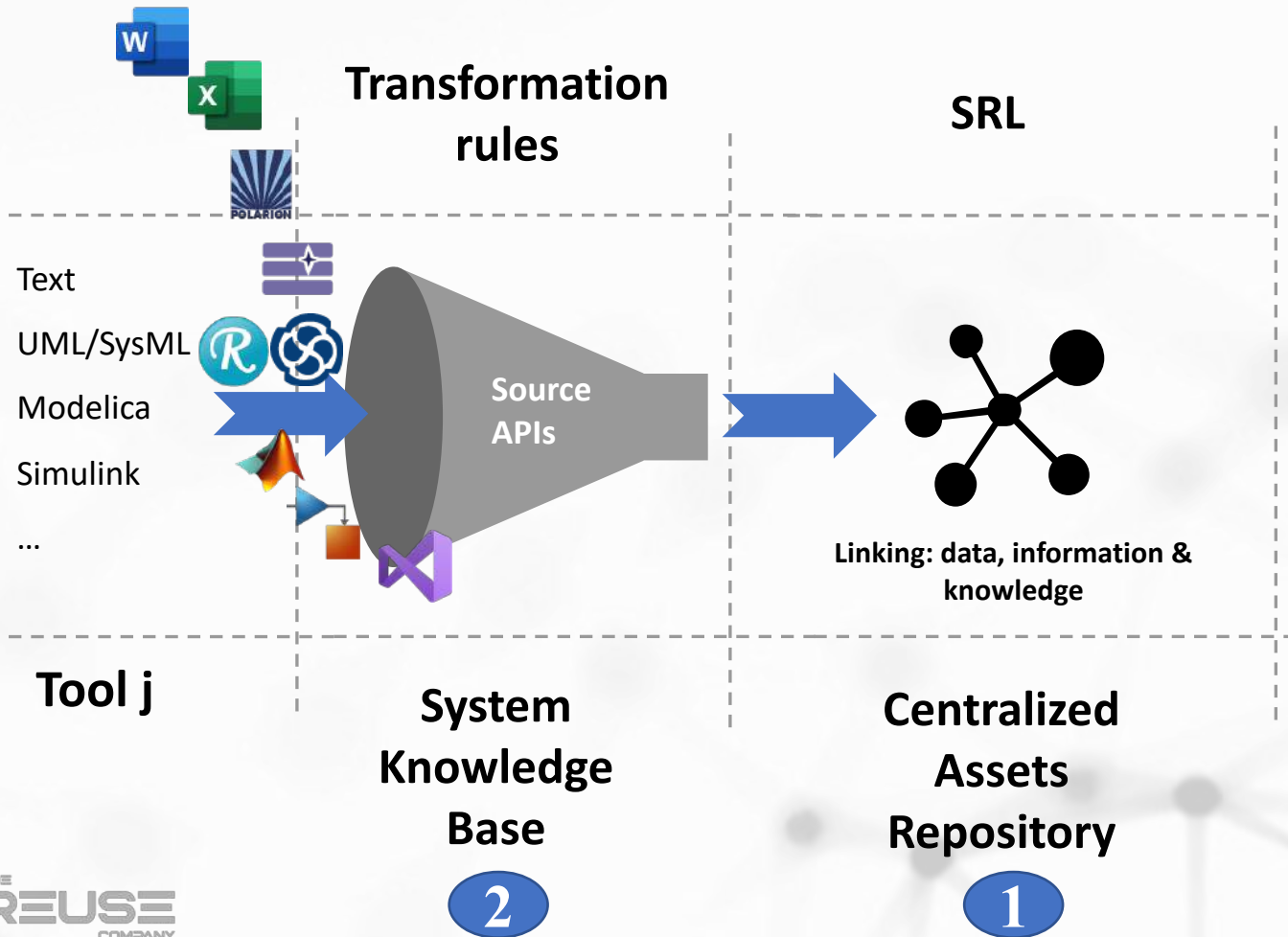


...To **Stage 2: Synchronized Sources of Truth**

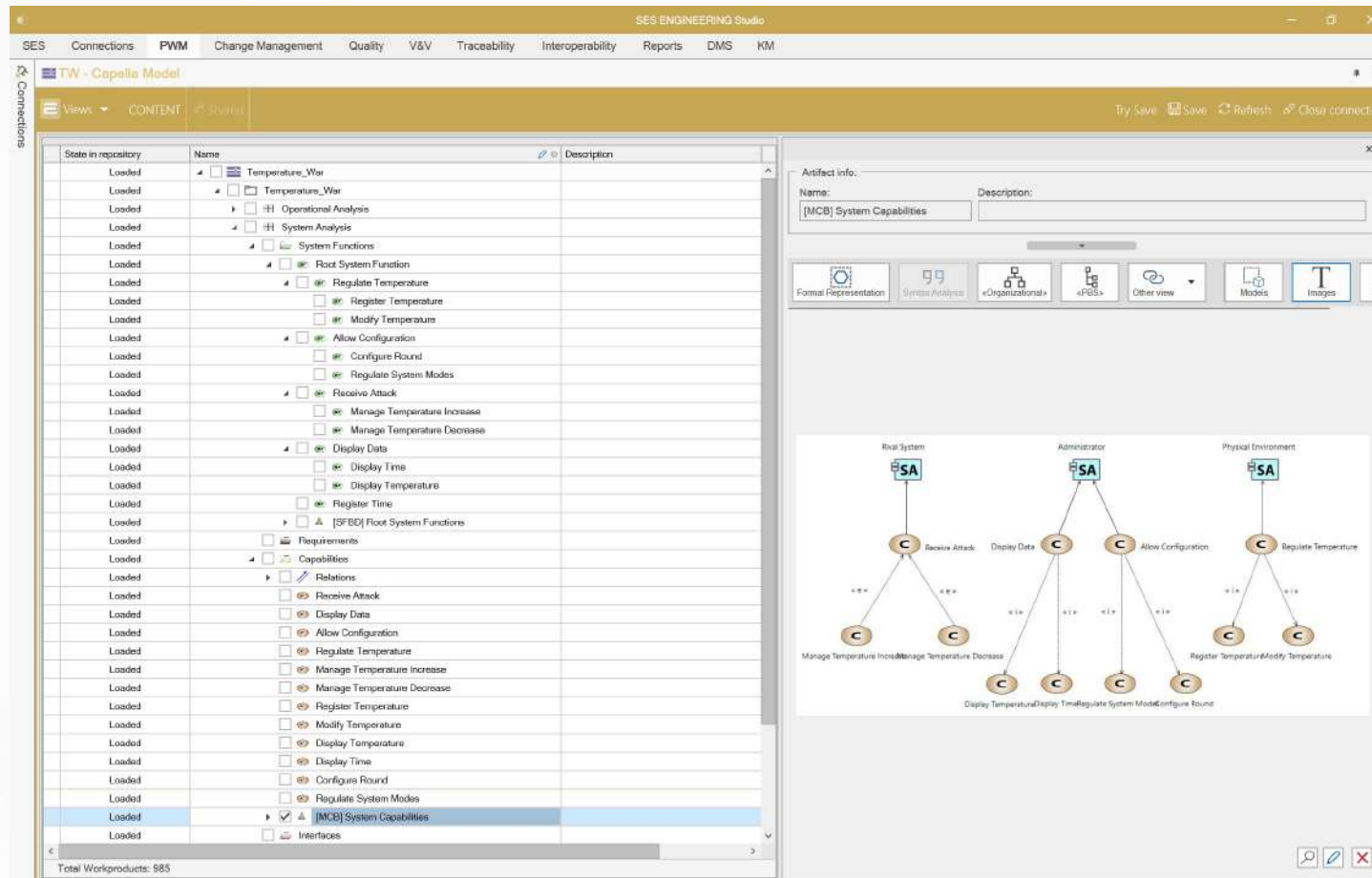
- Universal configuration management for all the assets.
- Back-up copy

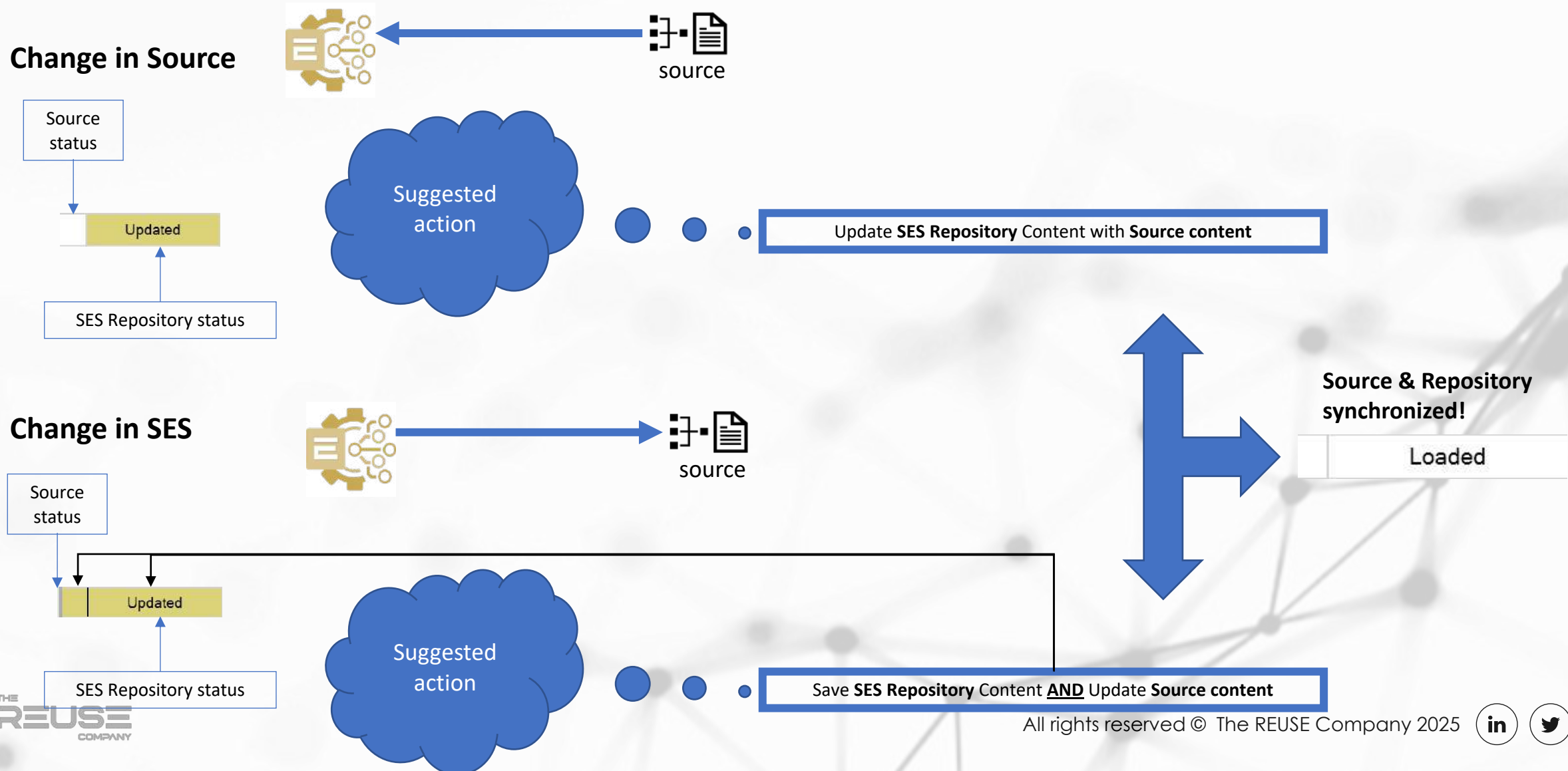


➤ The concept of universal connector



➤ The concept of universal connector: Capella (v7.0 also supported!)





➤ Universal Configuration Management:

- Object versions
- Project baselines

The screenshot displays the Capella Model/Operational Analysis interface. A context menu is open over the 'Operational Analysis' folder, listing actions such as 'Add new Workproduct', 'Change Management', and 'Configuration Management'. The 'Configuration Management' option is selected, opening a sub-menu with 'Show baselines for this module' and 'Create baseline for this module'. In the foreground, the 'SES ENGINEERING Studio' dialog box is open, showing two versions of a model: '#2 Version 'Function updates [v1.2]', by 'SESAdministrator' on {04/02/202...' and '#1 Version 'Updated model (v1.1)', by 'SESAdministrator' on {04/02/2025 10:51:26'. The 'Show differences' button is highlighted with a red box.

Differences
#1 Version: 'Updated model (v1.1)' Author: 'SESAdministrator' Date:

Change	Name	Traces	Description
None	Operational Activities		
None	Requirements		
None	Operational Capabilities		
None	Interfaces		
None	Data		
None	Roles		
None	Operational Entities		
None	System Analysis		
None	System Functions		
None	Requirements		
None	Capabilities		
None	Interfaces		
None	Data		
None	Structure		
None	Missions		
None	Logical Architecture		
None	Logical Functions		
None	Root Logical Function		
None	Receive Attack		
None	Register Time		
None	Register Temperature		
None	Modify Temperature	(o)	
None	Supply Power		
None	Regulate System Modes	(o)	
None	Configure Round	(o)	
None	Display Data		
Updated	Display Time		
Updated	Display Temperature		

- View changes for this element
- View quality diff
- View traces diff
- Select all rows
- Unselect all rows

Artifact: 'CAPELLA://D:\YOUSF\TRC\Programs\Capella 7.0\capella\workspace\Temperature_War\Temperature_War.aid//389073eb-c870-430b-9f46-e27f2547e2f6' - version history

CAPELLA://D:\YOUSF\TRC\Programs\Capella 7.0\capella\w... CAPELLA://D:\YOUSF\TRC\Programs\Capella 7.0\capella\w...

Name	Last modification date (repo)	Last modification user (repo)
Display Temperature	3/31/2025 3:53:14 PM	SESAdministrator
Display Ambient Te...	4/2/2025 11:03:08 AM	SESAdministrator

Content:

Label Format

NEW Summary = Room Temperature where the battle occurs

HasChanges

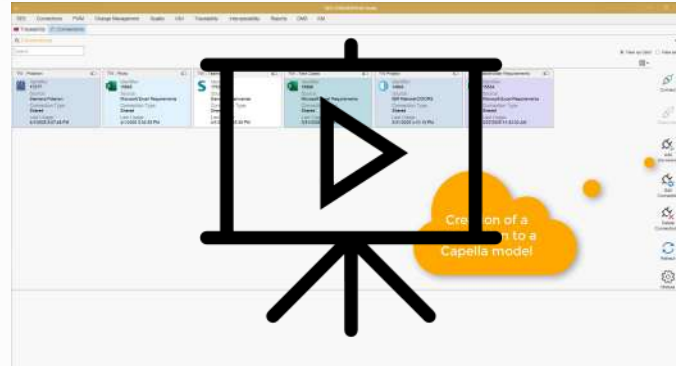
Show only elements with changes (new, deleted, updated) Compare metadata Compare properties

Updated	Display battle time		
Updated	Display Ambient Temperature		
None	Receive Attack		
None	Register Time		
None	[LFBID] FBS		

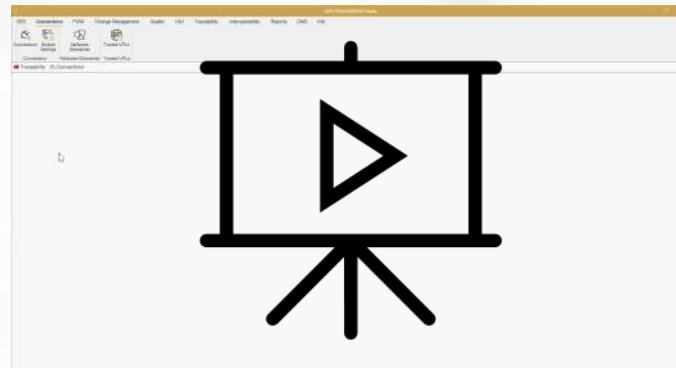
Total Workproducts: 157

Change Not contains None

- Use case #1: Connection to a Capella model (v7.0)



- Use case #2: Connection to an ALM Tool project (SIEMENS Polarion)

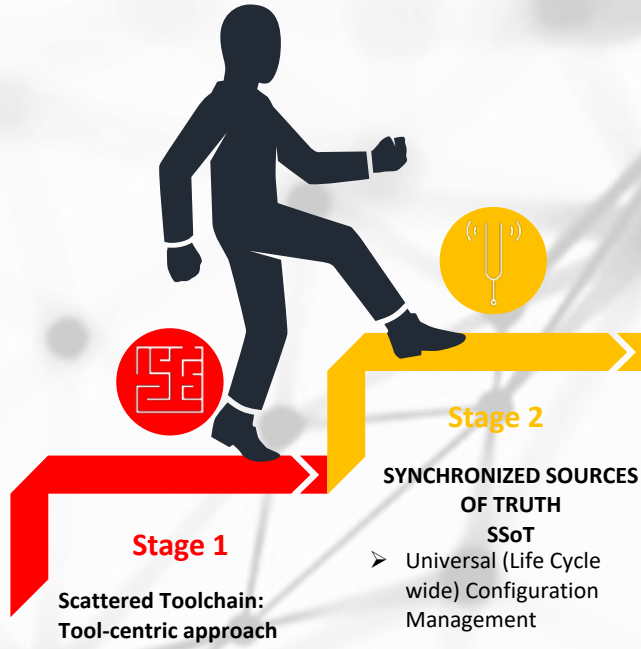
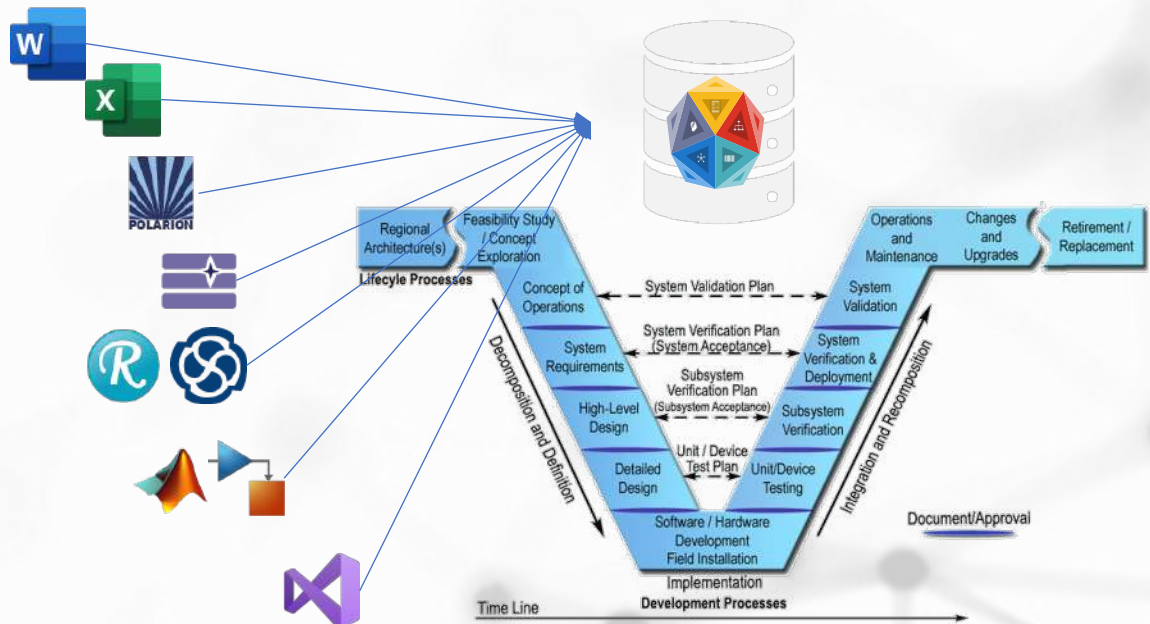


**EXTENDED
TRACEABILITY: ENSURE
MODEL-REQUIREMENT
CONSISTENCY**



From **Stage 2: Synchronized Sources of Truth**

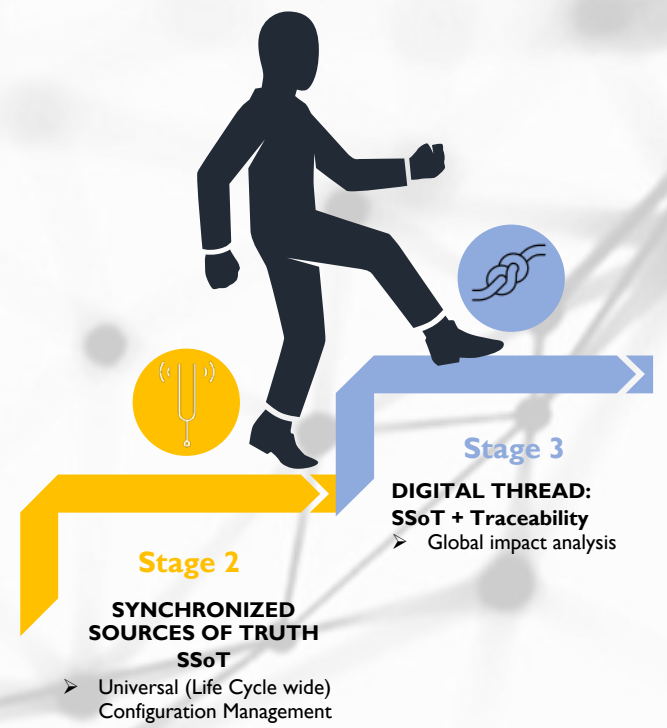
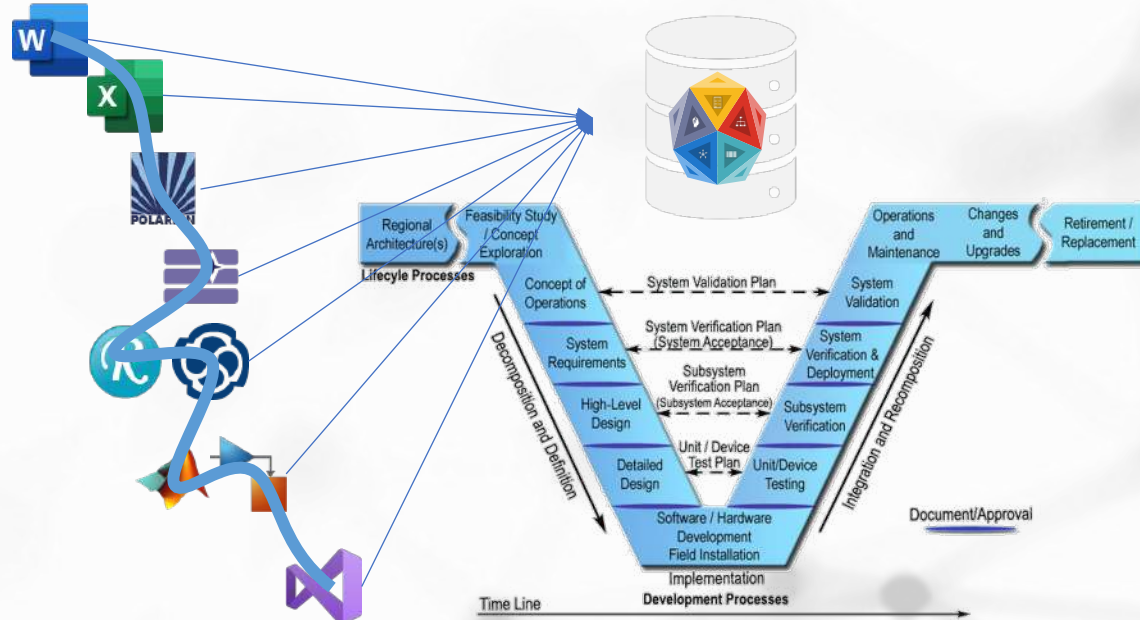
- Universal configuration management for all the assets.
- Back-up copy
-



Stage 2
SYNCHRONIZED SOURCES OF TRUTH
SSoT
➤ Universal (Life Cycle wide) Configuration Management

...To **Stage 3: Digital Thread**

- End-to-end traceability
- Global Impact analysis and suspect links detection



SES ENGINEERING Studio

SES Connections PWM Change Management Quality V&V Traceability Interoperability Reports DMS KM

Traceability Connections

Traceability

TRACEABILITY Studio - Temperature War

Projects Traces Load Unload Add Edit Delete Module Map Security

Navigation Load Modules Graphics view Security Management

Traceability Modules:
Traceability Project: "Temperature War"

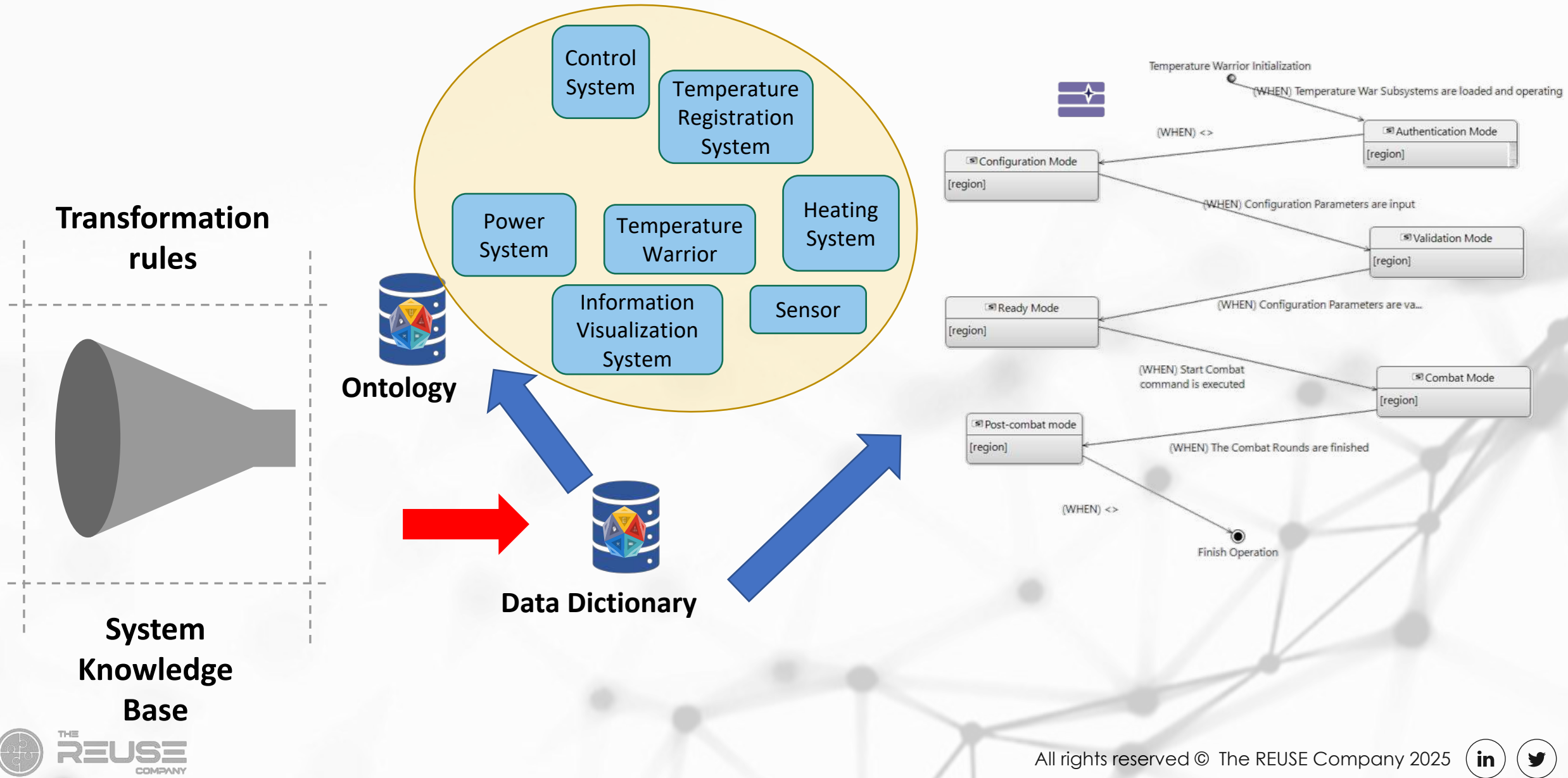
Identifier	Name	Description	Trace types	Security	Traces	Evaluat..	
17000	Logical Model -> System Requirements		Realizes		606		Loaded
15857	Stakeholder Requirements -> System R...		Derives		29		Loaded
	Role Mod... Project Server					Traced It...	
	Source SIRS TW - Stakeholder Reqi...	D:\YOUSFI\TRC\Consulting\Projects\Temperature War\Temperature_War			21	31.82%	
	Target Tempe Temperature War - Sy...	36677@localhost			24	15.89%	
16998	System Requirements -> Control Syste...		Allocates De...		16		Loaded
	Role Mod... Project Server					Traced It...	
	Source Tempe Temperature War - Sy...	36677@localhost			2	5.98%	
	Target Contro Temperature War - Sy...	36677@localhost			12	26.32%	
16997	System Requirements -> Managemen...		Allocates De...		41		Loaded
	Role Mod... Project Server					Traced It...	
	Source Tempe Temperature War - Sy...	36677@localhost			25	16.56%	
	Target Manag Temperature War - Sy...	36677@localhost			16	41.38%	
16998	System Requirements -> Power System...		Allocates De...		24		Loaded
	Role Mod... Project Server					Traced It...	
	Source Tempe Temperature War - Sy...	36677@localhost			13	8.61%	
	Target Power Temperature War - Sy...	36677@localhost			10	41.67%	
17023	System Requirements -> Risks		Threatens		1		Loaded
	Role Mod... Project Server					Traced It...	
	Source Tempe Temperature War - Sy...	36677@localhost			1	0.68%	
	Target Risks TW - Risks.xdsm	D:\YOUSFI\TRC\Consulting\Projects\Temperature War\Temperature_War			10	10%	
16999	System Requirements -> Temperature R...		Allocates De...		29		Loaded
	Role Mod... Project Server					Traced It...	
	Source Tempe Temperature War - Sy...	36677@localhost			14	9.27%	
	Target Tempe Temperature War - Sy...	36677@localhost			10	40%	
17024	System Requirements -> Test Cases		Verifies		1		Loaded
	Role Mod... Project Server					Traced It...	
	Source Tempe Temperature War - Sy...	36677@localhost			1	0.68%	
	Target TWSys: TW - Temperature War	D:\YOUSFI\TRC\Consulting\Projects\Temperature War\Temperature_War			10	10%	

Module Map:

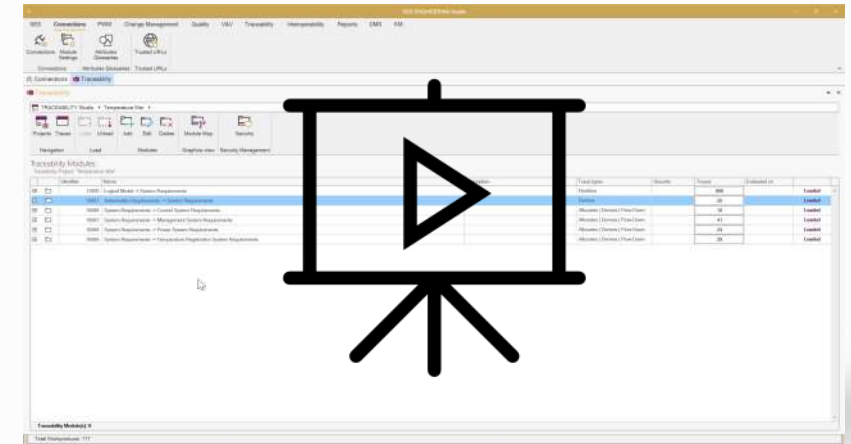
Home View

Bring to Front Send to Back Re-Layout Page Connectors Re-Layout Subordinates Save Layout Revert Layout

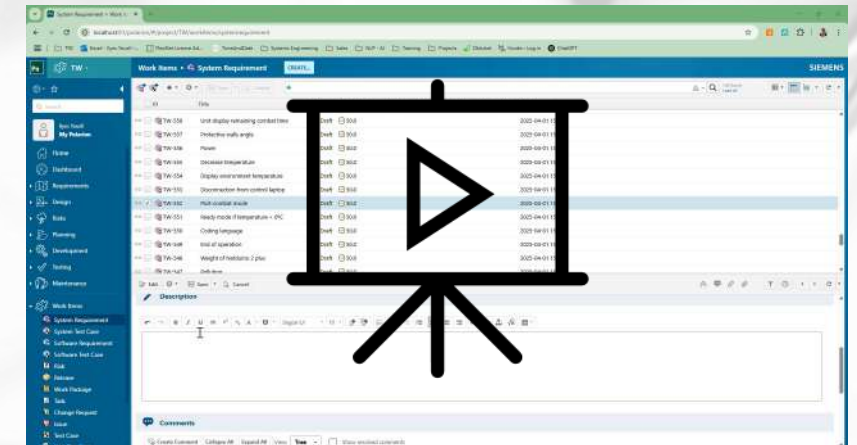
Arrange Layout



- Use case #3: Polarion – Capella traceability
 - Semantic traceability
 - Changes in Source / Target and suspect links



- Use case #4: Requirement-model consistency
 - Requirements authoring assisted by models elements (DOORS / Capella) with RAT
 - Completeness check before / after changes



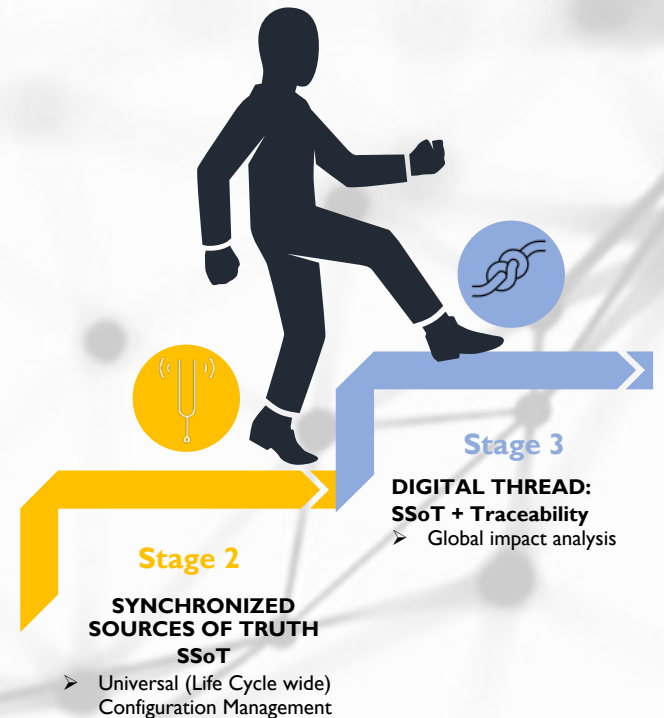
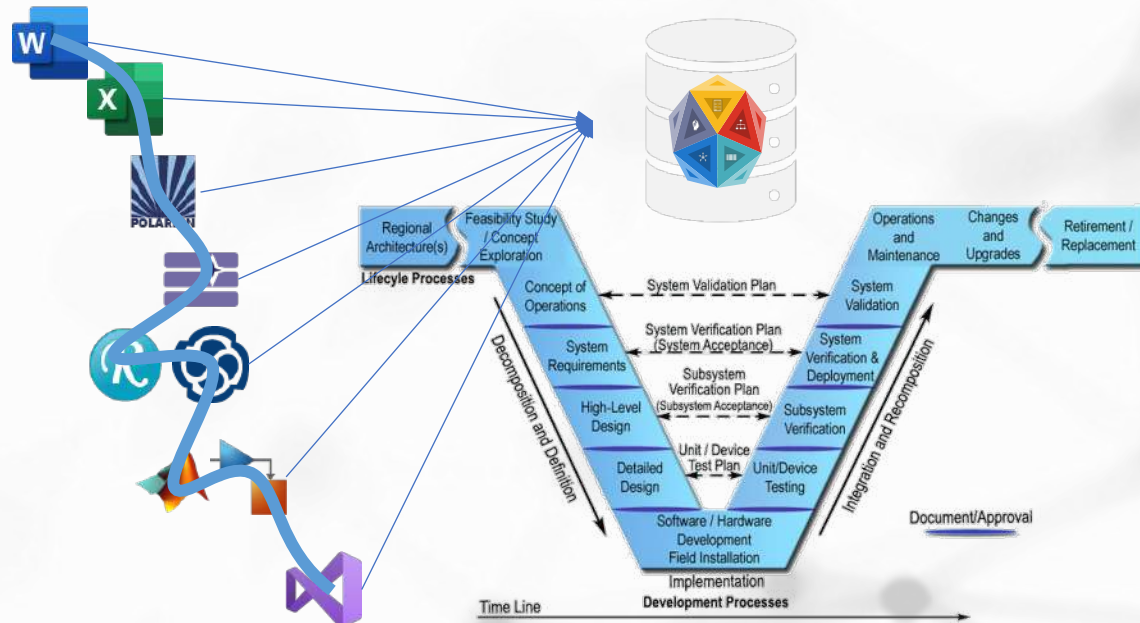
MODEL-REQUIREMENT CONSISTENCY: UNLOCKING INTEROPERABILITY



From **Stage 3: Digital Thread**

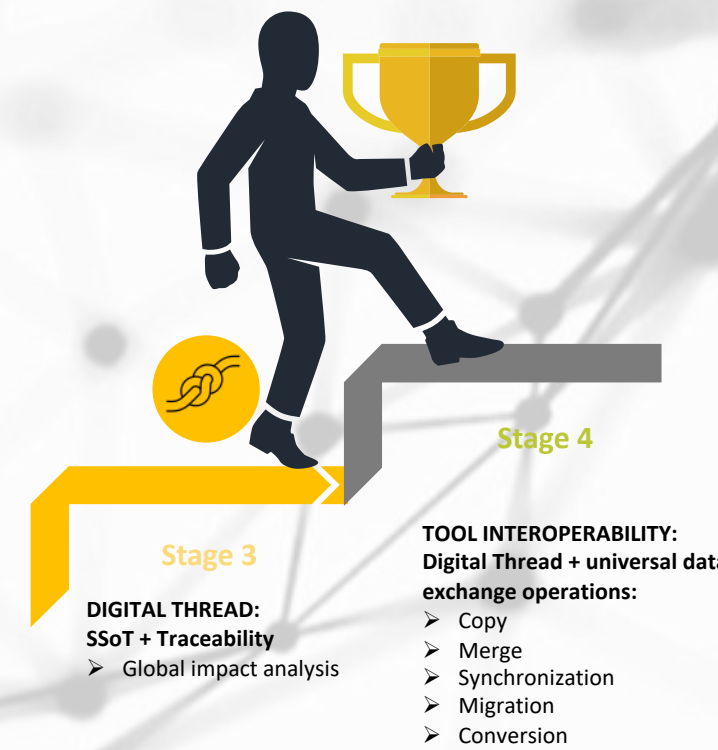
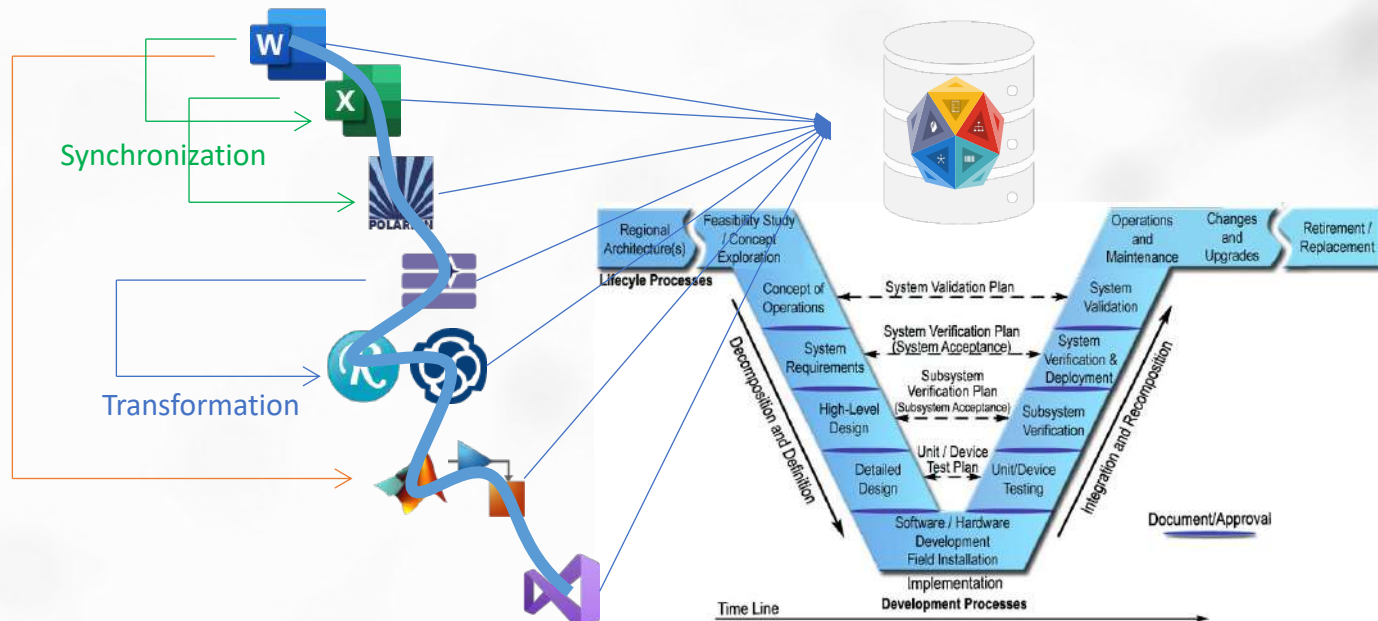
- End-to-end traceability
- Global Impact analysis and suspect links detection

...



...To **Stage 4: Extended Interoperability**

- Information Exchange: Copy/Merge/Synchronize
- Object Binding



- TOOL INTEROPERABILITY:**
Digital Thread + universal data exchange operations:
- Copy
 - Merge
 - Synchronization
 - Migration
 - Conversion

Stage 3
DIGITAL THREAD:
SSoT + Traceability
➤ Global impact analysis

THE PILLARS OF THE

Interoperability HUB

Digital thread without frontiers

1

2

3

4

5

CONNECTIVITY

+50 tools: RMS, MBSE, ALM, PLM tools, PDF, MS Office...
Semantic parsing of unstructured sources



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Digital thread without frontiers

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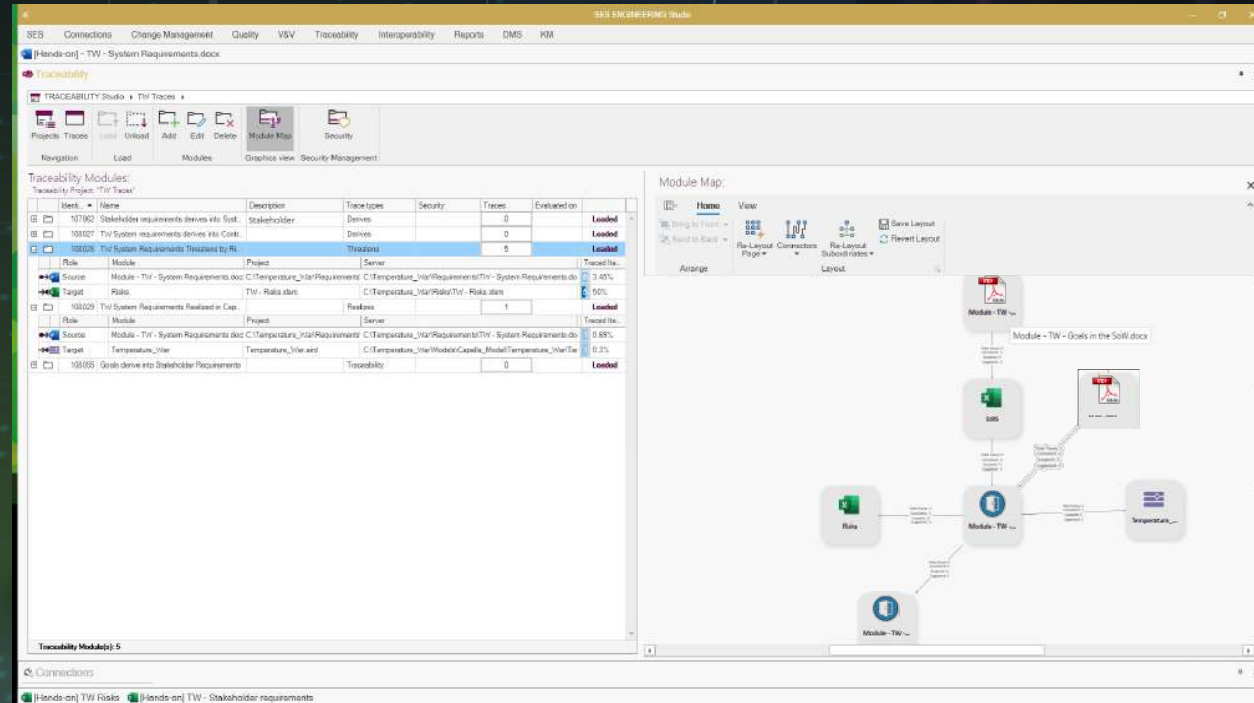
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SEMANTIC TRACEABILITY

Traces into heterogeneous environment
Automatic detection/suggestion of traces



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CONNECTIVITY

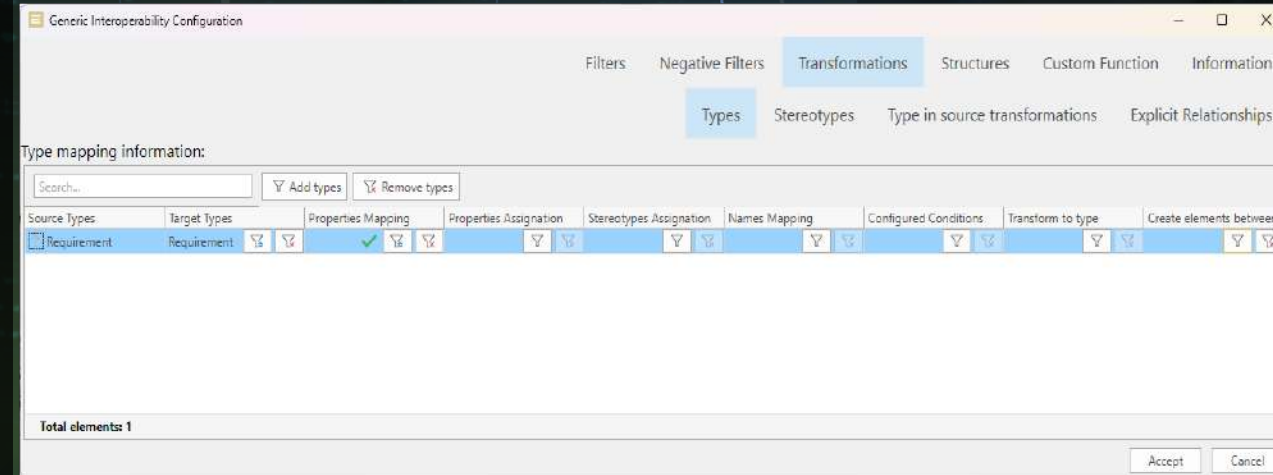
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TRANSFER WORK PRODUCTS

No change of metamodel between source and target
Just moving among different tools

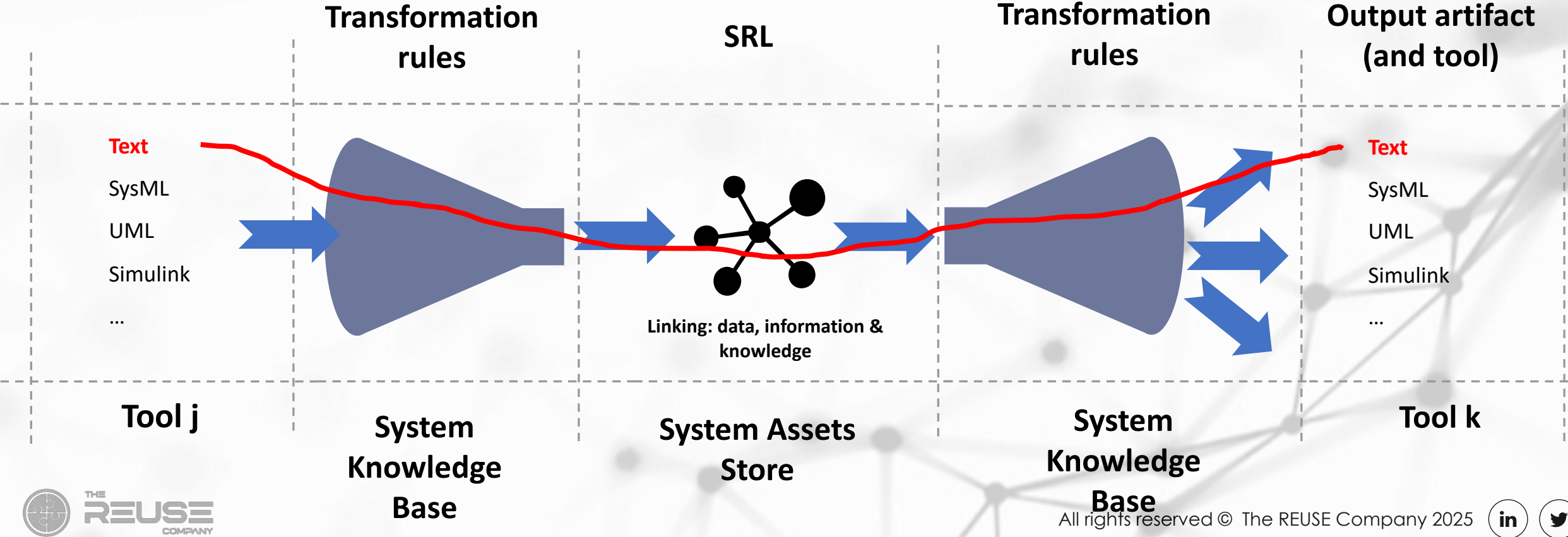


3

TRANSFER WORK PRODUCTS

*No change of metamodel between source and target
Just moving among different tools*

- Transfer:
- Copy
 - Merge
 - Synchronize



THE PILLARS OF THE

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COPYING/MOVING/SYNCHRONIZING WORK PRODUCTS

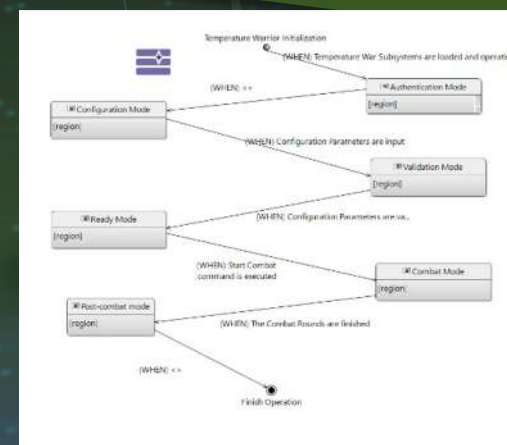
No change of metamodel between source and target
Just moving among different tools

4

TRANSFORMING WORK PRODUCTS

Change of metamodel between source and target work products
Textual requirements to models, SysML to Capella...

5



The screenshot shows a software tool interface with a table of states and transitions. The table has columns for ID, Name, Quality, Validating, and Validity Summary.

ID	Name	Quality	Validating	Validity Summary
1	State	High	10/10/2024	
2	Transitions	High	10/10/2024	
3	Activities	High	10/10/2024	
4	Triggers	High	10/10/2024	

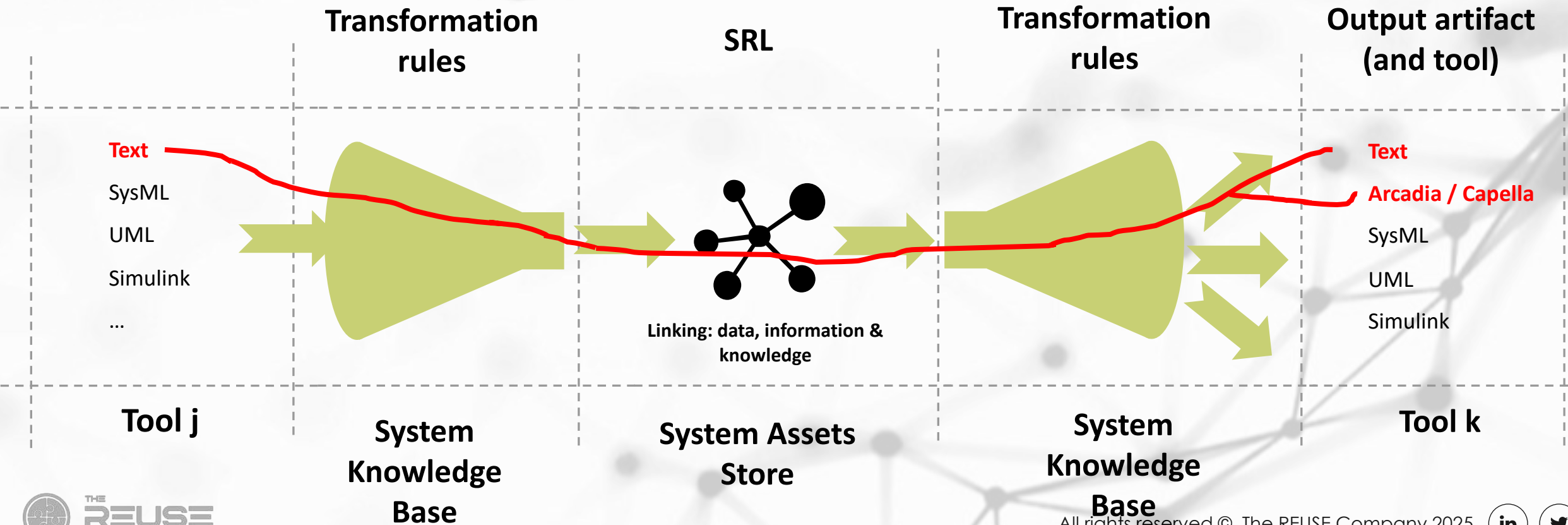
4

TRANSFORMING WORK PRODUCTS

*Change of metamodel between source and target work products
Textual requirements to models, SysML to Capella...*

Transformation Use Case #1:

- Requirements synchronization between Req Mgmt Tool & MBSE tool (“zig-zag”)



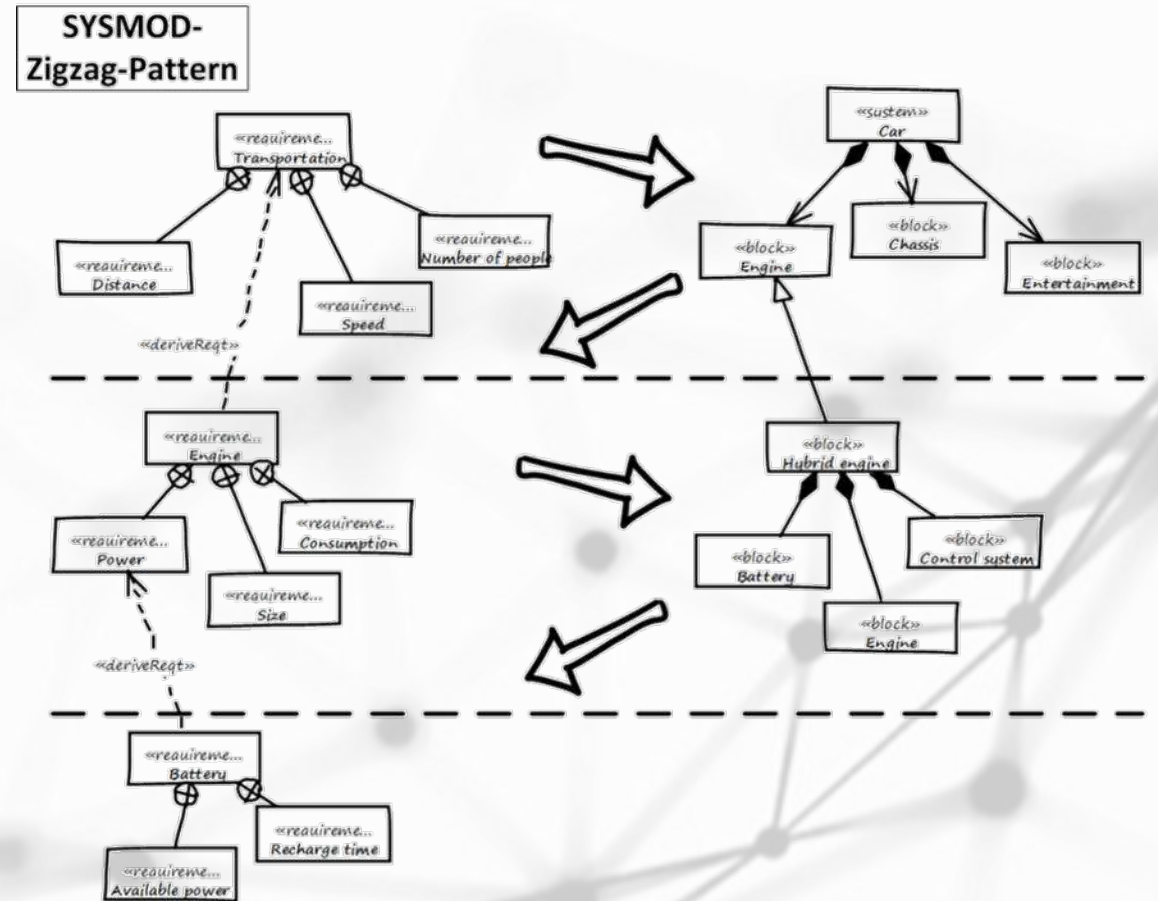
➤ Zig-zag model : The Requirements – MBSE Trade-off

Source:

<https://mbse4u.com/2012/03/26/the-sysmod-zigzag-pattern/>

Link to our latest webinar about the zig-zag pattern:

MBSE zig-zag pattern: A theoretical and practical approach



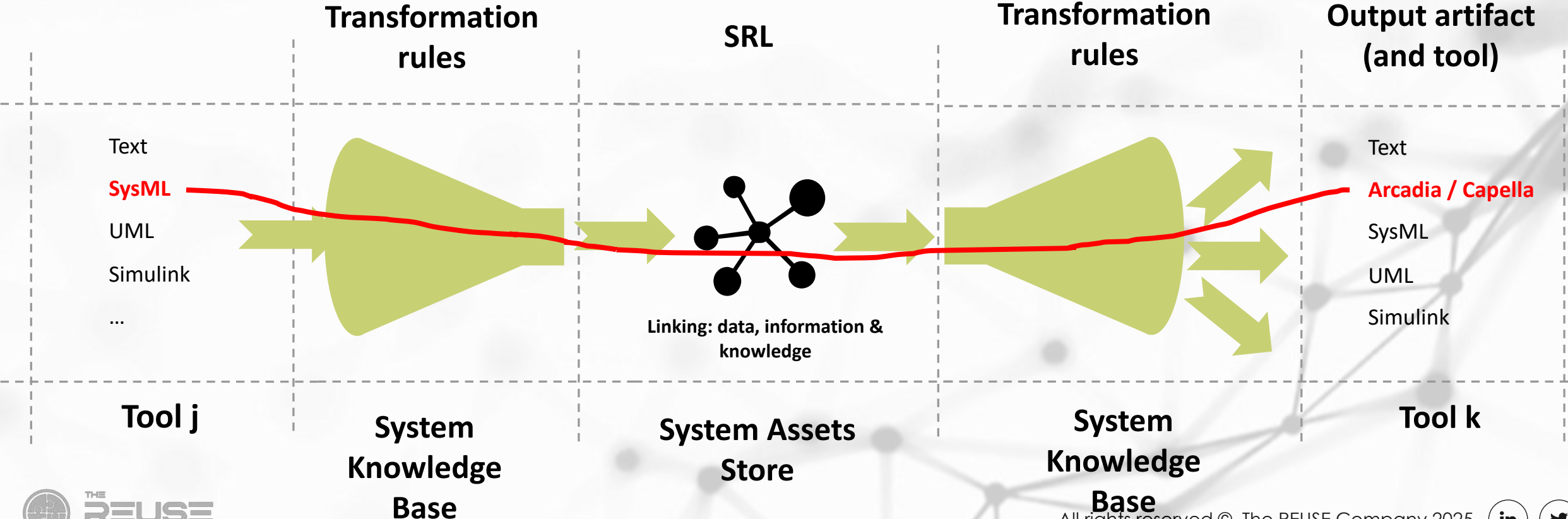
4

TRANSFORMING WORK PRODUCTS

*Change of metamodel between source and target work products
Textual requirements to models, SysML to Capella...*

Transformation Use Case #2:

- Model conversion between MBSE Tools



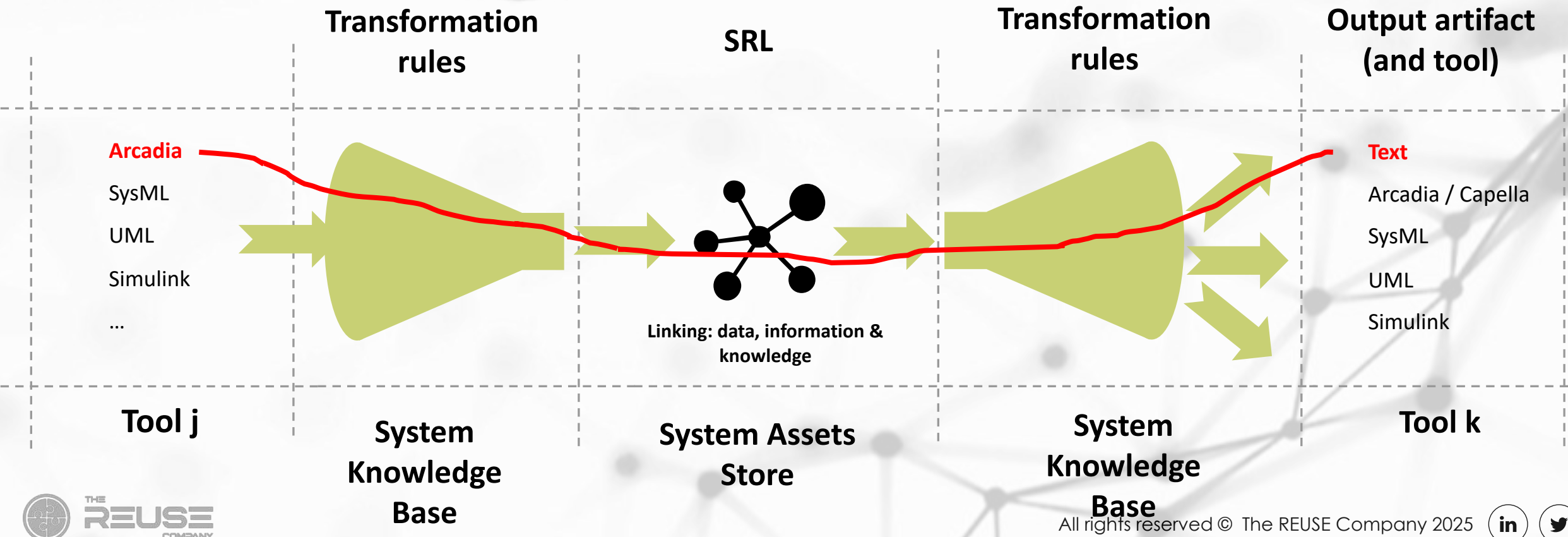
4

TRANSFORMING WORK PRODUCTS

*Change of metamodel between source and target work products
Textual requirements to models, SysML to Capella...*

Transformation Use Case #3:

- Generation of requirements from models



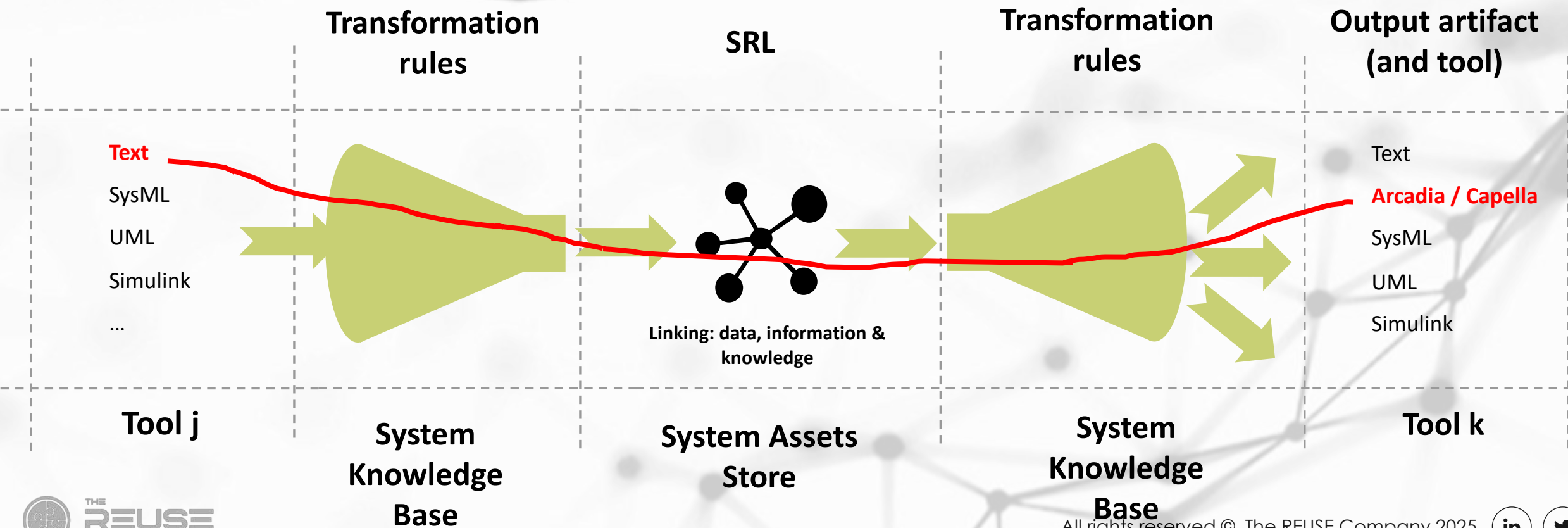
4

TRANSFORMING WORK PRODUCTS

*Change of metamodel between source and target work products
Textual requirements to models, SysML to Capella...*

Transformation Use Case #4:

- Generation of models from requirements



THE PILLARS OF THE

Interoperability HUB

Digital thread
without frontiers

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SEMANTIC TRACEABILITY

*Traces into heterogeneous environment
Automatic detection/suggestion of traces.*

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COPYING/MOVING/SYNCHRONIZING WORK PRODUCTS

*No change of metamodel between source and target
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TRANSFORMING WORK PRODUCTS

*Change of metamodel between source and target work products
Textual requirements to models, SysML to Capella...*

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REMOTE CONNECTIVITY

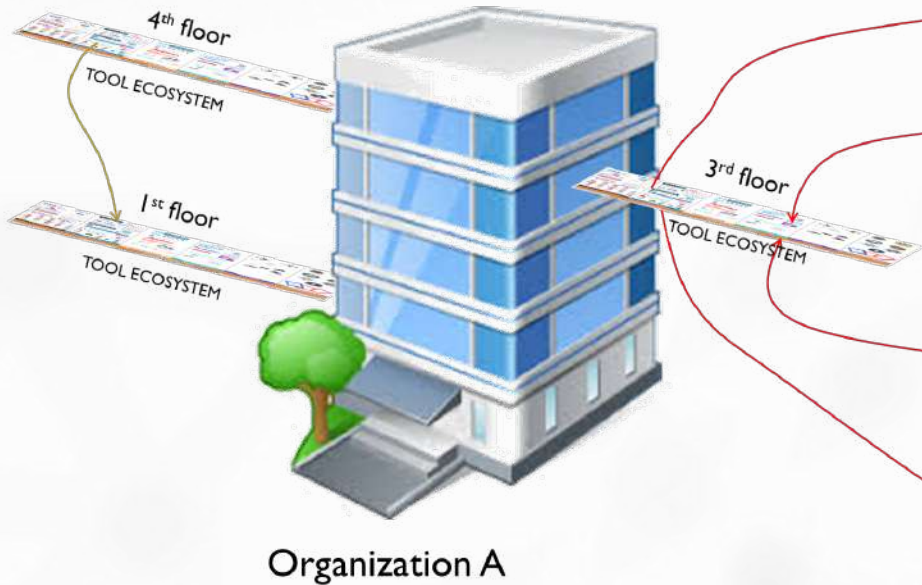
*Collaborative access to the content of a repository even from an external
infrastructure.*

5

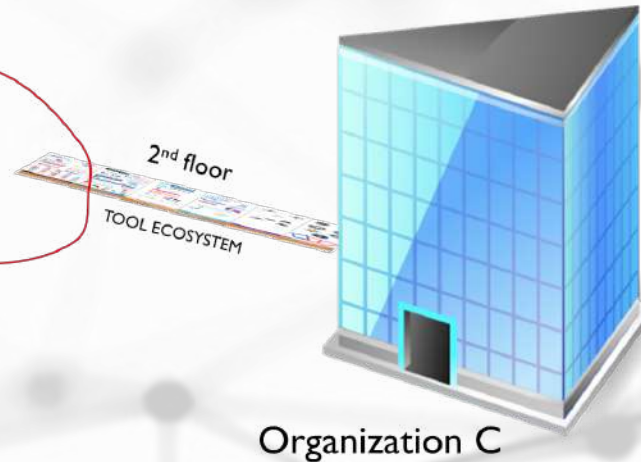
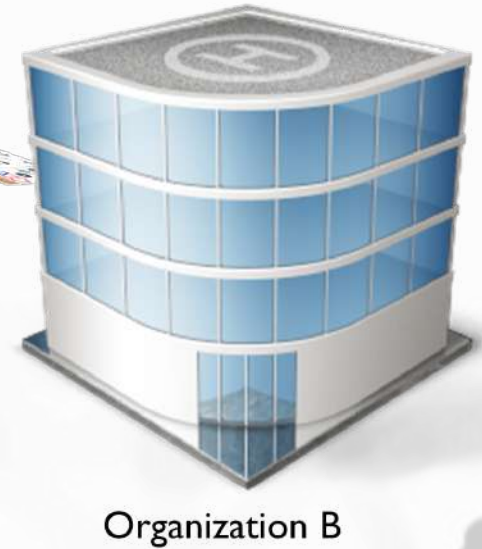
REMOTE CONNECTIVITY

Collaborative access to the content of a repository even from an external infrastructure.

Interoperability between departments of same organization



Interoperability between different organizations:
OEM-Tier
Collaborative Development
etc

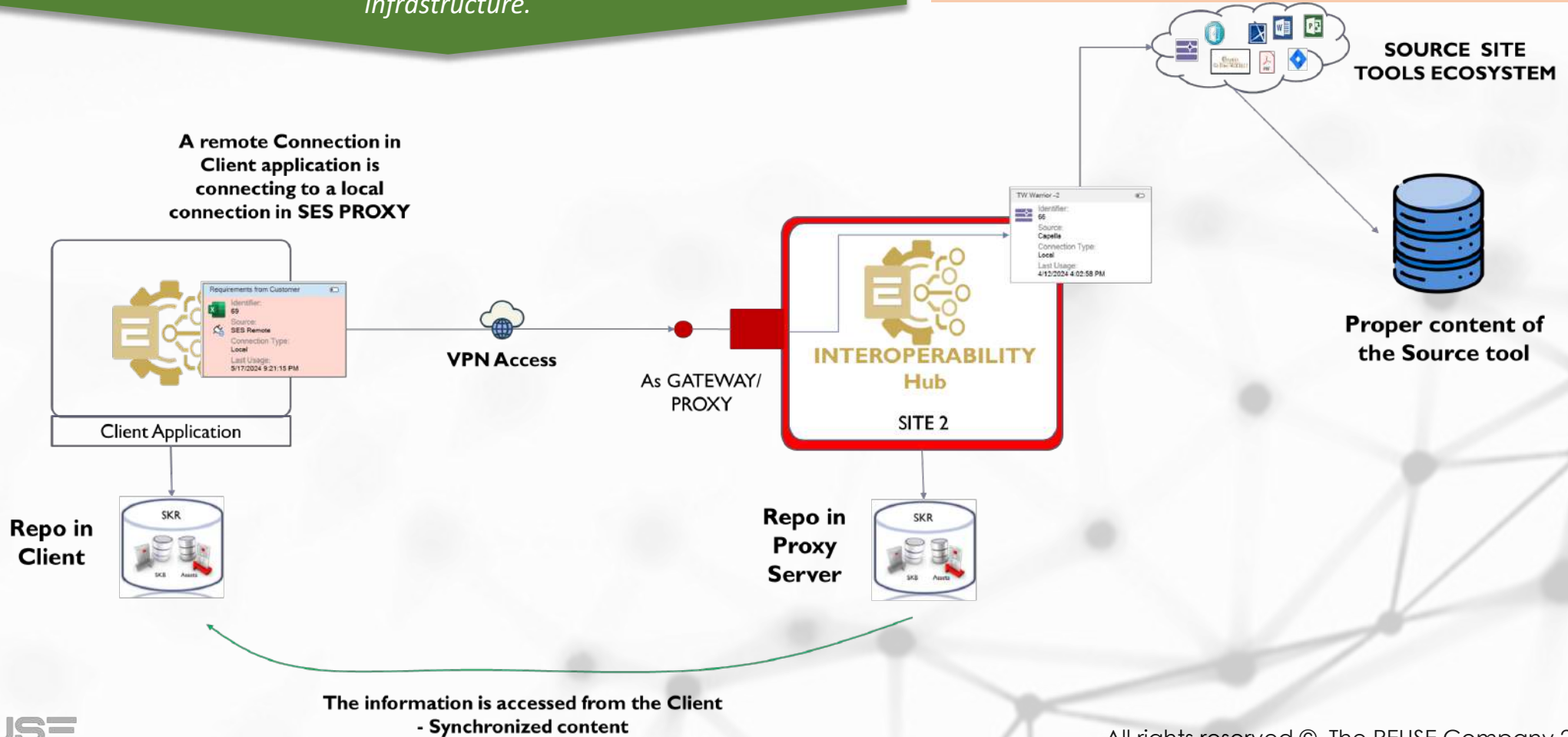


5

REMOTE CONNECTIVITY

Collaborative access to the content of a repository even from an external infrastructure.

USE CASE 1: REMOTE ACCESS

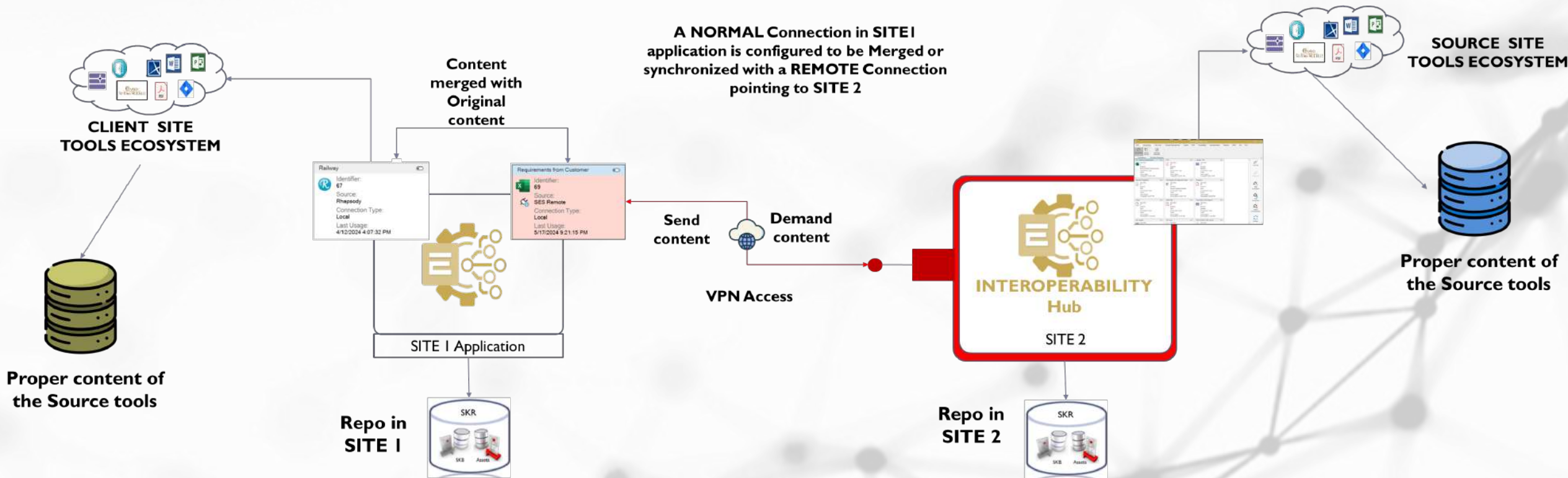


5

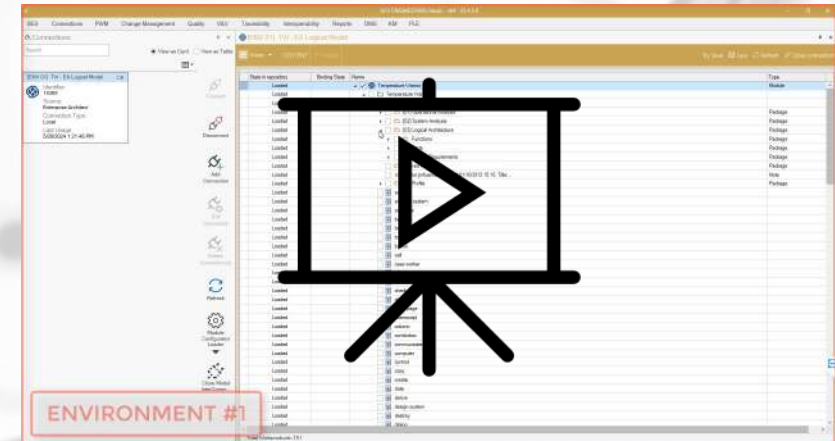
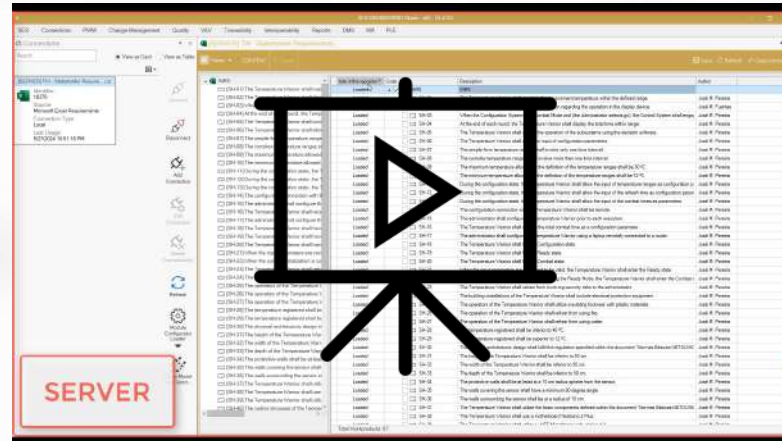
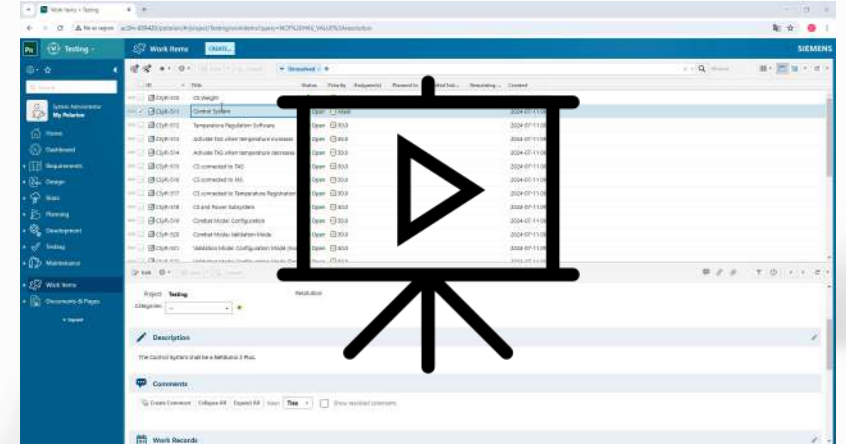
REMOTE CONNECTIVITY

Collaborative access to the content of a repository even from an external infrastructure.

USE CASE 2: COLLABORATIVE (MERGE/SYNC) WORK



- Use case #5: Zig-zag (Polarion <-> Capella)
 - Requirements pushed into the model
 - Modification and synchronization from model to Polarion
- Use case #6: SES Remote connector
 - 6.1 – Remote access
 - 6.2 – Collaboration between separate repositories (merge/synchronize)





Q&A



THE REUSE COMPANY ENABLING SMART SYSTEMS ENGINEERING

Resources ▾ Support Company ▾ Contact ▾

Software Tools for Digitizing the Systems Life Cycle Management

- Inter-connecting the complete Tools Ecosystem of your organization
- Enabling digital support to all the Technical Management processes (ISO 15288) for the engineering items of your tools ecosystem
- Integrating document centric (Documentation), knowledge driven (Reuse) and model-based (MBSE) approaches in one Hub

Systems Engineering Tools and Solutions for System Life cycle Management based on Connectivity, Interoperability and Reuse

www.reusecompany.com



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289 suscriptores

INICIO VIDEOS EN DIRECTO LISTAS COMUNIDAD CANALES INFORMACIÓN

SES ENGINEERING Studio ▶ Reproducir todo

- Boosting MS Word with Requirements Management... 35:05
- System Life Cycle Management with SES... 2:57
- Systems Engineering Rigor needs an Interoperability... 1:00:41
- Interoperability in SES ENGINEERING Studio 1:47
- Controlling the values of your signals in Technical... 24:04
- Configuration Management with SES ENGINEERING... 1:06:56

[@thereusecompany](https://www.youtube.com/@thereusecompany)



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