

WEBINAR RULES

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- Please write your questions or comments in the question section
- The Webinar will be recorded



STARTING SOON

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CEST

AI-POWERED SYSTEMS ENGINEERING REUSE



*“We provide a **PLATFORM** and a set of well-defined **METHODS** to support the implementation of an **INCREMENTAL** and comprehensive **REUSE PROCESS**.
The approach is based on **ARTIFICIAL INTELLIGENCE, KNOWLEDGE MANAGEMENT & elicitation, QUALITY** assessment, **INTEROPERABILITY** across tool ecosystems, and smart **SEARCH ENGINES.**”*

BASICALLY:
Implementing a holistic and systematic **REUSE** process



Dr. Juan Llorens has been a Systems Engineering Professor at the [Carlos III University of Madrid](#) – Spain until May 2026.

He has been the CTO of The REUSE Company through an agreement with the University, and since June, he will retake the CTO Position, now inside the Company. Juan got a PhD in Industrial Engineering and robotics in 1996.

Dr Llorens is member of INCOSE (International Council on Systems Engineering www.incose.org).

He holds a CSEP (Certified Systems Engineering Professional) accreditation and a ESEP (Expert Systems Engineering Professional).

His CV is presented in

<http://www.linkedin.com/pub/juan-llorens/b/857/632>

https://www.researchgate.net/profile/Juan_Llorens/

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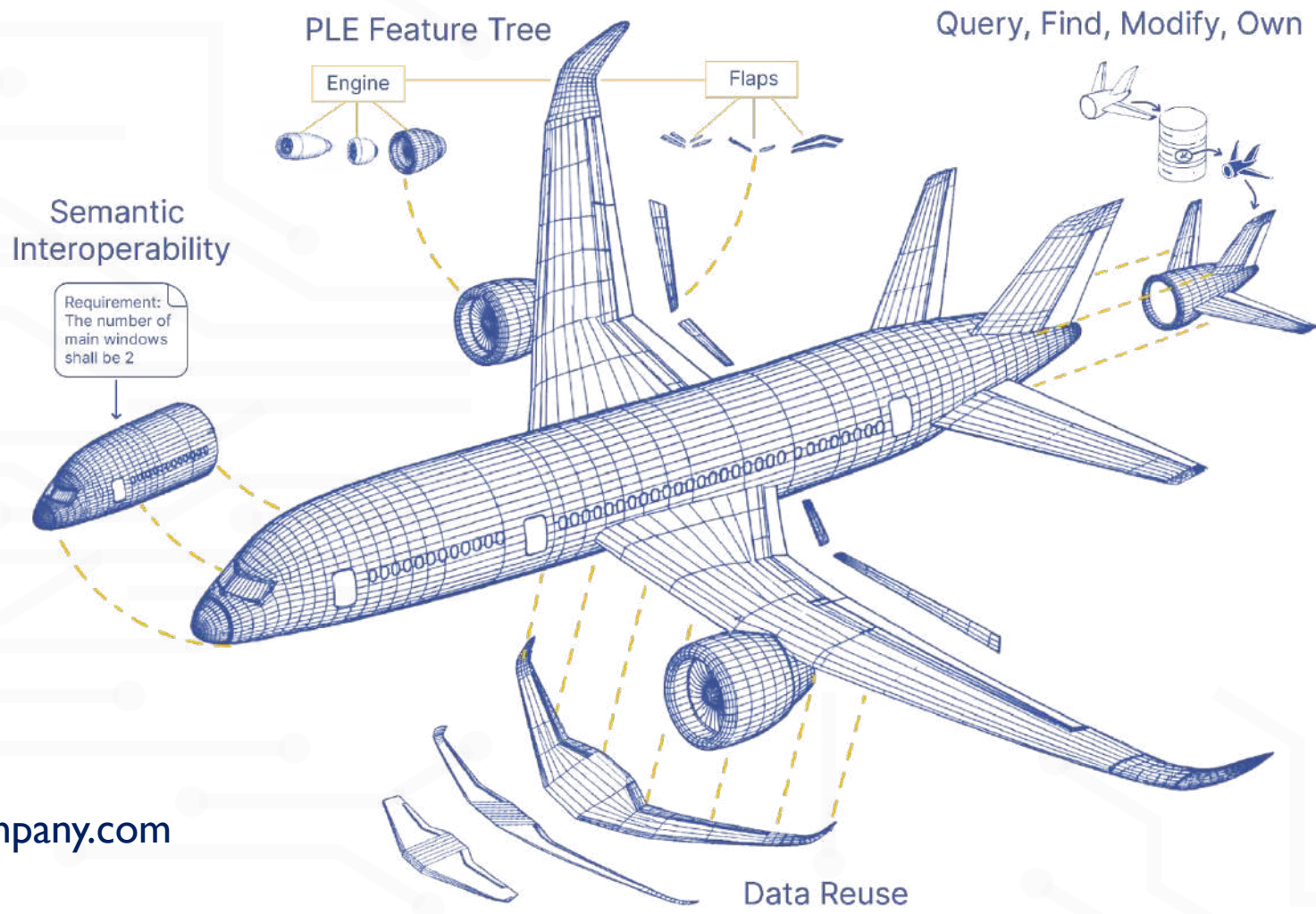
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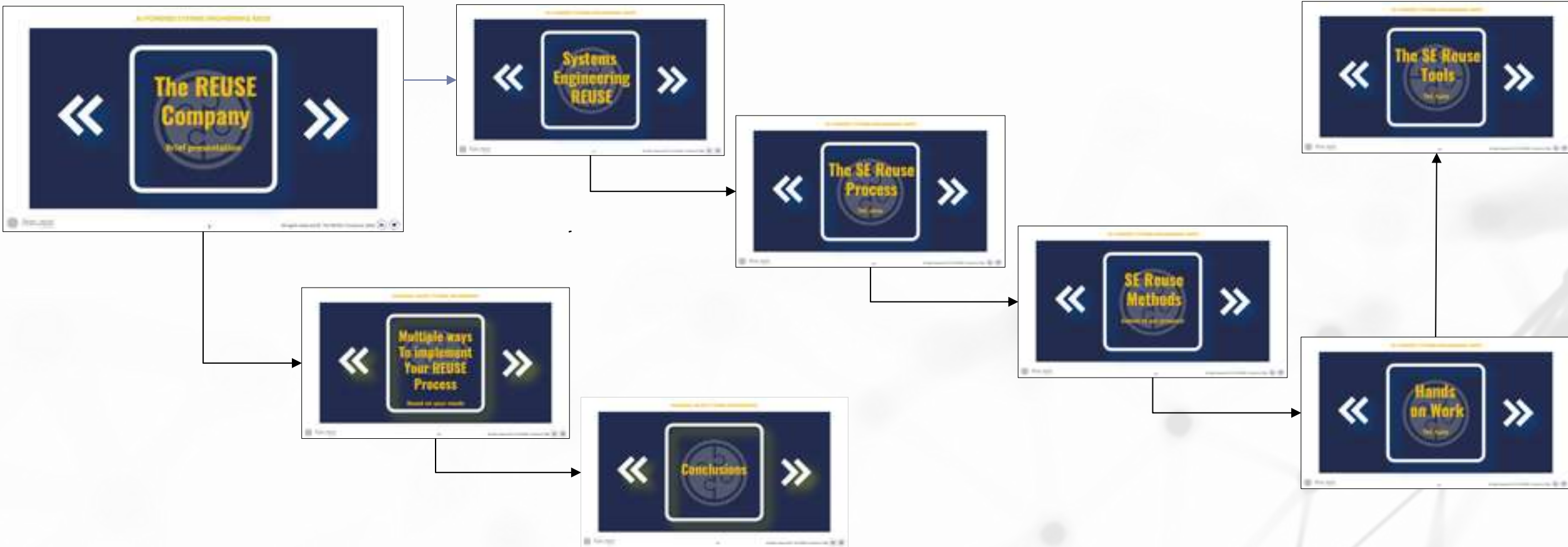
The REUSE Company



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AI-POWERED SYSTEMS ENGINEERING REUSE

www.reusecompany.com





The REUSE Company

Brief presentation



“The REUSE Company is a solutions provider specializing in enabling **SYSTEMS ENGINEERING REUSE by means of **ARTIFICIAL INTELLIGENCE** and **SEMANTIC TECHNOLOGIES**, with the main objective of improving the performance and efficiency of **SYSTEMS** development, production, and operation”**

We enable Systems Engineering digitalization...

guided by reuse,
driven by a knowledge-centric + model-based approach
(=> supporting authoritative source of truth),
integrating Document Centric views inside MBSE
Supervised by AI

By...

stating an Integration Hub (Repository)
providing connectivity to all siloed tools in the ecosystem
Enabling AI for whatever information content
offering Data, Information and functions Reuse for sources
enabling unlimited interoperability among tools
offering full support to technical management processes
digitalizing the life cycle management workflow

BASICALLY:
Implementing a holistic and integral REUSE process



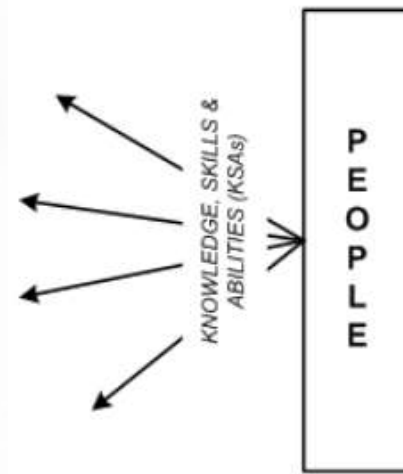
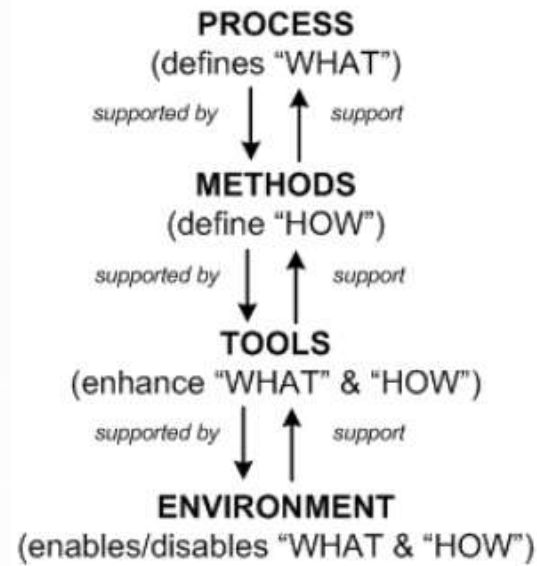
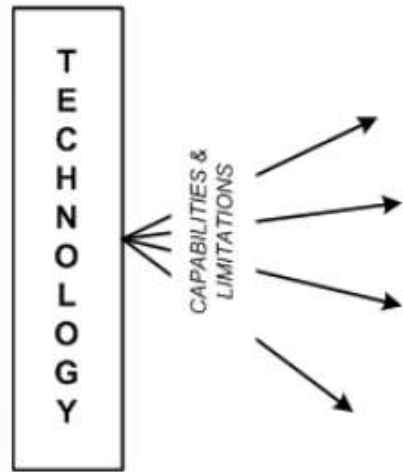
**Systems
Engineering
REUSE**



Systems Engineering REUSE can be defined as:

The **systematic** discovery, identification, classification, **adaptation**, and application of existing engineering assets (or parts of them) — such as requirements, architectures, designs, models, interfaces, processes, XBS, lessons learned... — **to new or evolving systems** in order to **reduce risk, cost, and schedule** while maintaining or **improving systems engineering quality and effectiveness**.

Source - The Reuse Company

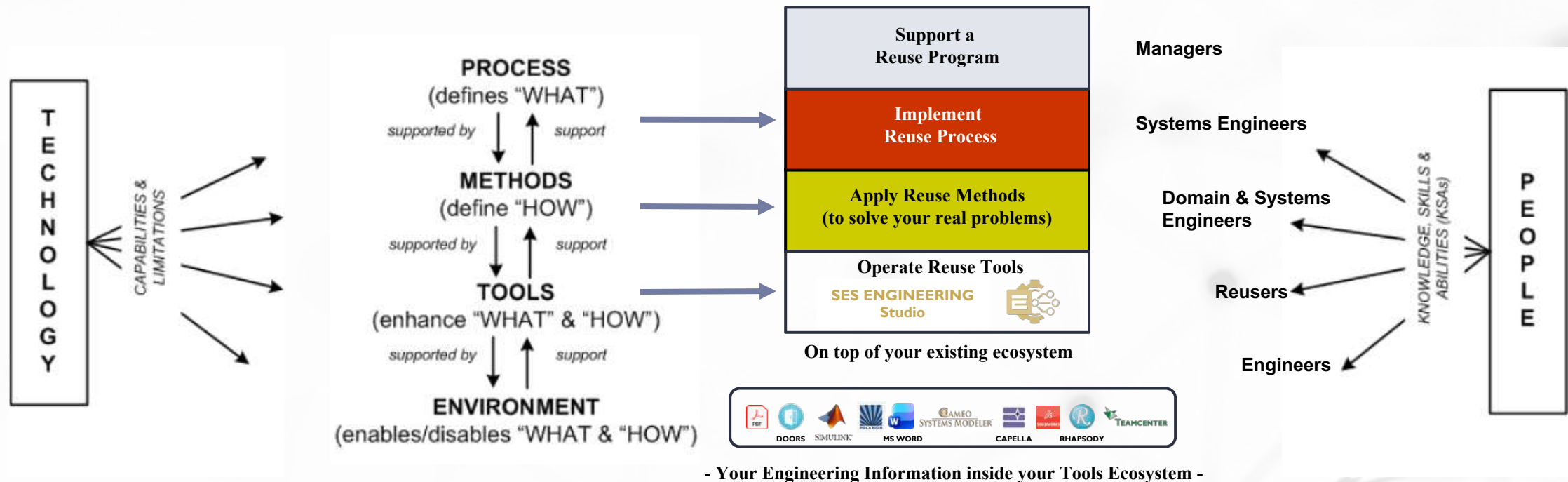


Martin, James N., Systems Engineering Guidebook: A Process for Developing Systems and Products, CRC Press, Inc.: Boca Raton, FL, 1996

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Source - The Reuse Company



- Your Engineering Information inside your Tools Ecosystem -

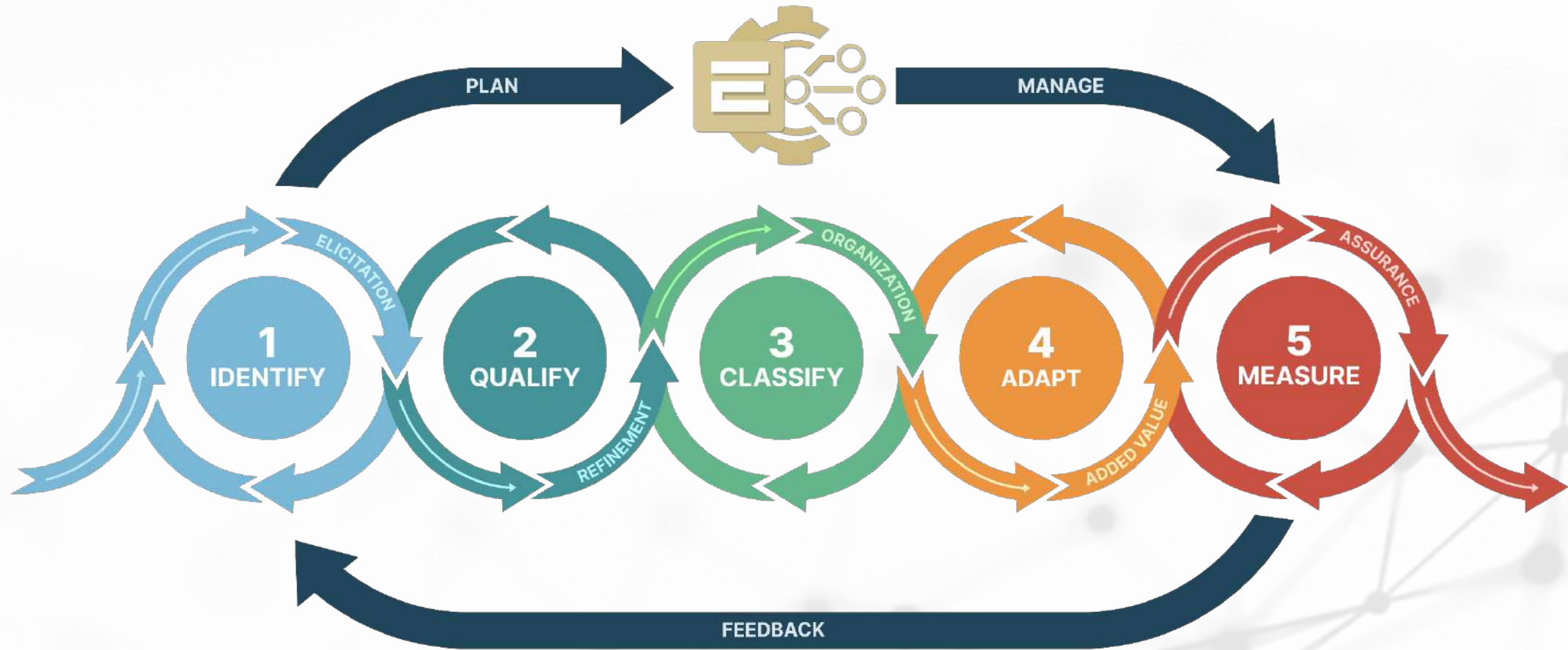


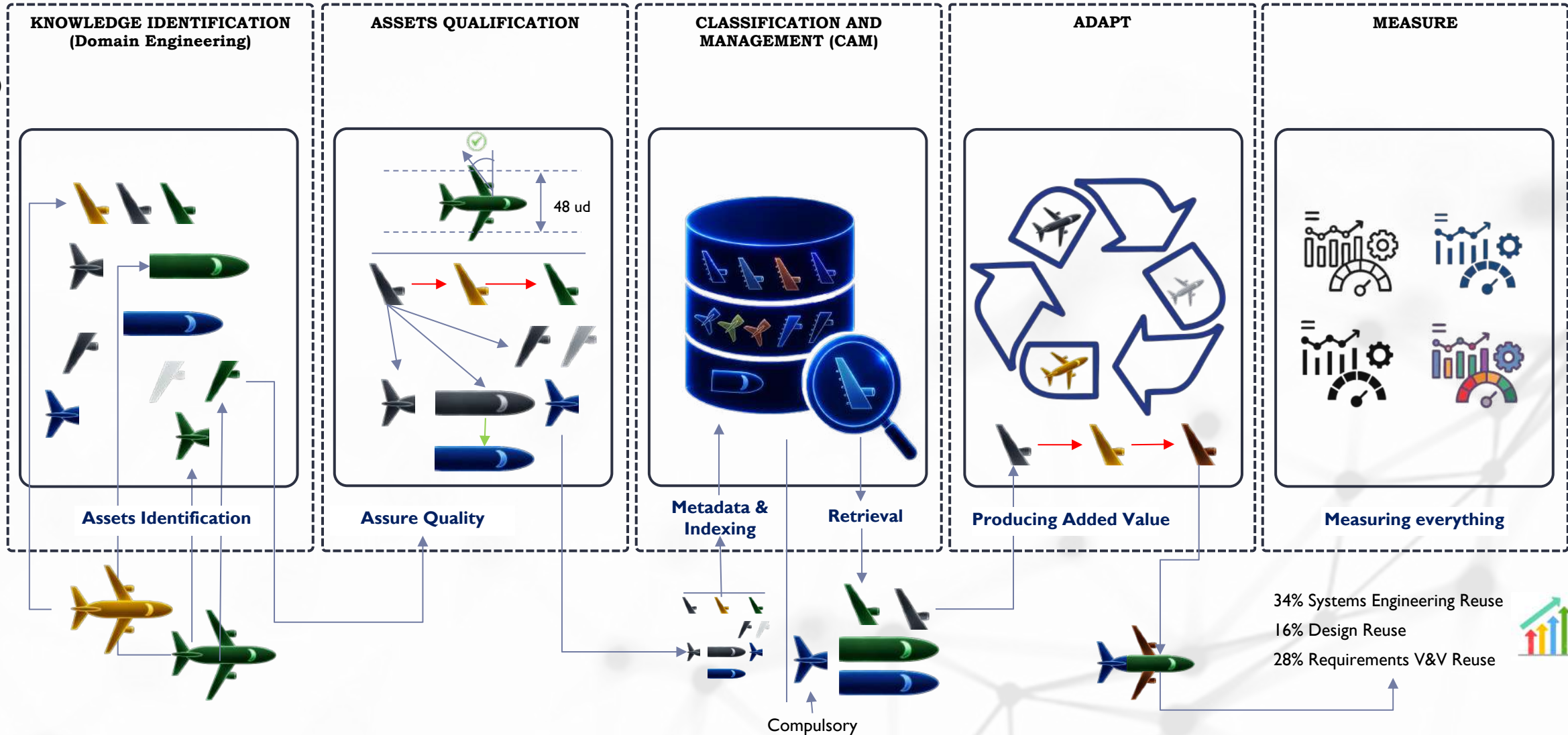
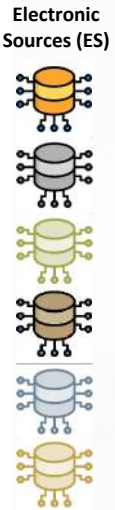
The SE Reuse Process

TRC view



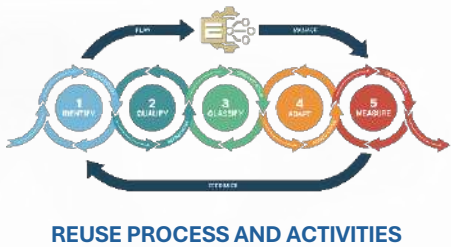
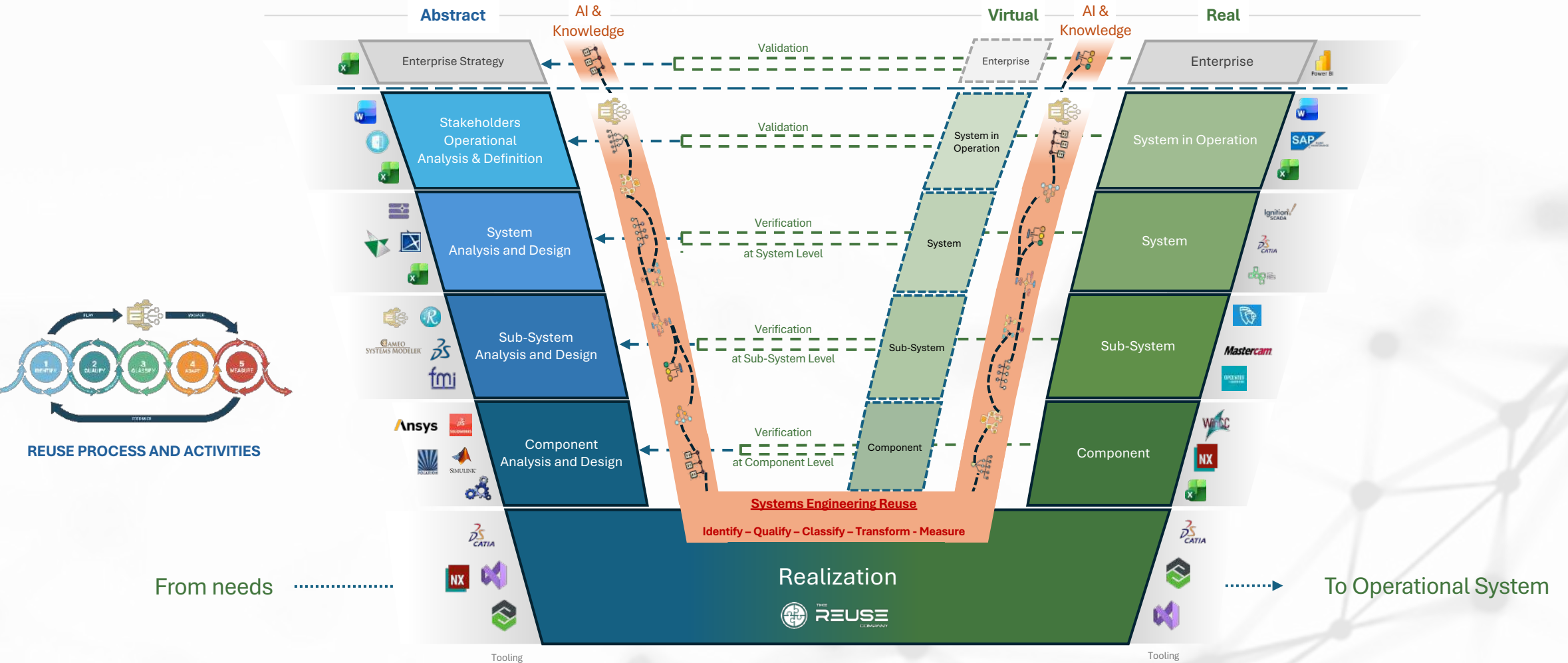
SYSTEMS ENGINEERING REUSE





DECOMPOSITION AND DEFINITION

INTEGRATION AND V&V



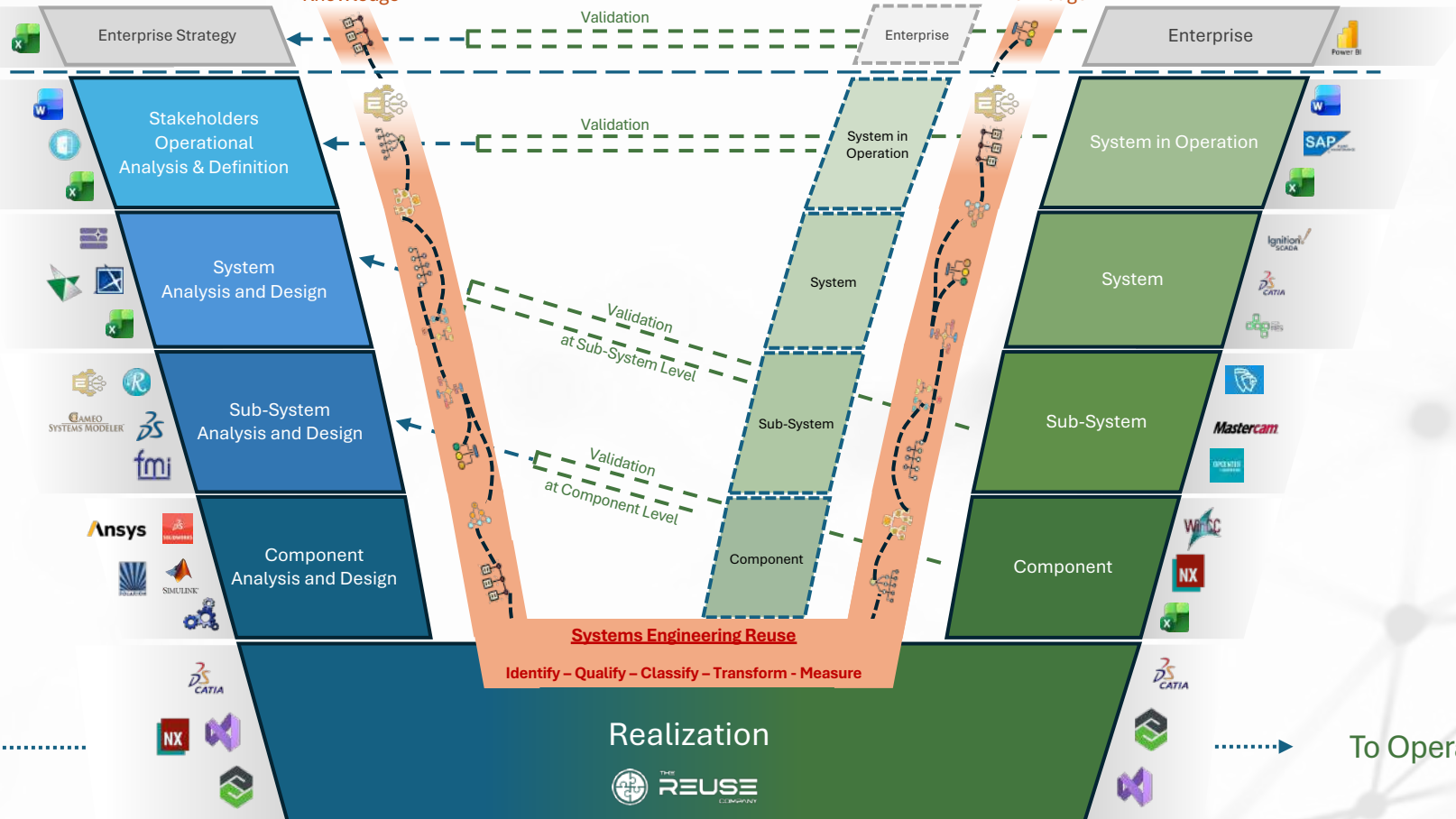
DECOMPOSITION AND DEFINITION

INTEGRATION AND V&V

Abstract

Virtual

Real



REUSE PROCESS AND ACTIVITIES

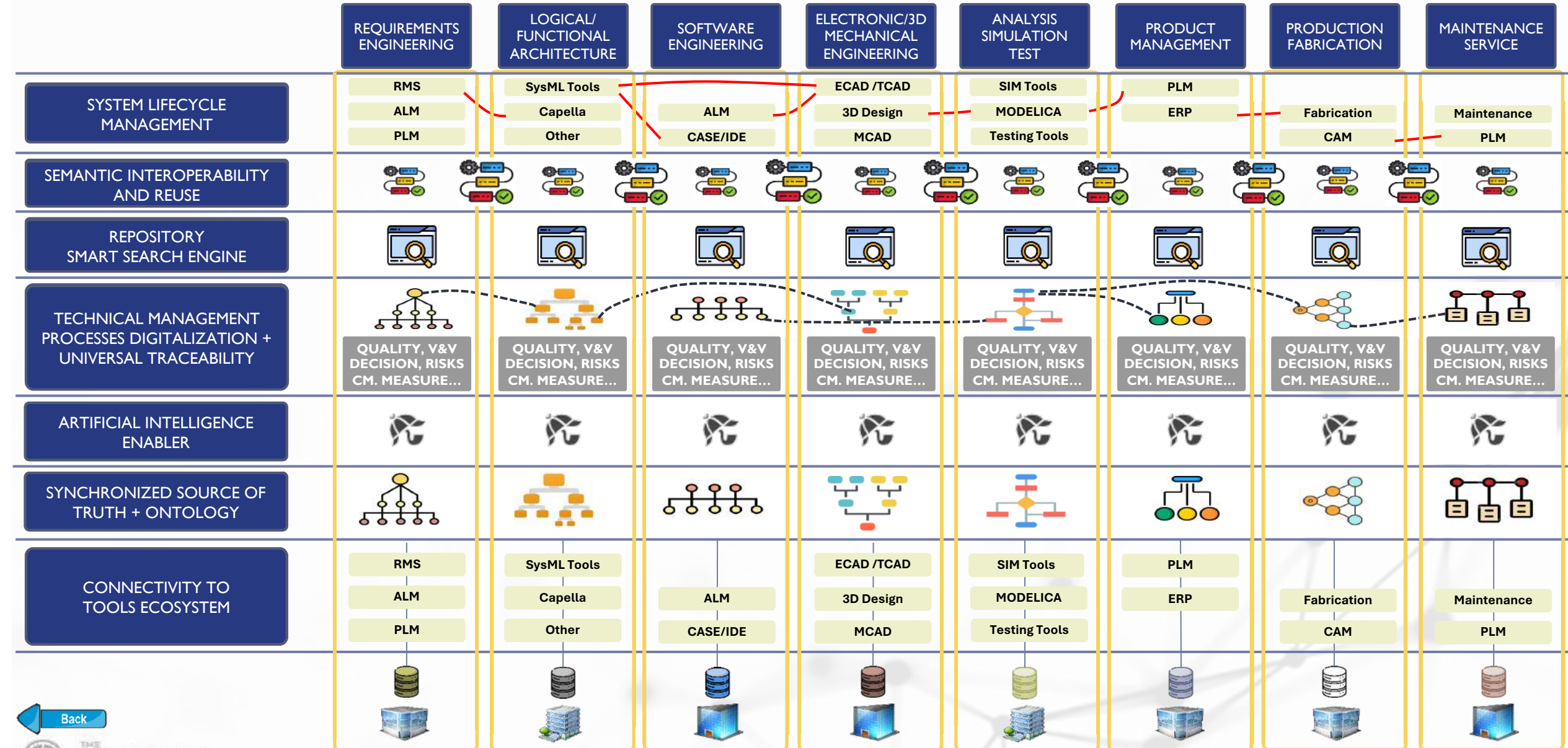
From needs

To Operational System

Tooling

Tooling

Verification
at System Level



← Back

Systems Engineering Suite
- SW oriented to REUSE -

REQUIREMENTS ENGINEERING	LOGICAL/FUNCTIONAL ARCHITECTURE	SOFTWARE ENGINEERING	ELECTRONIC/3D MECHANICAL ENGINEERING	ANALYSIS SIMULATION TEST	PRODUCT MANAGEMENT	PRODUCTION FABRICATION	MAINTENANCE SERVICE
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TRANSFORM, REUSE & MEASURE

RMS	SysML Tools		ECAD /TCAD	SIM Tools	PLM		
ALM	Capella	ALM	3D Design	MODELICA	ERP	Fabrication	Maintenance
PLM	Other	CASE/IDE	MCAD	Testing Tools		CAM	PLM

CLASSIFICATION AND MANAGEMENT

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ASSETS QUALIFICATION

QUALITY, V&V DECISION, RISKS CM. MEASURE...	QUALITY, V&V DECISION, RISKS CM. MEASURE...	QUALITY, V&V DECISION, RISKS CM. MEASURE...	QUALITY, V&V DECISION, RISKS CM. MEASURE...	QUALITY, V&V DECISION, RISKS CM. MEASURE...	QUALITY, V&V DECISION, RISKS CM. MEASURE...	QUALITY, V&V DECISION, RISKS CM. MEASURE...	QUALITY, V&V DECISION, RISKS CM. MEASURE...
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AI ENABLER

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KNOWLEDGE IDENTIFICATION (Domain Engineering)

RMS	SysML Tools		ECAD /TCAD	SIM Tools	PLM		
ALM	Capella	ALM	3D Design	MODELICA	ERP	Fabrication	Maintenance
PLM	Other	CASE/IDE	MCAD	Testing Tools		CAM	PLM

Knowledge Manager

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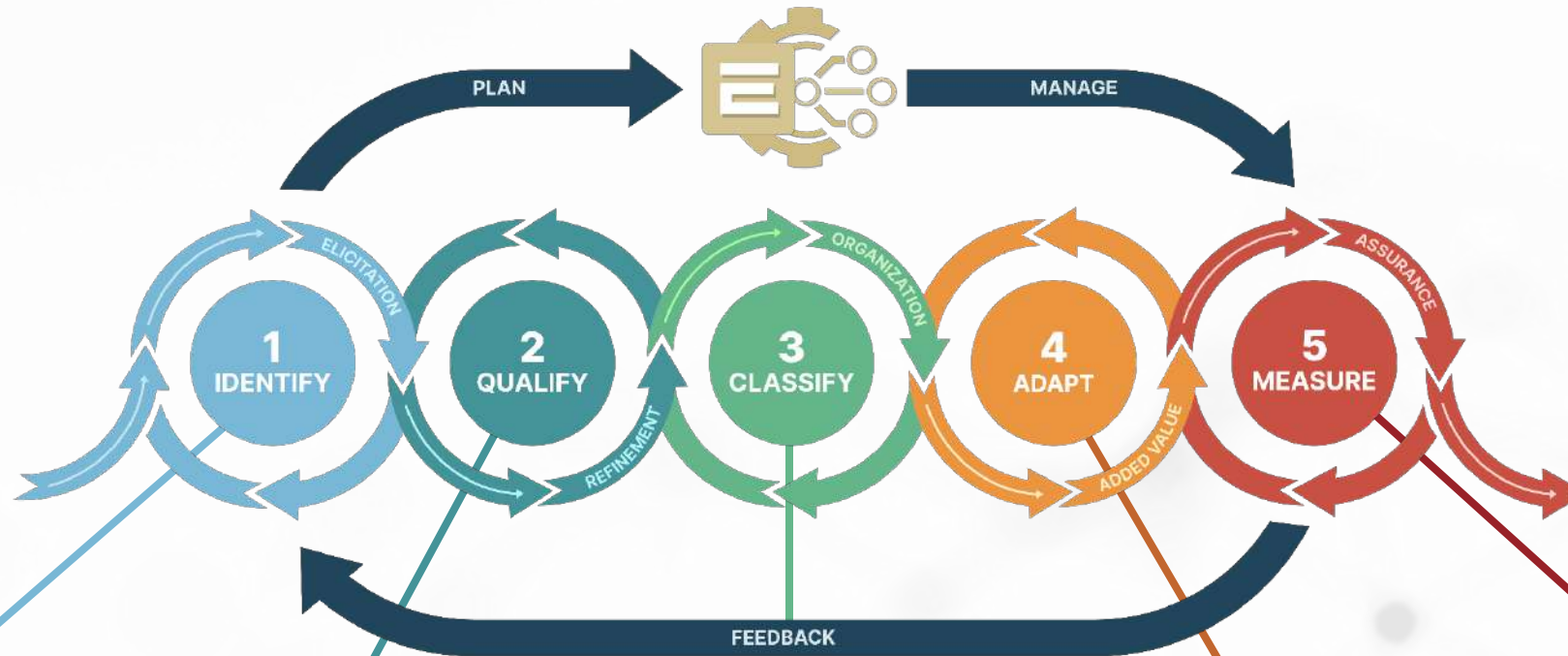


SE Reuse Methods

Subset of our proposal



AI-POWERED SYSTEMS ENGINEERING REUSE



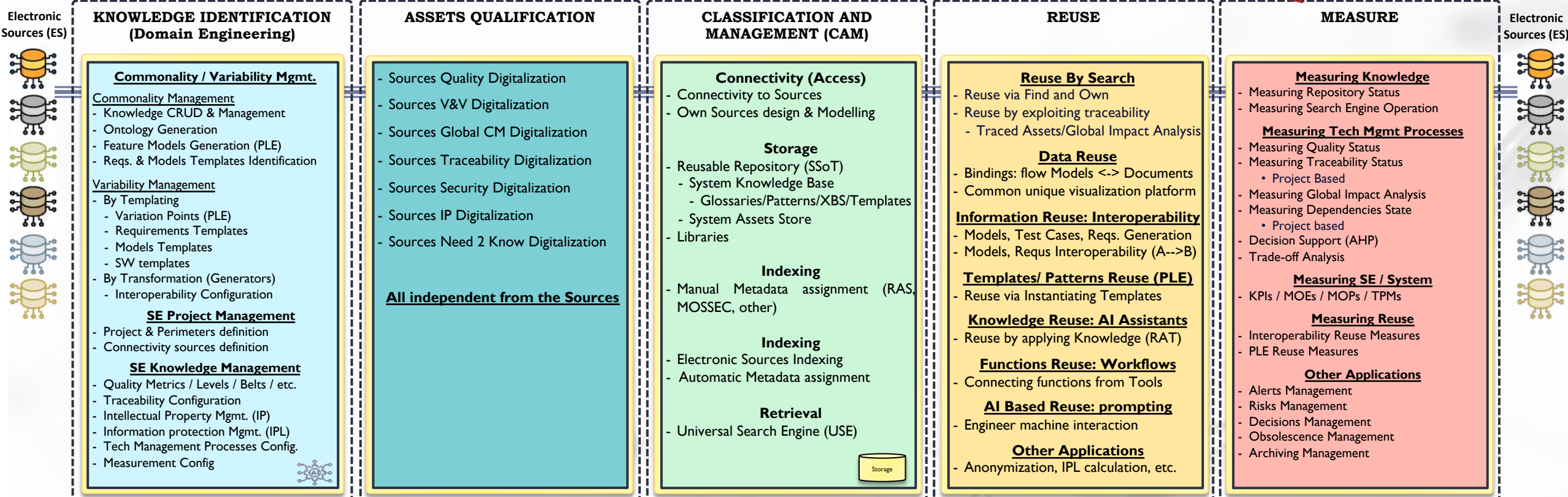
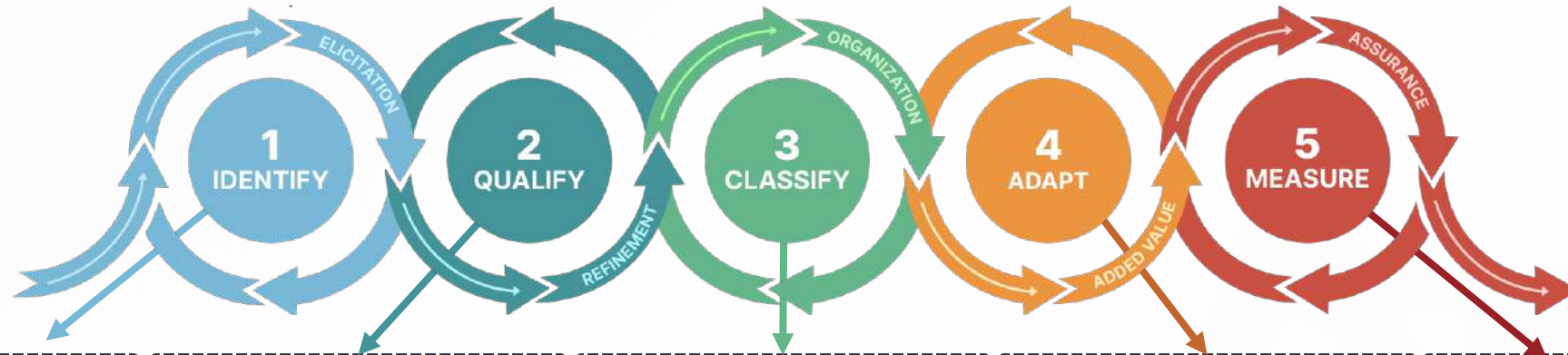
Apply AI to identify commonality, generate glossaries, xBS, create Quality metrics, produce Feature Trees (PLE), etc. and store them in the Repository

Get support from smart AI agents to calculate the quality, discover traceability, help you when authoring, perform trade-of analysis, create architectures, etc.

Multiply the search capabilities by using RAG & KAG, enriching the queries, integrate the knowledge graph, etc.

Transform formats and models, suggest improvements, and then send the information to the target source tools. All supported by AI

KPIs and dashboards to keep the Reuse process under control



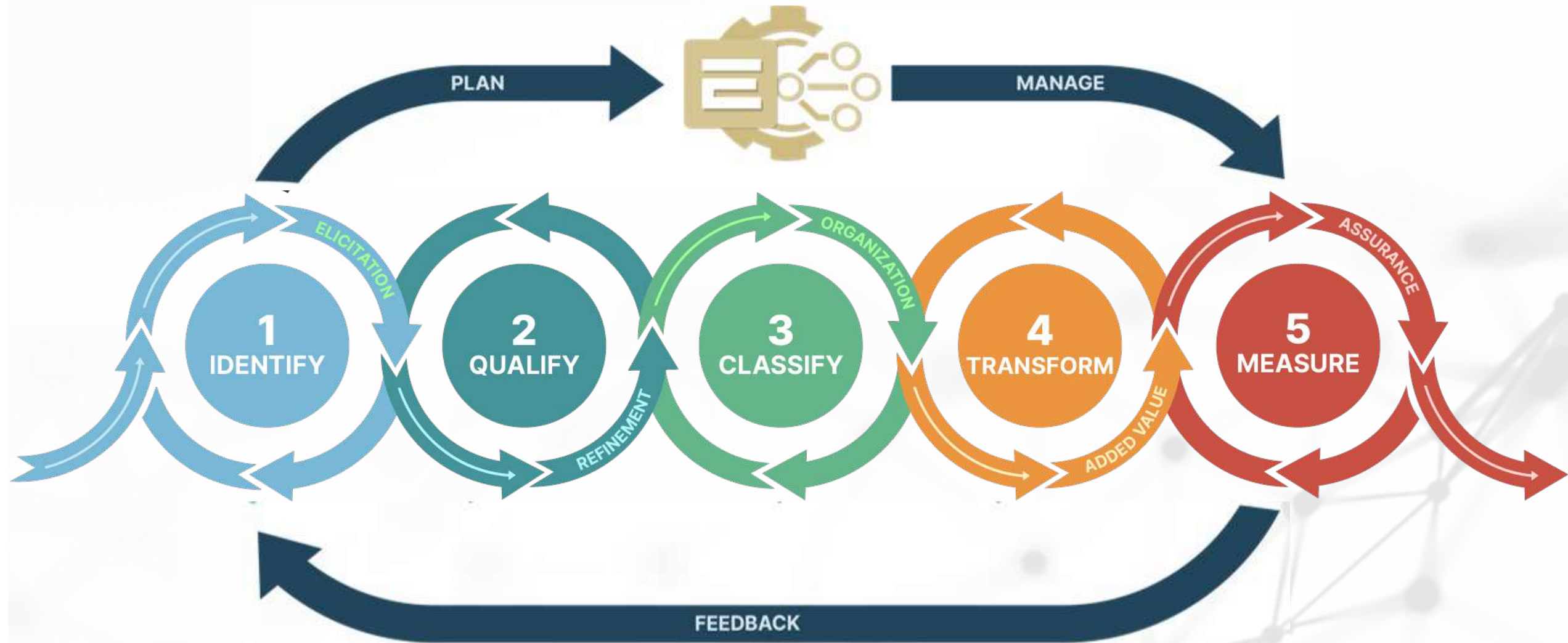
METHODS supported for every ACTIVITY	CAPABILITY	CAPABILITY
IDENTIFY		
1. Shared semantic foundation	Managing Glossaries, taxonomies, thesaurus, Ontologies, patterns	AI-assisted ontology construction from models and documents
2. Commonality / Variability Identification	Automatic identification of feature trees, templates, models using AI	
QUALIFY		
3. Continuous quality assurance	AI supported Architecture model quality assessment Automated verification and validation (V&V Studio)	Requirements quality assessment against ontology
4. Configuration and Change management (for any source)	Configuration management and version control	Global configuration management across heterogeneous tools
5. End-to-end traceability	End-to-end traceability (requirements to operations)	Automatic traceability discovery using agentic AI
	Bidirectional document-model synchronisation	
6. Risk Management support	Risk propagation analysis (FMEA, FTA, ETA integration) connected to models and requirements tools	
7. Decision Management	AHP-based trade-off analysis for any connected tool	
CLASSIFY		
8. Search and Indexing	Semantic Search Engine. Searchable asset repository populated by information from any connected tool	
9. Archiving long term information	Preservation of Engineering Information from any connected tool	
ADAPT		
10. Reuse By Search	Finding requirements, Models, test cases, traverse trace and reuse	
11. Data Reuse	Sharing and accessing data from different tools	Produce automatic bindings to flow between Models <-> Documents
12. Information Reuse: MBSE harmonisation	Model harmonisation and bidirectional synchronisation	Collaborative architecture design across distributed teams
	AHP-based trade-off analysis	AI-driven architecture generation from requirements
	Automatic security classification of documents and models	Reversible anonymisation of models and requirements
13. Templates / patterns Reuse	Reuse via Instantiating Templates or patterns in new projects	
14. Knowledge Reuse	Smart authoring of models and requirements against ontology	
15. Functions Reuse	Creation of Workflows by functional (tools) connection	
16. Product Line Engineering	Feature Models application to requirements, models, etc. (independent of the tool)	
MEASURE		
17. Measurement	Real-time Systems Engineering measurement scoreboard	Real-time Reuse measurement scoreboard

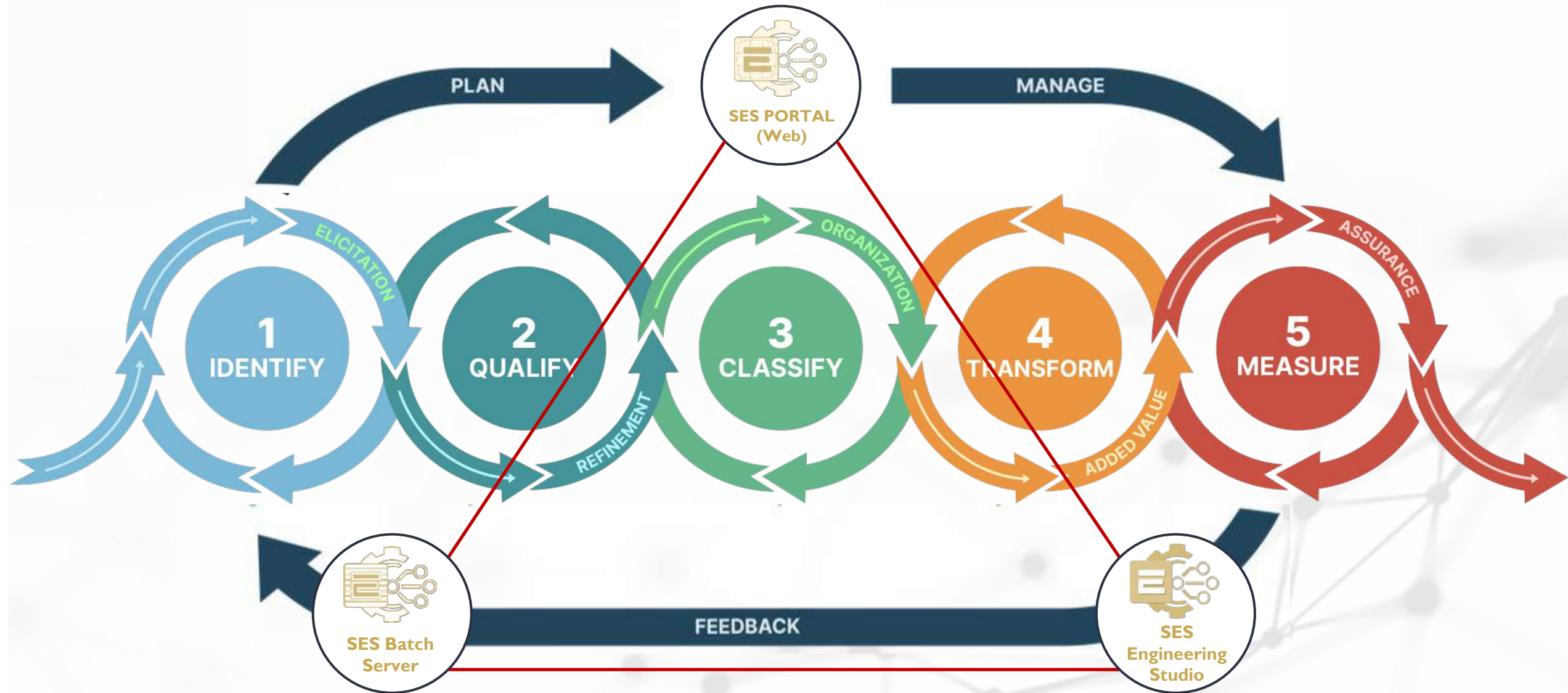


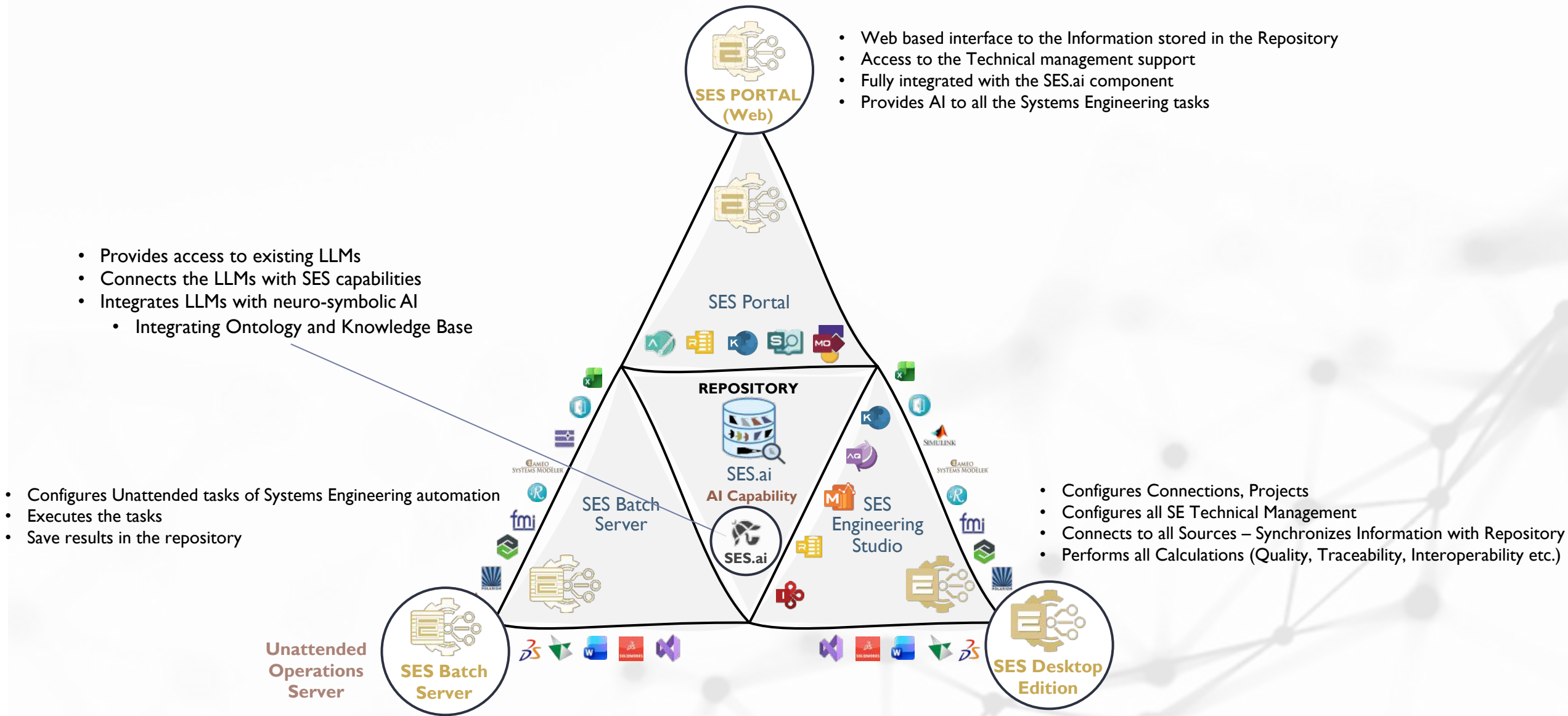
The SE Reuse Tools

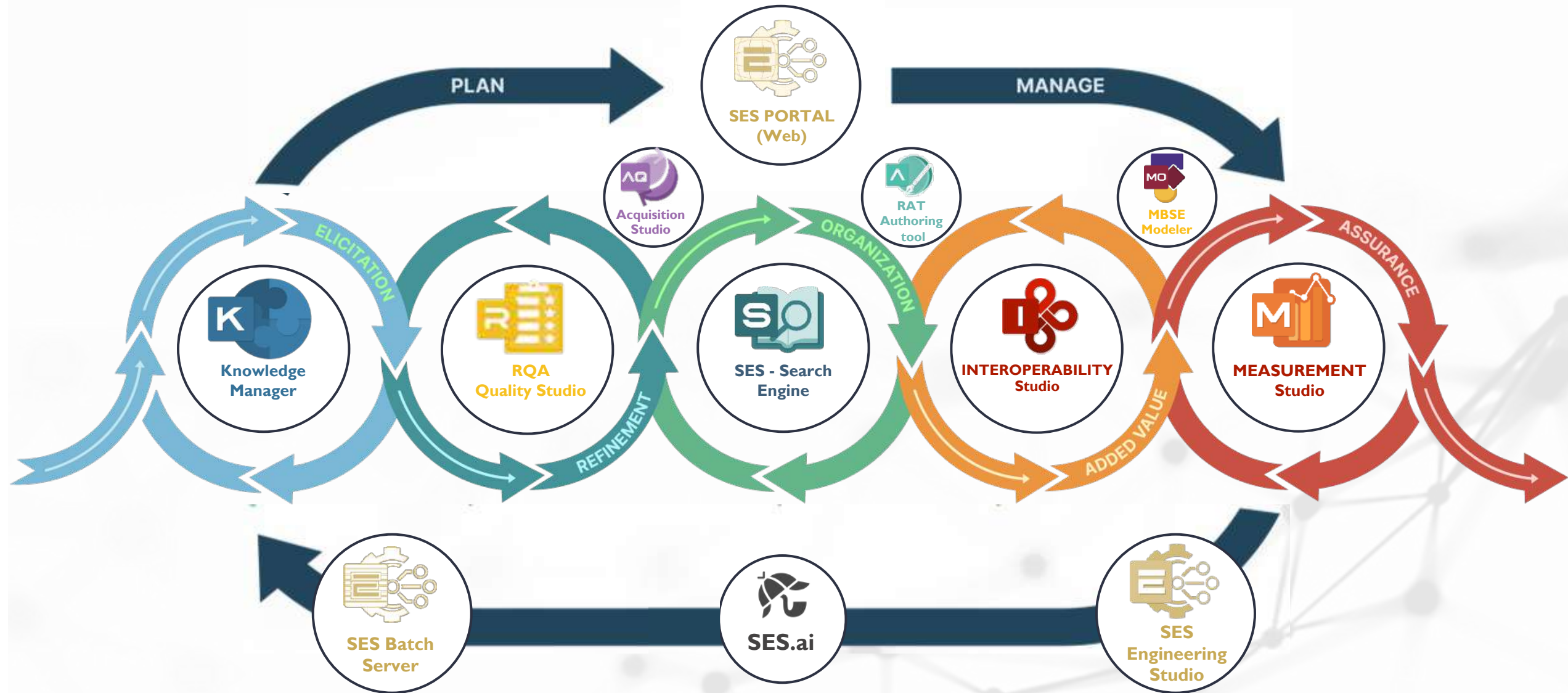
TRC Suite











1 IDENTIFY

Knowledge Manager

For Managing the Knowledge Base of the System. Using AI to identify reusable Assets

2 QUALIFY

RQA Quality Studio

For Assessing the quality and Technical Management of any engineering work-product.

3 CLASSIFY

SES - Search Engine

For classifying all the produced assets within the system life-cycle, and enabling its identification, search and access.

4 ADAPT

Interoperability Studio

For Managing the smart transformation of engineering work-products from whatever SE tool, method, model, etc. to any other environment

5 MEASURE

MEASUREMENT Studio

For providing automatic measurement capabilities to the Systems Engineering and Reuse processes

- Quality scoreboards
- MOE / MOPs / TPM / KPIs

Calculated from the engineering information.

SES Desktop Edition

SES PORTAL (Web)

SES Batch Server

Acquisition Studio

For Managing and digitalizing the Acquisition process of any Complex System.

Preservation Studio

For Supporting the long-term archiving of engineering information, automating the identification of obsolescence, the migration from old tools to new and different tools with no information loss.

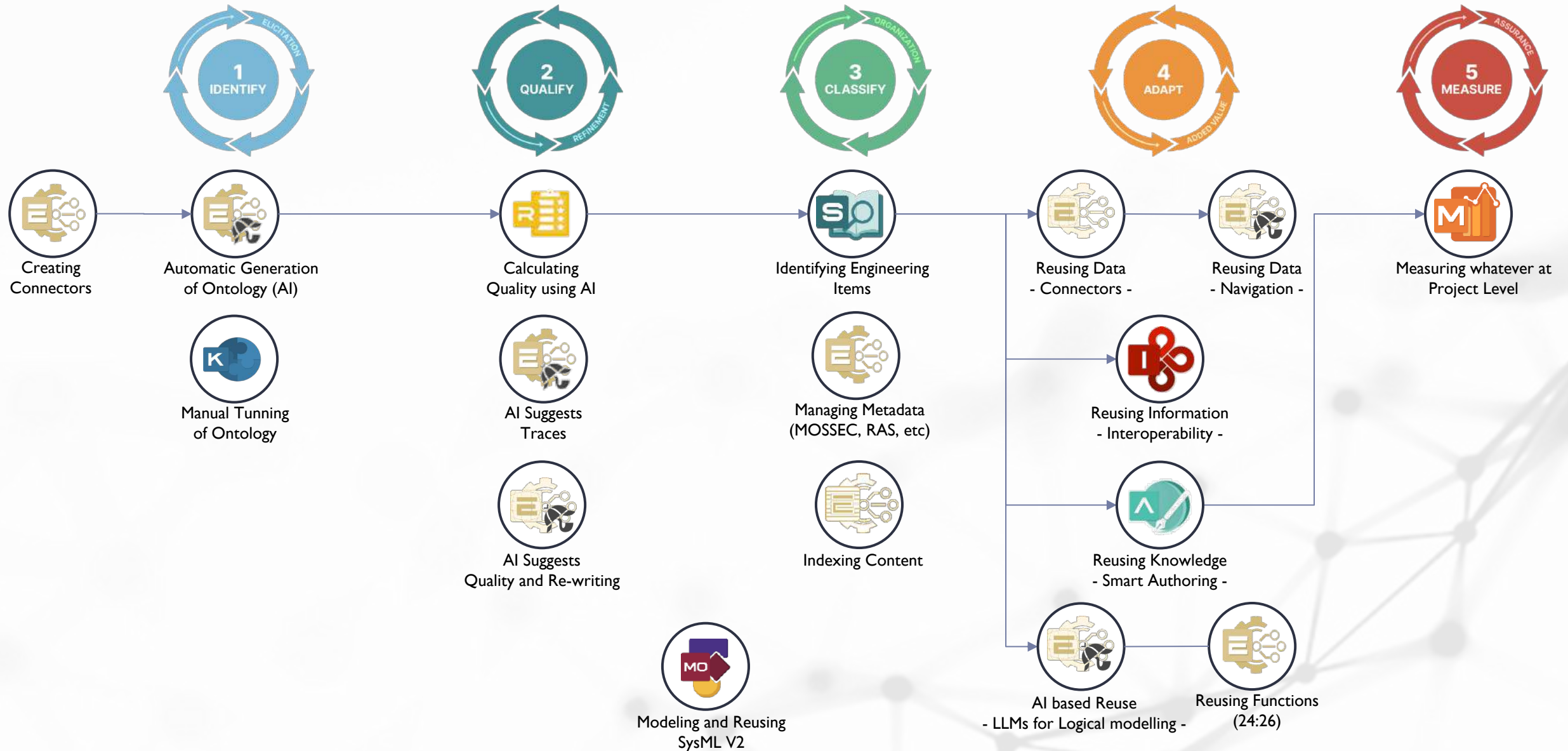
RAT Smart Authoring

For enabling AI guided authoring tool to assure terminology coherence, and textual / models Correctness, Consistency and Completeness

MBSE Modeling Studio

For producing SysML V2 models in a simple, collaborative and easy manner, connecting with the rest of the SES Engineering Studio capabilities. It can offer a SysML V2 view to existing models.







Multiple ways To implement Your REUSE Process

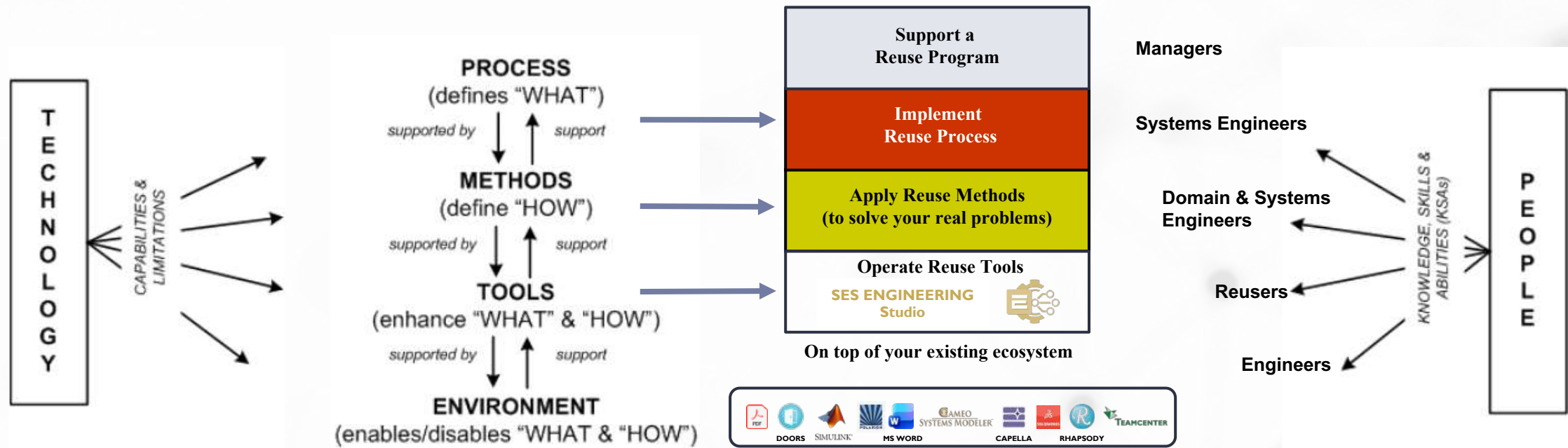
Based on your needs



Systems Engineering REUSE can be defined as:

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Source - The Reuse Company



- Your Engineering Information inside your Tools Ecosystem -

FORCED:

Pure disaster

- The Leadership imposes
- The process is understood in theory
- The problems are not identified
- Methods are not known
- Tools are ready to NOT help

IDEAL:

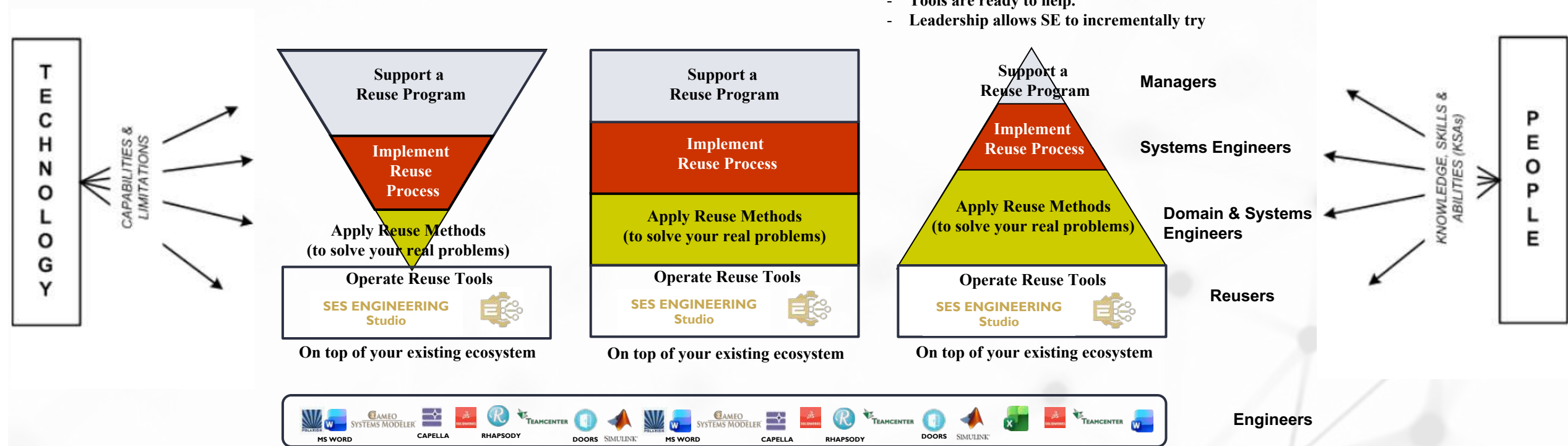
Almost Never seen it in reality

- The Leadership is Sponsor
- The process is clear
- The problems are identified
- The methods are selected
- Tools are operating properly

PRACTICAL:

A silent way to systematic Reuse

- The Leadership says ok but doesn't really support economically.
- The process is not fully clear, but Systems Engineers dare to go.
- The problems are identified and the methods to solve them are well known
- Tools are ready to help.
- Leadership allows SE to incrementally try

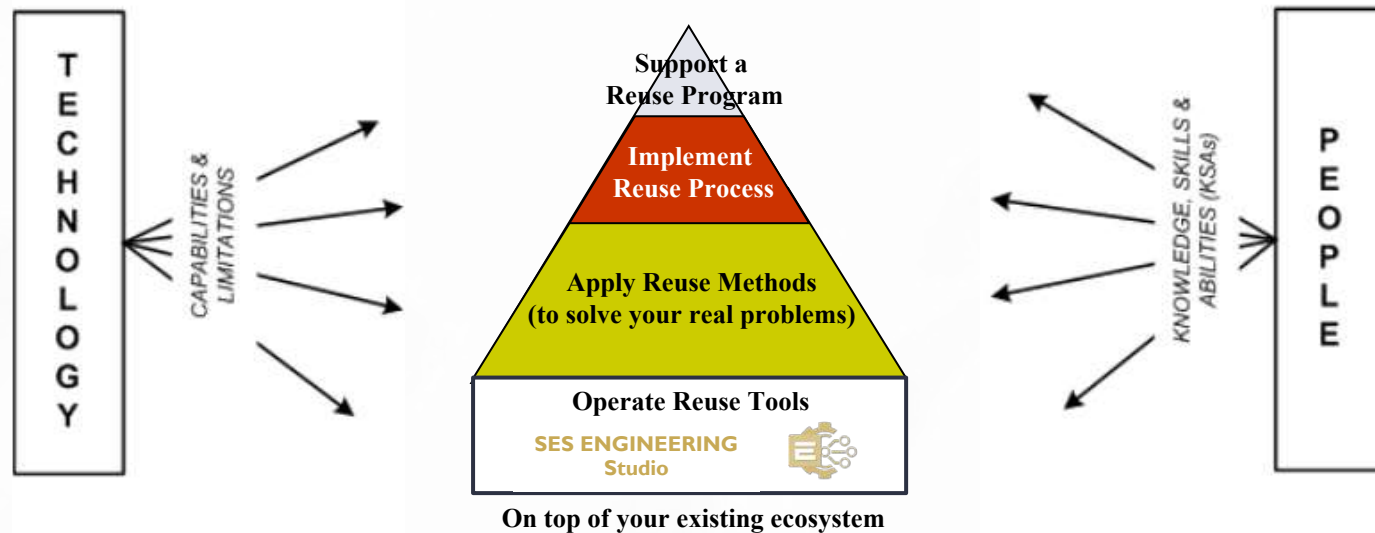


- Your Engineering Information inside your Tools Ecosystem -

PRACTICAL IMPLEMENTATION OF A REUSE PROCESS:

A silent way to systematic Reuse

- The Leadership says ok but doesn't really support economically.
- The process is not fully clear, but Systems Engineers dare to go.
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- Your Engineering Information inside your Tools Ecosystem -



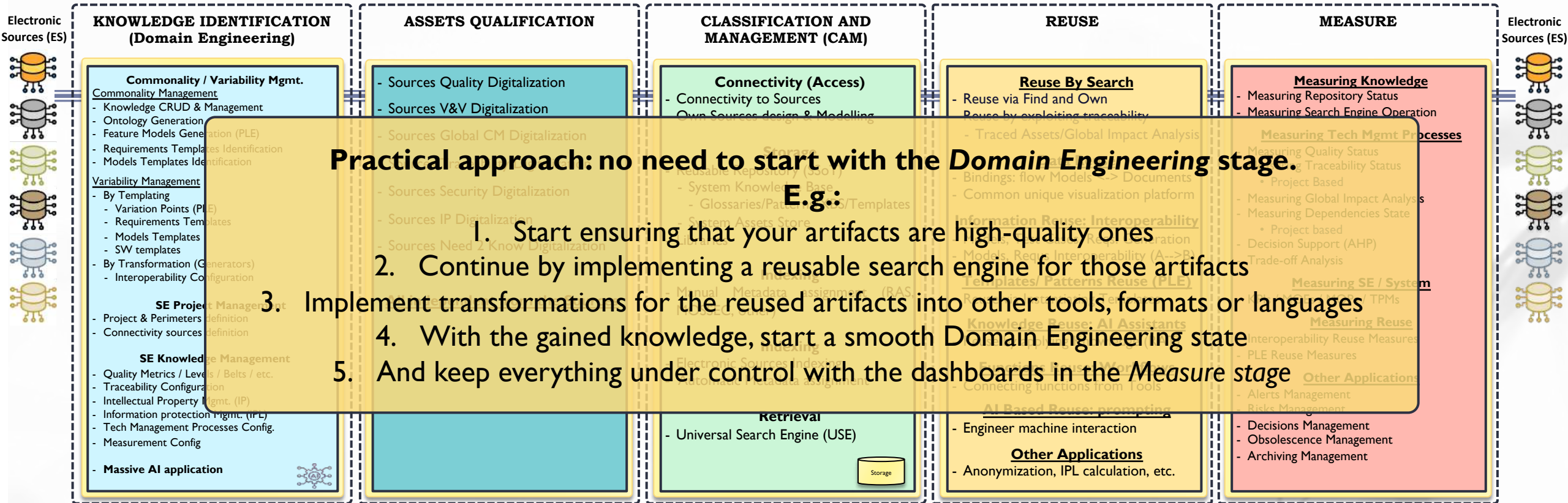
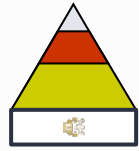
HOW?

By Solving DAILY Systems Engineering problems common with a REUSE process:

- ▶ I need to assure the Quality of my Requirements?
- ▶ I need to manage the models' consistency against another model
- ▶ I have to manage a Glossary of acronyms
- ▶ I need to connect the BOM with the Logical Model
- ▶ I want to interoperate between a requirements management SW and a MBSE tool
- ▶ I need to maintain a complete traceability matrix
- ▶ I need my documents to be automatically updated when the model changes
- ▶ I want to find models I have developed in the past connected with requirements I have today
 - ▶ I need to reuse the V&V activities of the found models
- ▶ I need to implement a Global change management process with all my tools
- ▶ ...

And I want to do all the previous without changing my existing engineering tools ecosystem





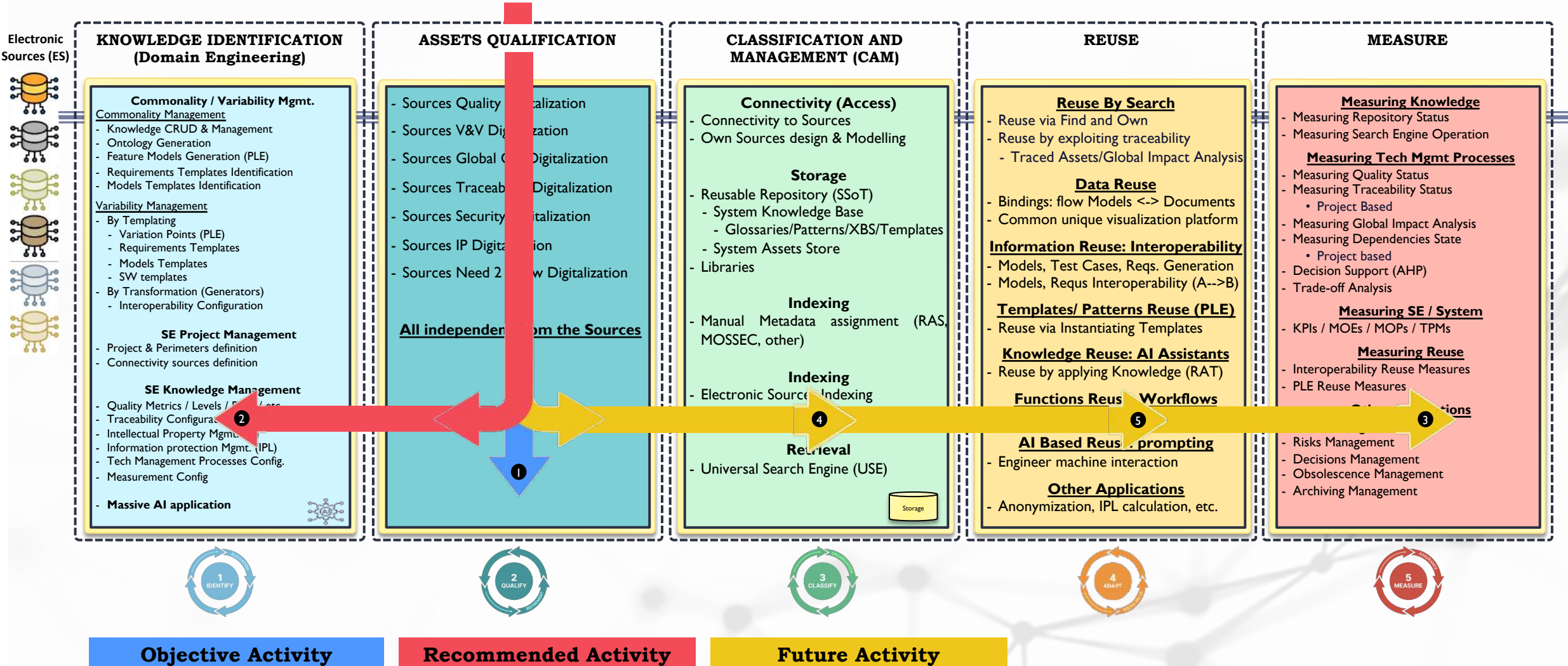
Practical approach: no need to start with the Domain Engineering stage.

E.g.:

1. Start ensuring that your artifacts are high-quality ones
2. Continue by implementing a reusable search engine for those artifacts
3. Implement transformations for the reused artifacts into other tools, formats or languages
4. With the gained knowledge, start a smooth Domain Engineering state
5. And keep everything under control with the dashboards in the Measure stage

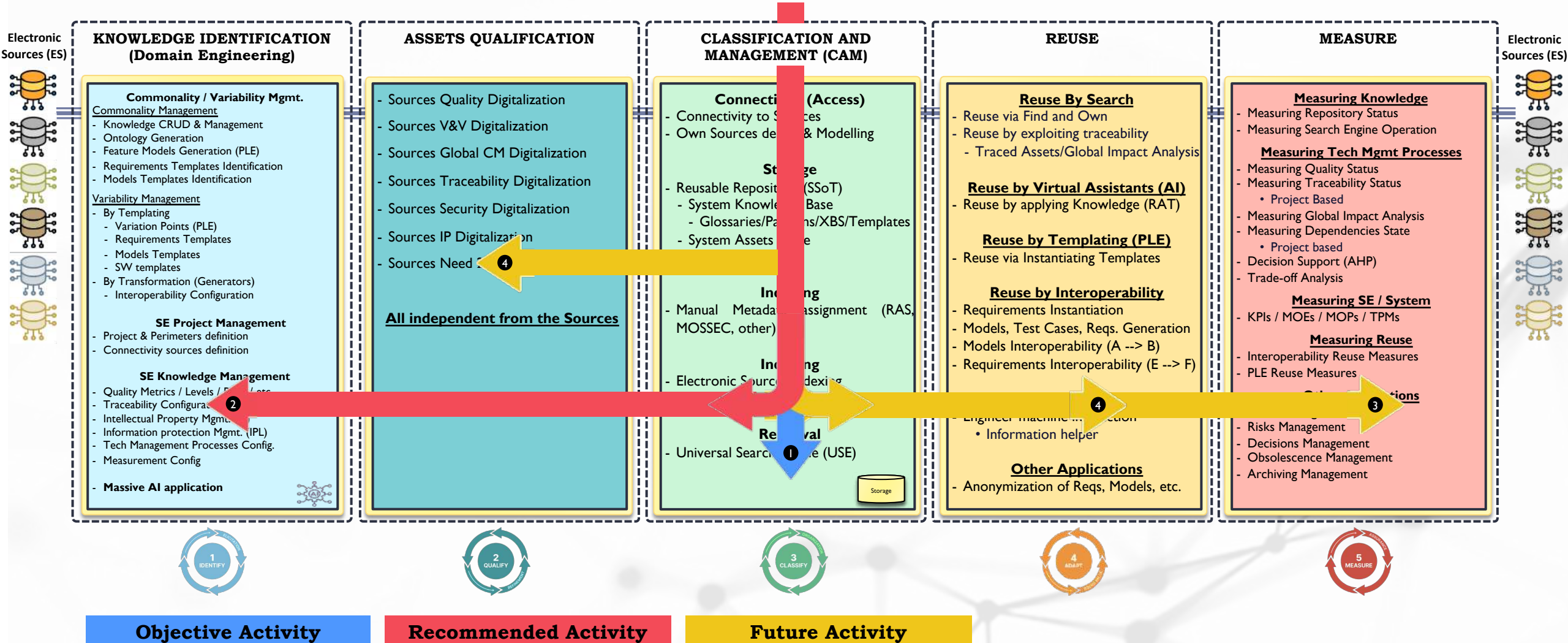


I need to assure the Quality of my Requirements
I need to manage the models' consistency
...



I need to Store, Find and Retrieve whatever engineering item

...

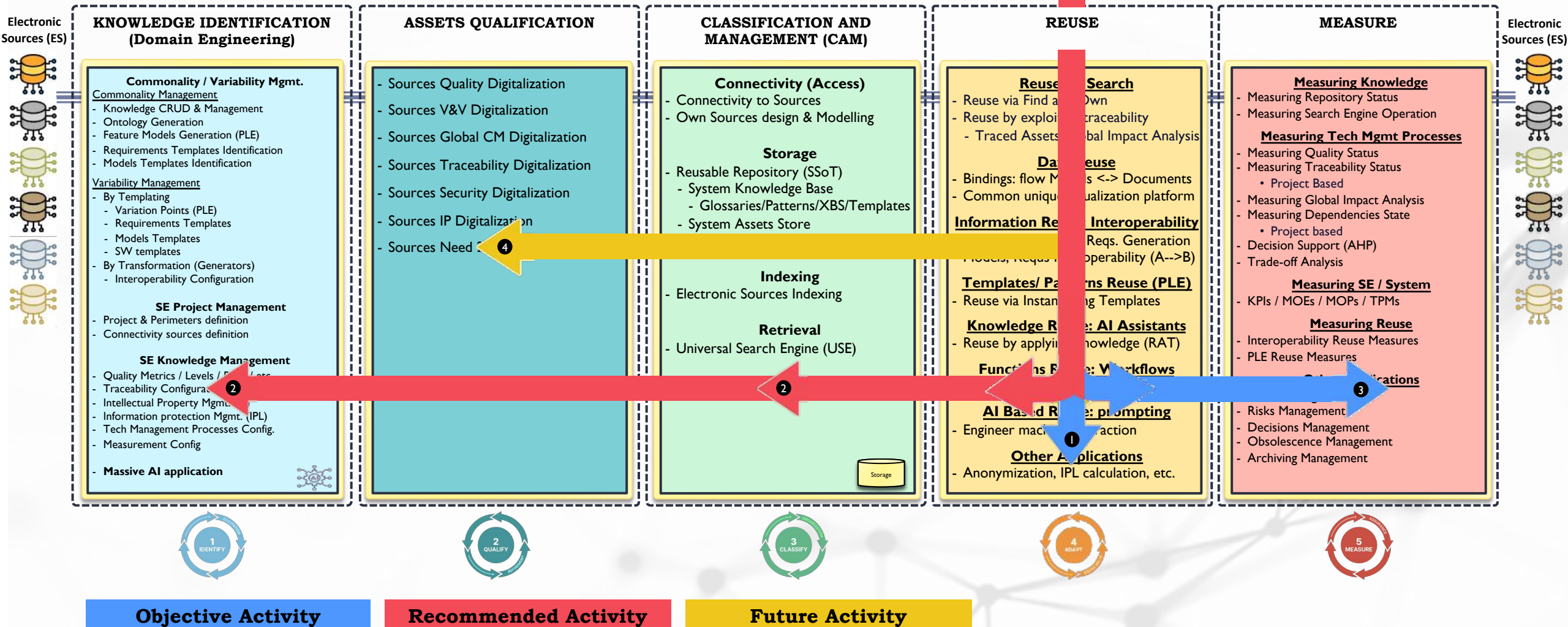


I want to implement a proper Product Line Engineering

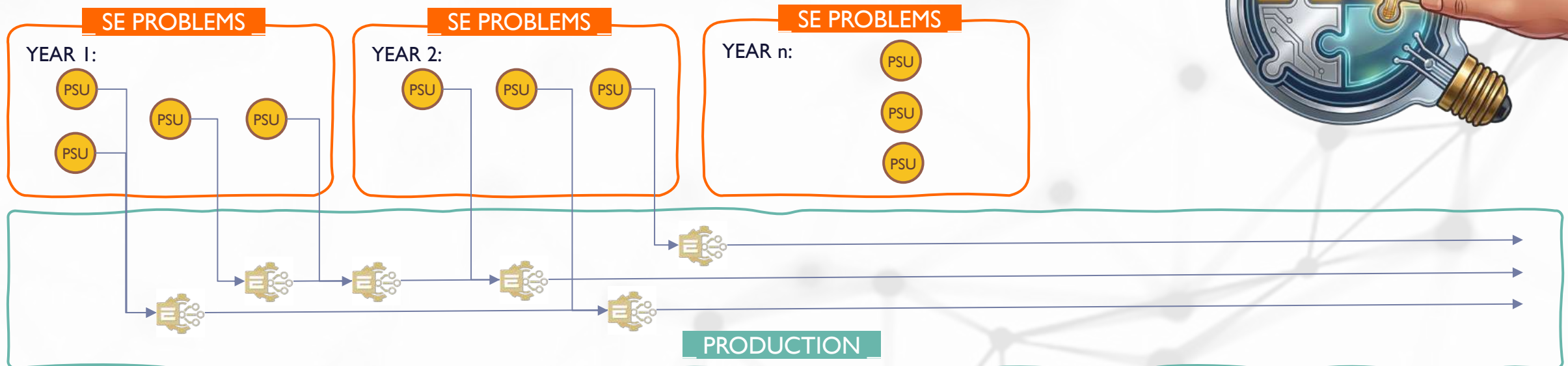
I want to Implement a Query, Find, Modify and Own approach (QFMO)

I want to automatically Generate my Models, Requirements, Test Cases, etc.

I want to start with a Copy – Paste Approach



- A Problem Solved Unit (PSU) intends to define a finished and tested solution to a Systems Engineering problem statement
 - Determines an activity where any or some of the methods described in the methods table must be used to solve a previously determined problem
 - It is solved by the consultants and engineers of The REUSE Company (TRC) together with the engineers of the company
 - It includes the usage of any of TRC's tools during the realization of the PSU
 - It implies the configuration, usage and eventually tailoring of any tool of The REUSE Company's tools set
 - It is verified against a predefined set of Use Cases provided by the company
 - It must be solved in few calendar time months (2 to 3)
 - Its order of complexity is measured in few person/months (2 to 3)
 - Its intention is to deploy the result into production when finished





THE REUSE
COMPANY

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Systematic Reuse Proposal for a Systems Engineering Intensive Corporation (SEIC)

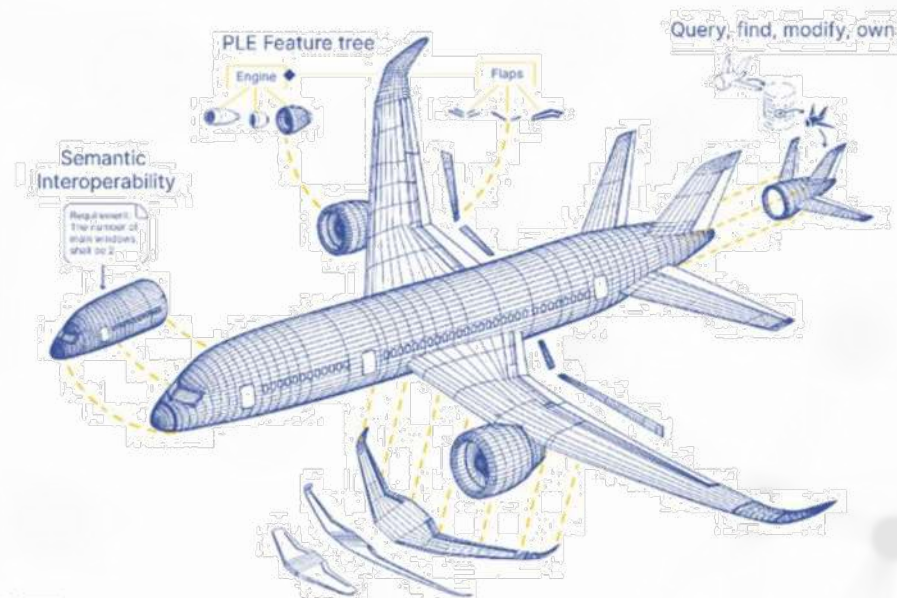
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111 36 Stockholm, Sweden

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Systematic Reuse Proposal for MoD of <Restricted>

PRIMARY CONTACT:

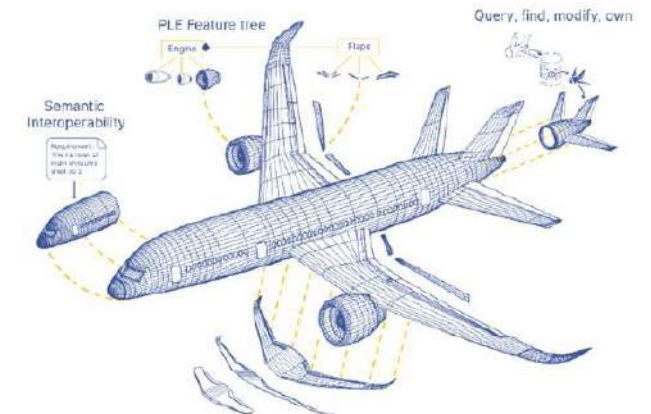
<Restricted>, Chief Commercial Officer

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<Restricted>, Msc, ASEP

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CONCLUSIONS

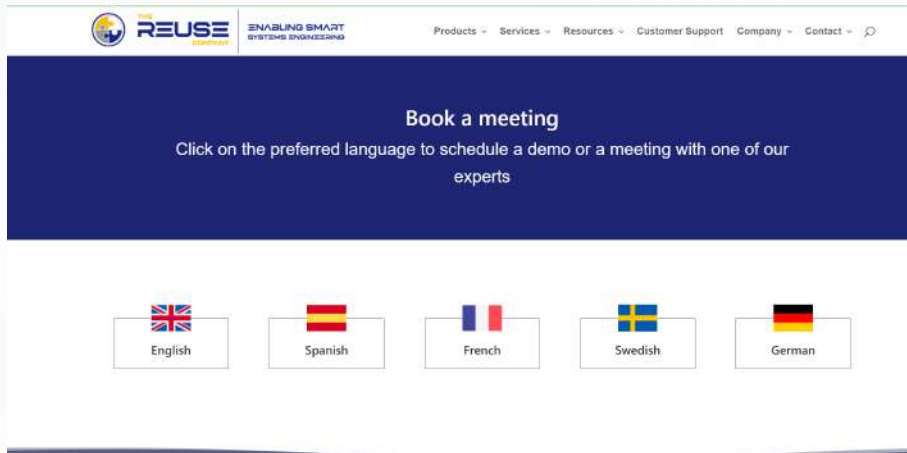
- ▶ This webinar has introduced the approach to Systematic Systems Engineering Reuse.
- ▶ The Reuse process implies the following activities
 - ▶ Identification of Assets, their Qualification, Classification, Adaptation and finally a Measurement activity
- ▶ A bottom-up way to apply Systems Engineering REUSE has been introduced.
 - ▶ By solving recurrent and non recurrent Systems Engineering problems (PSUs)

Q&A

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- **What would this save on your current project? Connect with us for more details!**
- **Book a meeting with a consultant**



- **Requirements Analysis Service** : <https://www.reusecompany.com/personalized-requirements-analysis>
- **Trial license request**: contact@reusecompany.com
- **Get further information...**



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

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Boosting MS Word with Requirements Management...
 System Life Cycle Management with SES...
 Systems Engineering Rigor needs an Interoperability...
 Interoperability in SES ENGINEERING Studio
 Controlling the values of your signals in Technical...
 Configuration Management with SES ENGINEERING...

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