“So, what’s all this stuff about *requirements*, anyhow?”

Kongsberg/USN SESG

John Pastor

13.February.2025

Confucius (551 B.C. -479 B.C.)

“If names not be correct, language is not in accordance with the truth of things”

Modernly paraphrased

“The beginning of wisdom is to call things by their proper name.”

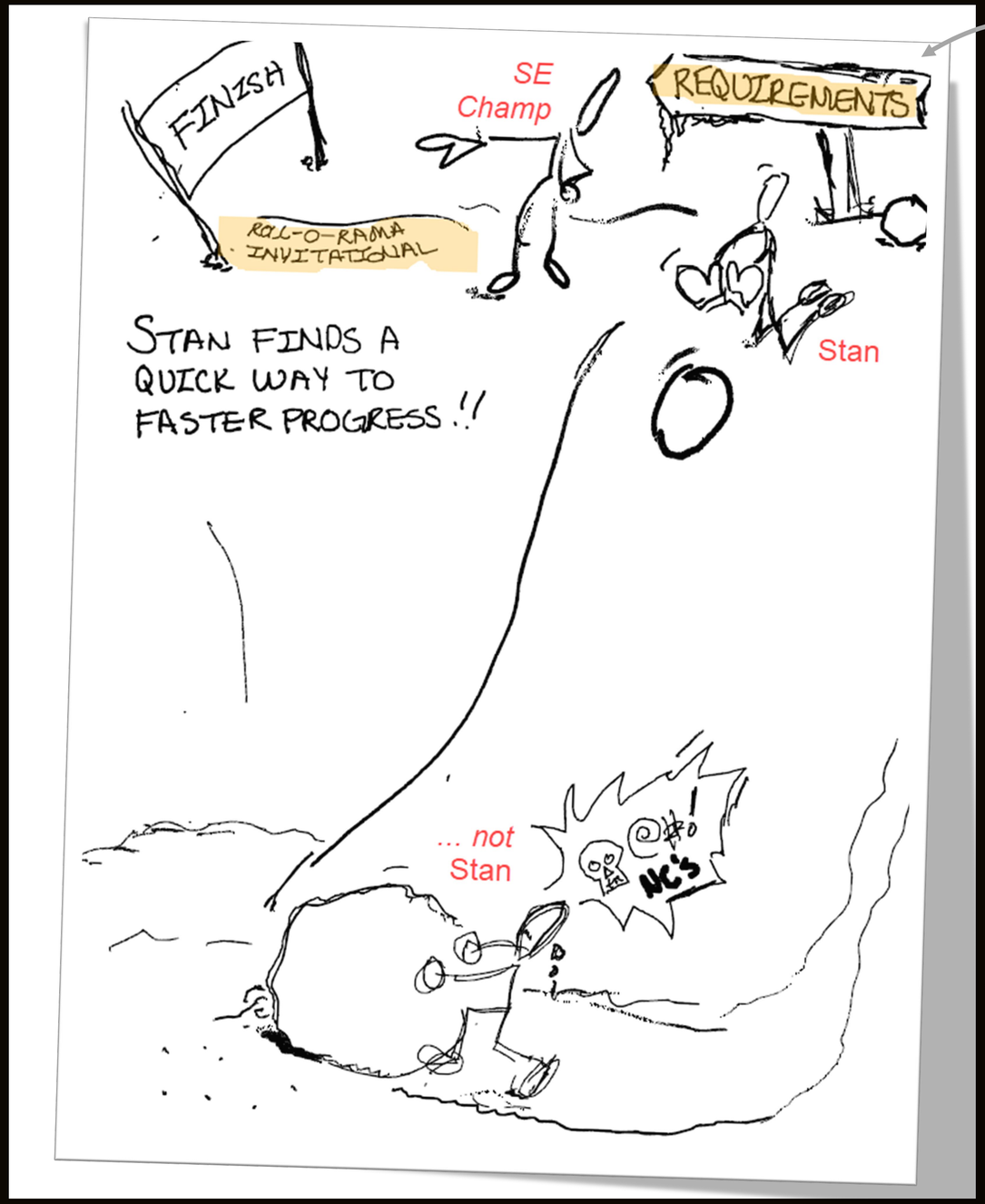
Modernly paraphrased

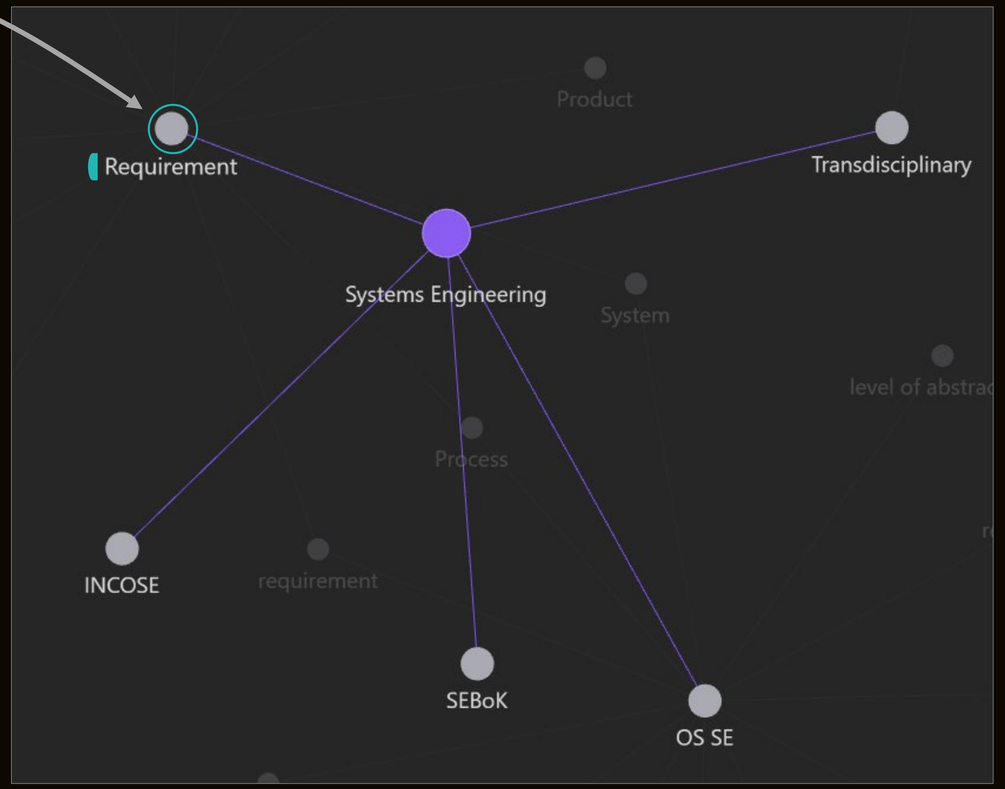
“The beginning of wisdom is to call things by their proper name.”

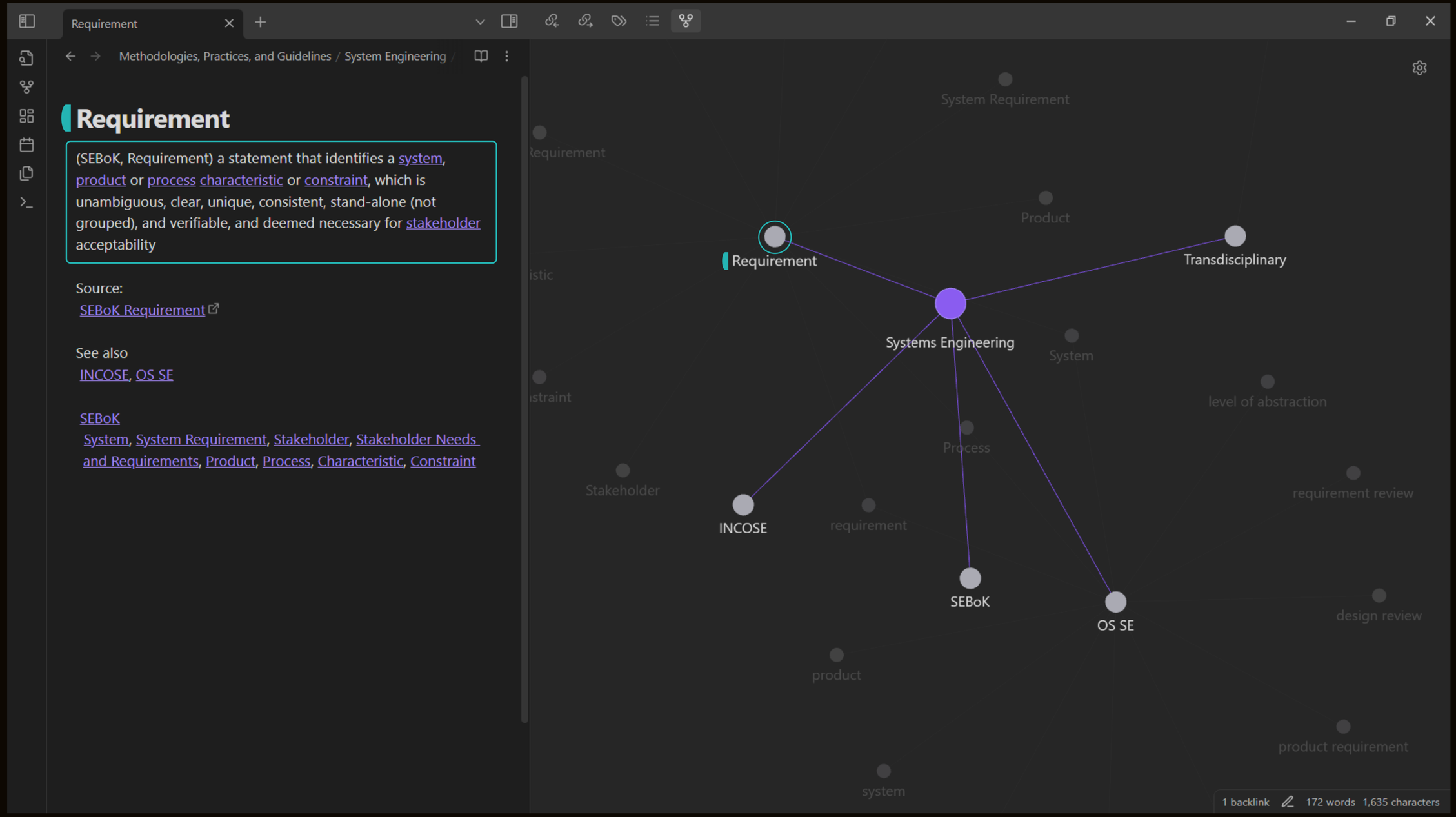
Taxonomy → *Wisdom?*

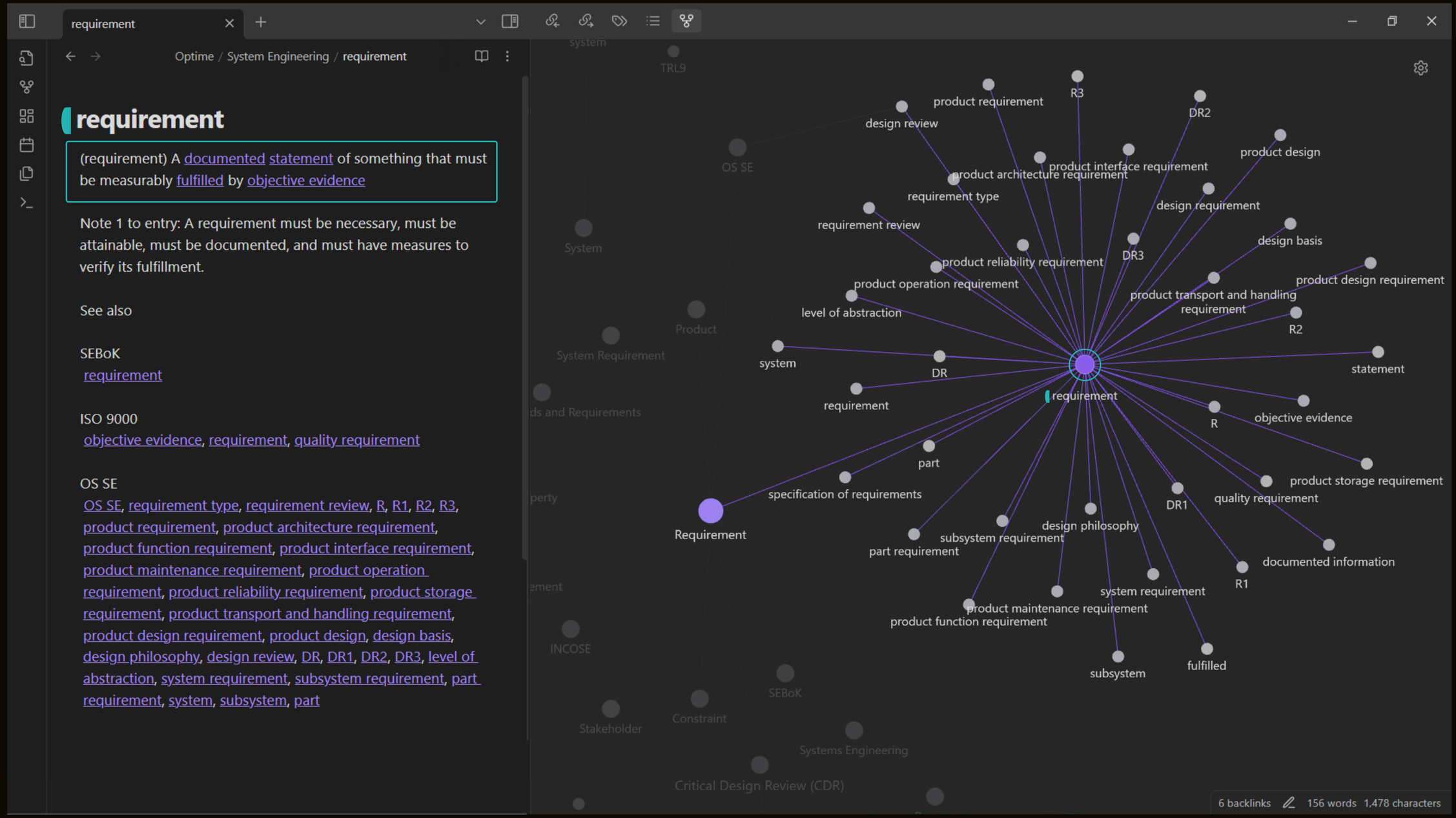
science of classification

“if so, then in Systems Engineering what is a requirement?”


FINISH
ROL-O-RAMA INVITATIONAL
SE Champ
REQUIREMENTS
STAN FINDS A QUICK WAY TO FASTER PROGRESS!!
Stan
... not Stan
#@$!
NC's


Product
Requirement
Transdisciplinary
Systems Engineering
System
level of abstrac
Process
INCOSE
requirement
SEBoK
OS SE


Requirement
Methodologies, Practices, and Guidelines / System Engineering /
Requirement
(SEBoK, Requirement) a statement that identifies a system, product or process characteristic or constraint, which is unambiguous, clear, unique, consistent, stand-alone (not grouped), and verifiable, and deemed necessary for stakeholder acceptability
Source:
SEBoK Requirement
See also
INCOSE, OS SE
SEBoK
System, System Requirement, Stakeholder, Stakeholder Needs and Requirements, Product, Process, Characteristic, Constraint
System Requirement
Product
Transdisciplinary
Systems Engineering
System
level of abstraction
Process
Stakeholder
requirement review
INCOSE
requirement
SEBoK
OS SE
design review
product
product requirement
system
1 backlink
172 words
1,635 characters



requirement type

Optime / System Engineering / requirement type

requirement type

a unique identifier given to an group of requirements which all share a commonality, purpose, or attribute.

Note 1 to entry: Requirement types can be established for any delineation of commonality that has recognized merit, such as for processes, functions, operations etc.

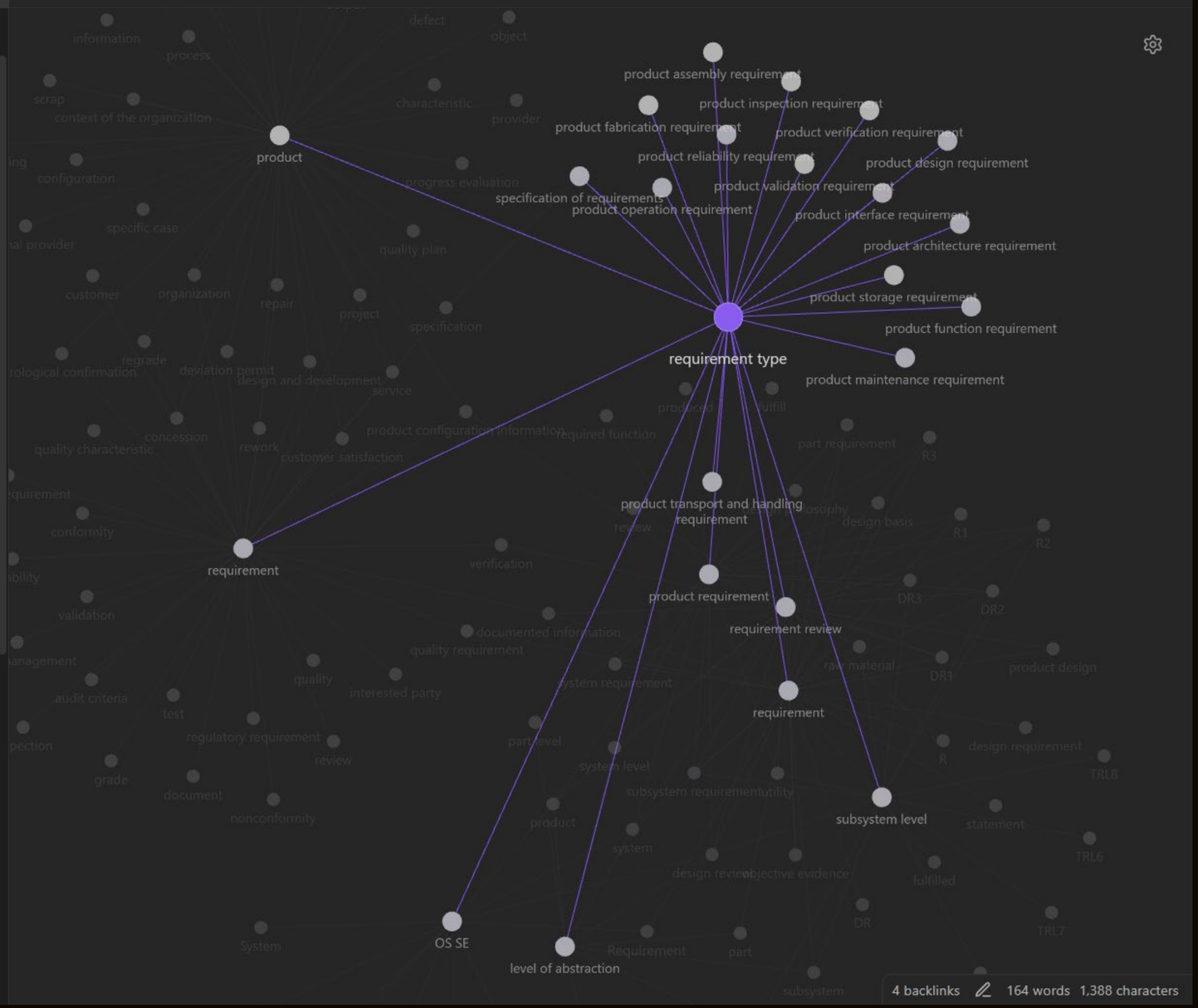
Note 2 to entry: Requirement types serve to modify requirements when placed before the word requirement, such as in product requirement, product architecture requirement, product design requirement or similar.

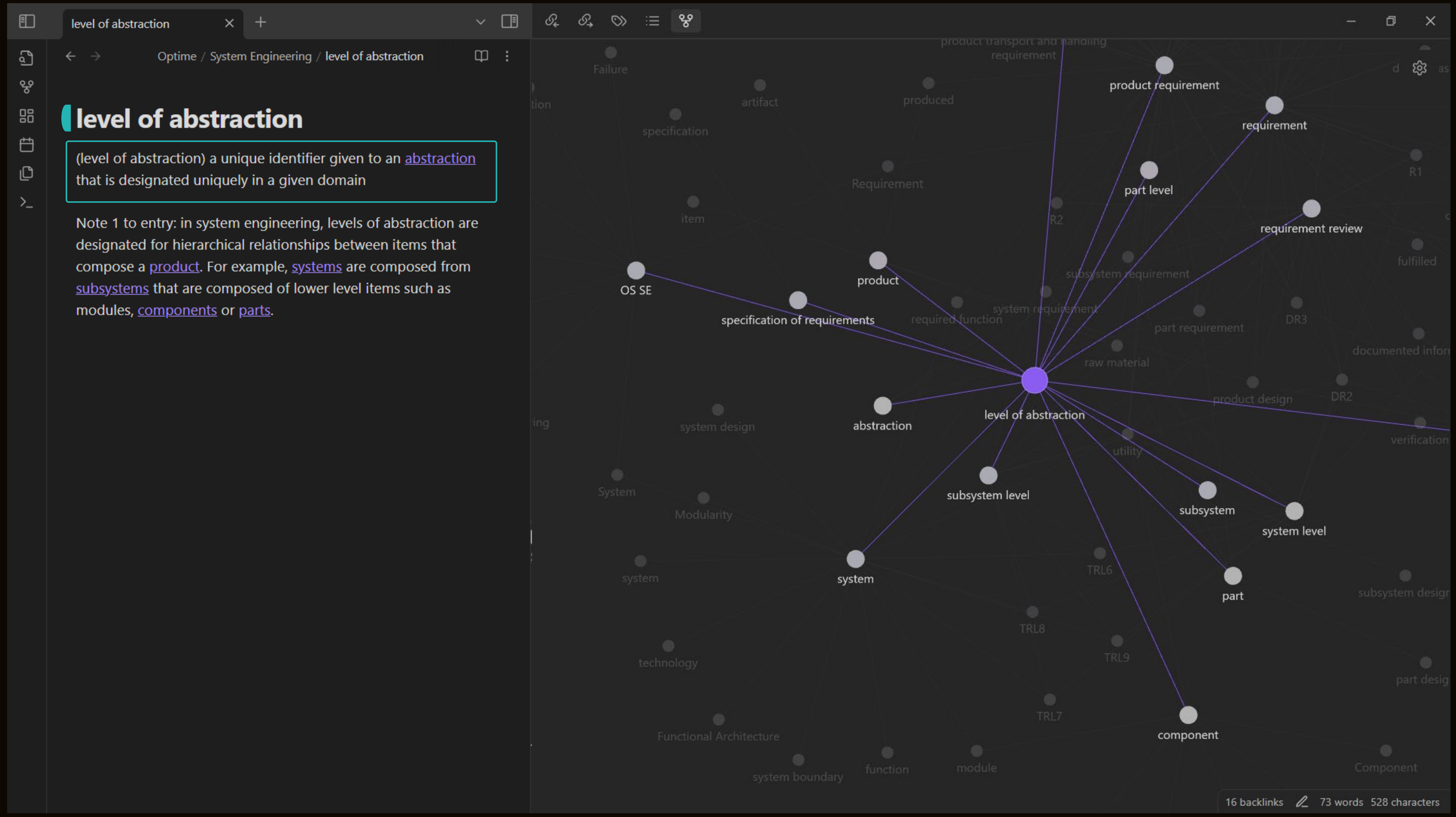
Note 3 to entry: Requirement types themselves can be modified for level of abstraction, such as in subsystem level product function requirement.

See also

ISO 9000
product, requirement

OS SE
level of abstraction, product architecture requirement, product design requirement, product function requirement, product interface requirement, product reliability requirement, product operation requirement, product fabrication requirement, product inspection requirement, product assembly requirement , product verification requirement, product transport and handling requirement, product storage requirement, product maintenance requirement, product validation requirement





requirement review

Optime / System Engineering / requirement review

requirement review

(requirements review /R) The verification process undertaken by stakeholders to determine if a requirement has been established and agreed upon by documented information and fulfilled by documented objective evidence

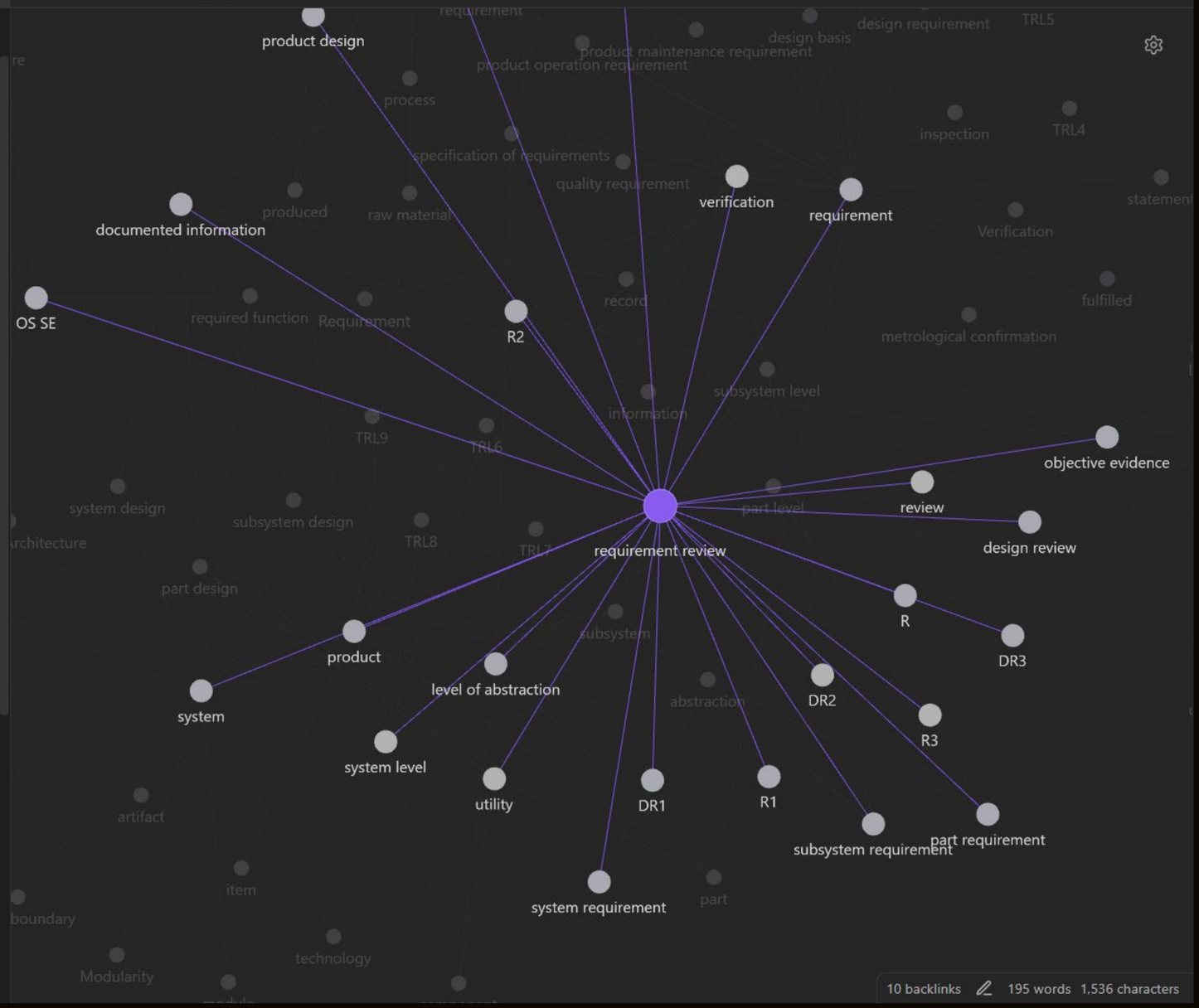
Note 1 to entry: In practice, requirements are qualified by their requirement type and or level of abstraction

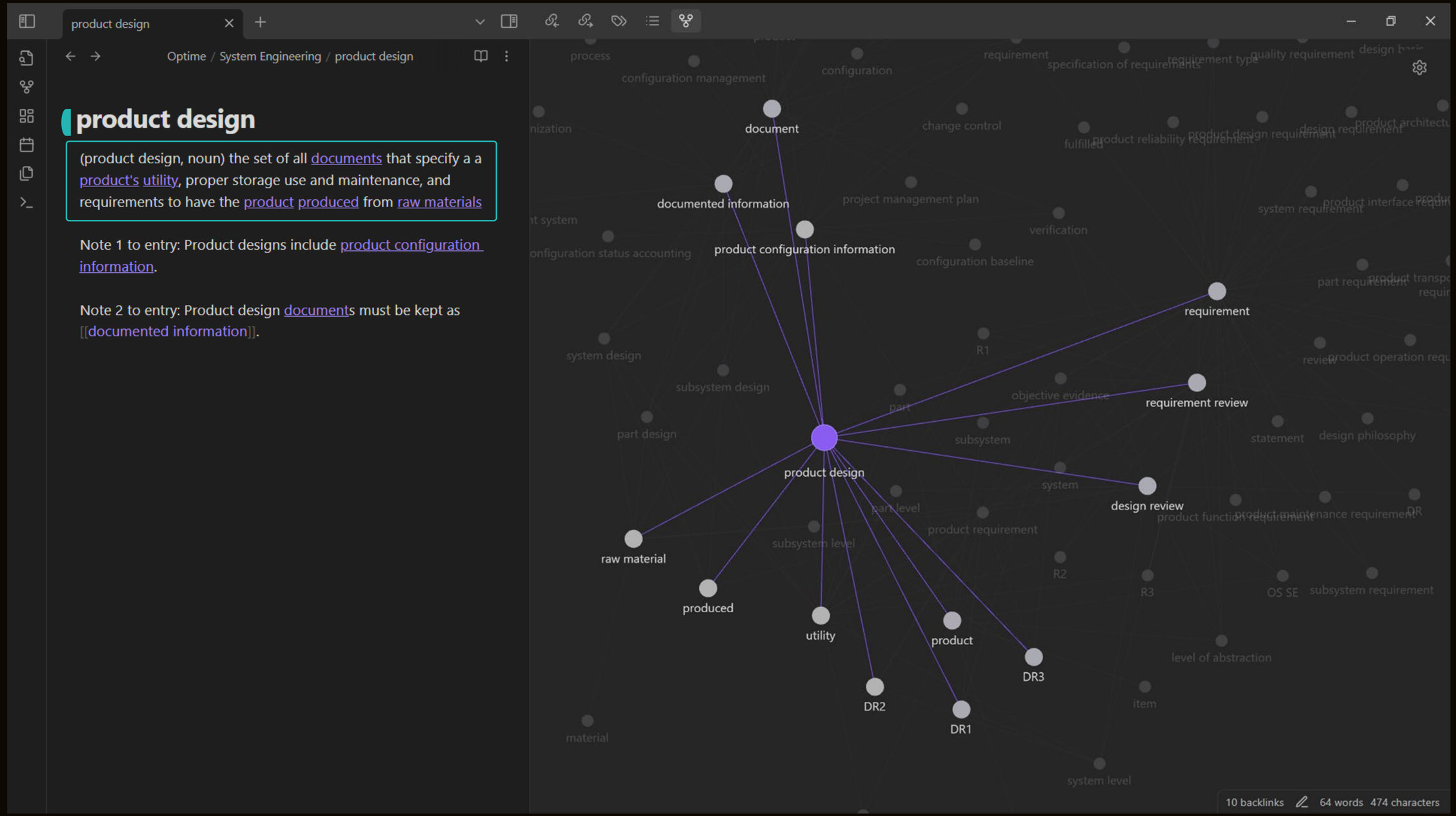
Note 2 to entry: Customers can establish product requirements at any level of abstraction.

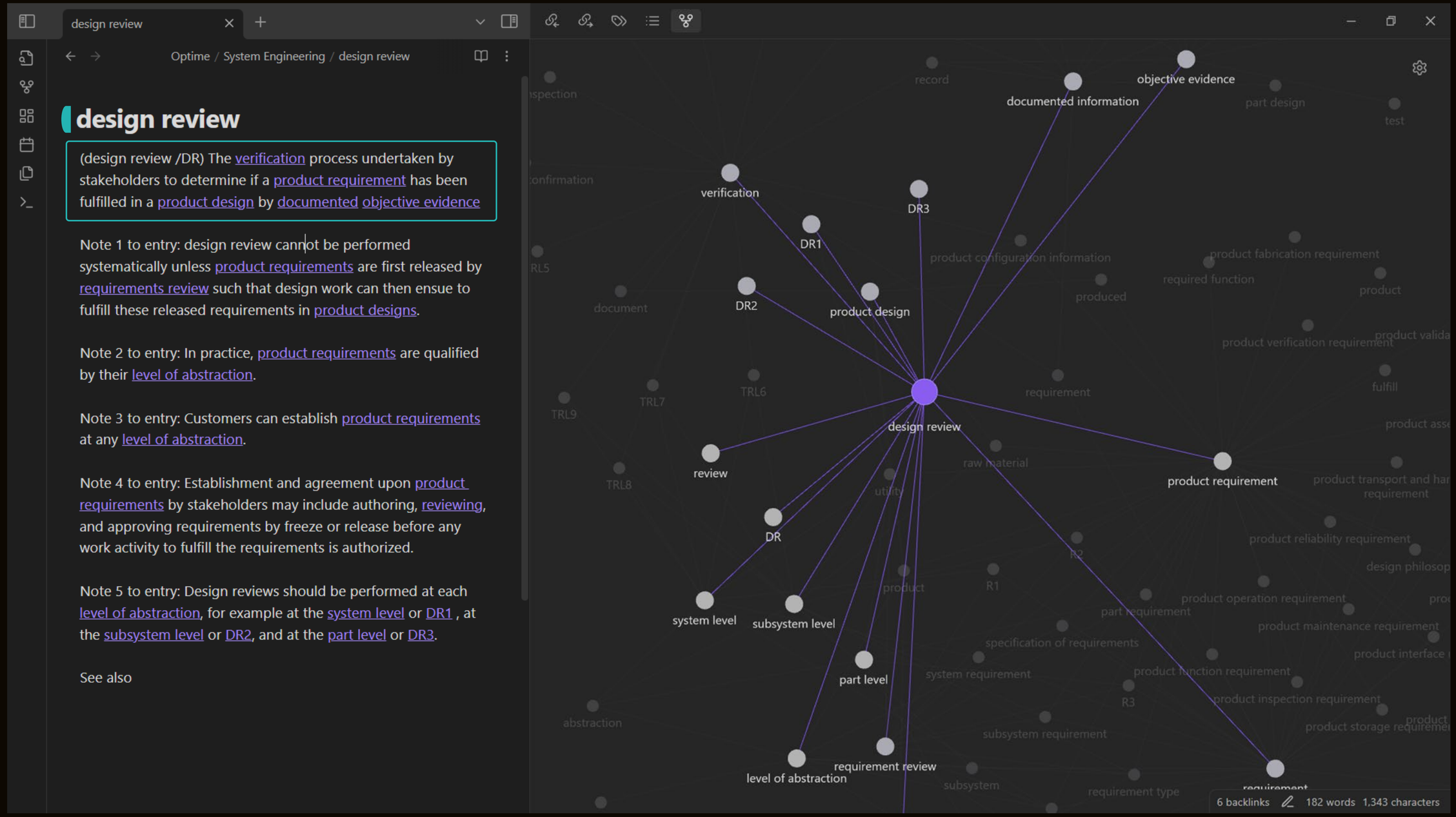
Note 3 to entry: Establishment and agreement upon requirements by stakeholders may include authoring, reviewing, and approving requirements by freeze or release before any work activity to fulfill the requirement is authorized. For example, a product requirement should be established, agreed, and frozen prior to commencement any affected product design work.

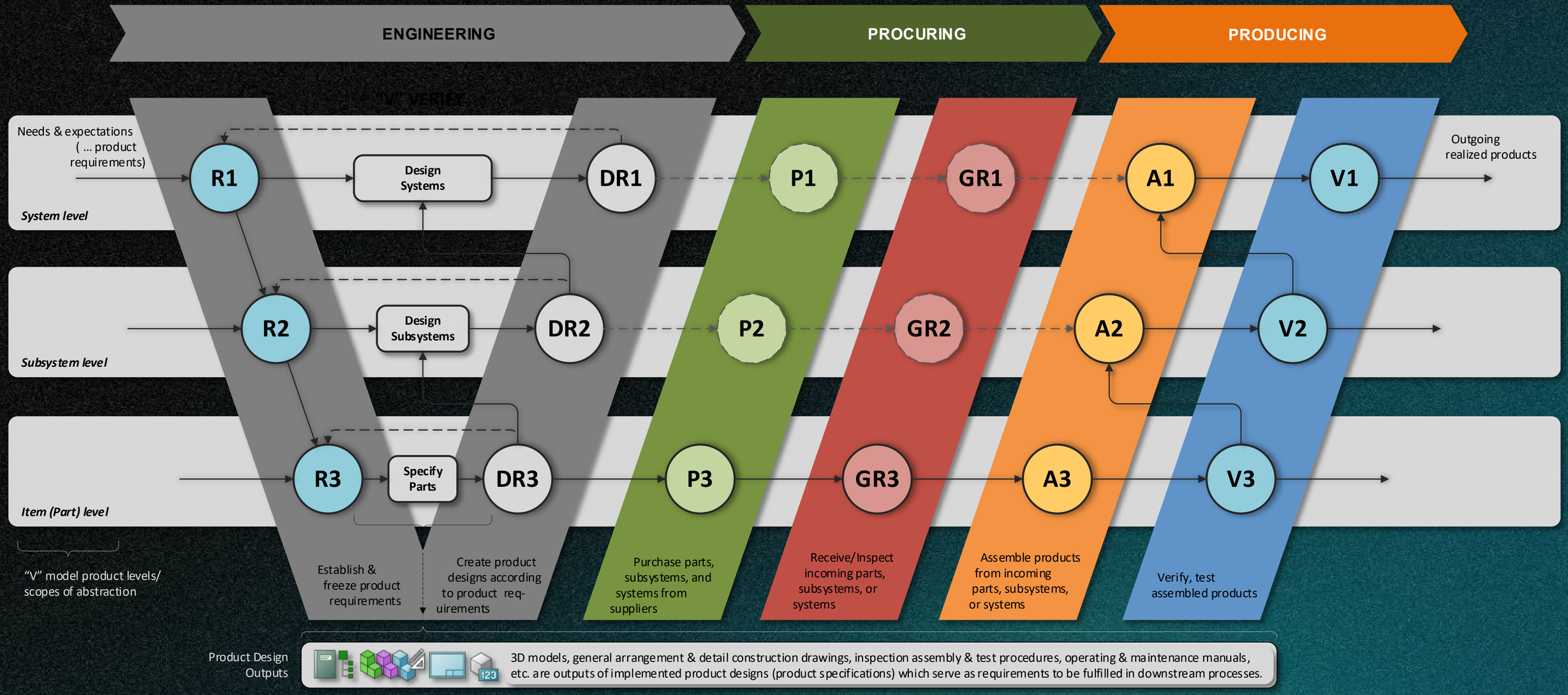
Note 4 to entry: At the system level, product requirements are often established based on customer needs and expectations for product or system utility. Subsystem requirements can then be derived from from the released system requirements, and part requirements from released subsystem requirements.

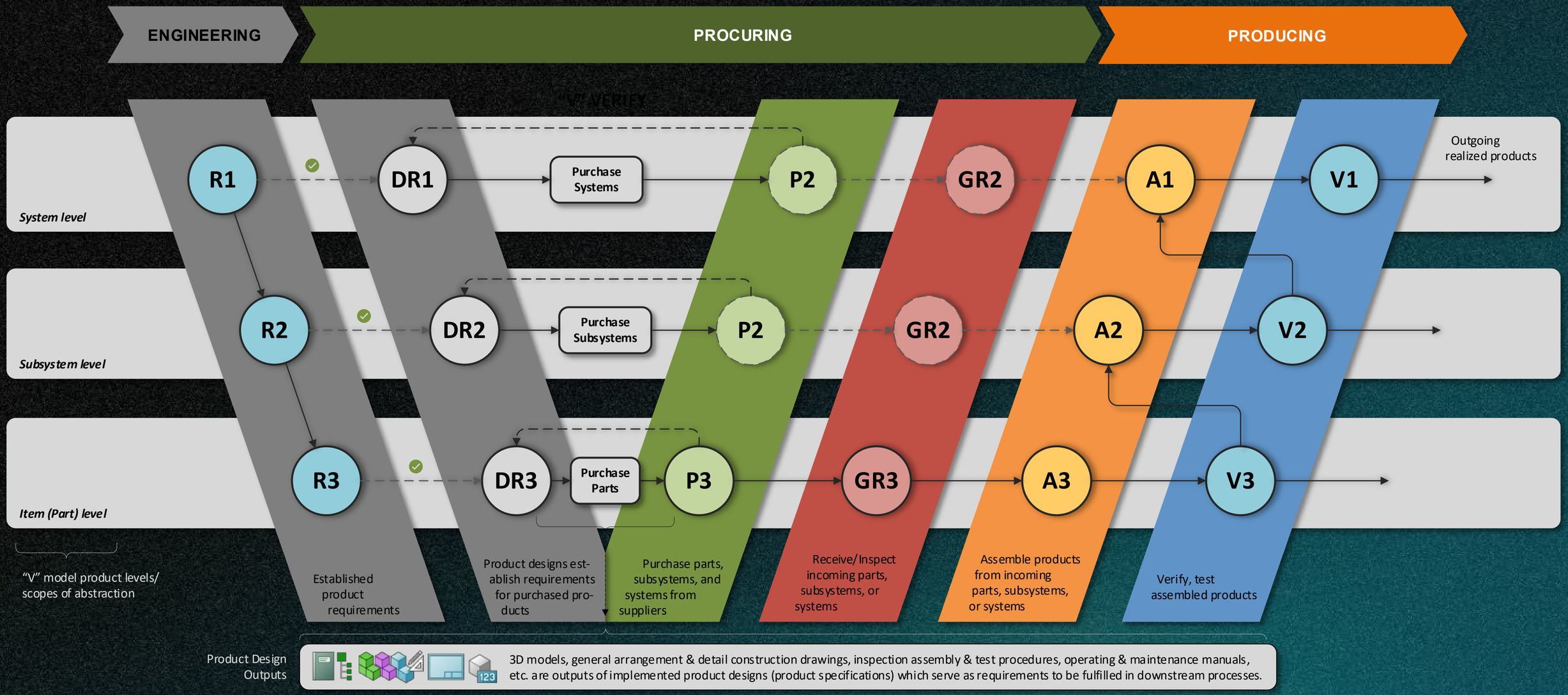
See also

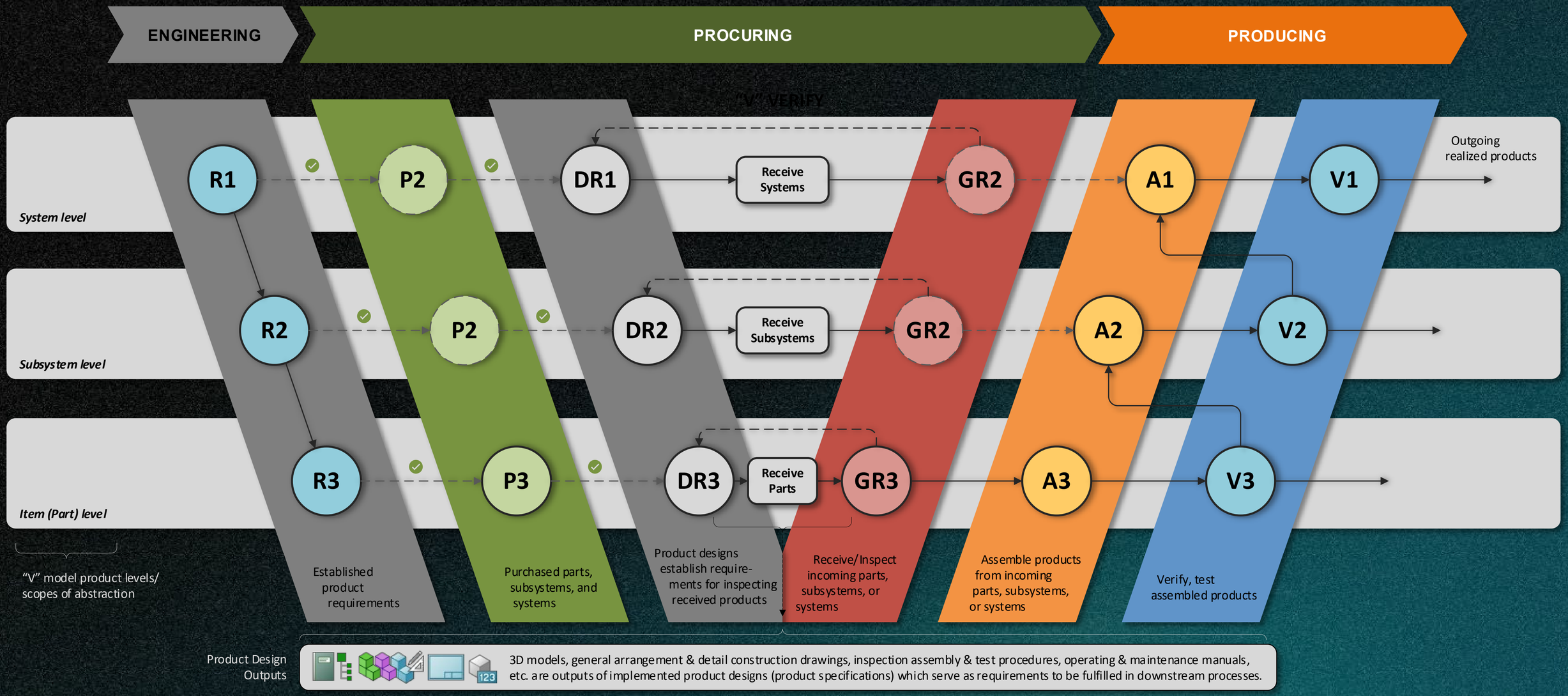


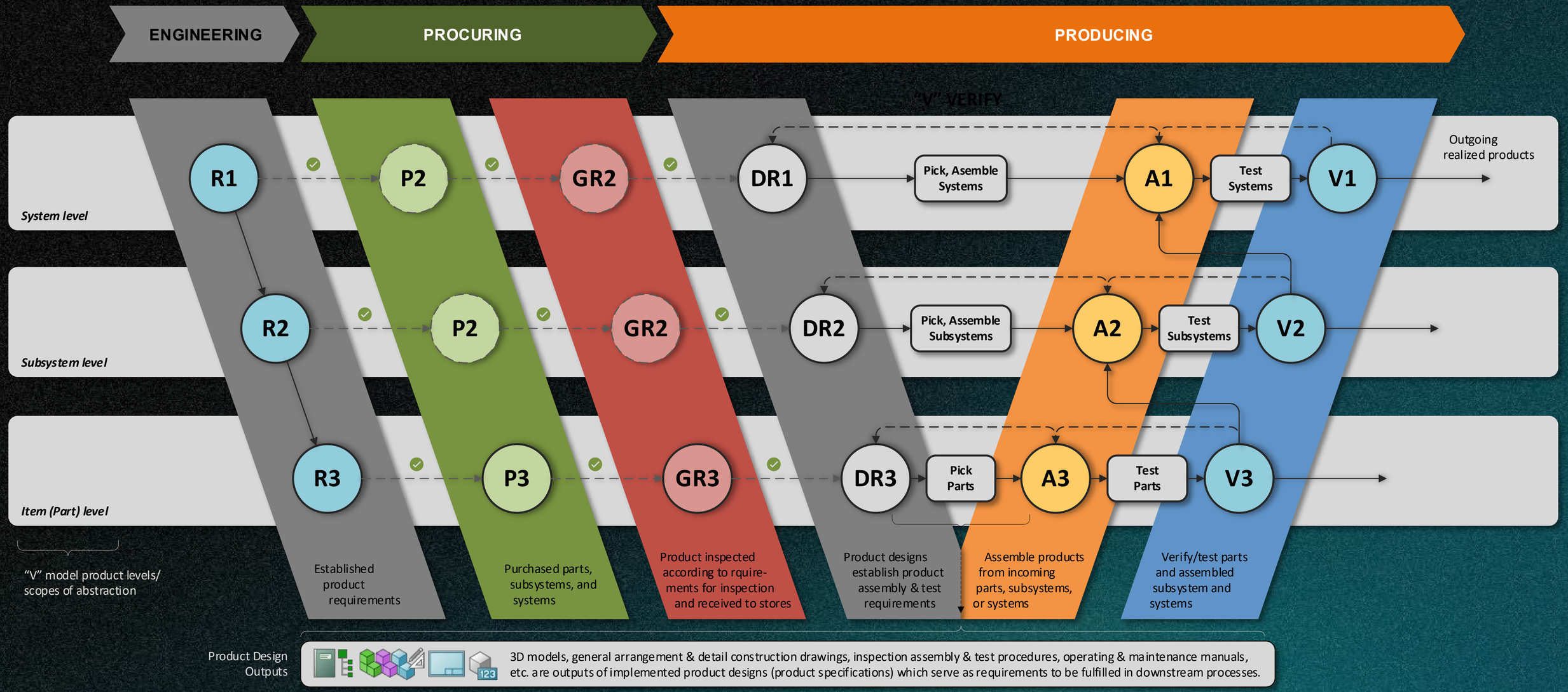












Value Chain

Sequential view for products

New Designs

100% Requirements

100% Quality

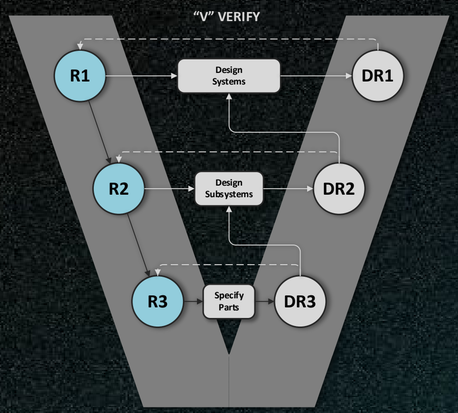
100% Proven

TRL 0 | TRL 1 - 2 | TRL 3 - 4 | TRL 5 - 7

Conceive → Design → Qualify → Procure → Assemble → Verify → Deploy → Validate → Maintain

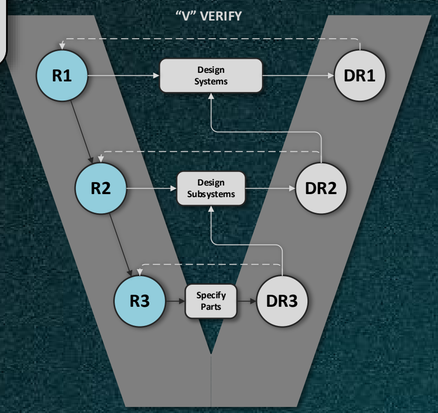
Enterprise Resource Planning

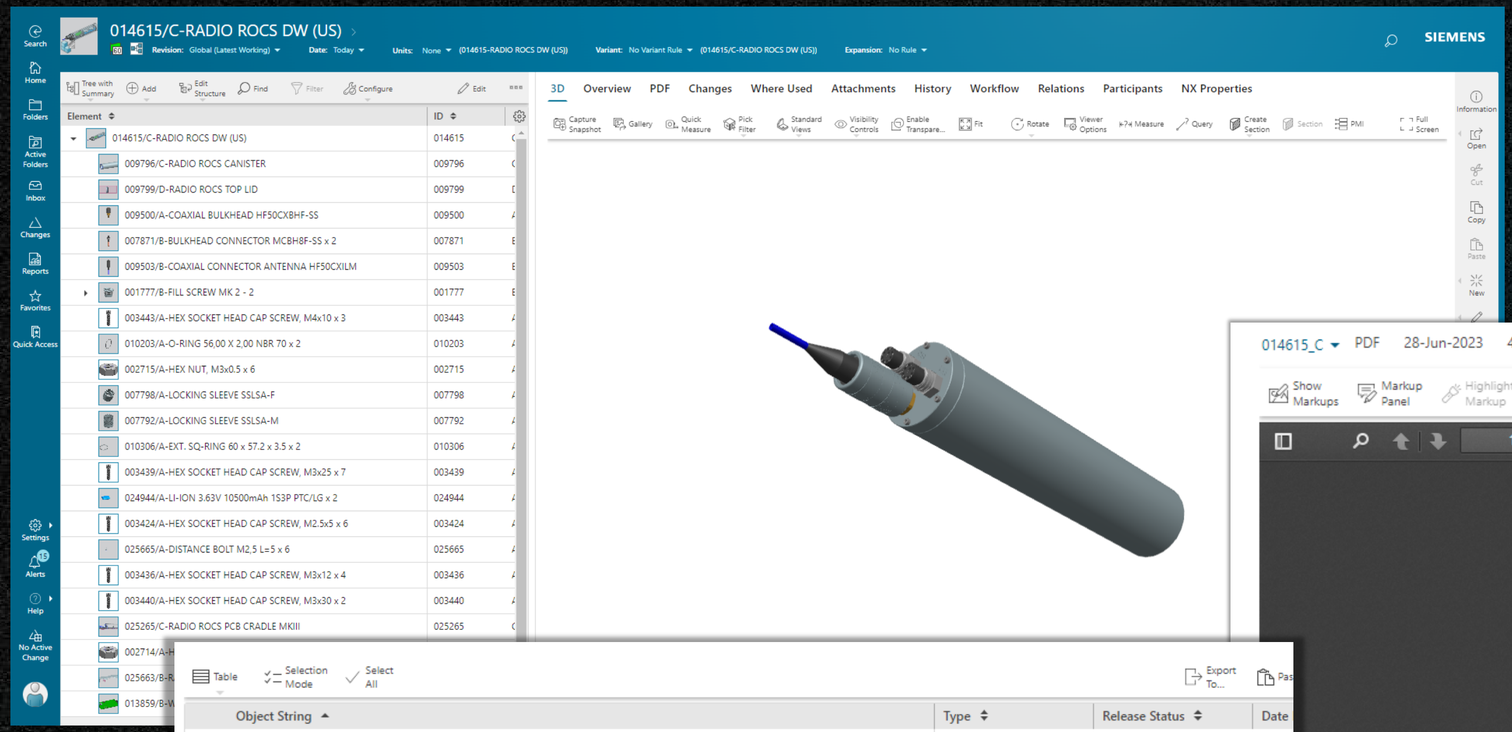
Product Lifecycle Management/PLM (Design Data)

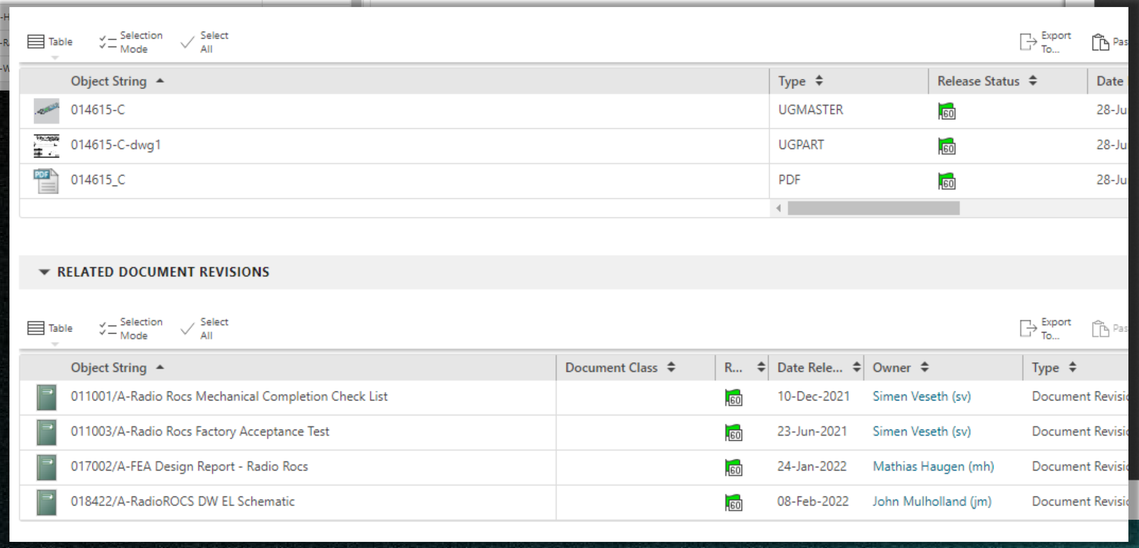


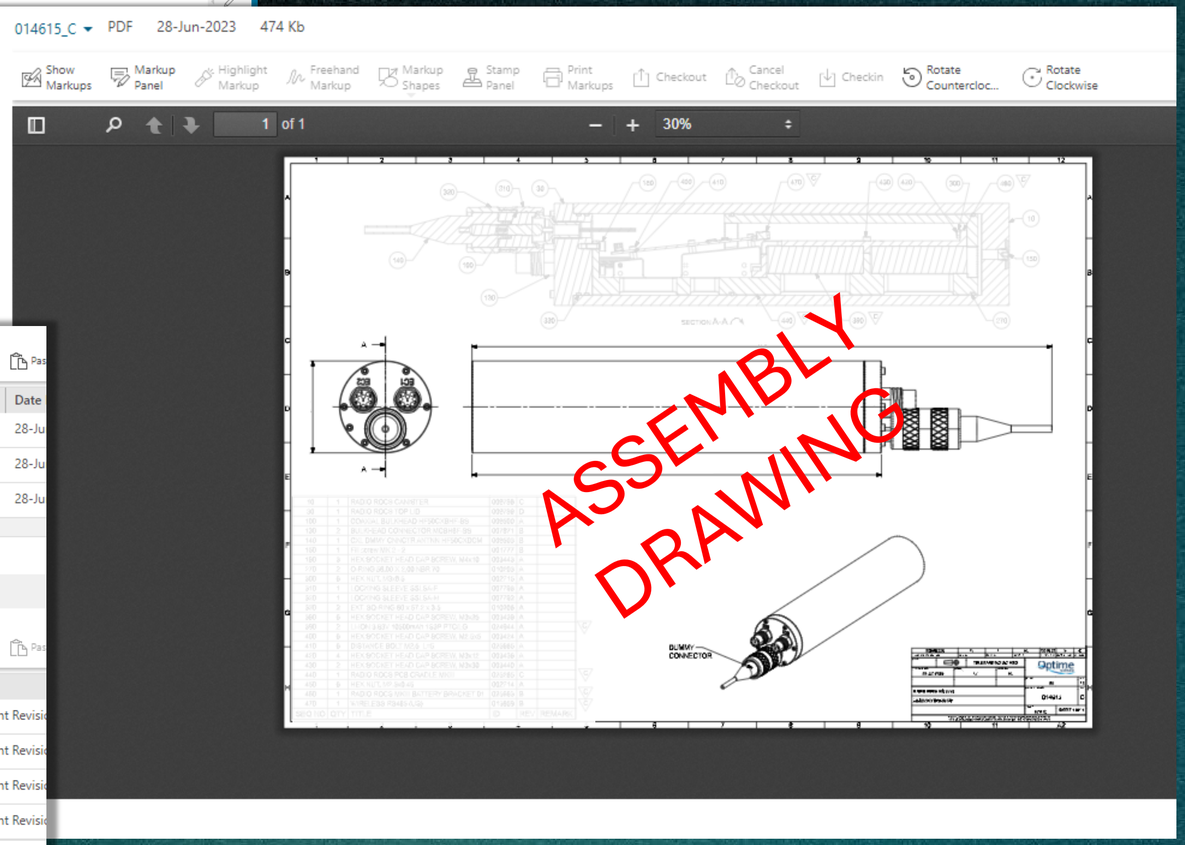
Service Life Cycle Management/SLM
(As-Built/ As-Maintained Records)

3D models, general arrangement & detail construction drawings, inspection assembly & test procedures, operating & maintenance manuals, etc. are outputs of implemented product designs (product specifications) which serve as requirements to be fulfilled in downstream processes.









Value Chain

Sequential view for products

New Designs

100% Requirements

100% Quality

100% Proven

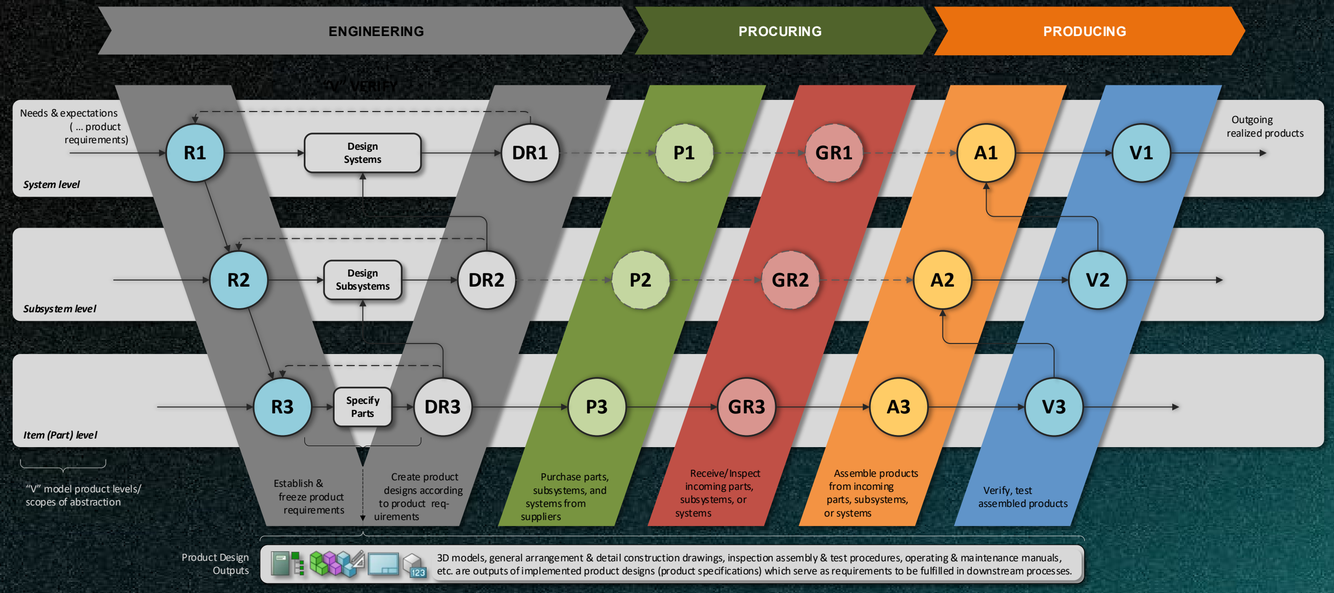
TRL 0 | TRL 1 - 2 | TRL 3 - 4 | TRL 5 - 7

Conceive → Design → Qualify → Procure → Assemble → Verify → Deploy → Validate → Maintain

Enterprise Resource Planning

Product Lifecycle Management/PLM (Design Data)

Service Life Cycle Management/SLM
(As-Built/ As-Maintained Records)



Value Chain

Sequential view for products

New Designs

100% Requirements

100% Quality

100% Proven

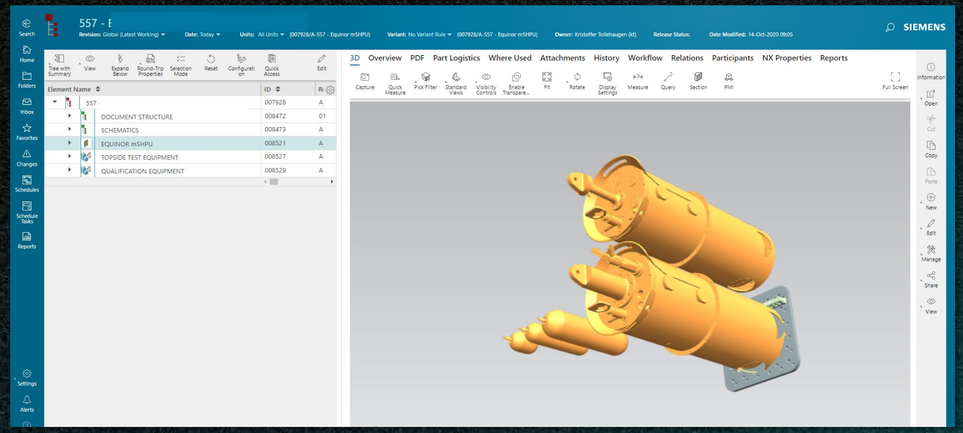
TRL 0 | TRL 1 - 2 | TRL 3 - 4 | TRL 5 - 7

Conceive → Design → Qualify → Procure → Assemble → Verify → Deploy → Validate → Maintain

Enterprise Resource Planning

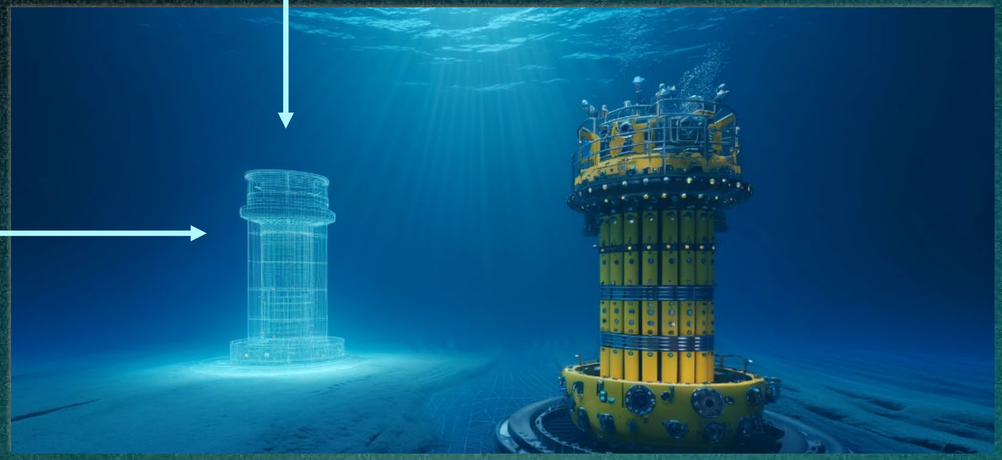
PLM

Individual unit-designs serve to clone digital-twins to collect all manufacturing and test records, and later service records in deployment



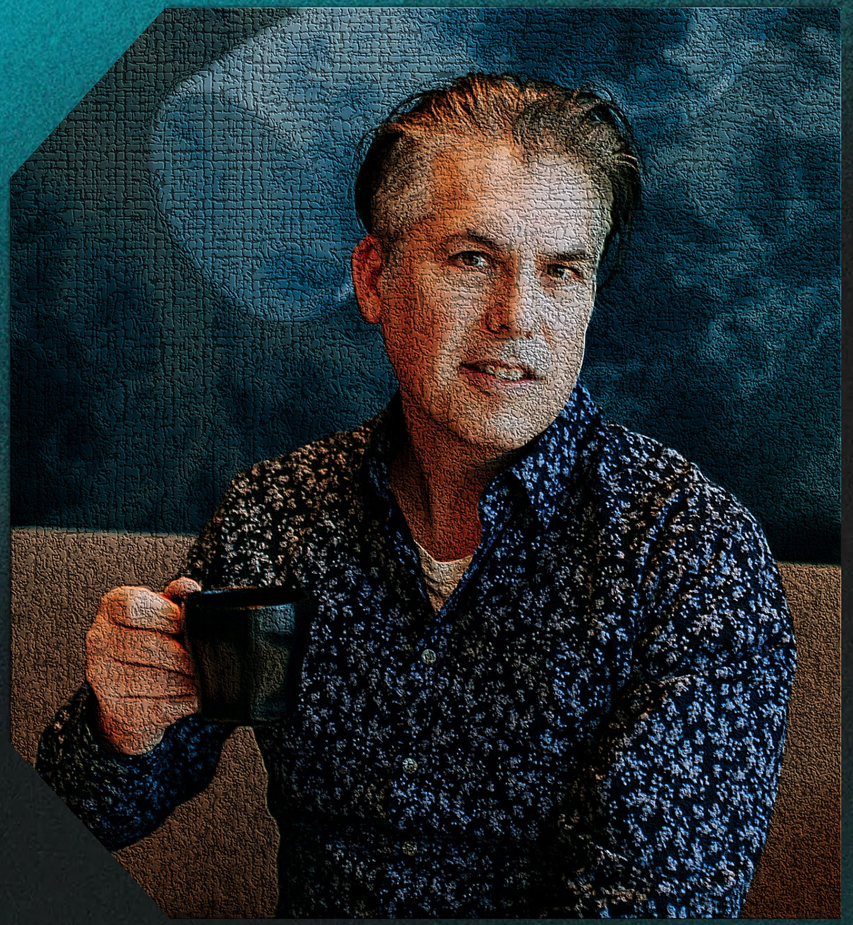
Digital Twins in-service deployments accrue all records by SN of repair, rework, & re-engineering

SLM



Fictitious product illustrating actual in-service equipment and its shadowing digital twin

THANK YOU!



John Pastor
Vice President Enterprise Architecture
jp@optimesubsea.com