


Engineering

CMMI for Development V.1.2

Module 3

Agenda

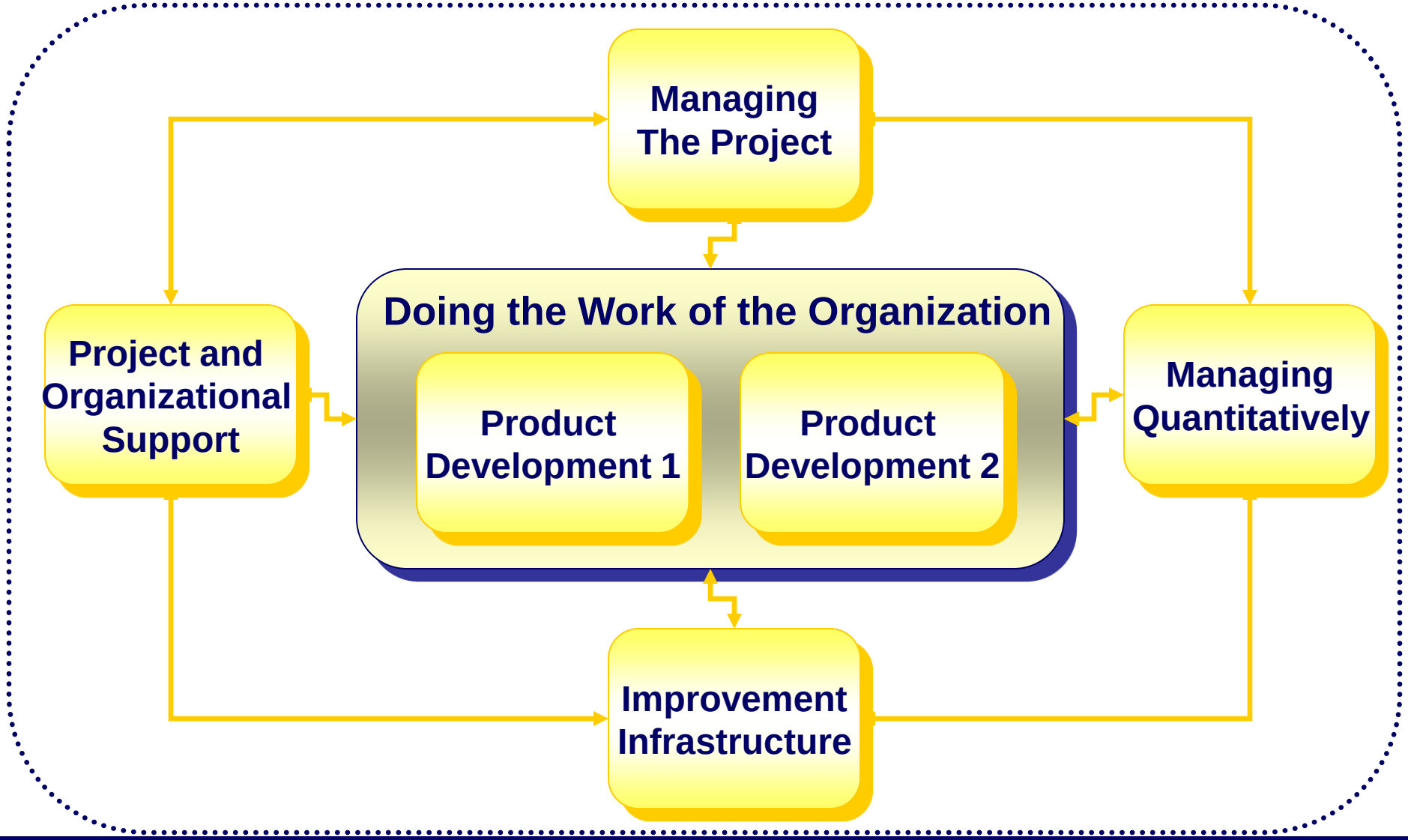
- Global scope
- RD Requirements Development
- REQM Requirements Management
- TS Technical Solution
- PI Product Integration
- VER Verification
- VAL Validation
- SE Process vs. CMMI Engineering

Module 03 / Engineering
- Requirements Engineering (REQM, RD)
- Building the Product (TS, PI)
- Quality in Engineering (VAL, VER)

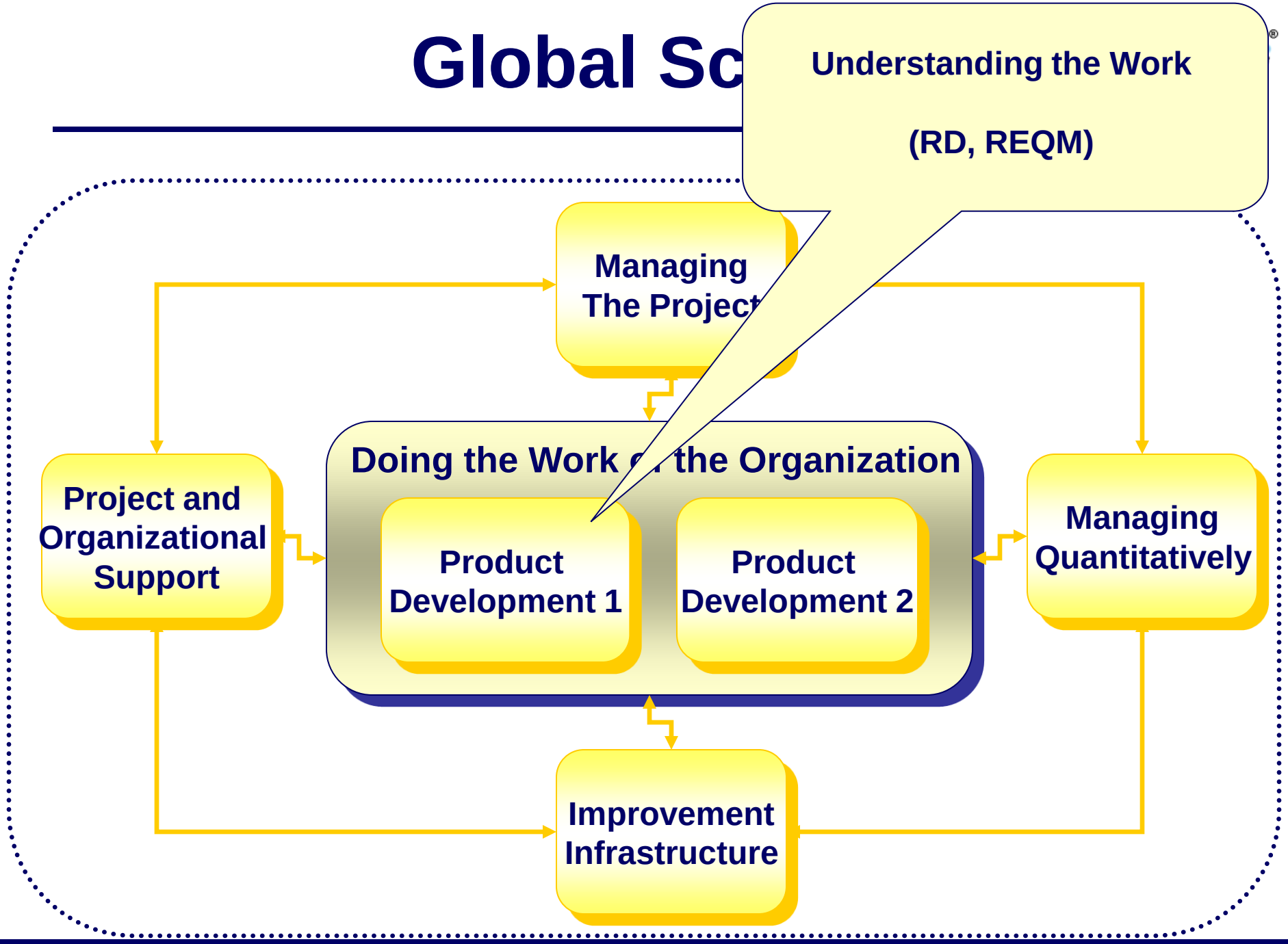
Scope

			Engineering	Support
ML5	OID			CAR
ML4	OPP	QPM		
ML3	OPF OPD+IPPD OT	IPM+IPPD RSKM	RD TS PI VAL VER	DAR
ML2		PP PMC SAM	REQM	CM MA PPQA
ML1				

Global Scope



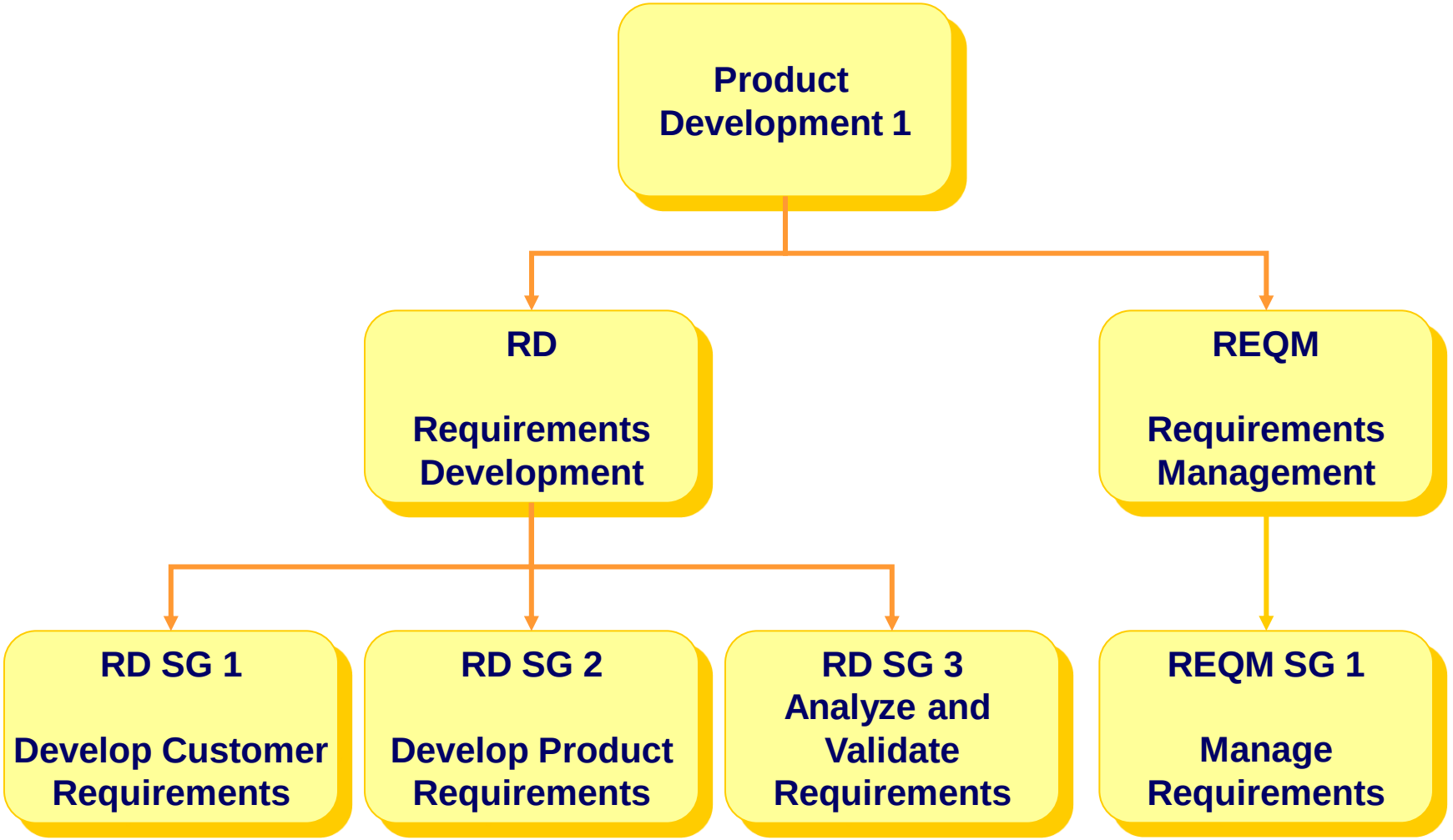
Global Sc


Understanding the Work
(RD, REQM)
Managing The Project
Project and Organizational Support
Doing the Work of the Organization
Product Development 1
Product Development 2
Managing Quantitatively
Improvement Infrastructure

Product Development 1

- **Establishing and maintaining sets of requirements**
  - customer requirements
  - product requirements
  - product-component requirements
  - managing the requirements as the product evolves

Product Development 1



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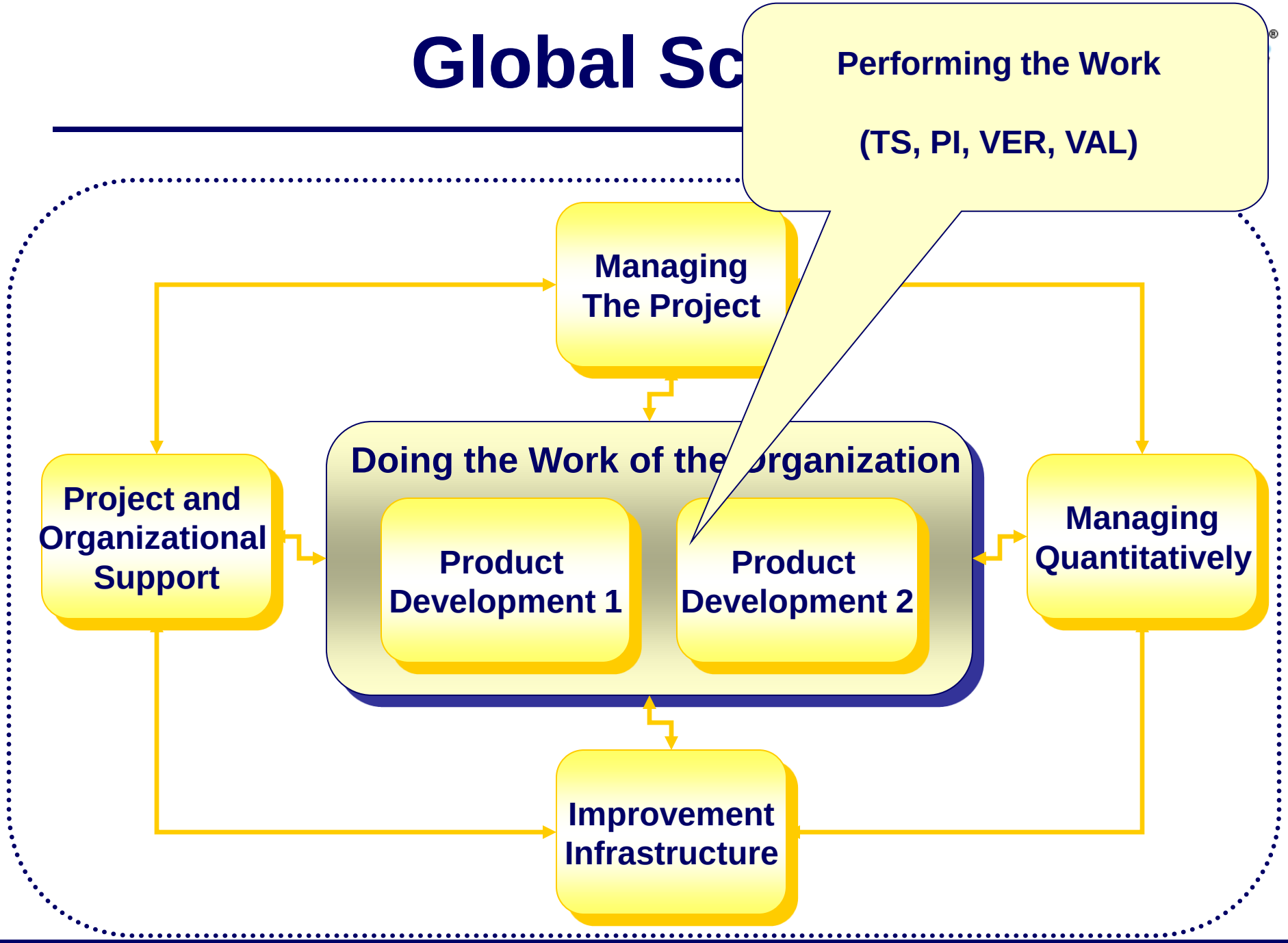
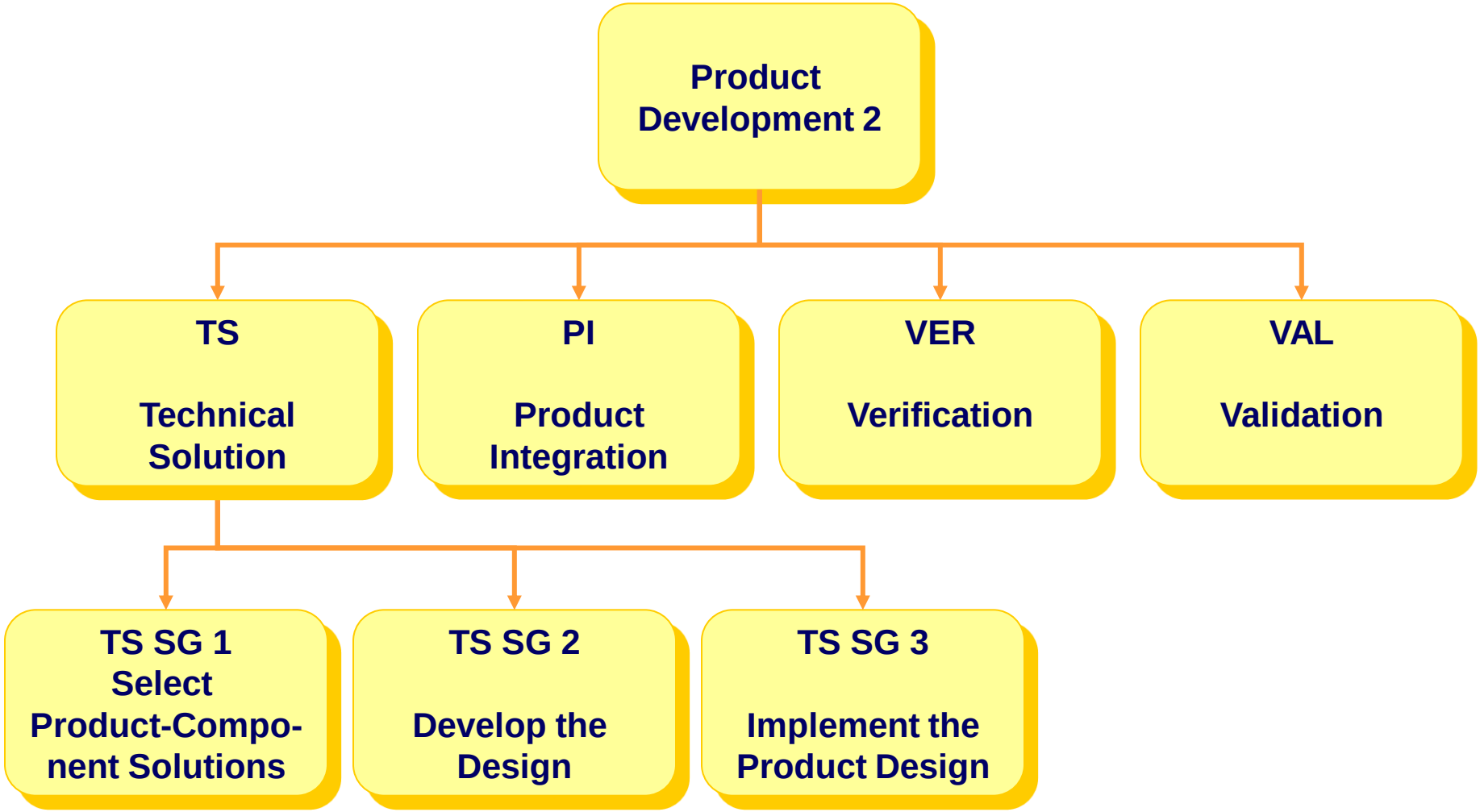

Performing the Work
(TS, PI, VER, VAL)
Managing The Project
Doing the Work of the Organization
Project and Organizational Support
Product Development 1
Product Development 2
Managing Quantitatively
Improvement Infrastructure

Product Development 2

- **System / Product Development**
  - Designing the product and its components
  - Managing the interfaces
    - among the components
    - between the product and the other products
  - Building the components
  - Integrating the components into the product
  - Ensuring the requirements are satisfied
  - Ensuring the product will perform as intended
  - Delivering the product

Product Development 2



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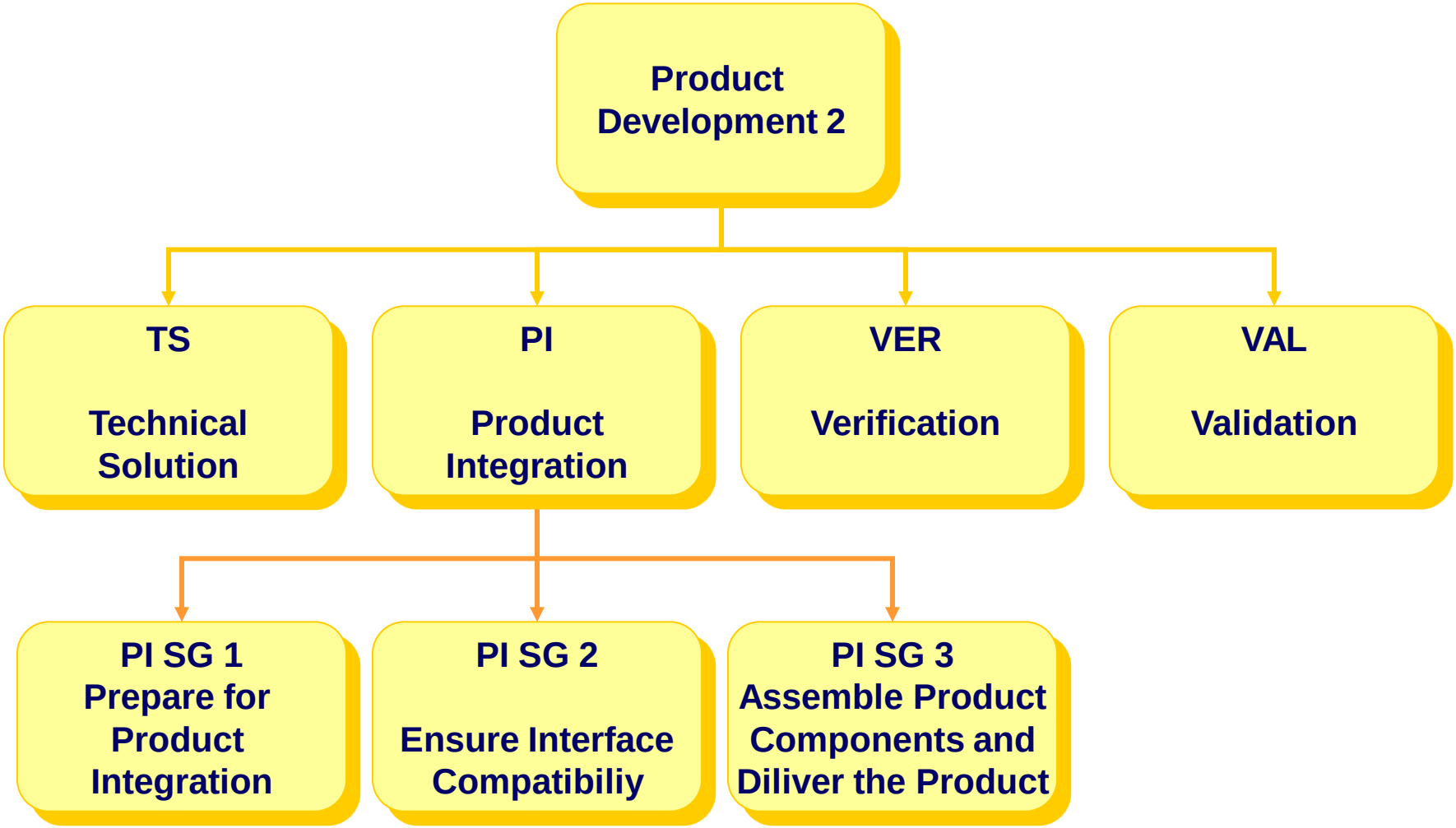

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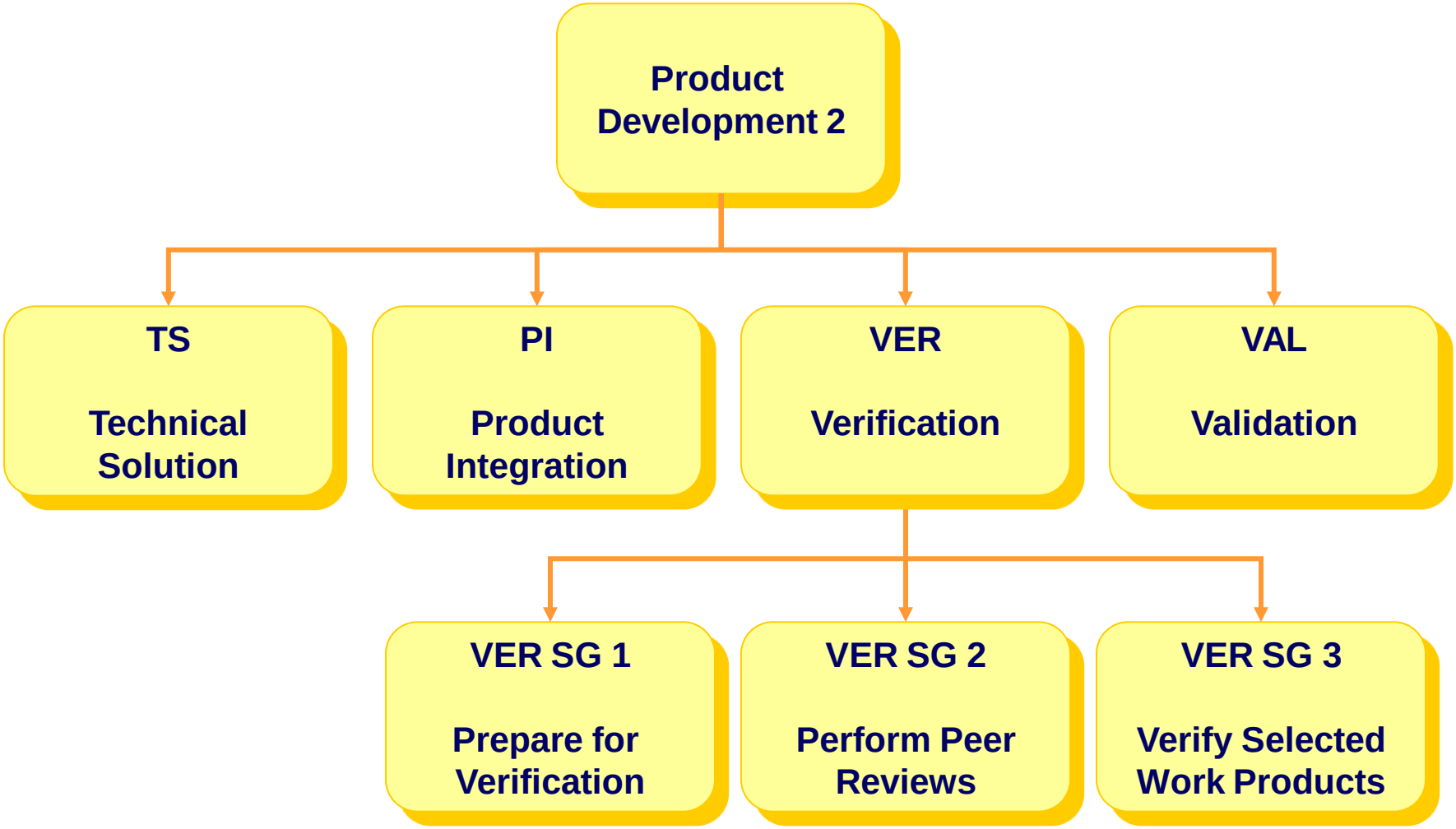

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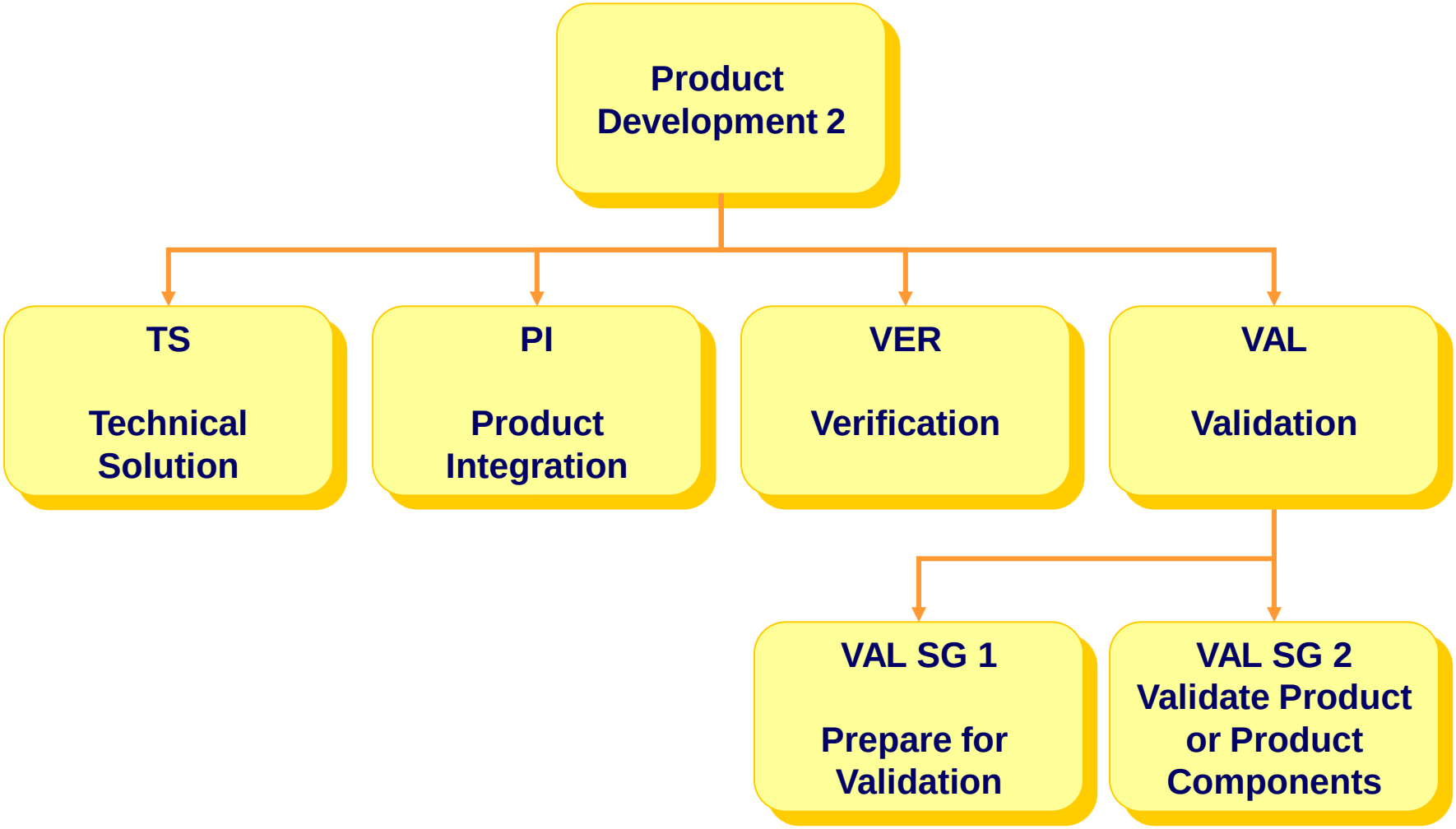

Product Development 2

- **Relationship to the Waterfall life cycle**
  - CMMI PAs are not generally aimed at describing phases of a Waterfall life cycle
  - Engineering PAs are in a tight connection with Waterfall life cycle for product development
  - Engineering PAs do not impose any specific model of applying Waterfall life cycle phases
    - RD, TS, PI, VER, and VAL activities may take place recursively throughout the life cycle

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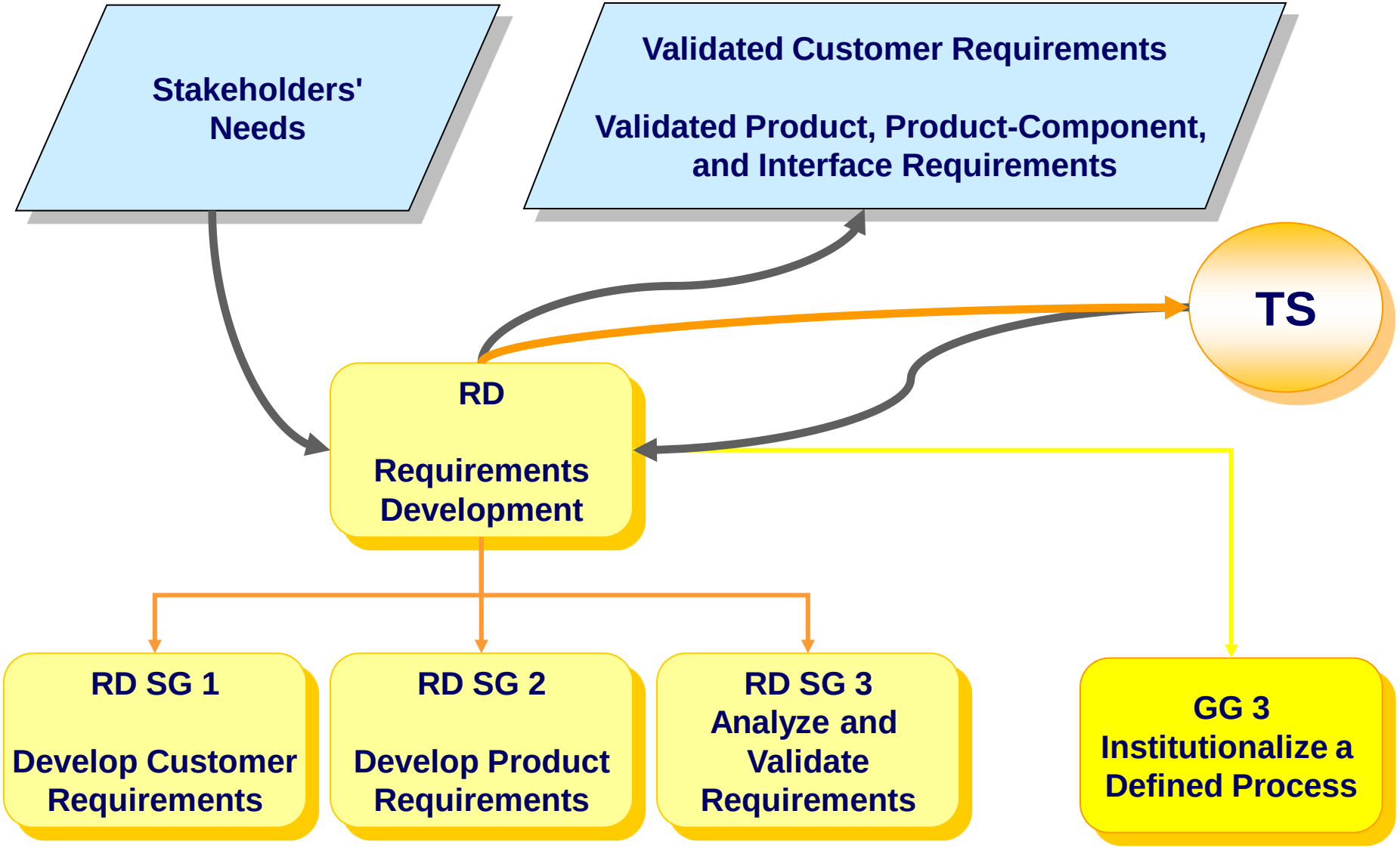
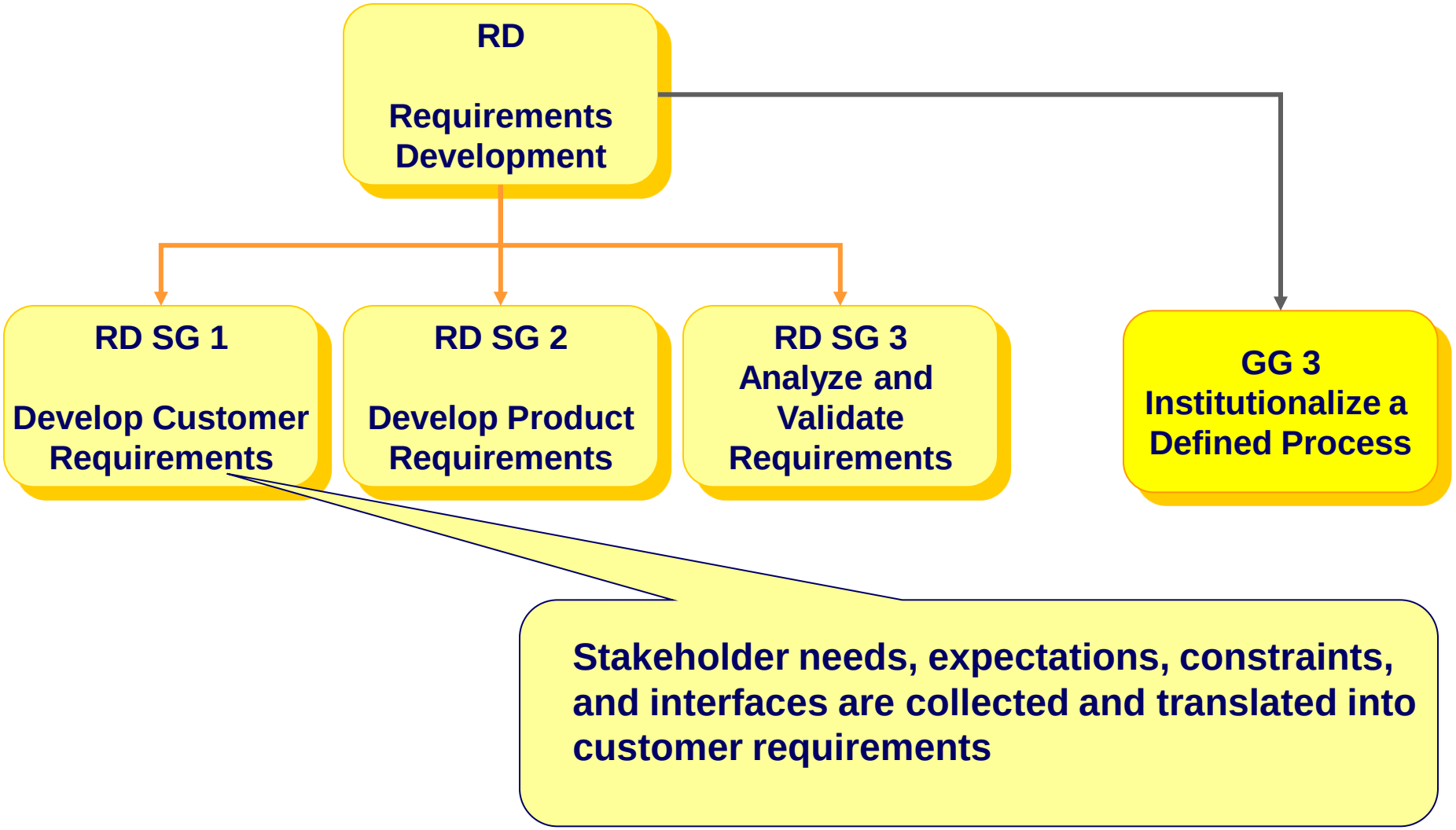
Requirements Development



Requirements Development



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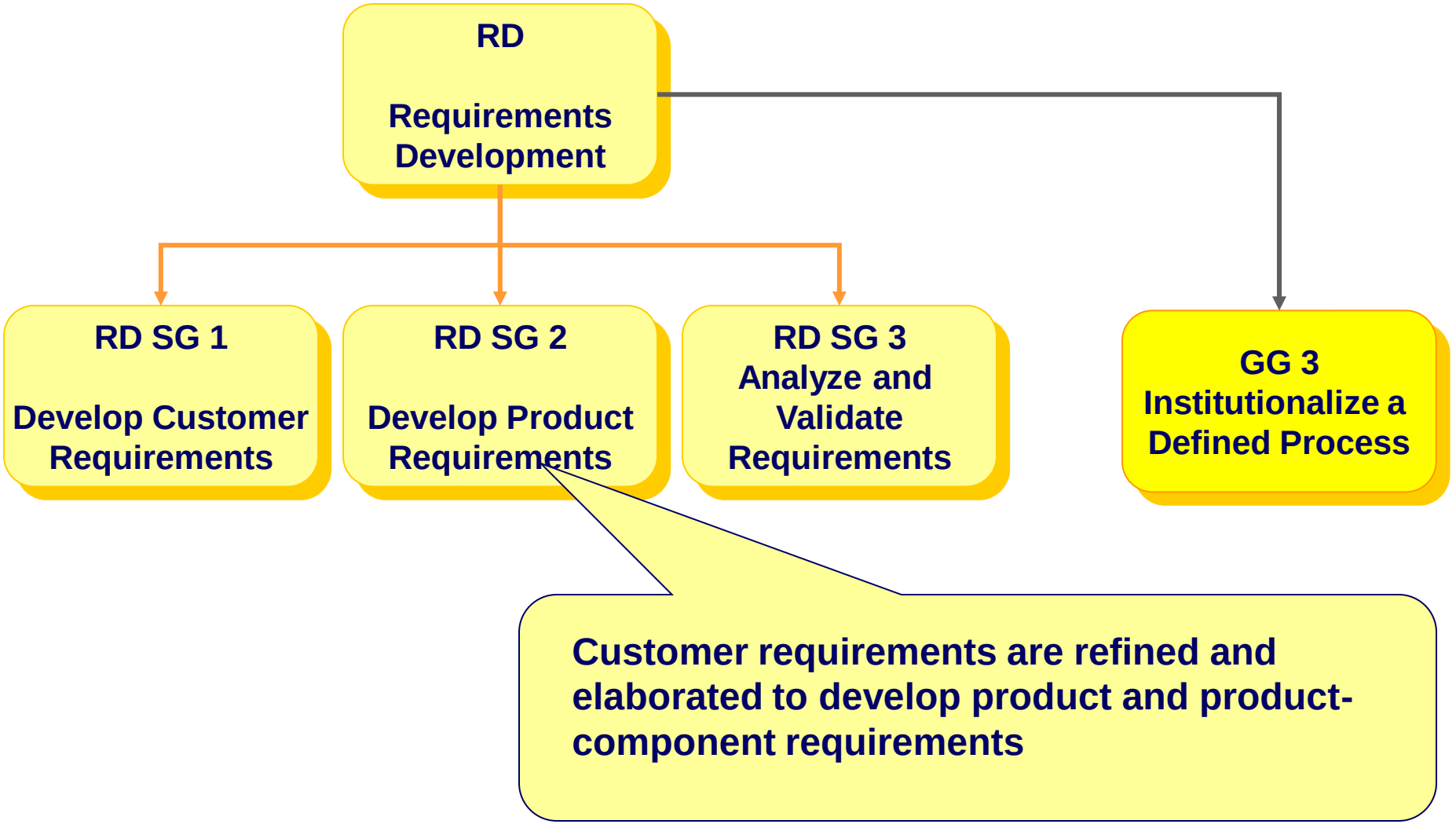

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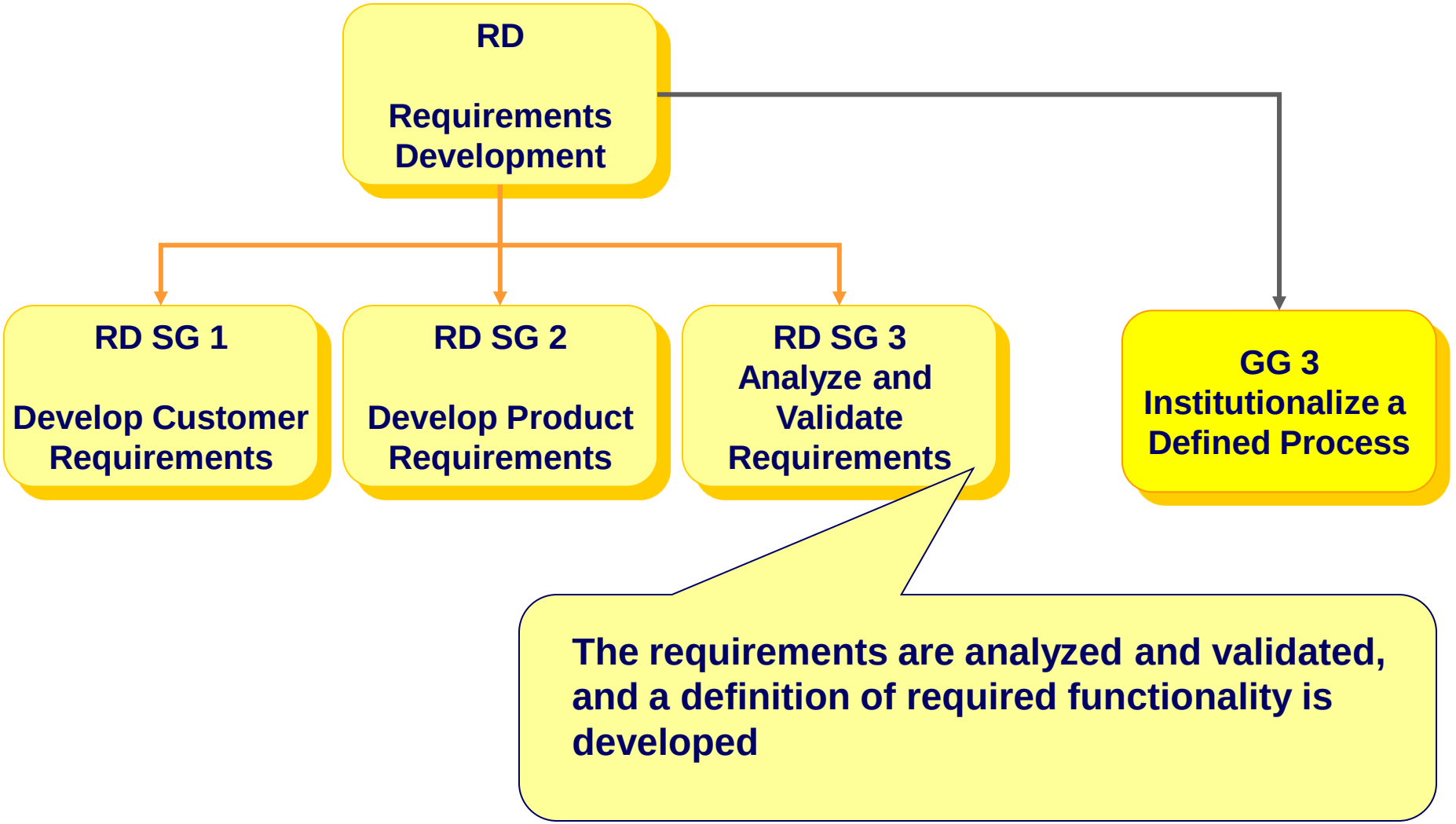


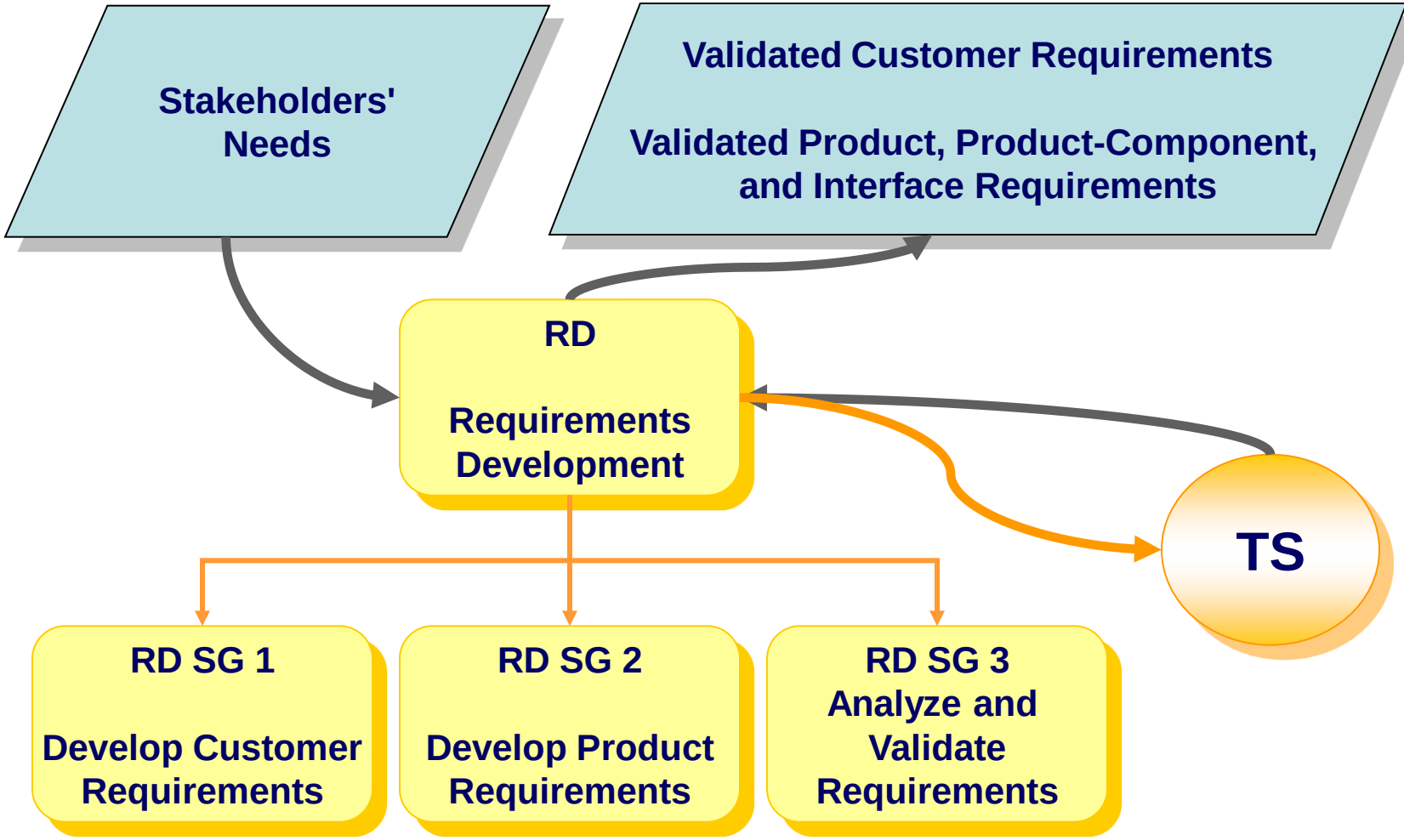
Requirements Development

- **Additional Relevant Terminology**
  - **Allocated Requirement**
    - Requirement that levies all or part of a higher level requirement (functionality, performance) on a lower level architectural or design component
  - **Derived Requirement**
    - Requirement that is not stated explicitly in the customer requirements, but are inferred from
      - contextual requirements (law, standards, policies, etc.)
      - reqirements needed to specify a product component

Requirements Development

- **About functional decomposition**
  - RD allowes (or even undertakes) performing a functional decomposition of a
    - system being analyzed, or
    - product being developed
  - Motivation:
    - it is very rarely to expect that a project start off with a complete and precise specified knowledge of requirements

Requirements Development



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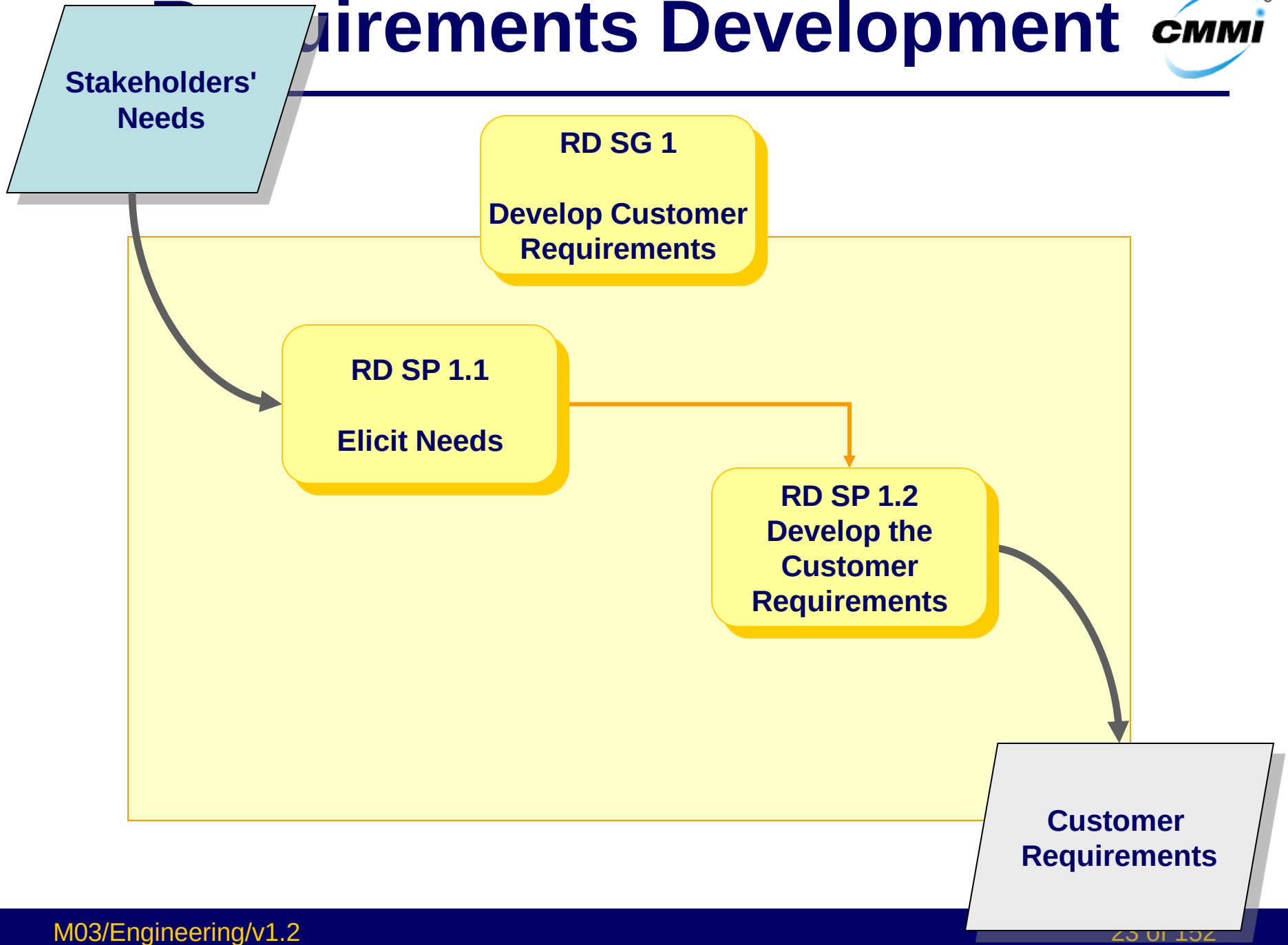

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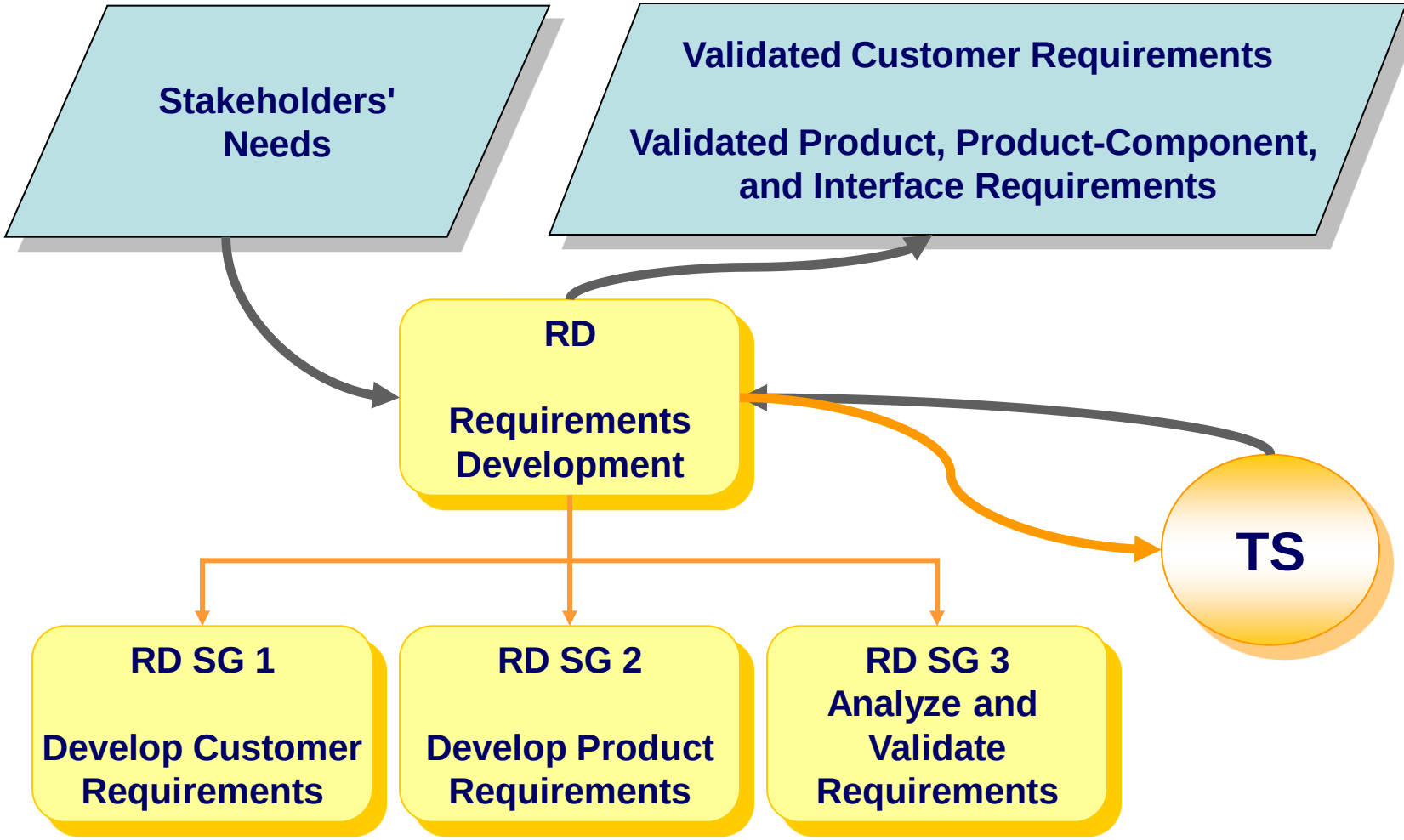

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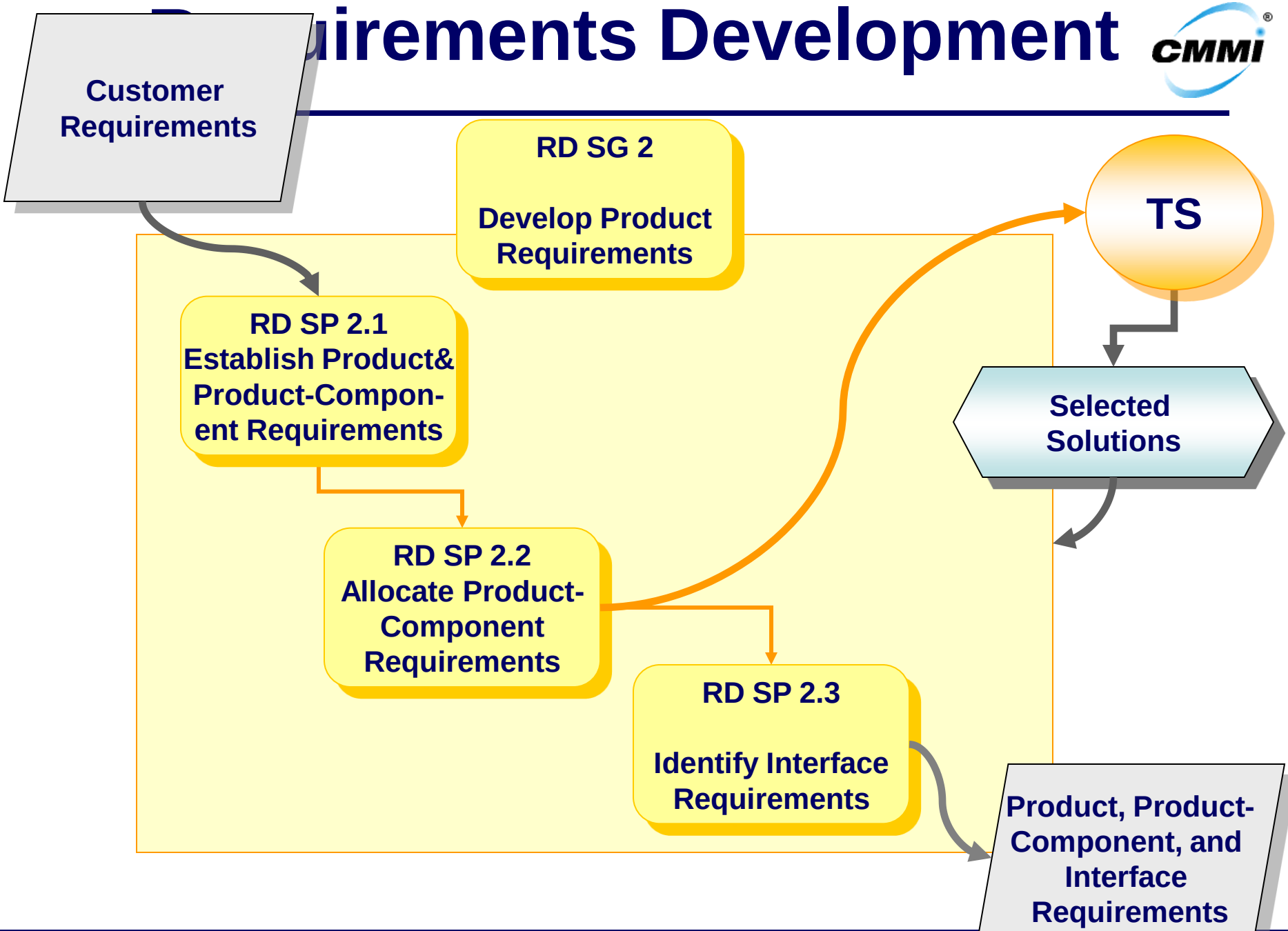

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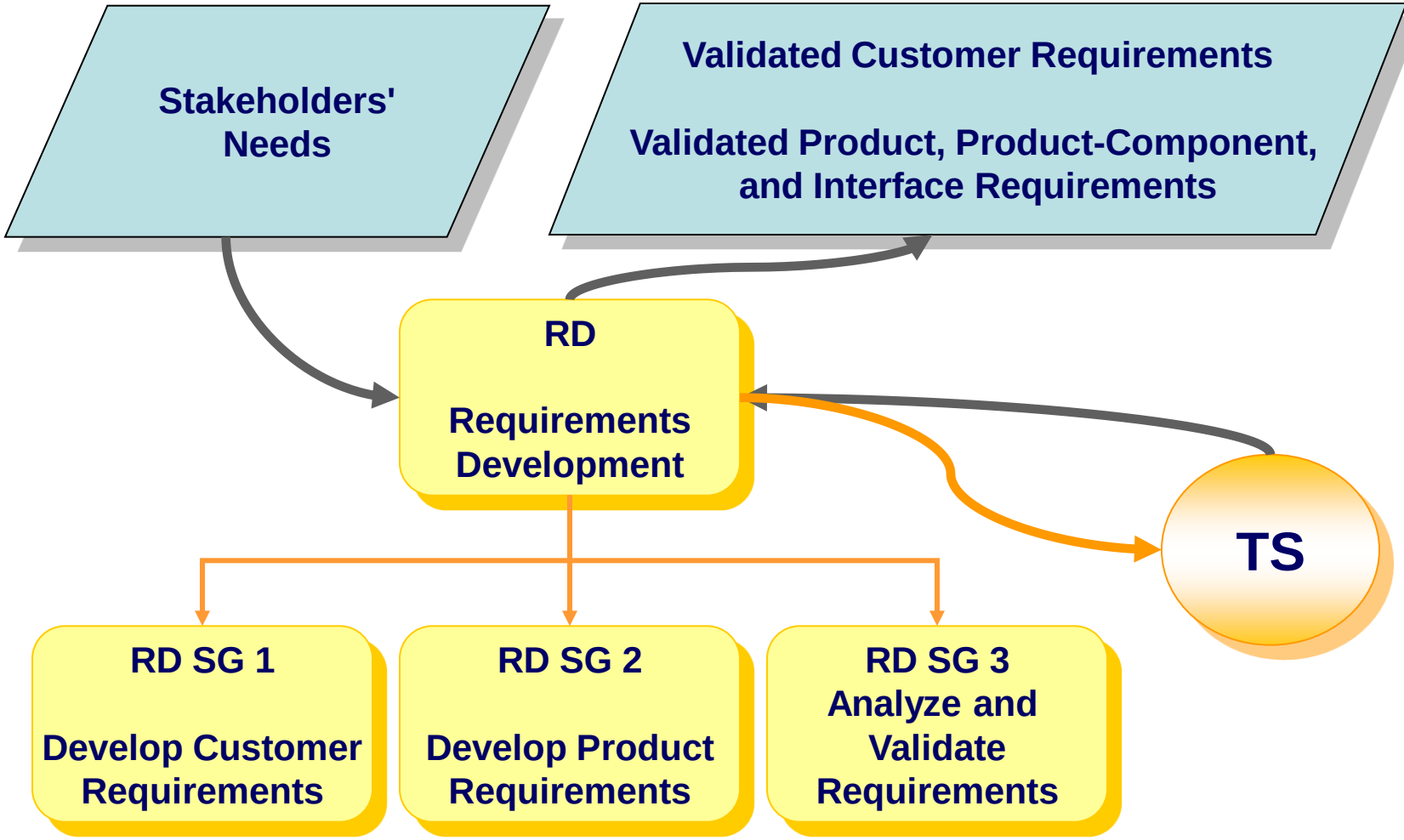

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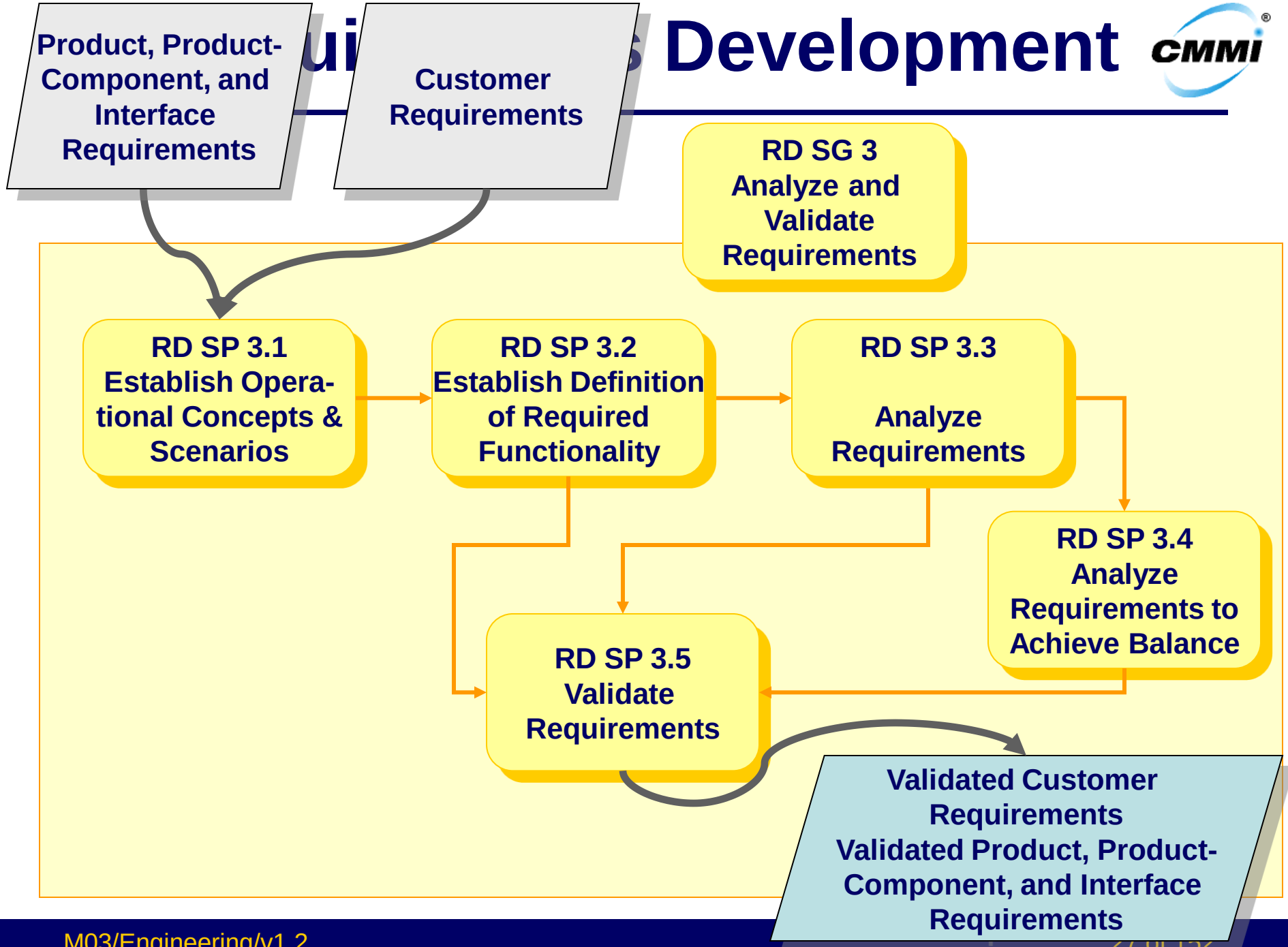

Requirements Development

- **Specific Goals**
  - SG 1 Develop Customer Requirements
    - Stakeholder needs, expectations, constraints, and interfaces are collected and translated into customer requirements
  - SG 2 Develop Product Requirements
    - Customer requirements are refined and elaborated to develop product and product-component requirements
  - SG 3 Analyze and Validate Requirements
    - The requirements are analyzed and validated, and a definition of required functionality is developed

SG 1 Develop Customer Reqs.

- SP 1.1 Elicit stakeholder needs, expectations, constraints, and interfaces for all phases of the product life cycle
  - Examples of techniques - include the following
    - Technology demonstrations
    - Interface control working groups
    - Technical control working groups
    - Interim project reviews
    - Questionnaires, interviews, and operational scenarios obtained from end users
    - Operational walkthroughs and end-user task analysis
    - Prototypes and models
    - Brainstorming

SG 1 Develop Customer Reqs.

- SP 1.1 Elicit stakeholder needs, expectations, constraints, and interfaces for all phases of the product life cycle
  - Examples of techniques - include the following
    - Quality Function Deployment
    - Market surveys
    - Beta testing
    - Extraction from sources such as documents, standards, or specifications
    - Observation of existing products, environments, and workflow patterns
    - Use cases
    - Business case analysis
    - Reverse engineering (for legacy products)

SG 1 Develop Customer Reqs.

- SP 1.2 Transform stakeholder needs, expectations, constraints, and interfaces into customer requirements
  - Typical Work Products
    - Customer requirements
    - Customer constraints on the conduct of verification
    - Customer constraints on the conduct of validation

SG 2 Develop Product Reqs.

- SP 2.1 Establish and maintain product and product-component requirements, which are based on the customer requirements
  - Typical Work Products
    - Derived requirements
    - Product requirements
    - Product-component requirements

SG 2 Develop Product Reqs.

- SP 2.2 Allocate the requirements for each product component
  - Typical Work Products
    - Requirement allocation sheets
    - Provisional requirement allocations
    - Design constraints
    - Derived requirements
    - Relationships among derived requirements
- SP 2.3 Identify interface requirements
  - Typical Work Products
    - Interface requirements
  - Examples of these interfaces include
    - interfaces with test equipment, transportation systems, support systems, and manufacturing facilities

SG 3 Analyze and Validate Reqs

- SP 3.1 Establish and maintain operational concepts and associated scenarios
  - Typical Work Products
    - Operational concept
    - Product installation, operational, maintenance, and support concepts
    - Disposal concepts
    - Use cases
    - Timeline scenarios
    - New requirements

SG 3 Analyze and Validate Reqs

- SP 3.2 Establish and maintain a definition of required functionality
  - Typical Work Products
    - Functional architecture
    - Activity diagrams and use cases
    - Object-oriented analysis with services identified

SG 3 Analyze and Validate Reqs

- SP 3.3 Analyze requirements to ensure that they are necessary and sufficient
  - Typical Work Products
    - Requirements defects reports
    - Proposed requirements changes to resolve defects
    - Key requirements
    - Technical performance measures
- SP 3.4 Analyze requirements to balance stakeholder needs and constraints
  - Typical Work Products
    - Assessment of risks related to requirements

SG 3 Analyze and Validate Reqs

- SP 3.5 Validate requirements to ensure the resulting product will perform as intended in the user's environment
  - Typical Work Products
    - Record of analysis methods and results
  - Note:
    - SP 3.5 overlaps with VAL – it stresses out a necessity to perform validation in RD

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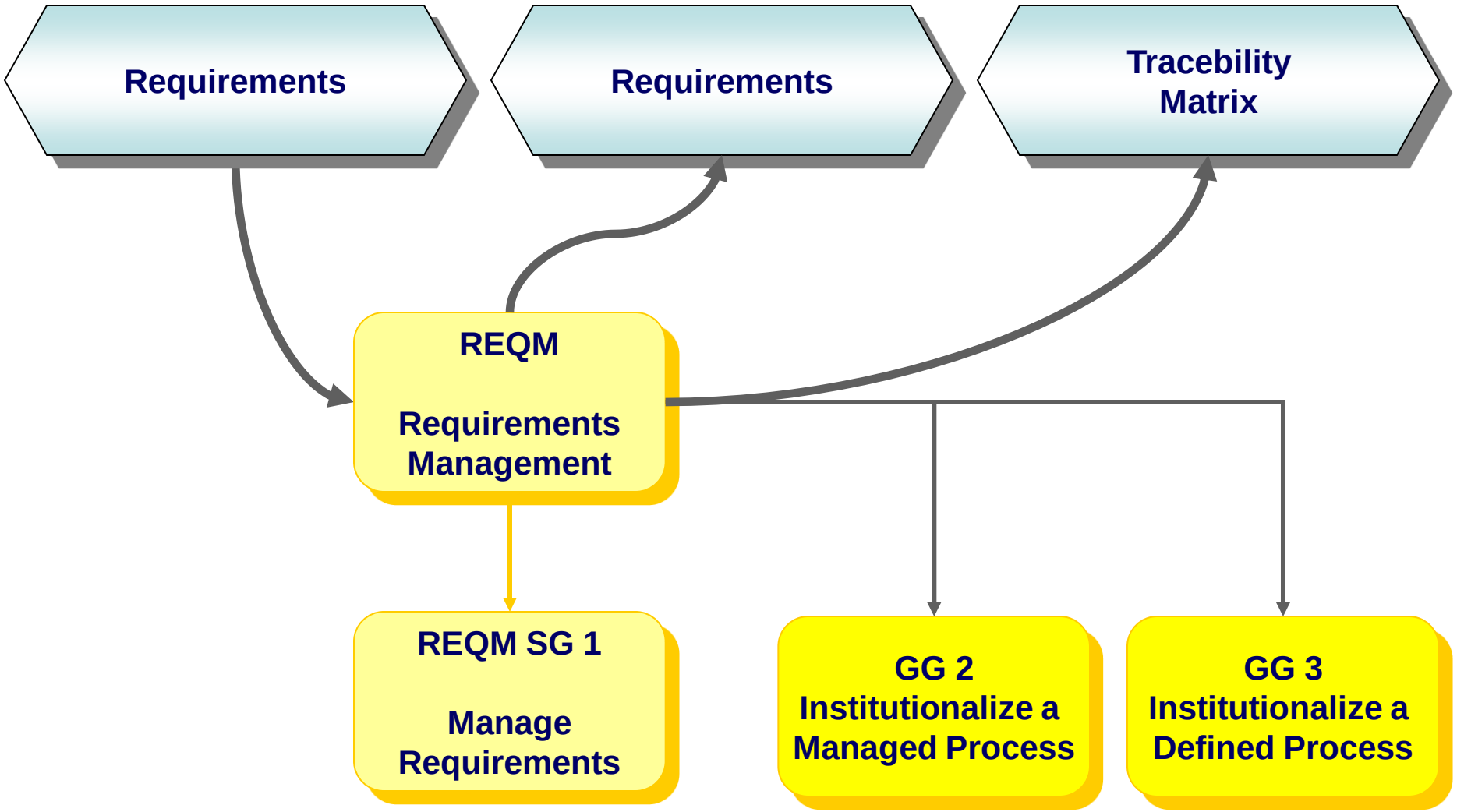
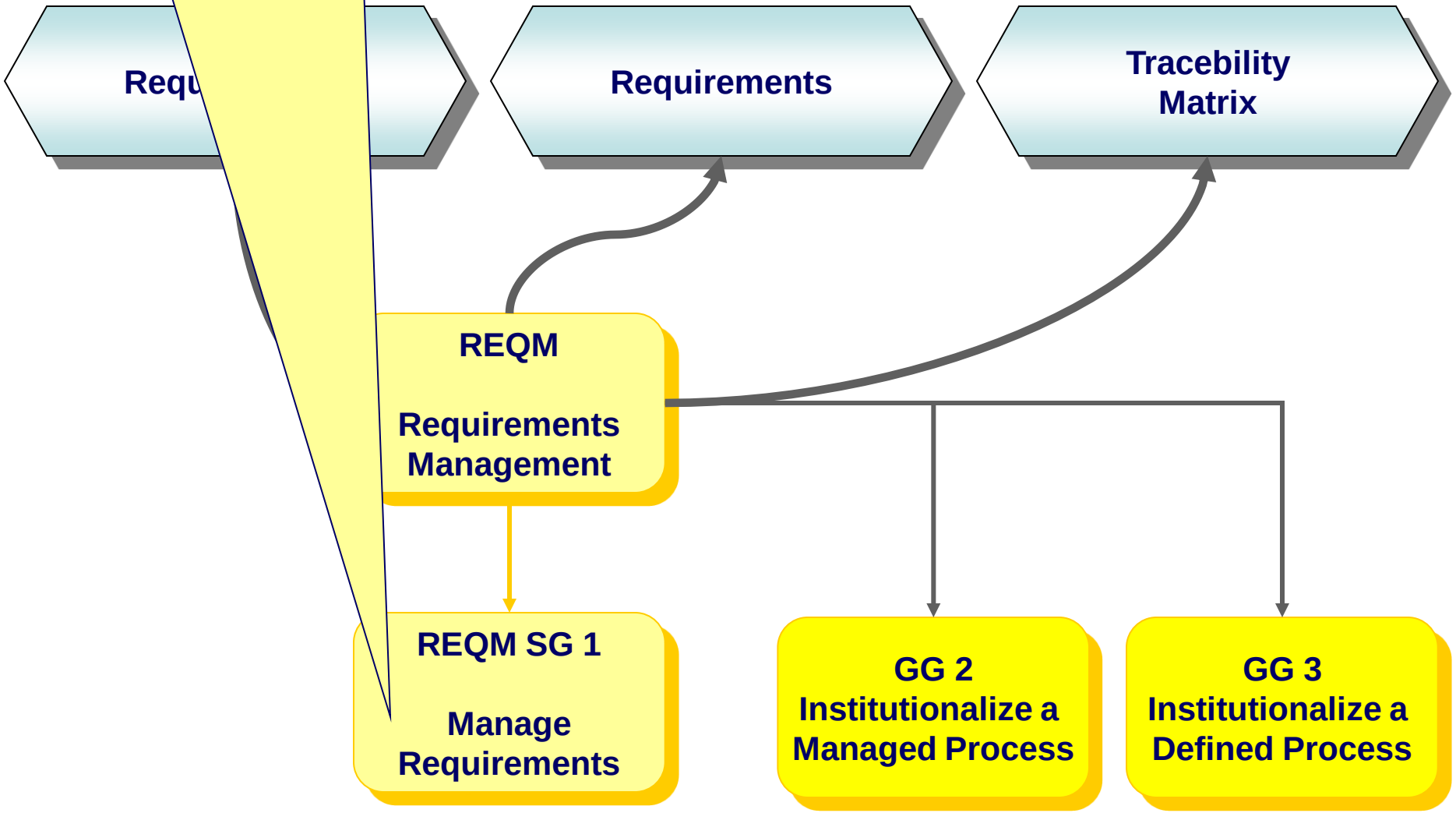
Requirements Management



lanagement

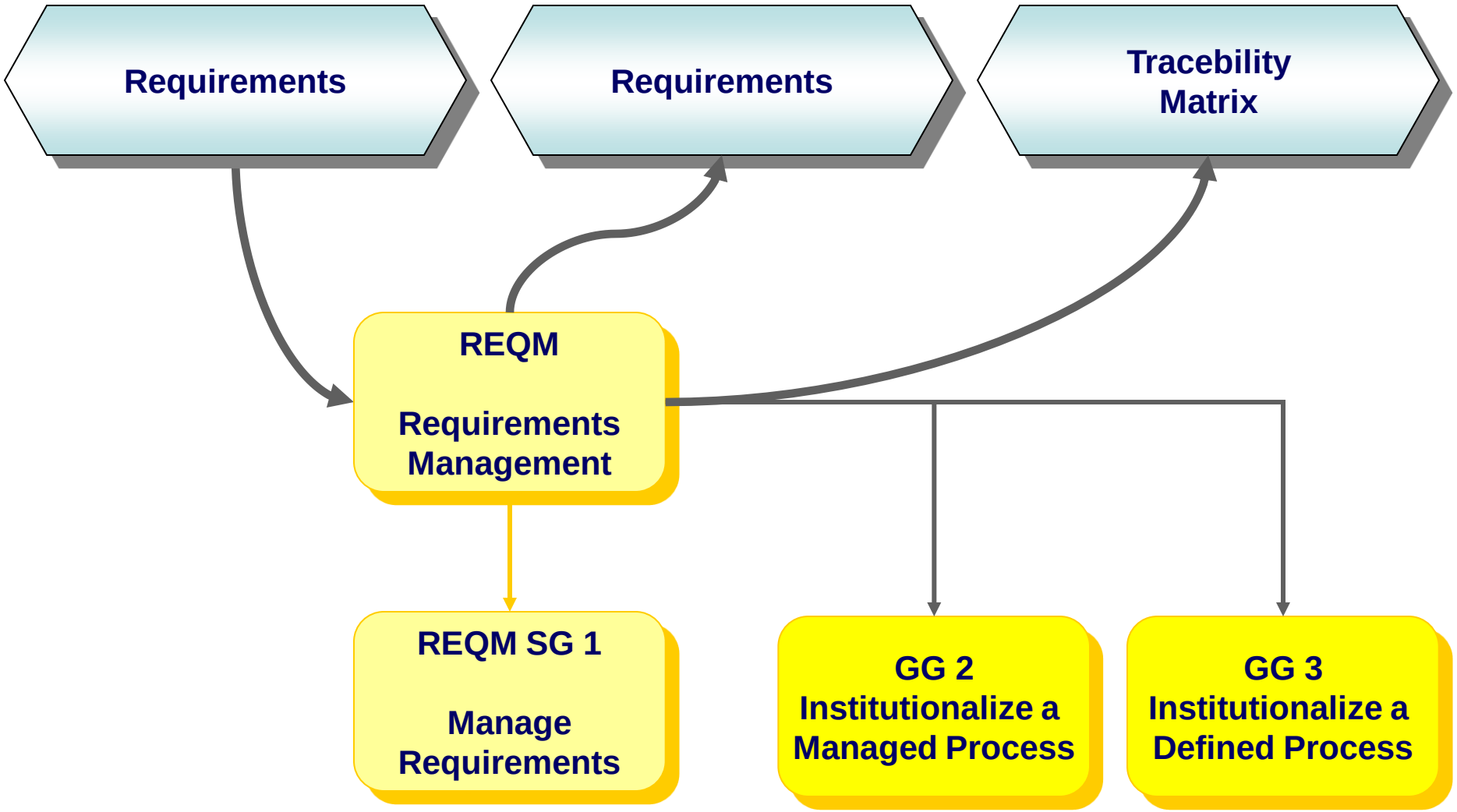
Requirements are managed and inconsistencies with project plans and work products are identified



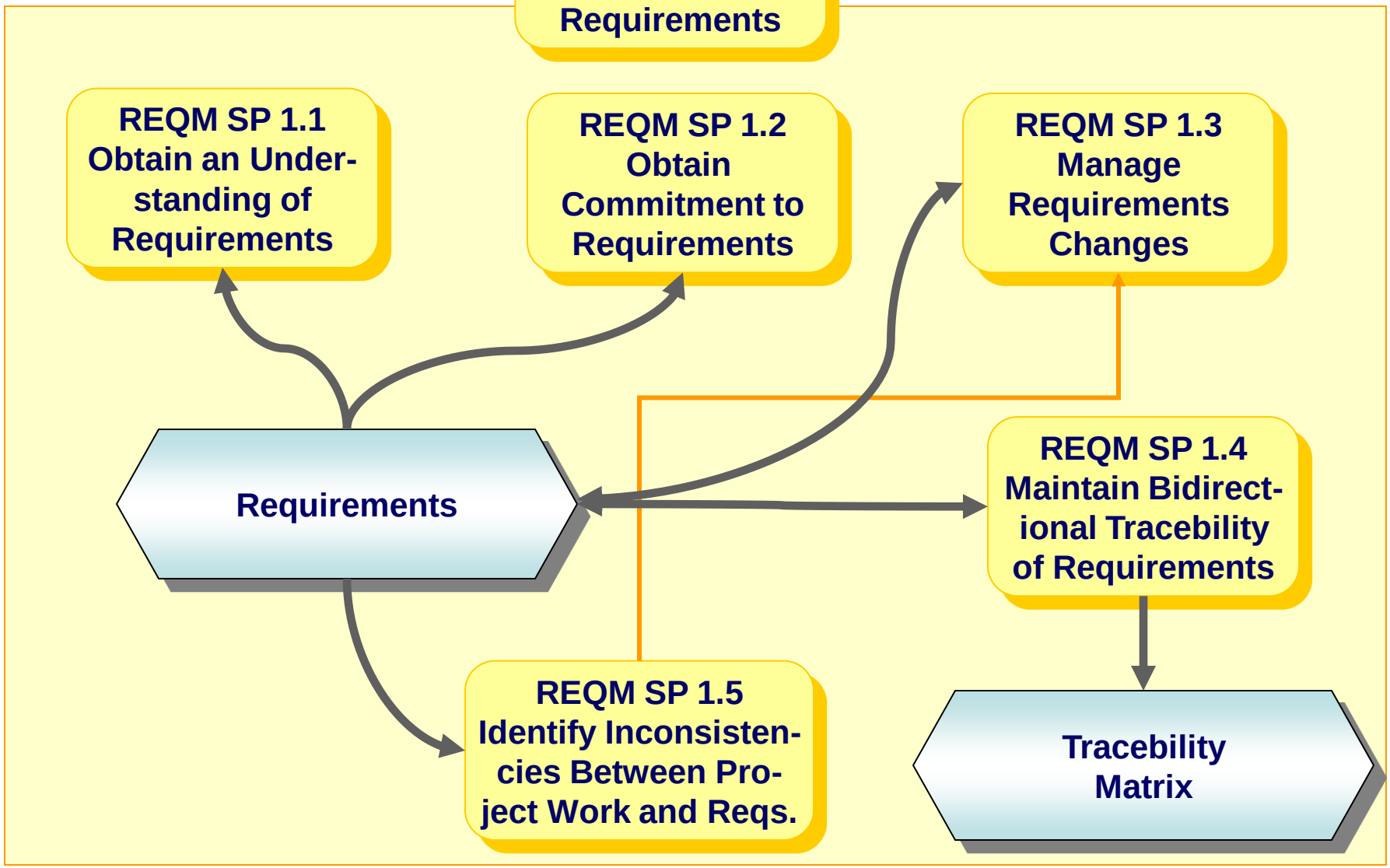
Requirements Management

- **Additional Relevant Terminology**
  - **Requirements Tracebility**
    - The evidence of an association between a requirement and its
      - source requirement,
      - implementation, and
      - verification

Requirements Management



Requirements Management



Requirements Management

- **Specific Goals**
  - SG 1 Manage Requirements
    - Requirements are managed and inconsistencies with project plans and work products are identified

SG 1 Manage Requirements

- SP 1.1 Develop an understanding with the requirements providers on the meaning of the requirements
  - Typical Work Products
    - Lists of criteria for distinguishing appropriate requirements providers
    - Criteria for evaluation and acceptance of requirements
    - Results of analyses against criteria
    - An agreed-to set of requirements

SG 1 Manage Requirements

- SP 1.1 Develop an understanding with the requirements providers on the meaning of the requirements
  - Examples of acceptance criteria include the following:
    - Clearly and properly stated
    - Complete
    - Consistent with each other
    - Uniquely identified
    - Appropriate to implement
    - Verifiable (testable)
    - Traceable

SG 1 Manage Requirements

- SP 1.2 Obtain commitment to the requirements from the project participants
  - Typical Work Products
    - Requirements impact assessments
    - Documented commitments to requirements and requirements changes

SG 1 Manage Requirements

- SP 1.3 Manage changes to the requirements as they evolve during the project
  - Typical Work Products
    - Requirements status
    - Requirements database
    - Requirements decision database

SG 1 Manage Requirements

- SP 1.4 Maintain bidirectional traceability among the requirements and the work products
  - Typical Work Products
    - Requirements traceability matrix
    - Requirements tracking system
  - Note
    - decide what level of granularity is appropriate for a traceability matrix
      - » too much detail can become overwhelming
      - » too little detail makes the matrix worthless

SG 1 Manage Requirements

- SP 1.5 Identify inconsistencies between the project plans and work products and the requirements
  - Typical Work Products
    - Documentation of inconsistencies including sources, conditions, and rationale
    - Corrective actions

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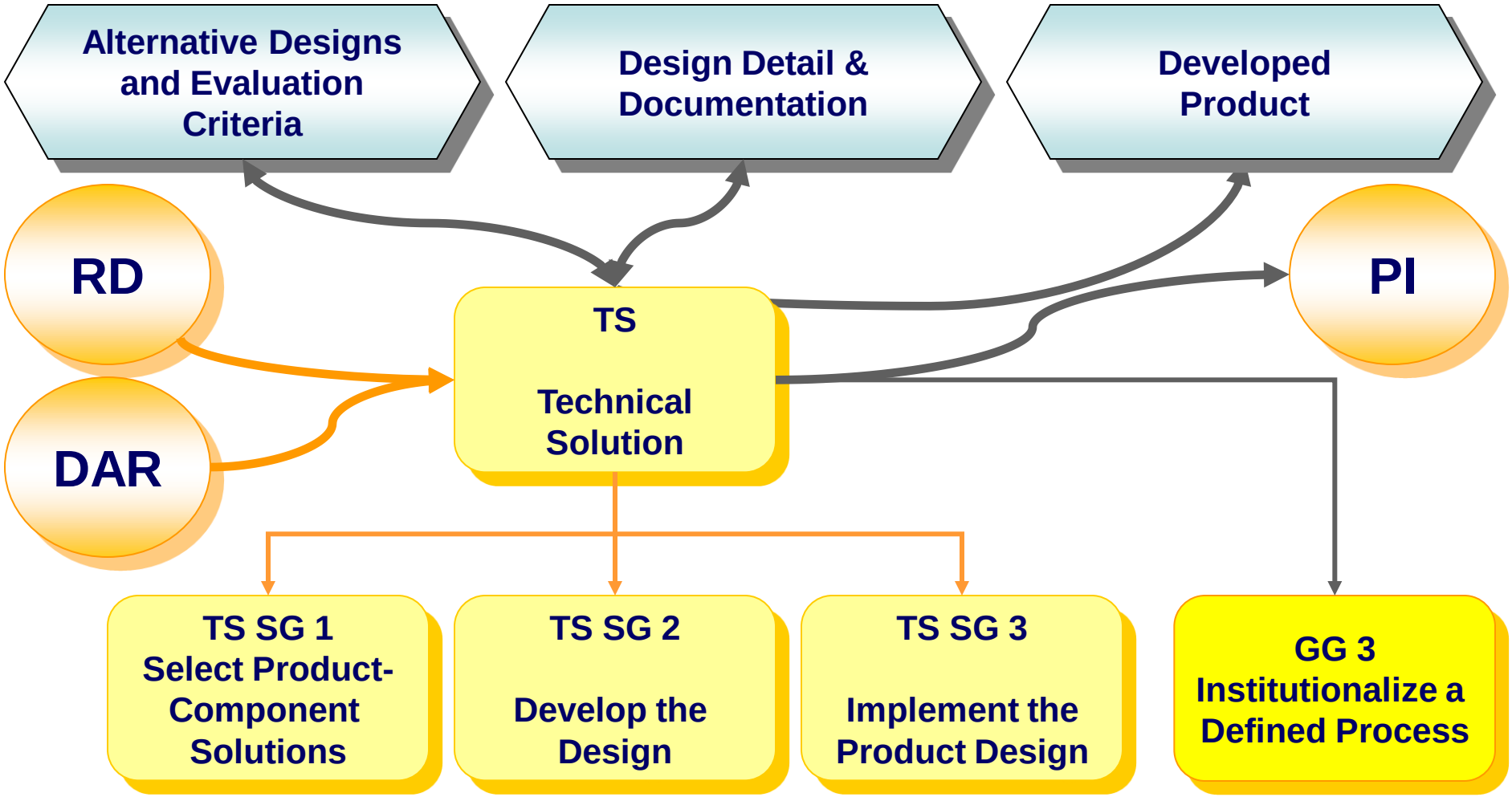
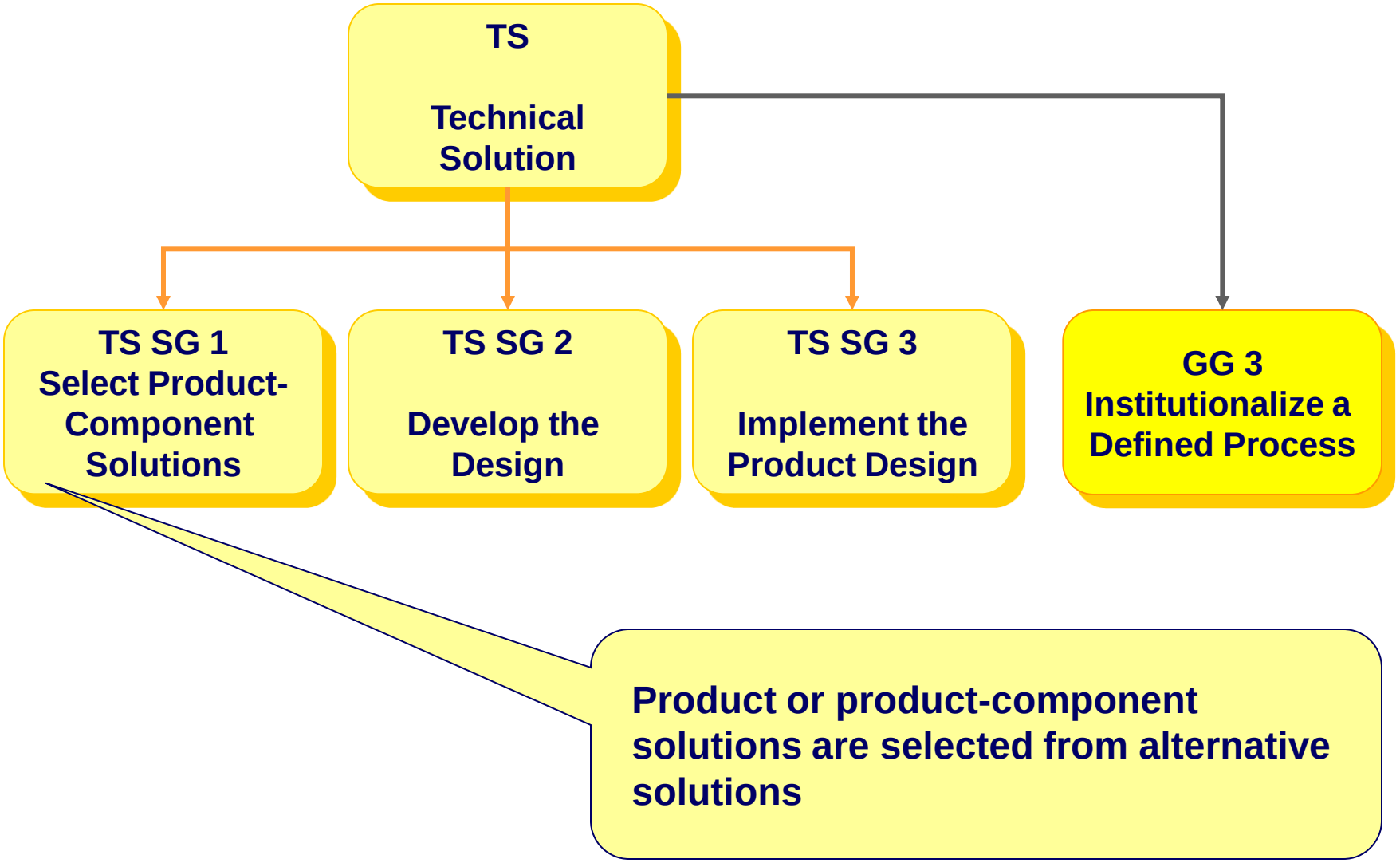
Technical Solution



Technical Solution



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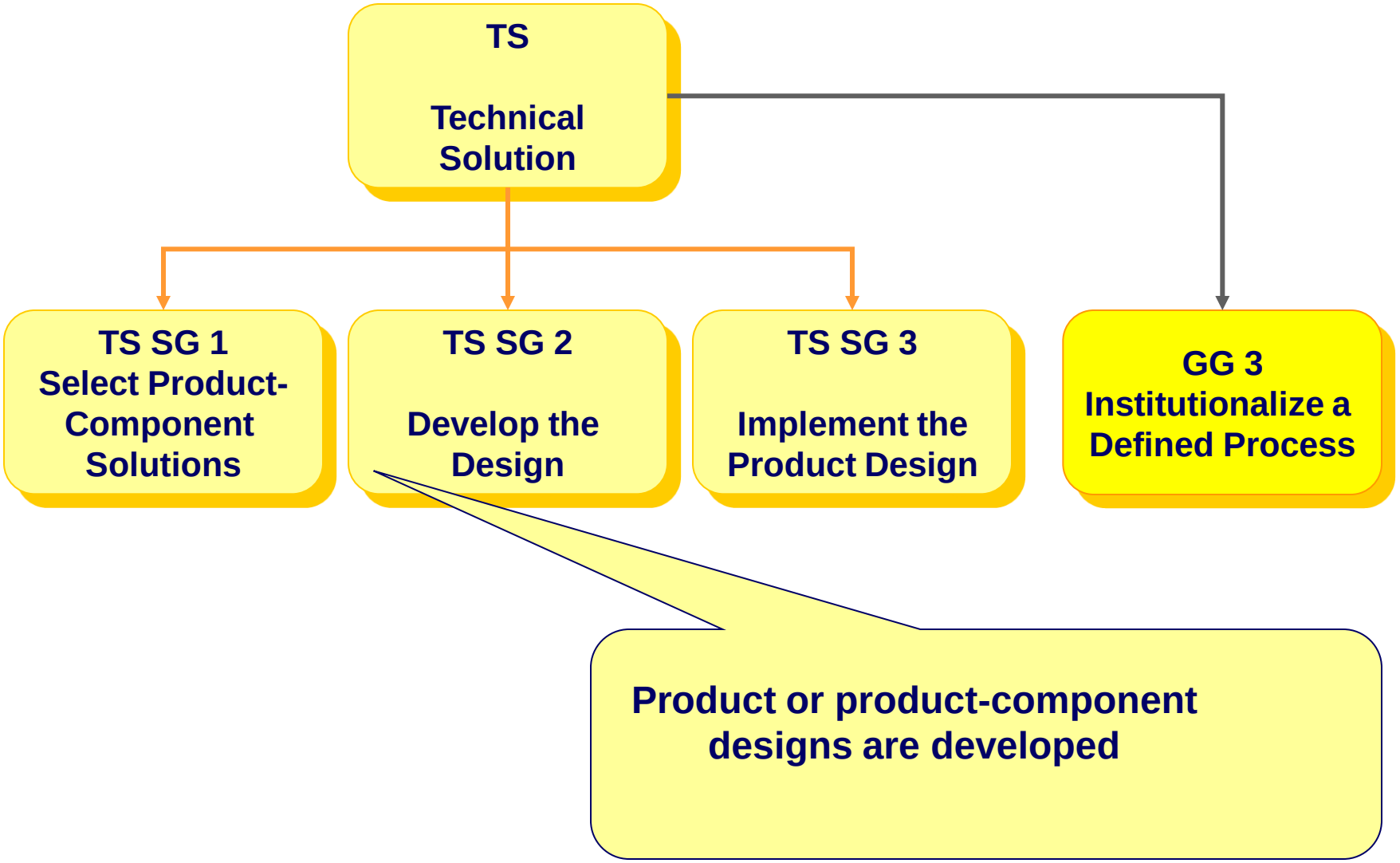

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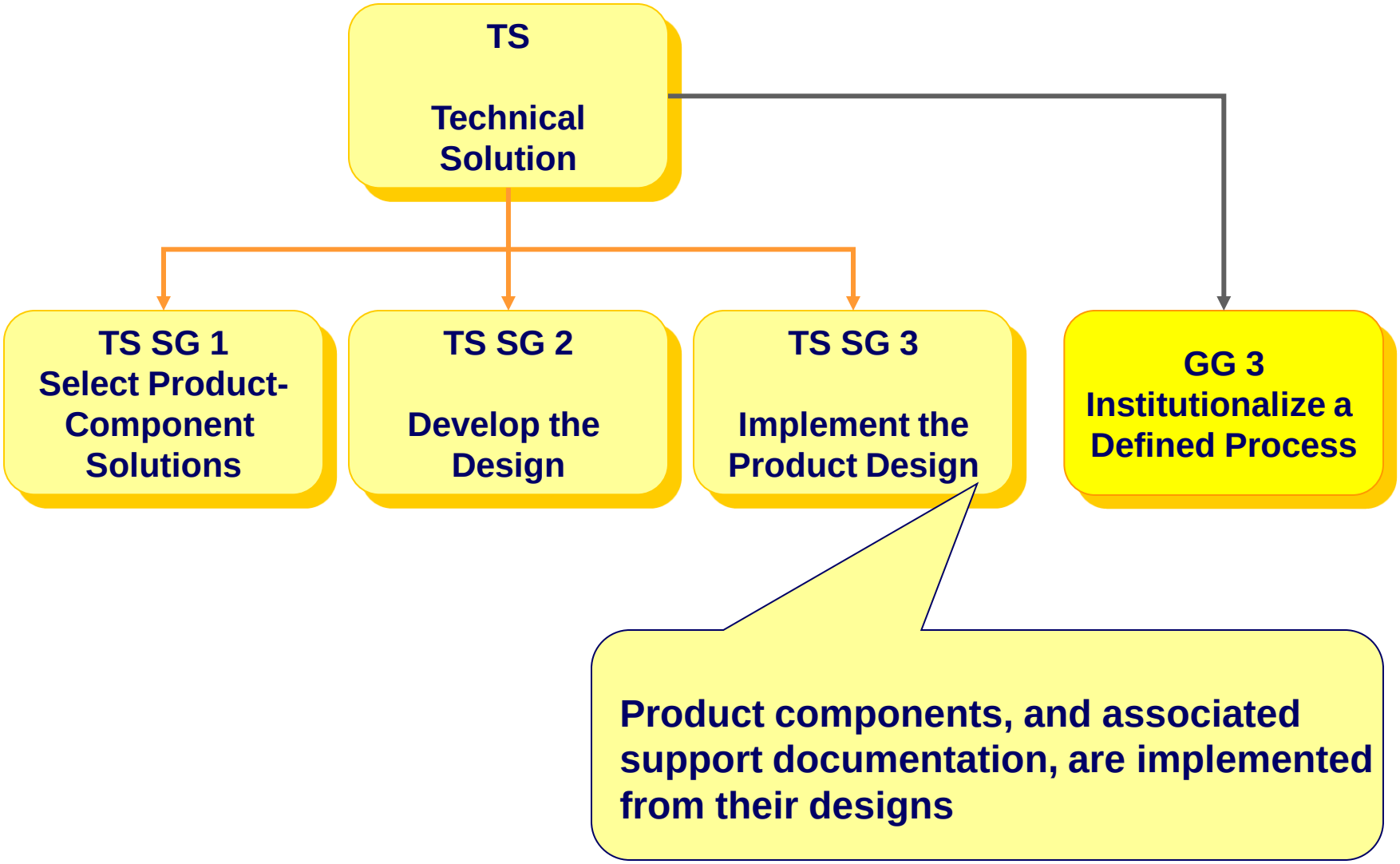


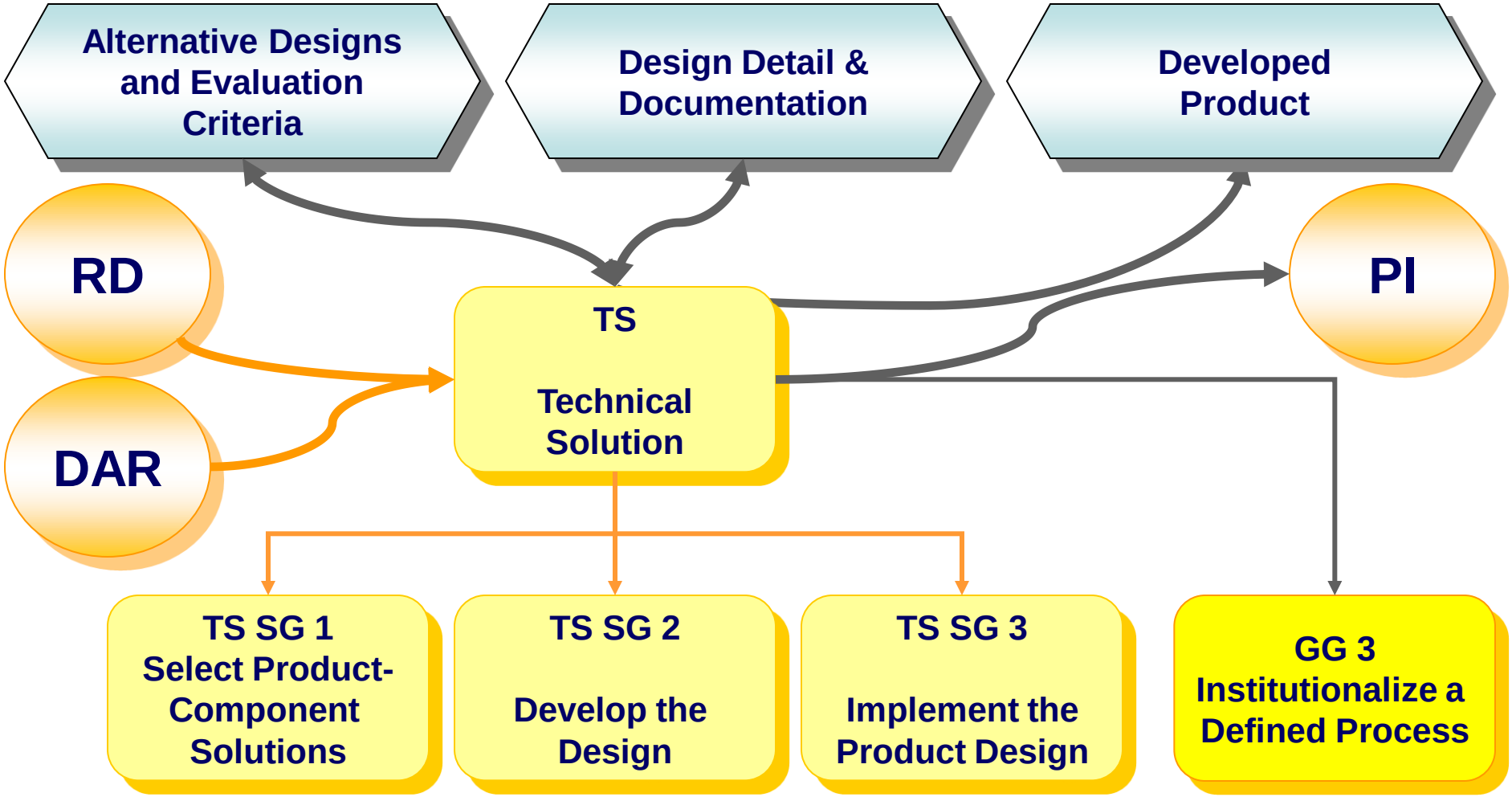
Technical Solution

- **Additional Relevant Terminology**
  - **Product-related life-cycle processes**
    - Processes associated with a product throughout one or more phases of its life
  - **Sustainment**
    - The processes used to ensure that product can be utilized operationally by its end users / customers

Technical Solution

- **Additional Relevant Terminology**
  - **Operational concept**
    - Description of the way in which component is used
  - **Operational scenario**
    - A scenario of events and calls which shows how the component will be used
  - **Tech data package**
    - Set of documents appropriate to the product
      - Architecture and product description and characteristics
      - Interface requirements
      - Physical characteristics and constraints

Technical Solution



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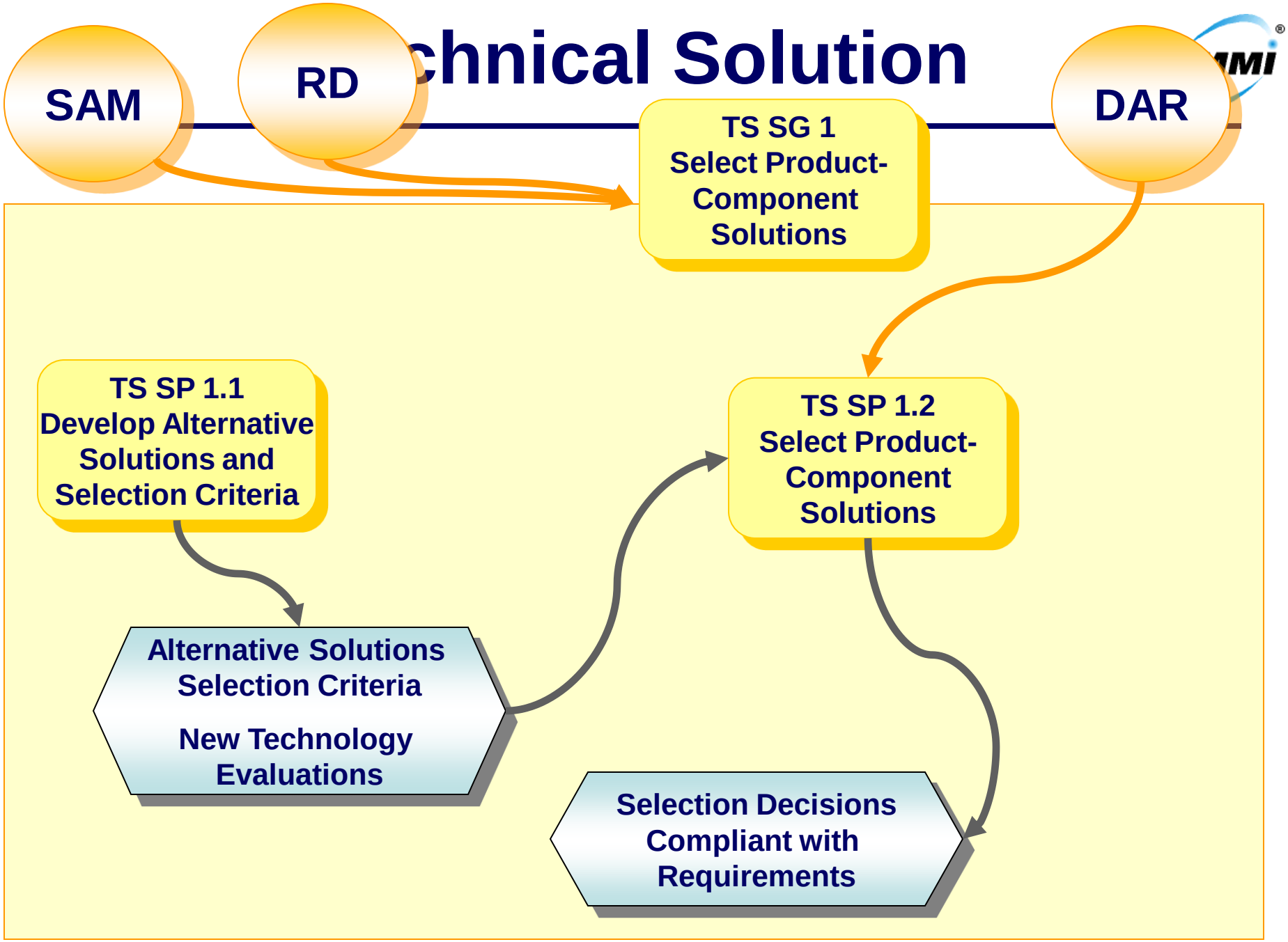

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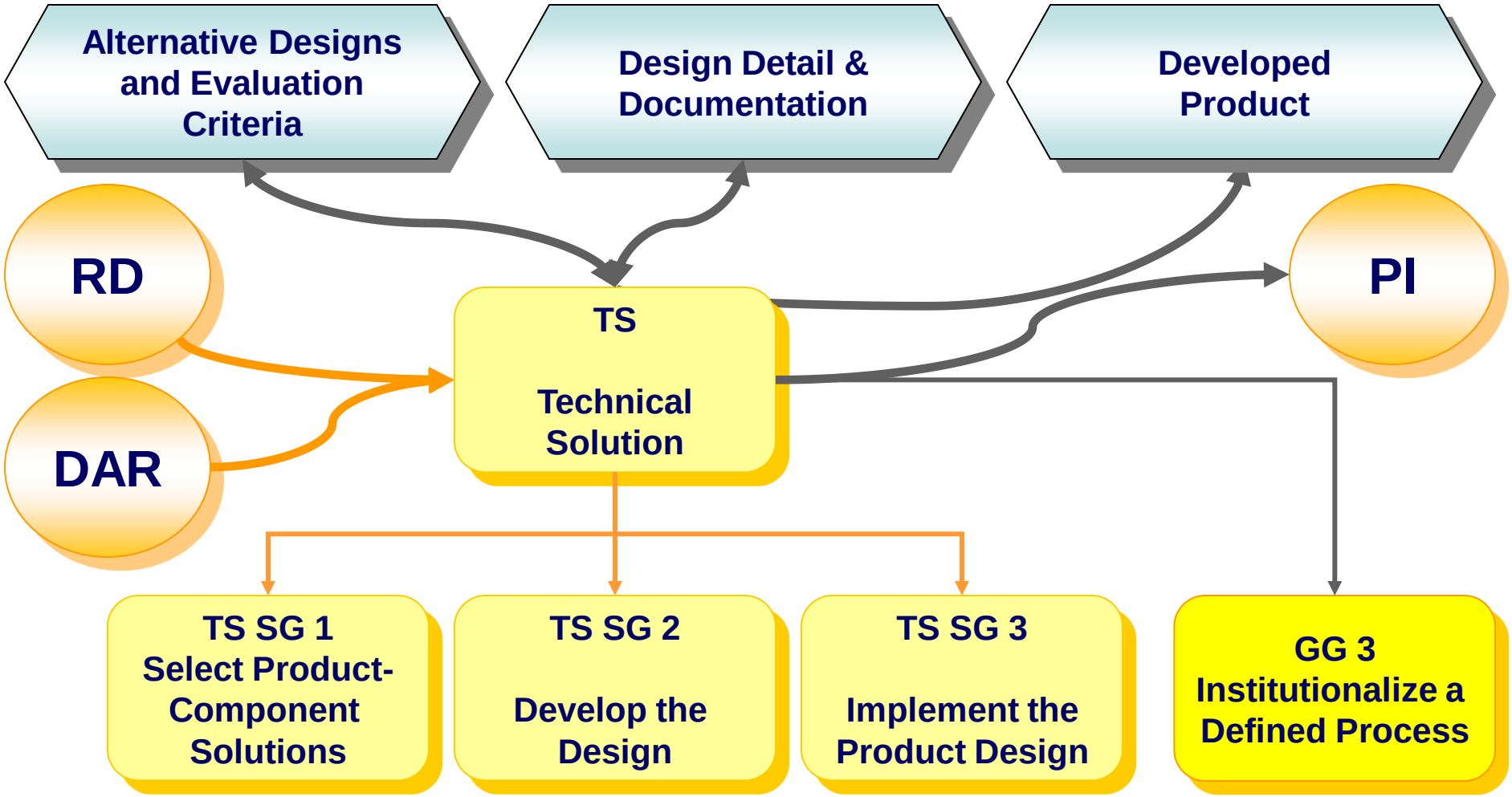

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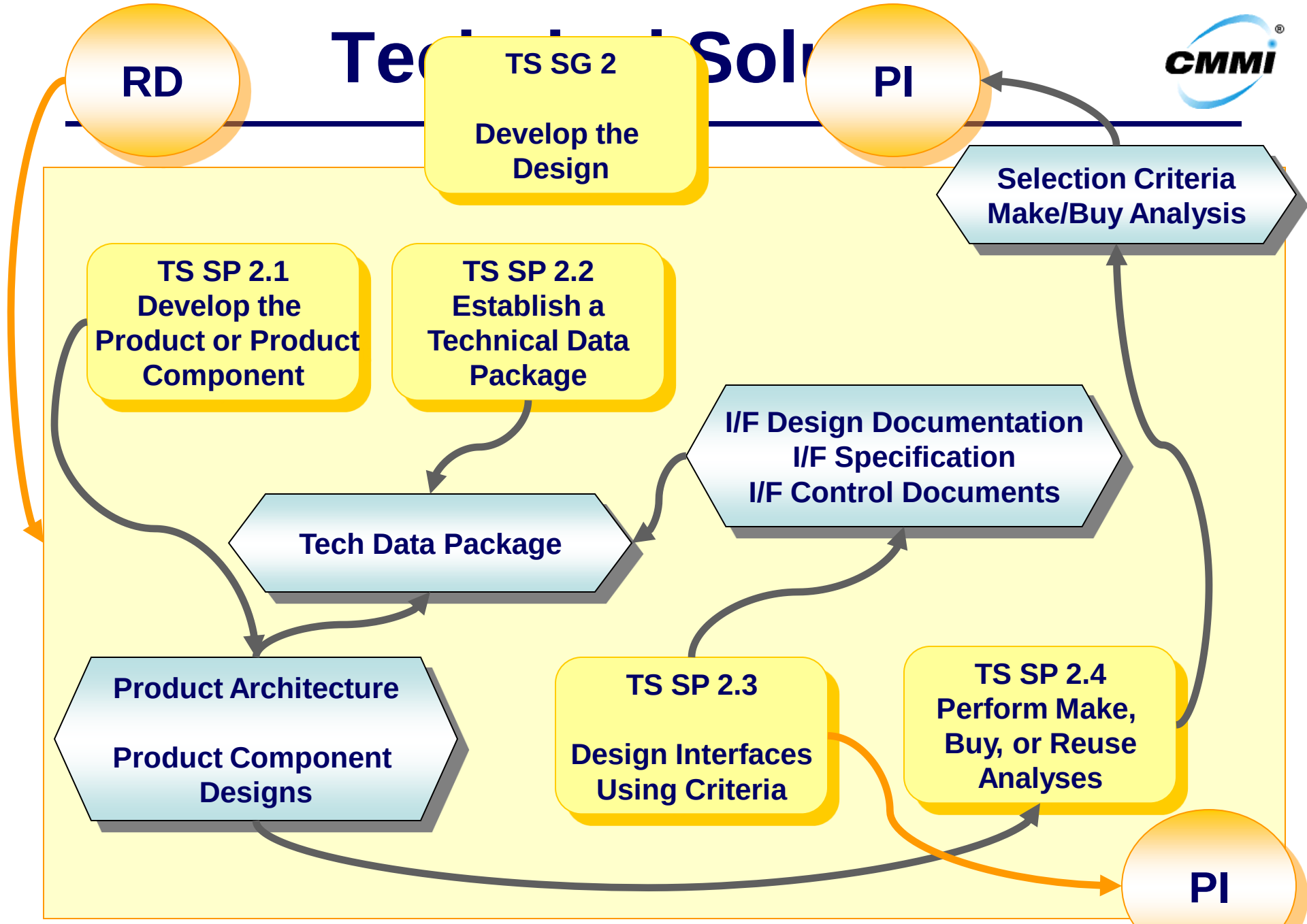
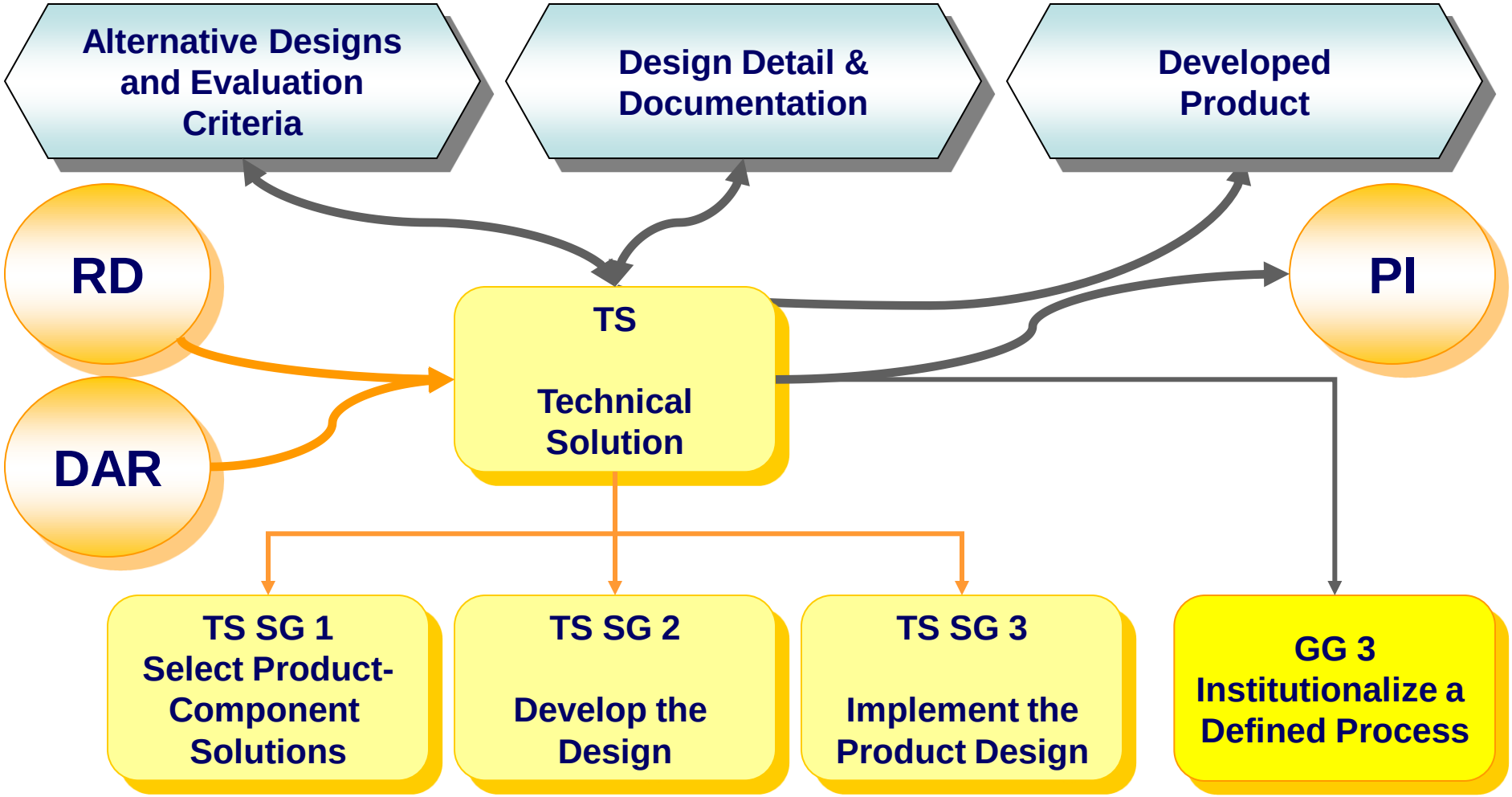
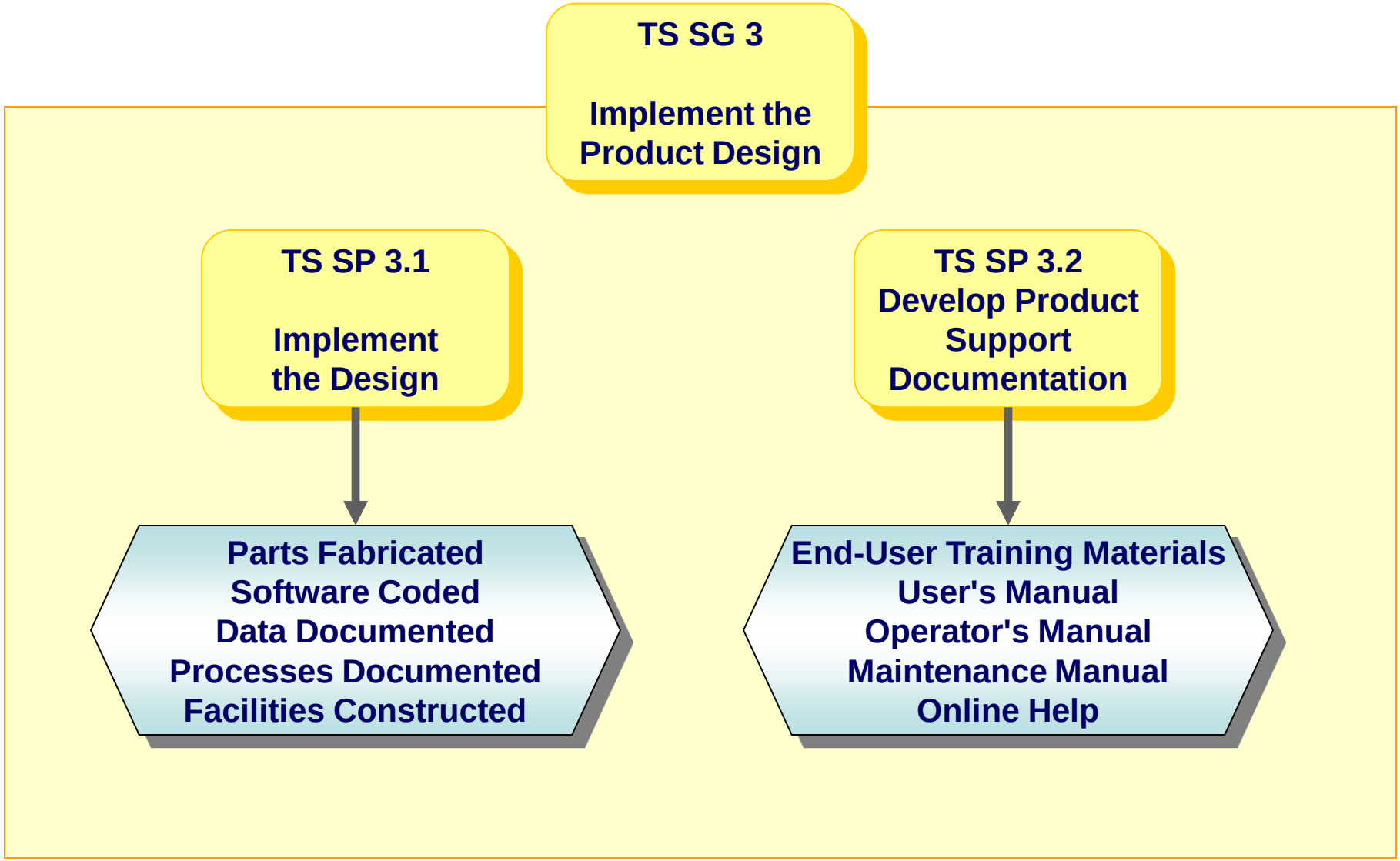

RD
TS SG 2
Develop the Design
PI
Selection Criteria
Make/Buy Analysis
TS SP 2.1
Develop the Product or Product Component
TS SP 2.2
Establish a Technical Data Package
I/F Design Documentation
I/F Specification
I/F Control Documents
Tech Data Package
Product Architecture
Product Component Designs
TS SP 2.3
Design Interfaces Using Criteria
TS SP 2.4
Perform Make, Buy, or Reuse Analyses
PI

Technical Solution



Technical Solution



Technical Solution

- **Specific Goals**
  - SG 1 Select Product-Component Solutions
    - Product or product-component solutions are selected from alternative solutions
  - SG 2 Develop the Design
    - Product or product-component designs are developed
  - SG 3 Implement the Product Design
    - Product components, and associated support documentation, are implemented from their designs

SG 1 Select Prod-Comp. Solns

- SP 1.1 Develop alternative solutions and selection criteria
  - Typical Work Products
    - Alternative solution screening criteria
    - Evaluations of new technologies
    - Alternative solutions
    - Selection criteria for final selection
    - Evaluation reports of COTS products

SG 1 Select Prod-Comp. Solns

- SP 1.2 Select the product component solutions that best satisfy the criteria established
  - Typical Work Products
    - Product-component selection decisions and rationale
    - Documented relationships between requirements and product components
    - Documented solutions, evaluations, and rationale

SG 2 Develop the Design

- SP 2.1 Develop a design for the product or product component
  - Typical Work Products
    - Product architecture
    - Product-component designs
  - Examples of techniques and methods that facilitate effective design include the following:
    - Prototypes
    - Structural models
    - Object-oriented design
    - Essential systems analysis
    - Entity relationship models
    - Design reuse
    - Design patterns

SG 2 Develop the Design

- SP 2.2 Establish and maintain a technical data package
  - Typical Work Products
    - Technical data package

SG 2 Develop the Design

- SP 2.3 Design product-component interfaces using established criteria
  - Typical Work Products
    - Interface design specifications
    - Interface control documents
    - Interface specification criteria
    - Rationale for selected interface design

SG 2 Develop the Design

- SP 2.4 Evaluate whether the product components should be developed, purchased, or reused based on established criteria
  - Typical Work Products
    - Criteria for design and product-component reuse
    - Make-or-buy analyses
    - Guidelines for choosing COTS product components

SG 3 Implement the Prod. Design

- SP 3.1 Implement the designs of the product components
  - Typical Work Products
    - Implemented design
  - Examples of software coding criteria include the following:
    - Modularity
    - Clarity
    - Simplicity
    - Structured (e.g., no GOTOs, one entrance, and one exit)
    - Maintainability

SG 3 Implement the Prod. Design

- SP 3.2 Develop and maintain the end-use documentation
  - Typical Work Products
    - End-user training materials
    - User's manual
    - Operator's manual
    - Maintenance manual
    - Online help
  - When documentation may need to be revised
    - Requirements change
    - Design changes are made
    - Product changes are made
    - Documentation errors are identified
    - Workaround fixes are identified

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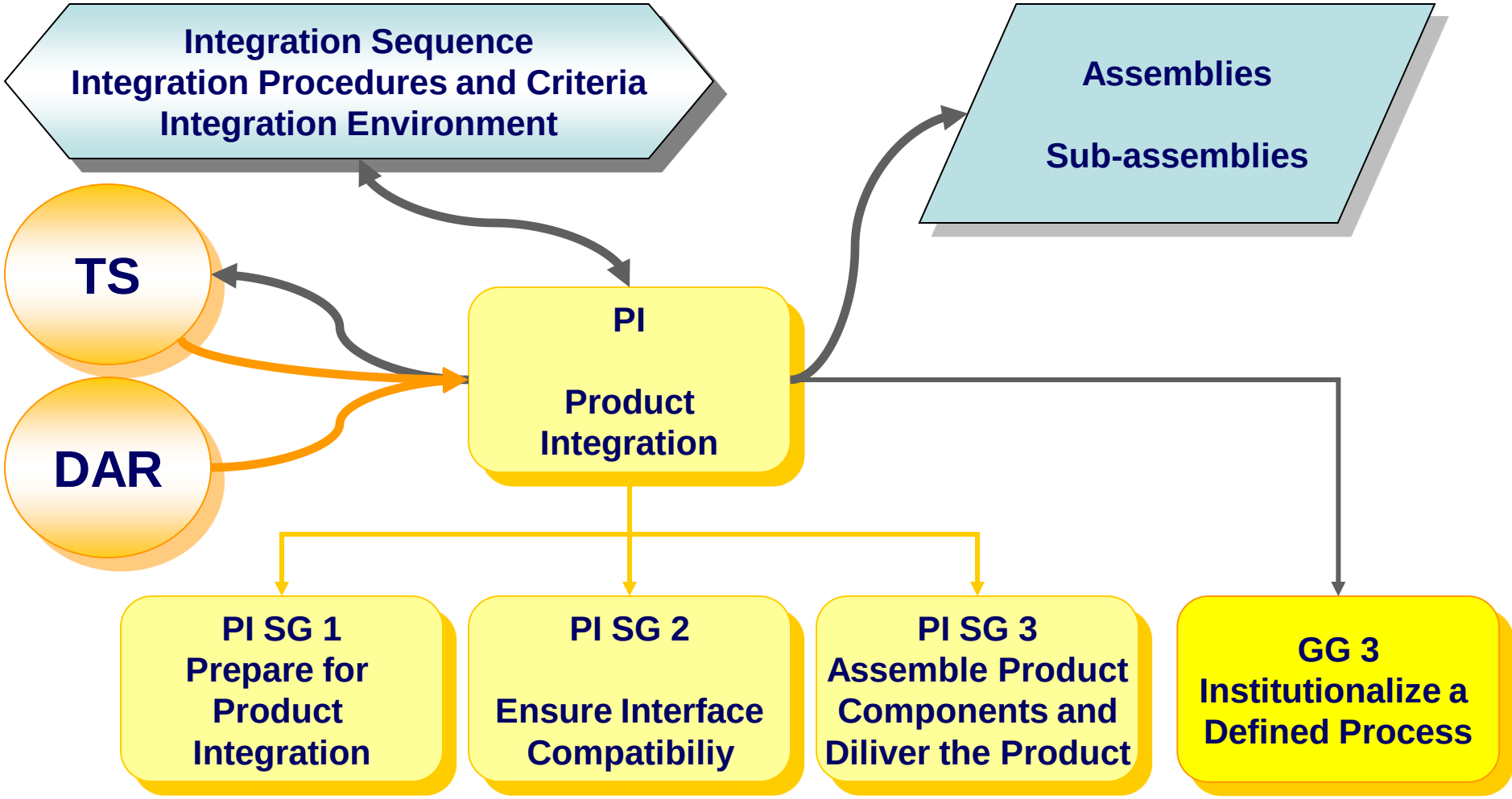
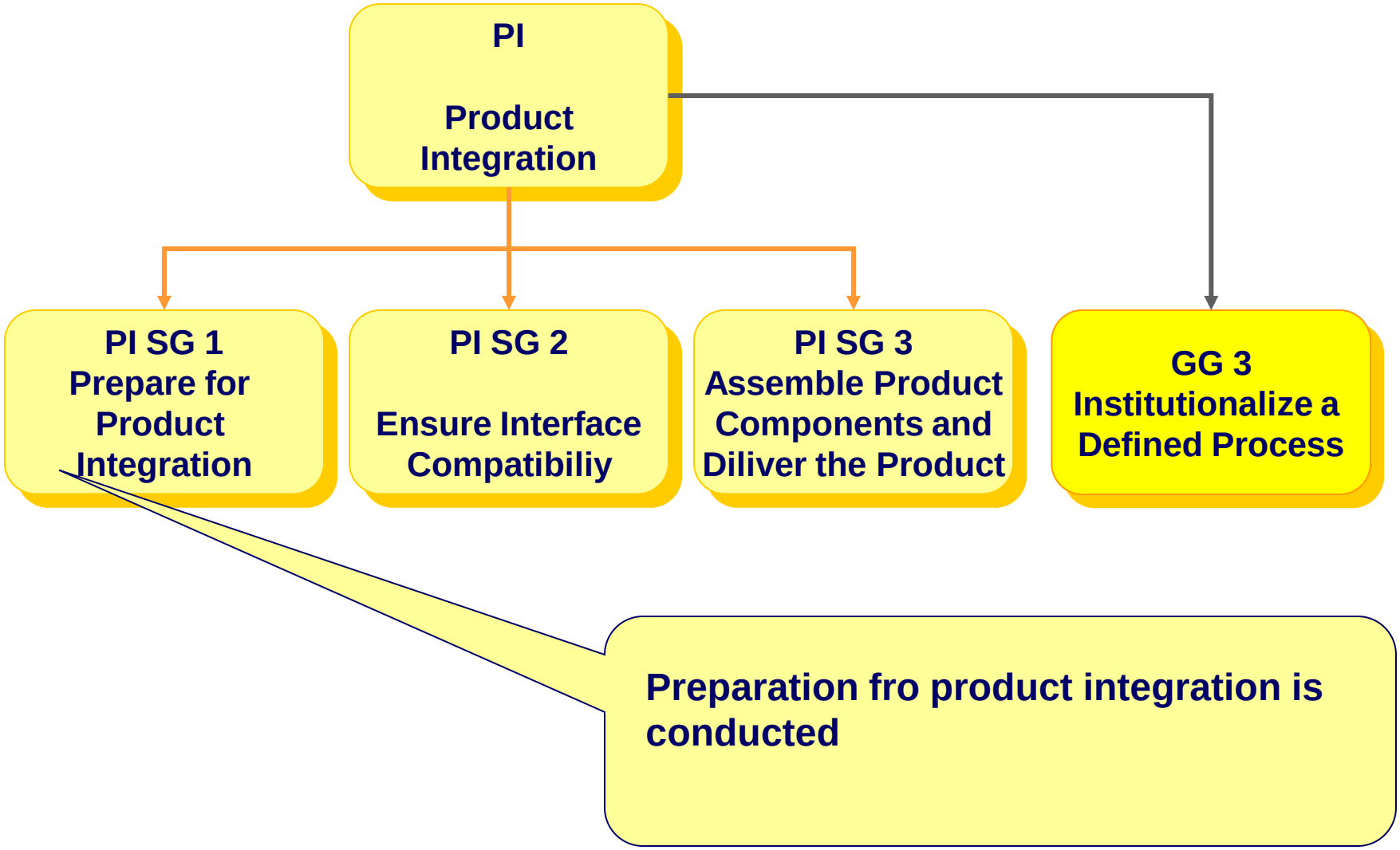
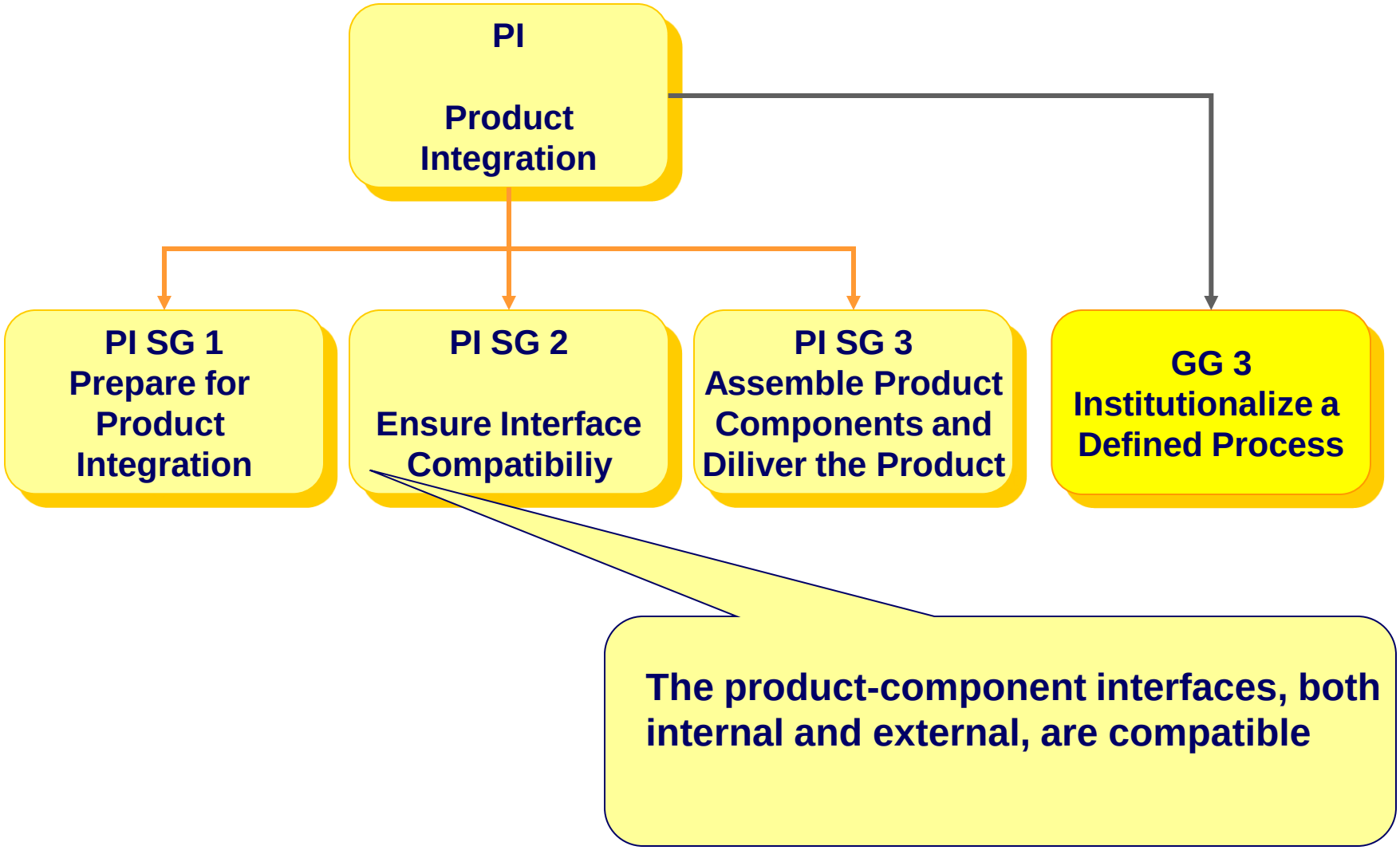
Product Integration



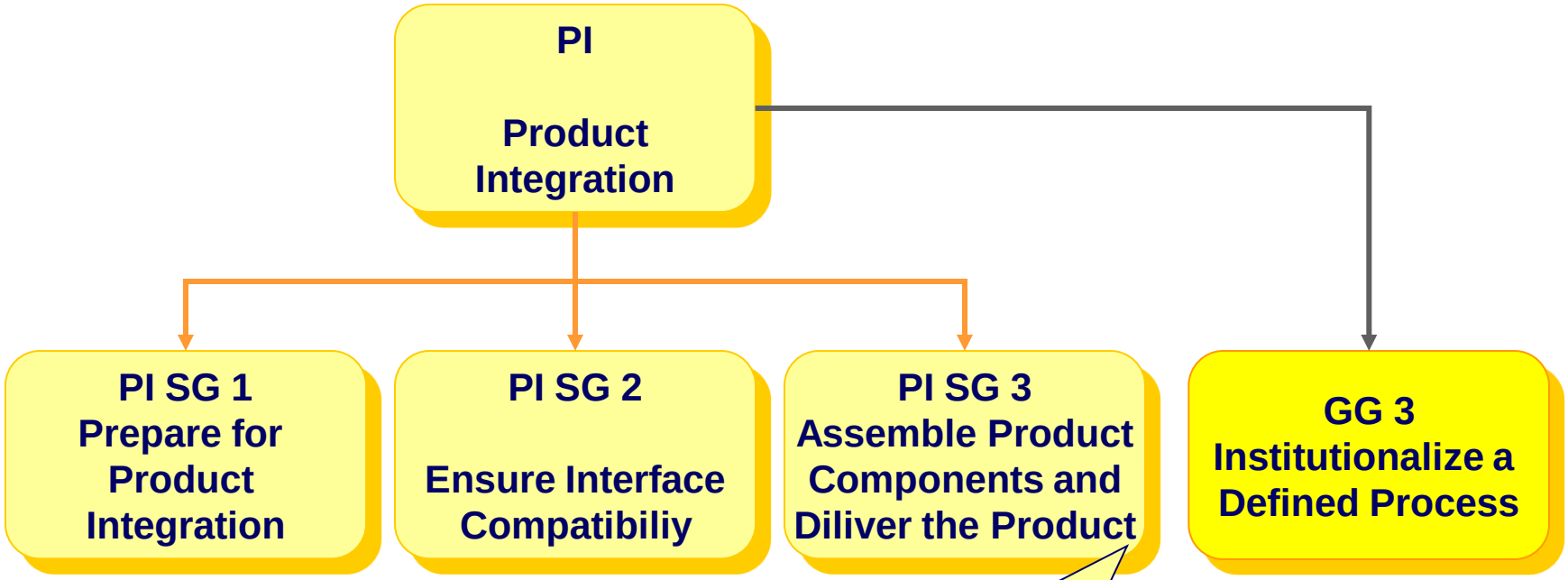
Product Integration



Product Integration

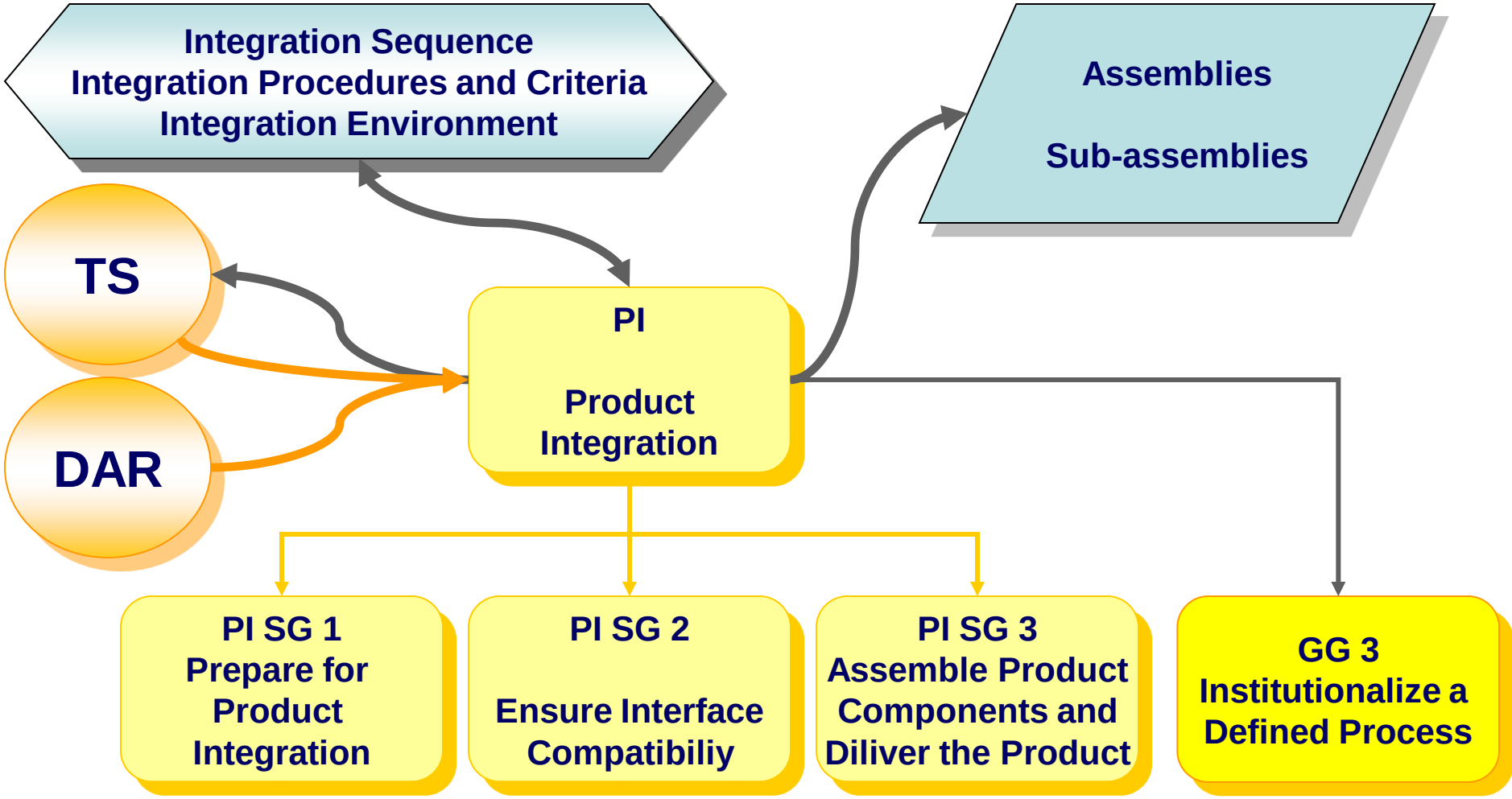


Product Integration



Verified product components are assembled and the integrated, verified, and validated product is dilivered

Product Integration



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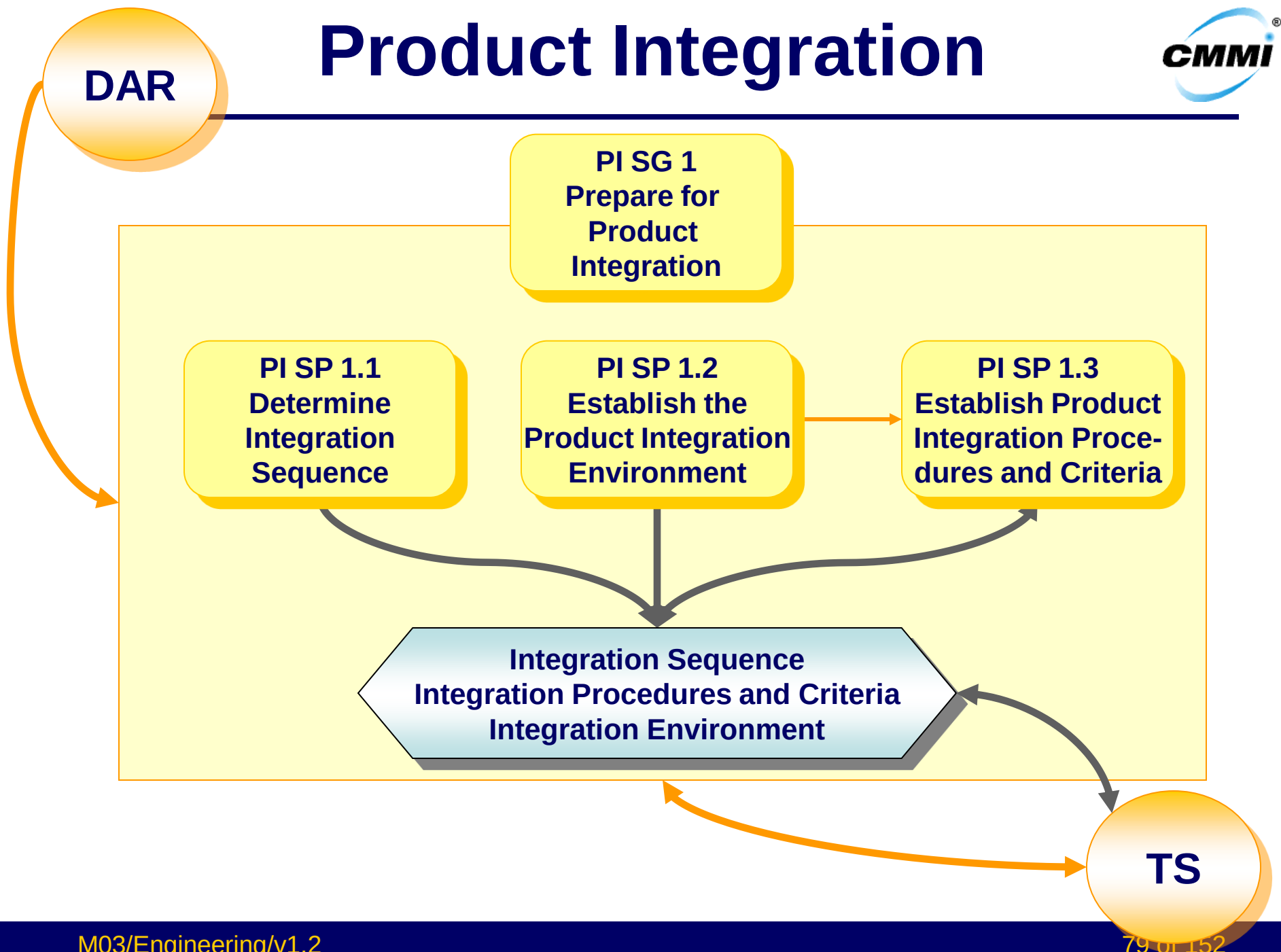
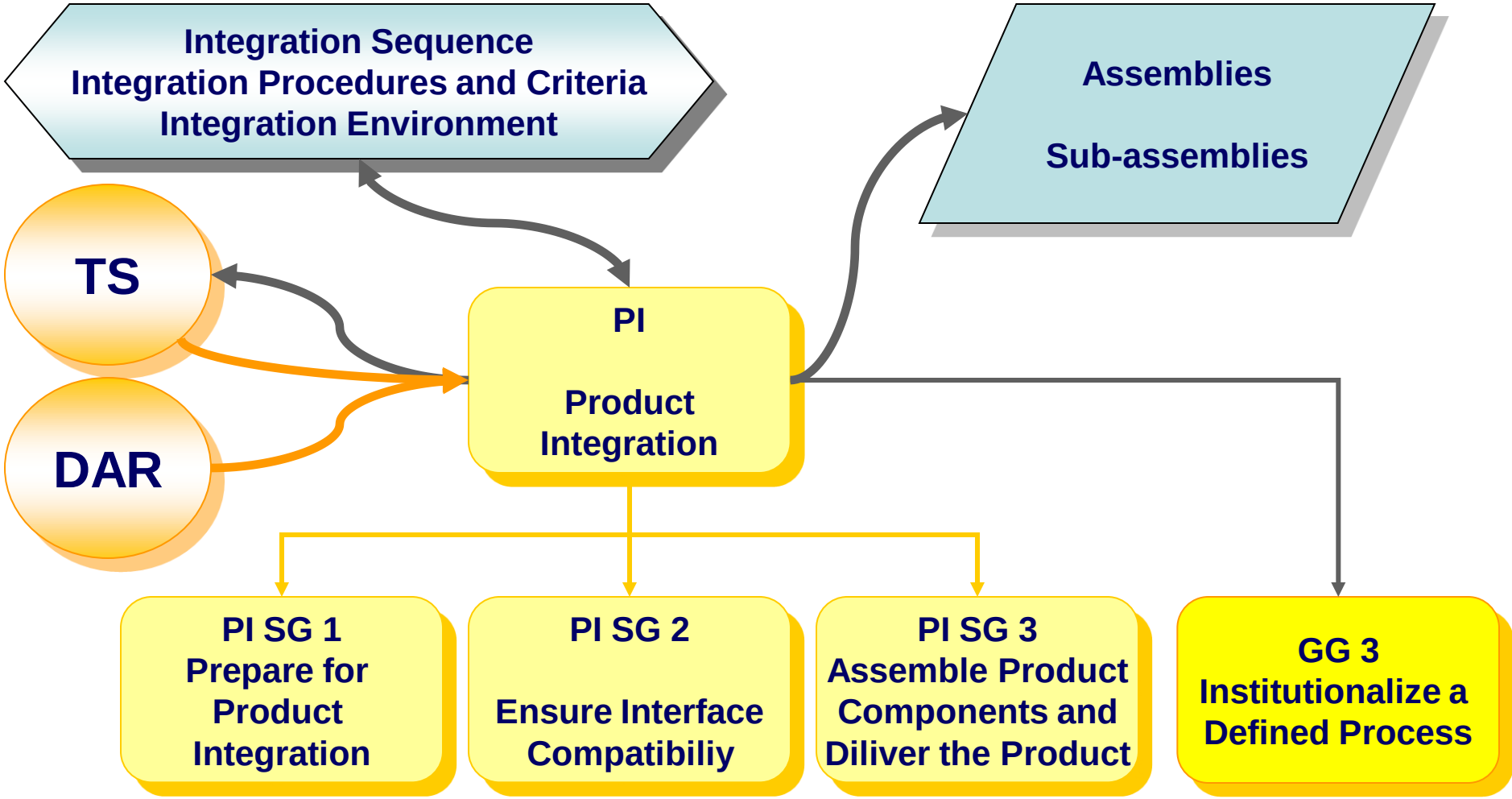
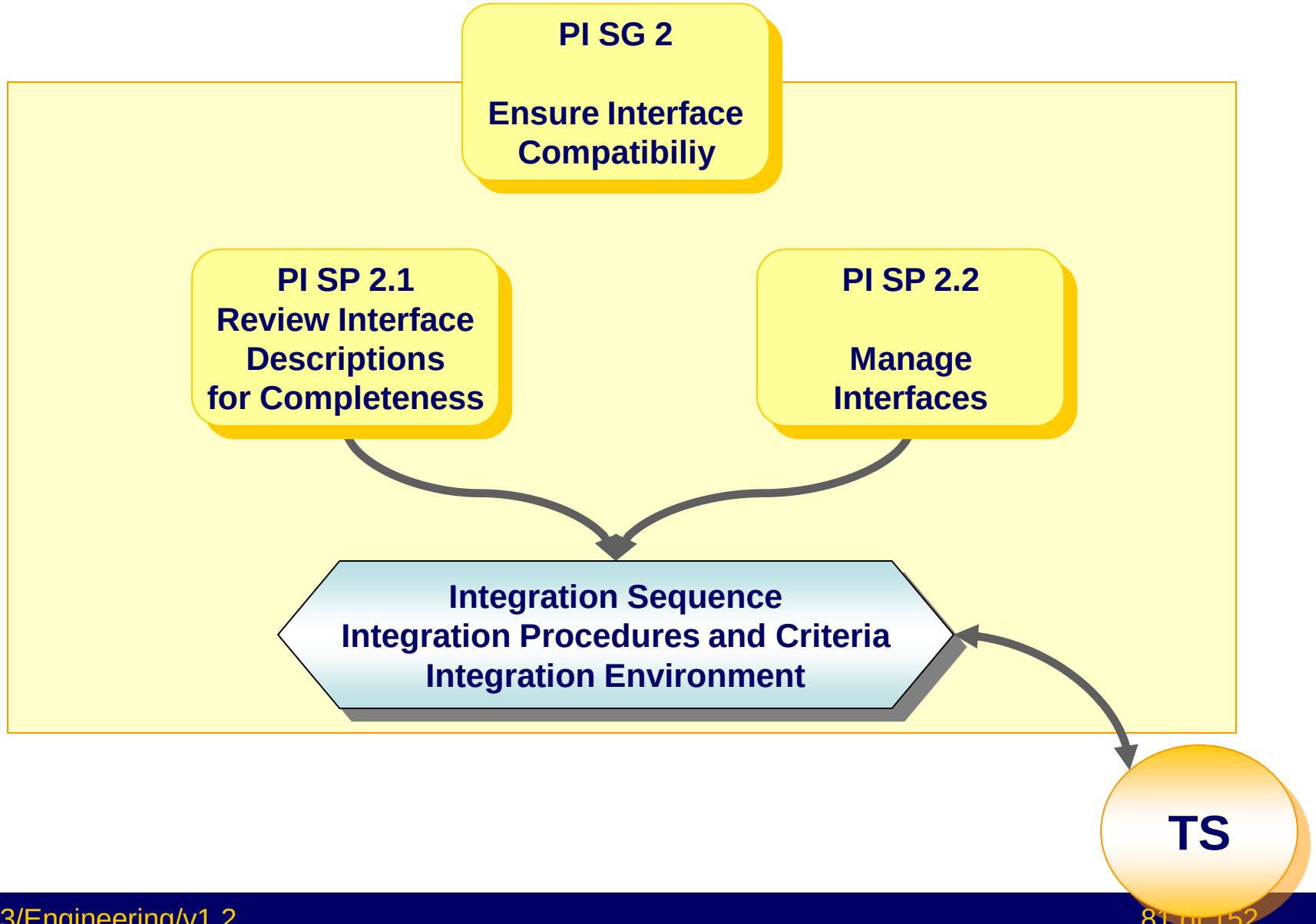


Product Integration



Product Integration



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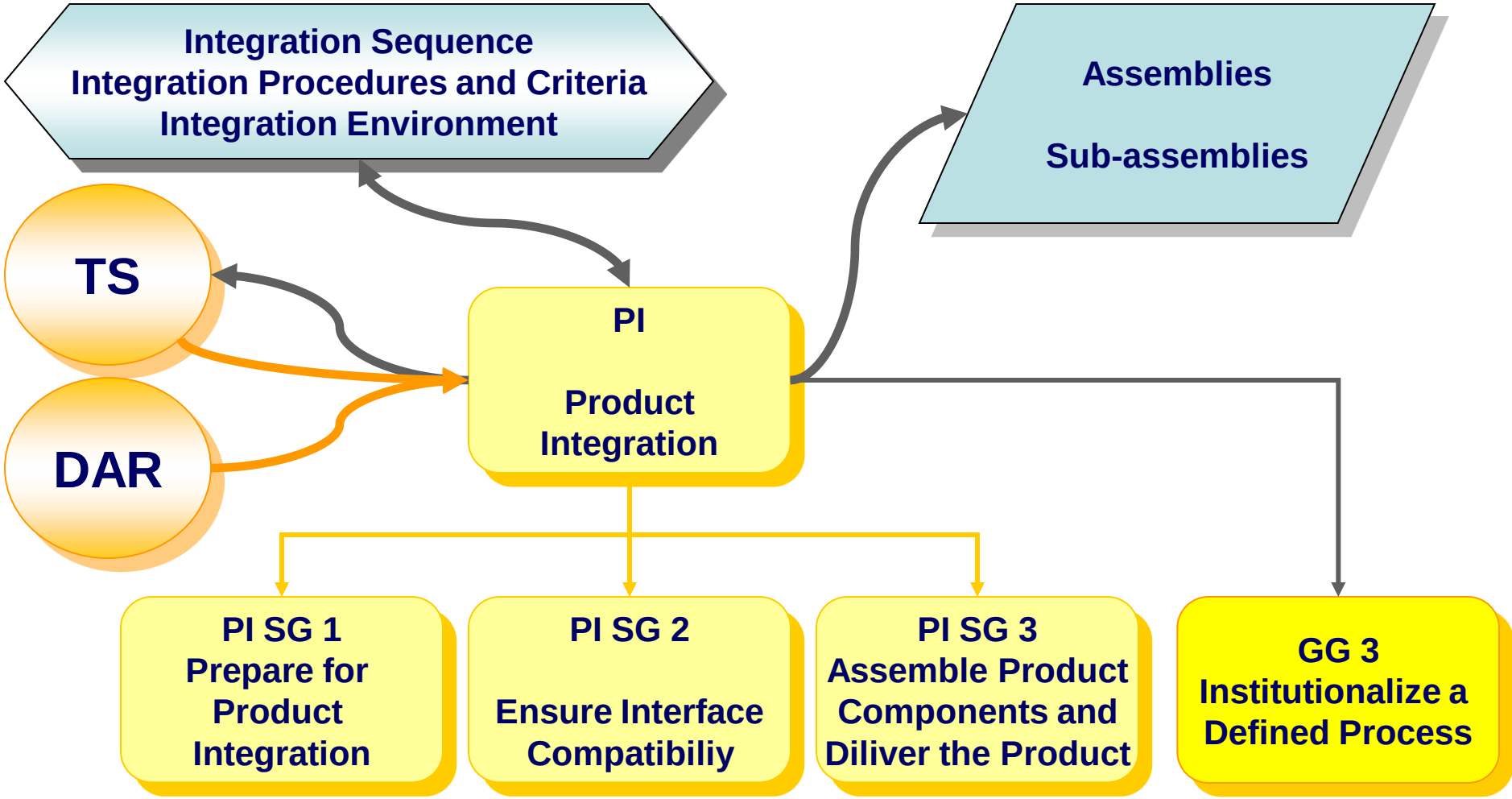
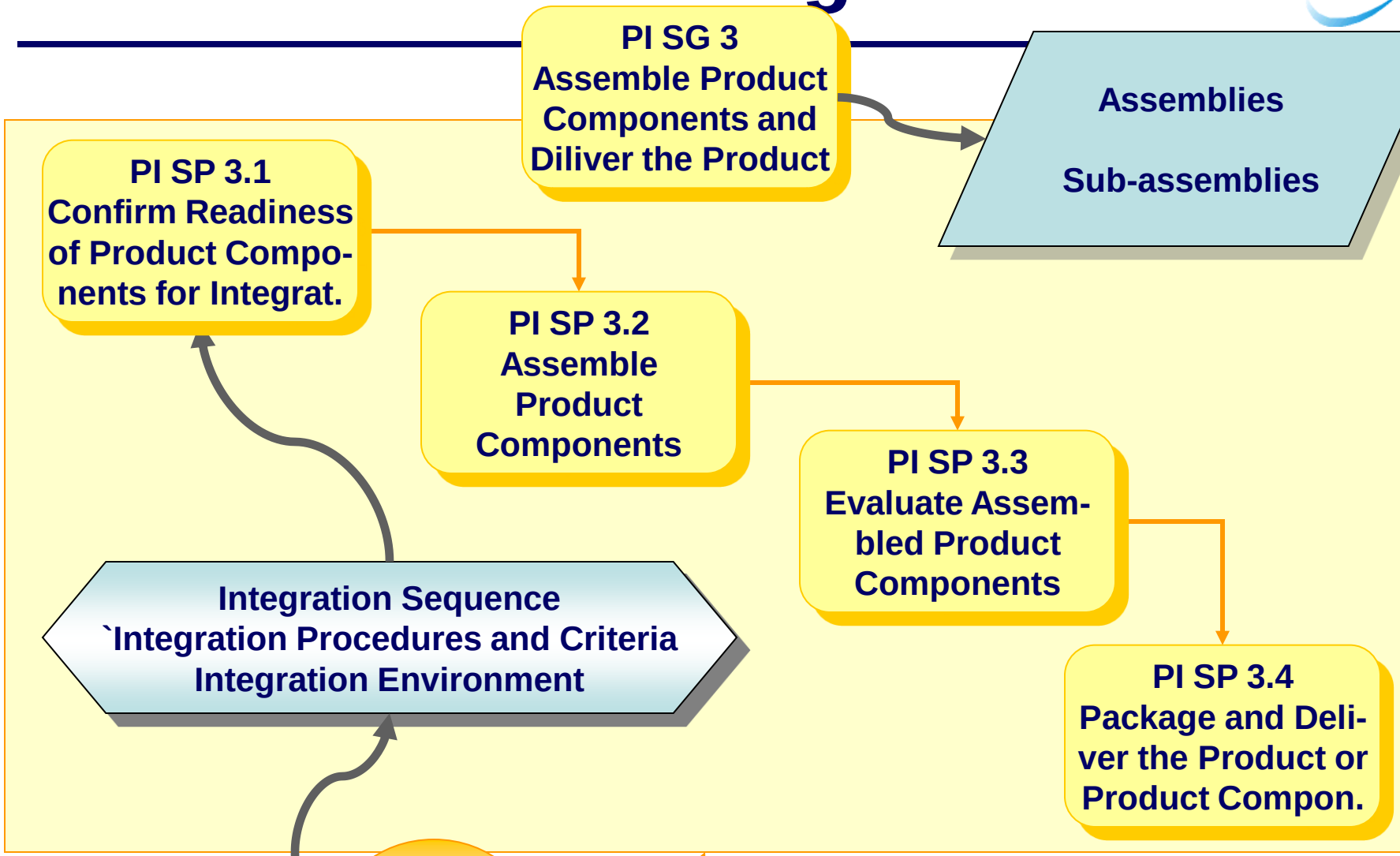


Product Integration



Product Integration

- **Specific Goals**
  - SG 1 Prepare for Product Integration
    - Preparation for product integration is conducted
  - SG 2 Ensure Interface Compatibility
    - The product-component interfaces, both internal and external, are compatible
  - SG 3 Assemble Product Components and Deliver the Product
    - Verified product components are assembled and the integrated, verified, and validated product is delivered

SG 1 Prepare for Product Integr

- SP 1.1 Determine the product-component integration sequence
  - Typical Work Products
    - Product integration sequence
    - Rationale for selecting or rejecting integration sequences
- SP 1.2 Establish and maintain the environment needed to support the integration of the product components
  - Typical Work Products
    - Verified environment for product integration
    - Support documentation for the product integration environment

SG 1 Prepare for Product Integr

- SP 1.3 Establish and maintain procedures and criteria for integration of the product components
  - Typical Work Products
    - Product integration procedures
    - Product integration criteria

SG 2 Ensure Interface Compat

- SP 2.1 Review interface descriptions for coverage and completeness
  - Typical Work Products
    - Categories of interfaces
    - List of interfaces per category
    - Mapping of the interfaces to the product components and product integration environment
  - Note
    - SP 2.1 describes a VER / VAL type activity
    - it is slightly redundant with VER / VAL
    - stresses out a necessity to perform VER / VAL in SG2 (there are good reasons)

SG 2 Ensure Interface Compat

- SP 2.2 Manage internal and external interface definitions, designs, and changes for products and product components
  - Typical Work Products
    - Table of relationships among the product components and the external environment (e.g., main power supply, fastening product, computer bus system)
    - Table of relationships between the different product components
    - List of agreed-to interfaces defined for each pair of product components, when applicable
    - Reports from the interface control working group meetings
    - Action items for updating interfaces
    - Application program interface (API)
    - Updated interface description or agreement

SG 3 Assemble Product Components and Deliver the Product

- SP 3.1 Confirm, prior to assembly, that each product component required to assemble the product has been properly identified, functions according to its description, and that the product-component interfaces comply with the interface descriptions
  - Typical Work Products
    - Acceptance documents for the received product components
    - Delivery receipts
    - Checked packing lists
    - Exception reports
    - Waivers

SG 3 Assemble Product Components and Deliver the Product

- SP 3.2 Assemble product components according to the product integration sequence and available procedures
  - Typical Work Products
    - Assembled product or product components

SG 3 Assemble Product Components and Deliver the Product

- SP 3.3 Evaluate assembled product components for interface compatibility
  - Typical Work Products
    - Exception reports
    - Interface evaluation reports
    - Product integration summary reports
  - Example results include the following:
    - Any adaptation required to the integration procedure
    - Any change to the product configuration (spare parts, new release)
    - Evaluation procedure deviations

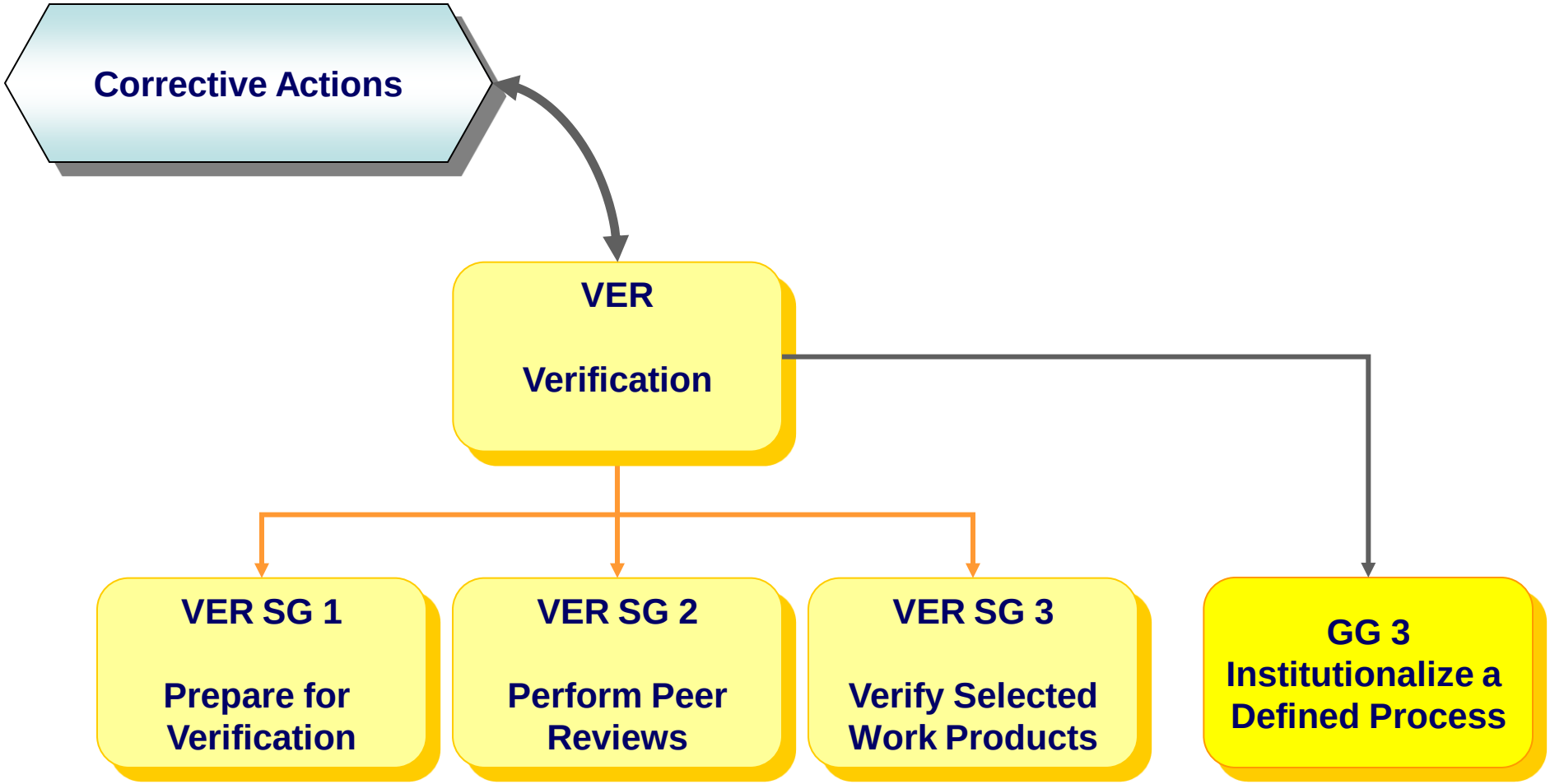
SG 3 Assemble Product Components and Deliver the Product

- SP 3.4 Package the assembled product or product component and deliver it to the appropriate customer
  - Typical Work Products
    - Packaged product or product components
    - Delivery documentation

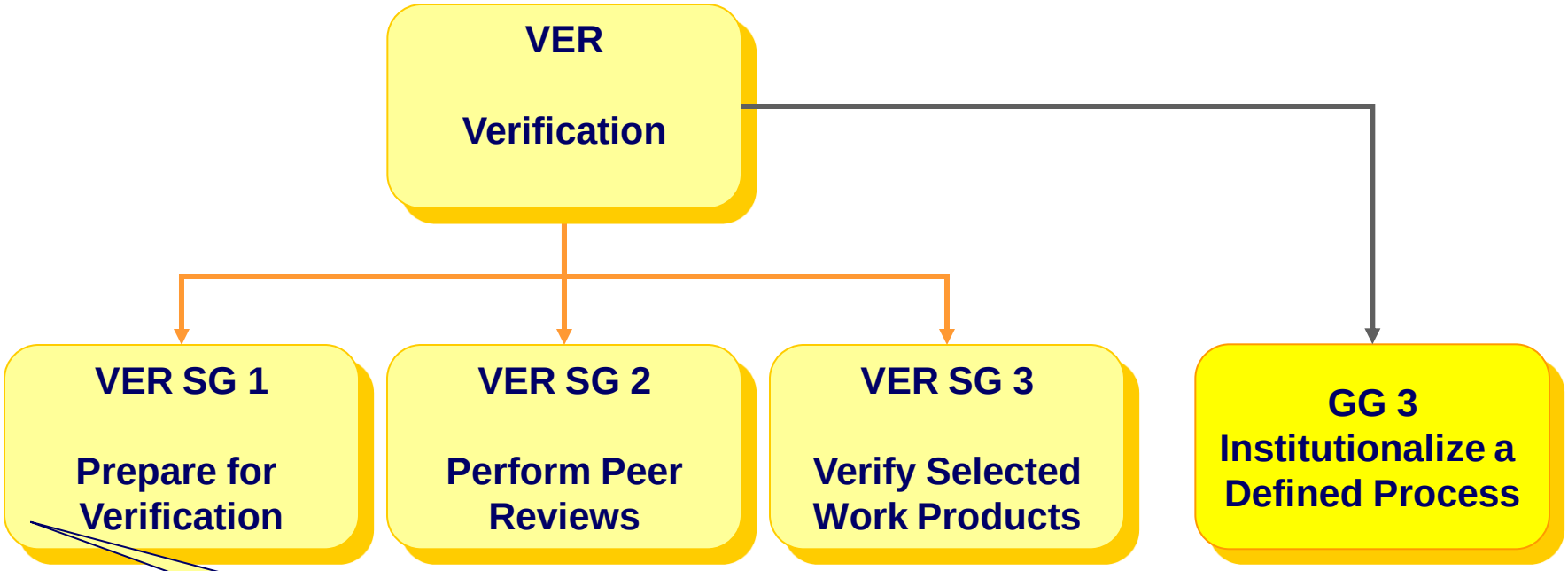
Agenda

- Global scope
- RD Requirements Development
- REQM Requirements Management
- TS Technical Solution
- PI Product Integration
- VER Verification
- VAL Validation
- SE Process vs. CMMI Engineering

Verification

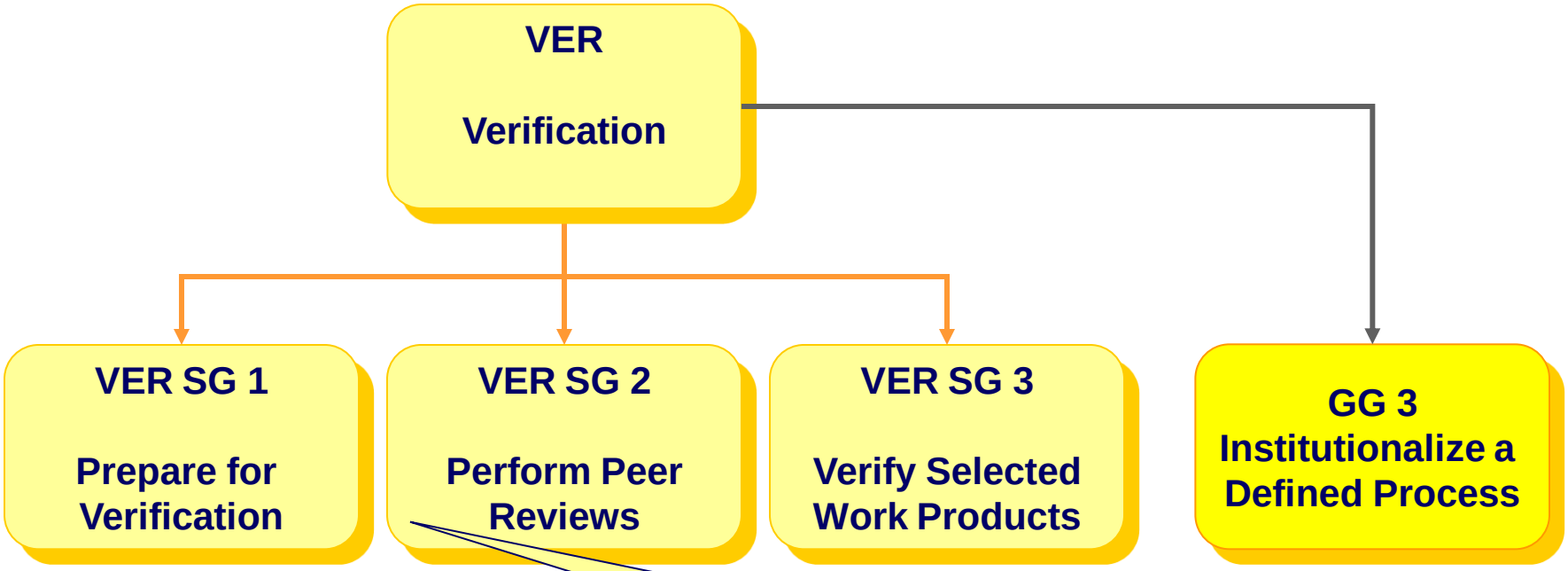


Verification



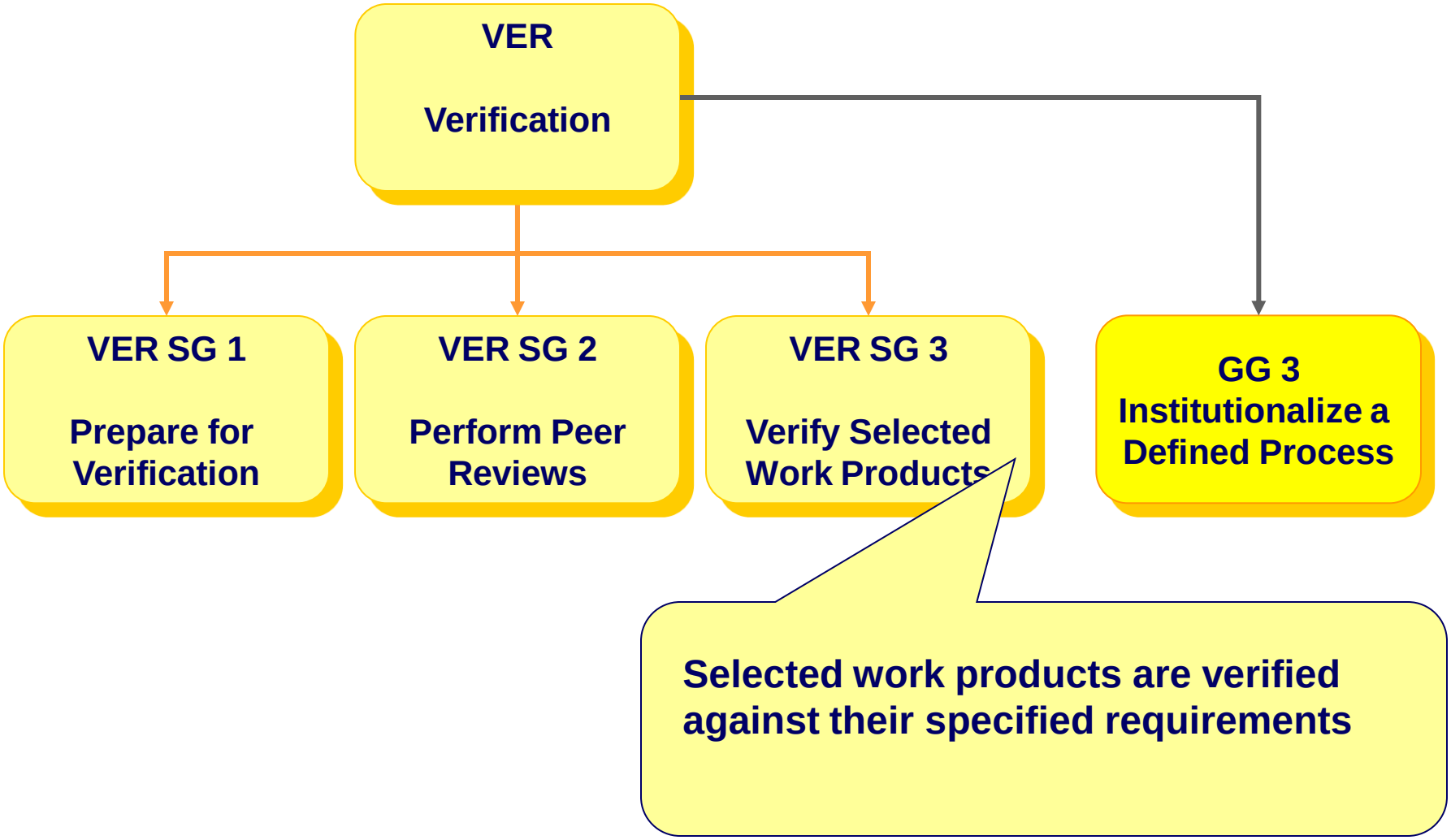
Preparation for verification is conducted

Verification



Peer reviews are performed on selected work products

Verification



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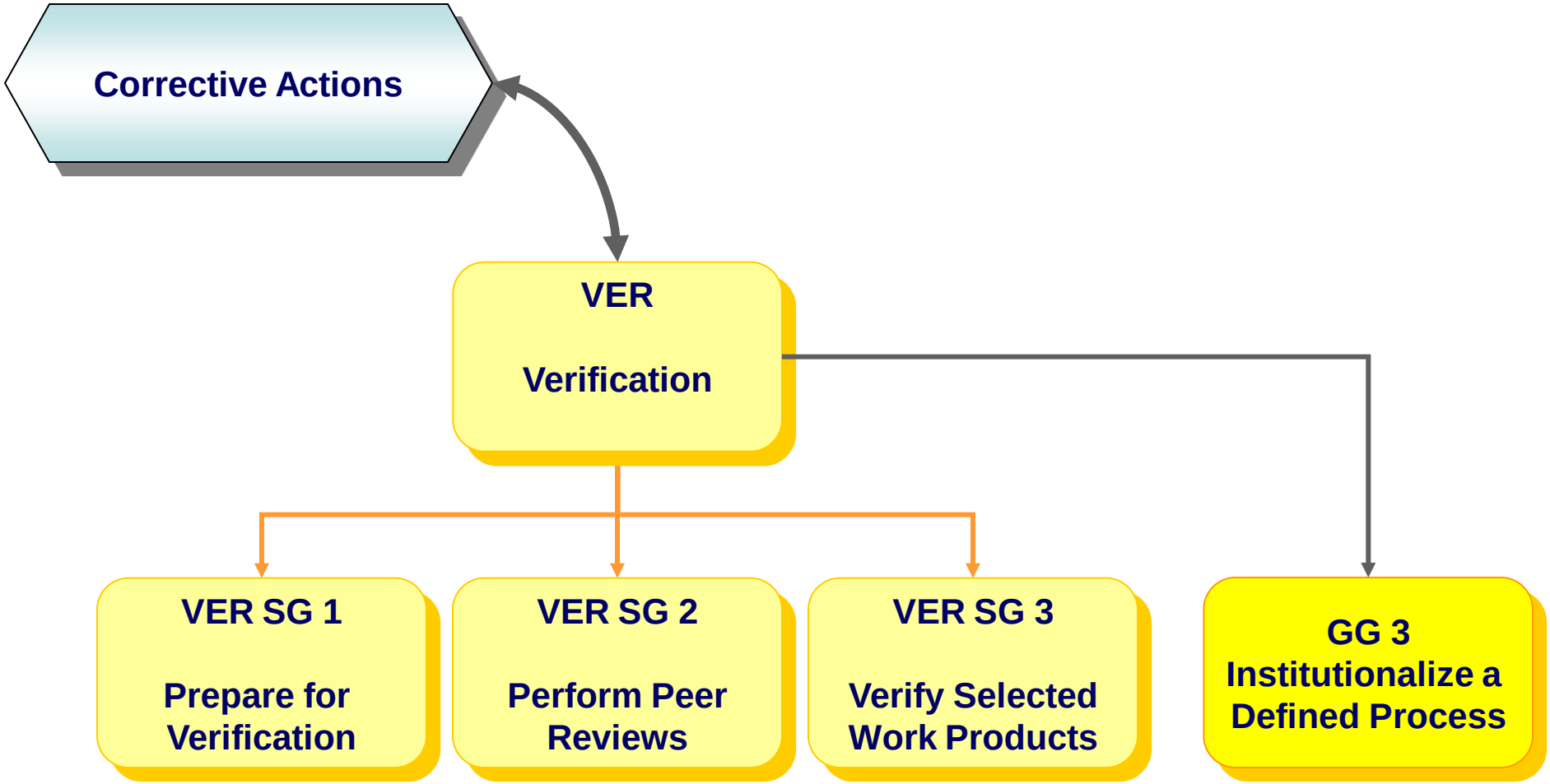

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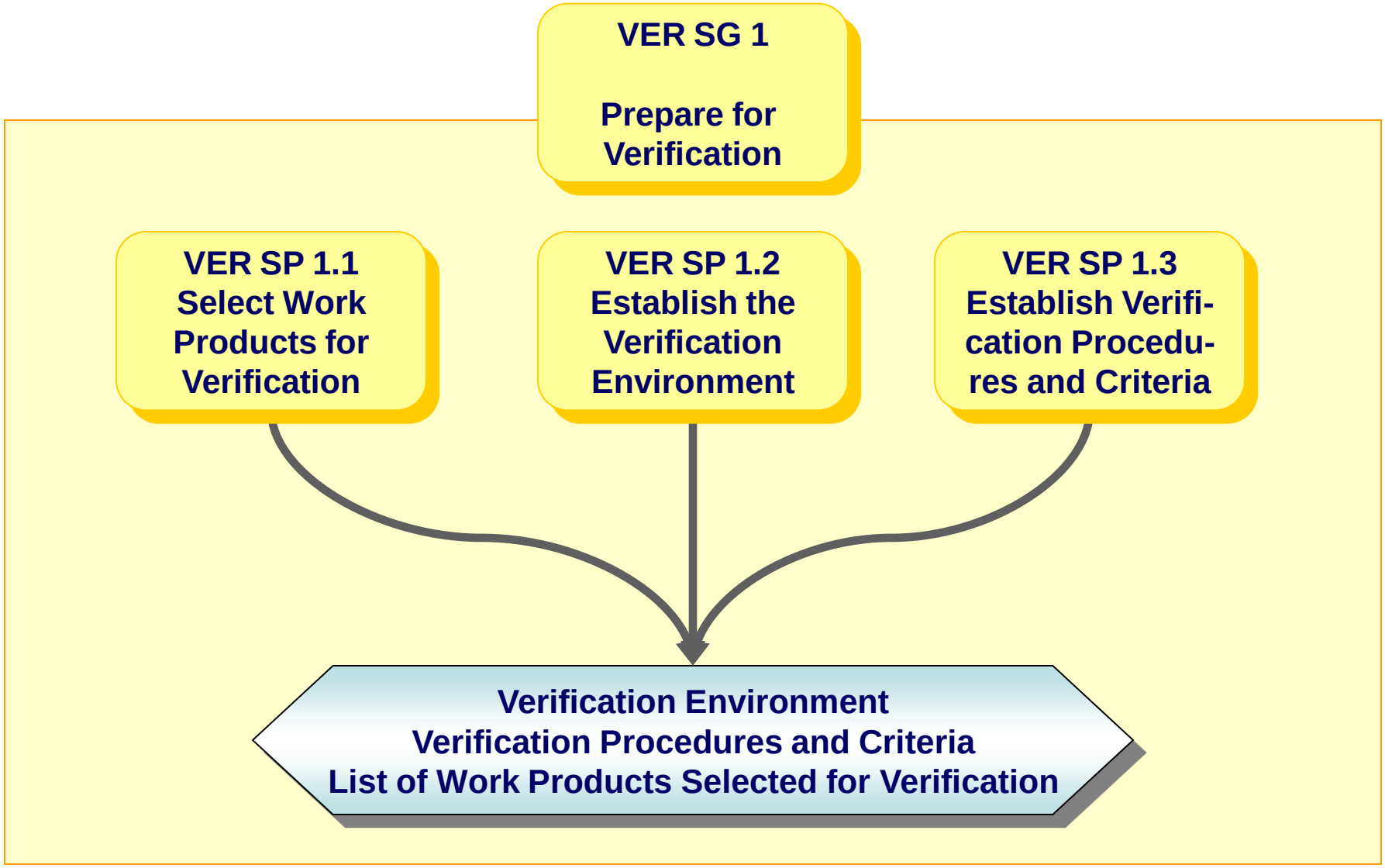

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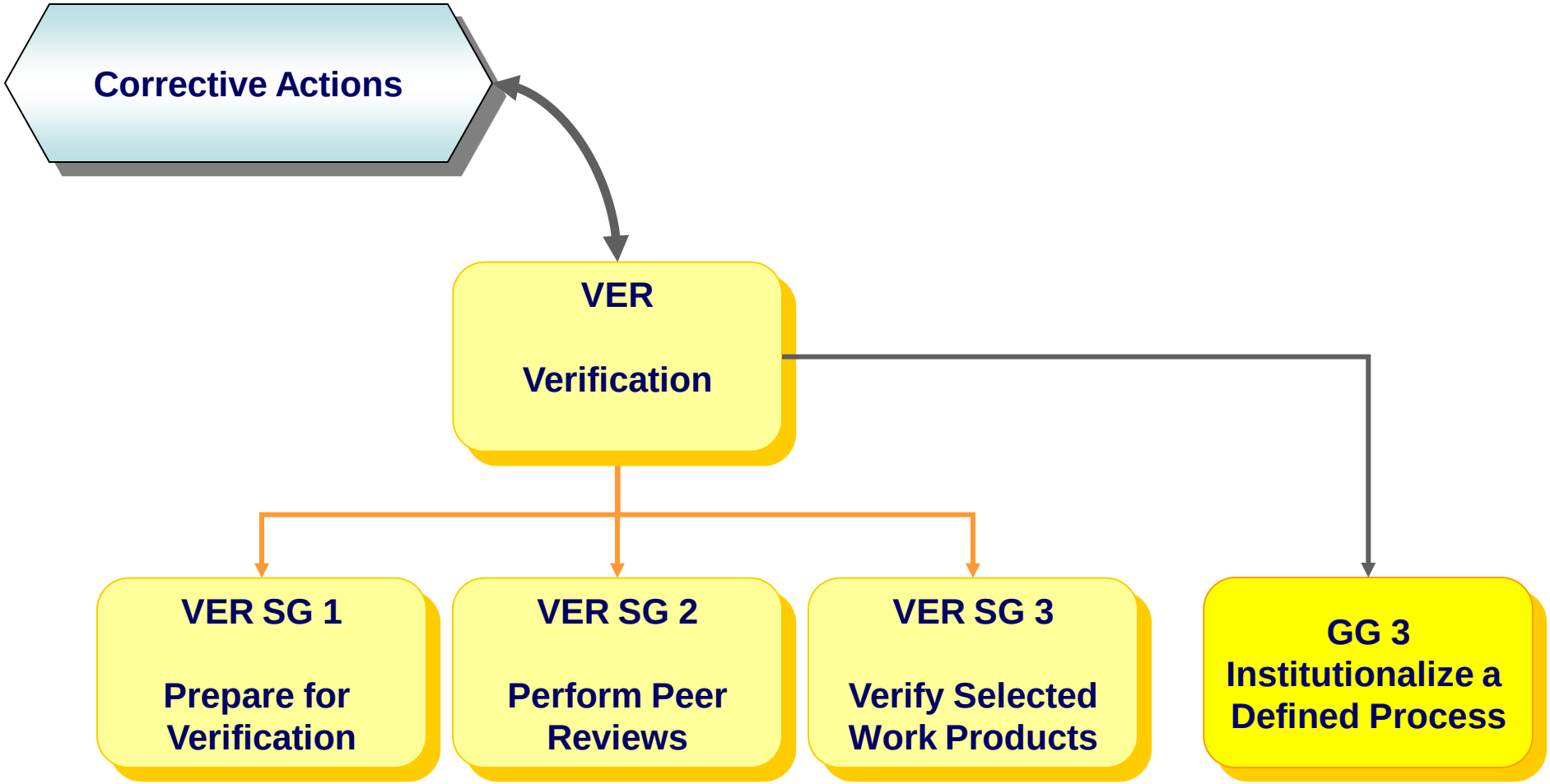

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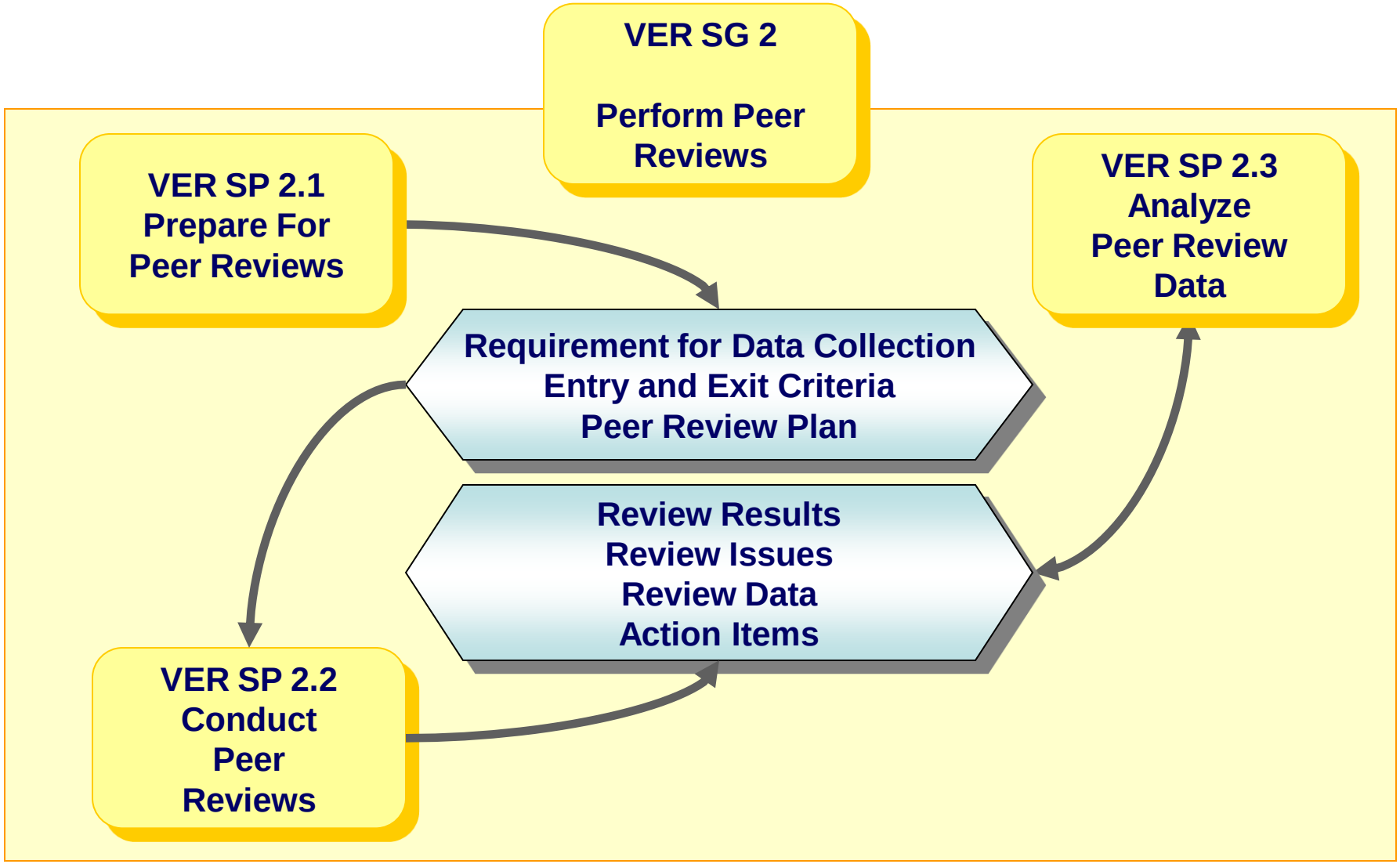

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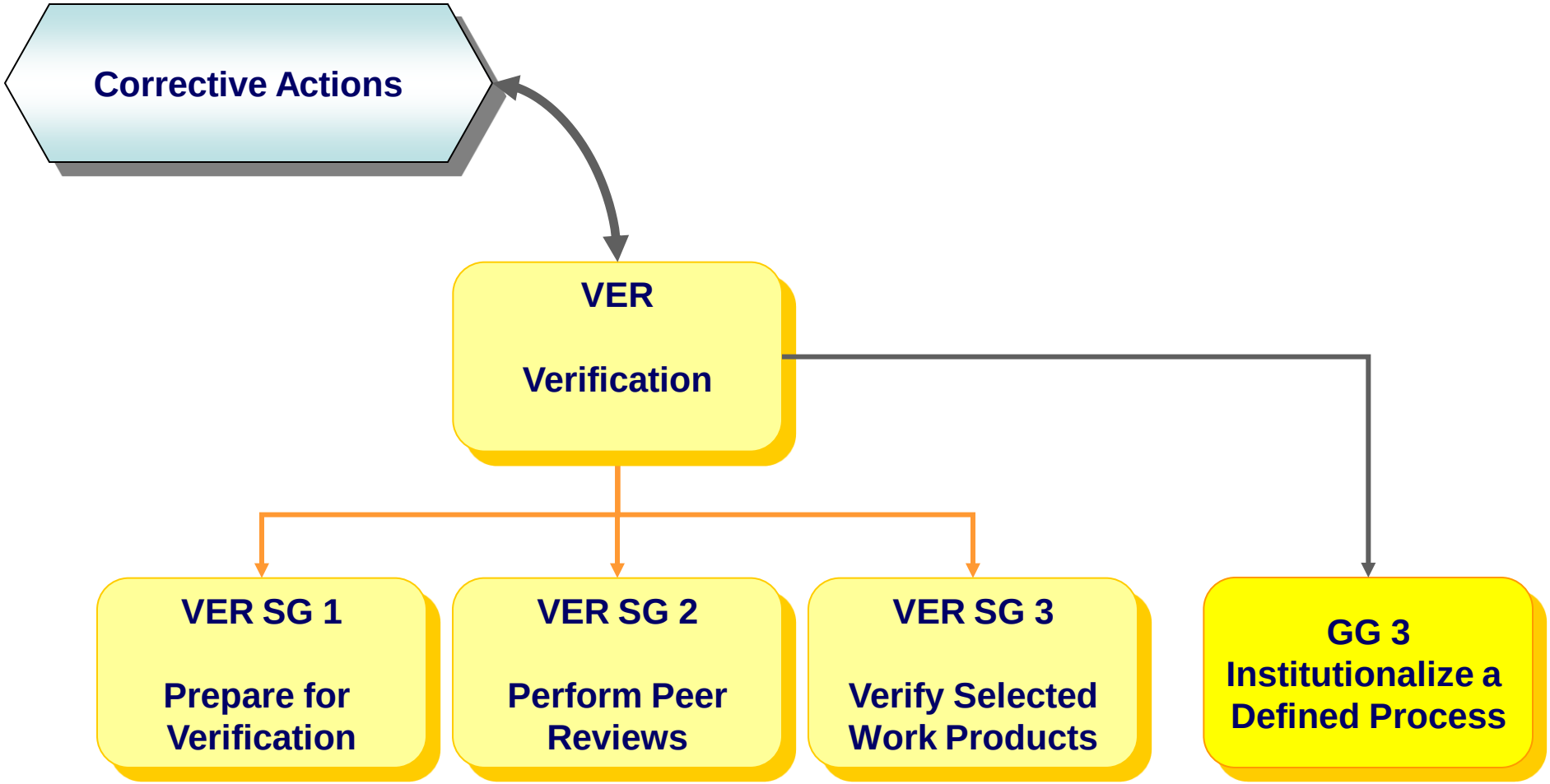
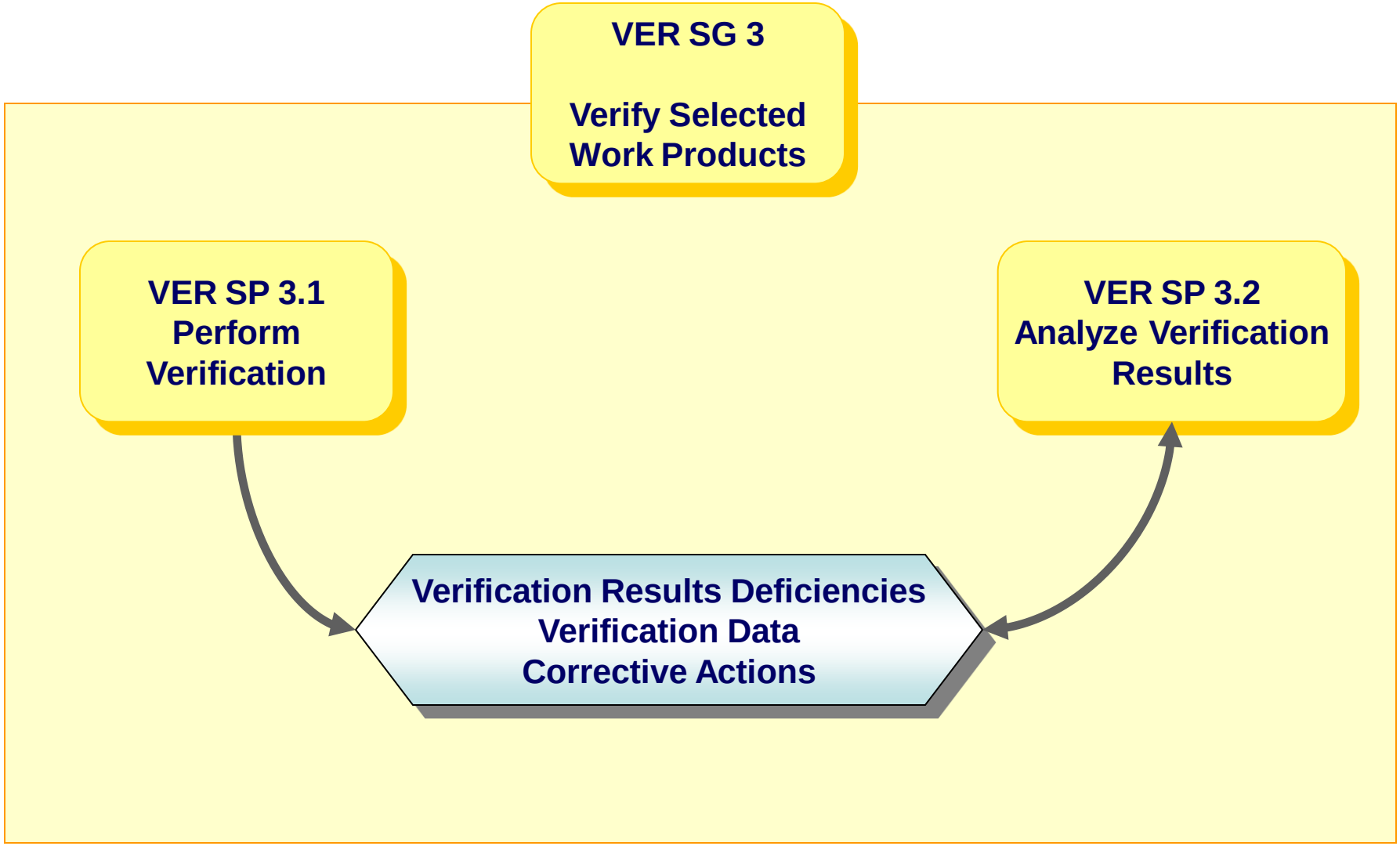


Verification



Verification

- **Specific Goals**
  - SG 1 Prepare for Verification
    - Preparation for verification is conducted.
  - SG 2 Perform Peer Reviews
    - Peer reviews are performed on selected work products.
  - SG 3 Verify Selected Work Products
    - Selected work products are verified against their specified requirements

SG 1 Prepare for Verification

- SP 1.1 Select the work products to be verified and the verification methods that will be used for each
  - Typical Work Products
    - Lists of work products selected for verification
    - Verification methods for each selected work product
  - Examples of verification methods include the following: Path coverage testing
    - Load, stress, and performance testing
    - Decision-table-based testing
    - Functional-decomposition-based testing
    - Test-case reuse
    - Acceptance tests

SG 1 Prepare for Verification

- SP 1.2 Establish and maintain the environment needed to support verification
  - Typical Work Products
    - Verification environment
- SP 1.3 Establish and maintain verification procedures and criteria for the selected work products
  - Typical Work Products
    - Verification procedures
    - Verification criteria

SG 2 Perform Peer Reviews

- SP 2.1 Prepare for peer reviews of selected work products
  - Typical Work Products
    - Peer review schedule
    - Peer review checklist
    - Entry and exit criteria for work products
    - Criteria for requiring another peer review
    - Peer review training material
    - Selected work products to be reviewed
  - Examples of types of peer reviews include the following:
    - Inspections
    - Structured walkthroughs
    - Active reviews

SG 2 Perform Peer Reviews

- SP 2.1 Prepare for peer reviews of selected work products
  - Note
    - Peer reviews are covered by IEEE Std 1028-1997 IEEE Standard for Software Reviews
      - » the standard defines five types of software reviews, together with procedures required for the execution of each review type

SG 2 Perform Peer Reviews

- SP 2.2 Conduct peer reviews on selected work products and identify issues resulting from the peer review
  - Typical Work Products
    - Peer review results
    - Peer review issues
    - Peer review data
- SP 2.3 Analyze data about preparation, conduct, and results of the peer reviews
  - Typical Work Products
    - Peer review data
    - Peer review action items

SG 3 Verify Selected Work Prods

- SP 3.1 Perform verification on the selected work products
  - Typical Work Products
    - Verification results
    - Verification reports
    - Demonstrations
    - As-run procedures

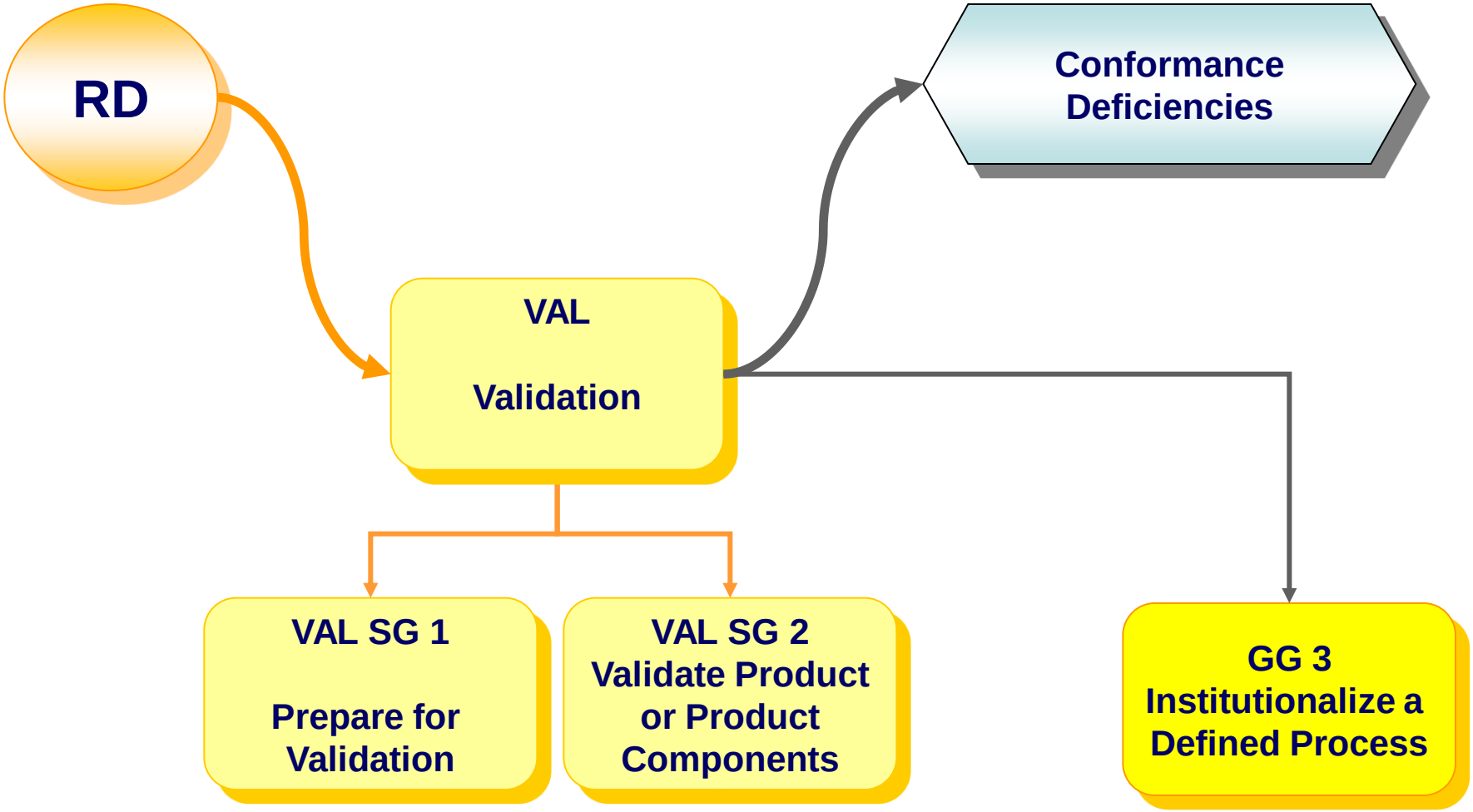
SG 3 Verify Selected Work Prods

- SP 3.2 Analyze the results of all verification activities
  - Typical Work Products
    - Analysis report (such as statistics on performances, causal analysis of nonconformances, comparison of the behavior between the real product and models, and trends)
    - Trouble reports
    - Change requests for the verification methods, criteria, and environment

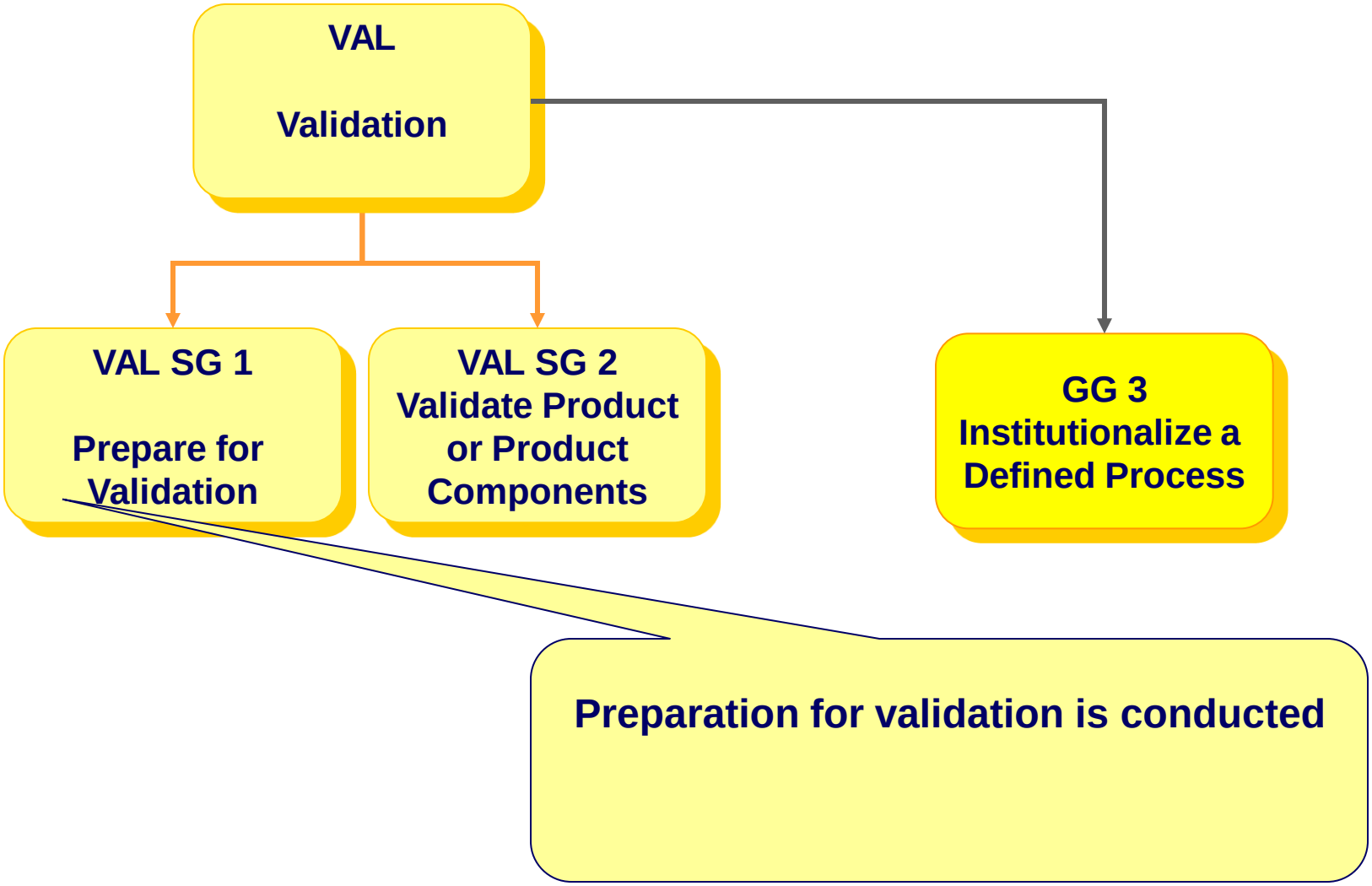
Agenda

- Global scope
- RD Requirements Development
- REQM Requirements Management
- TS Technical Solution
- PI Product Integration
- VER Verification
- VAL Validation
- SE Process vs. CMMI Engineering

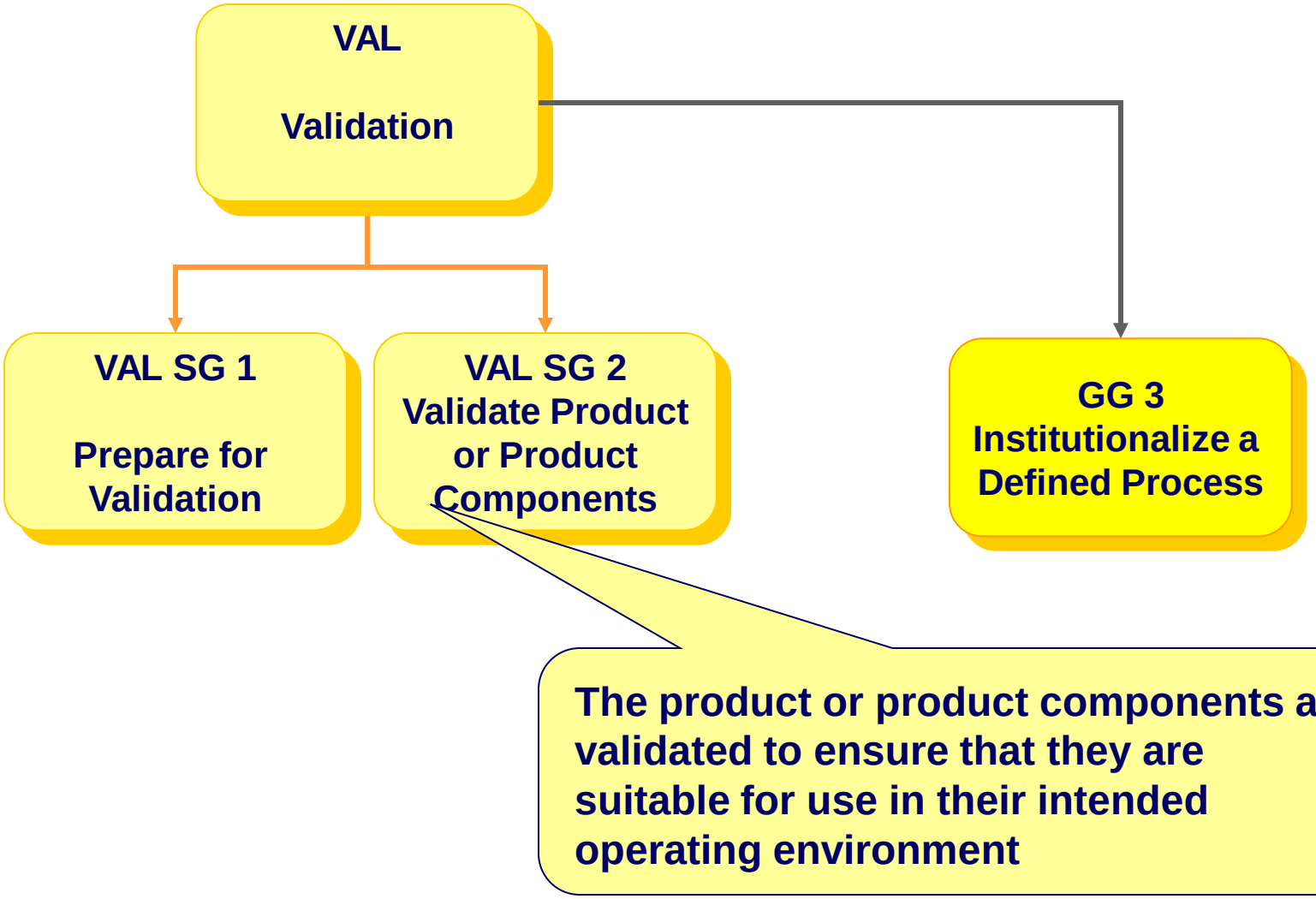
Validation


RD
Conformance Deficiencies
VAL
Validation
VAL SG 1
Prepare for Validation
VAL SG 2
Validate Product or Product Components
GG 3
Institutionalize a Defined Process

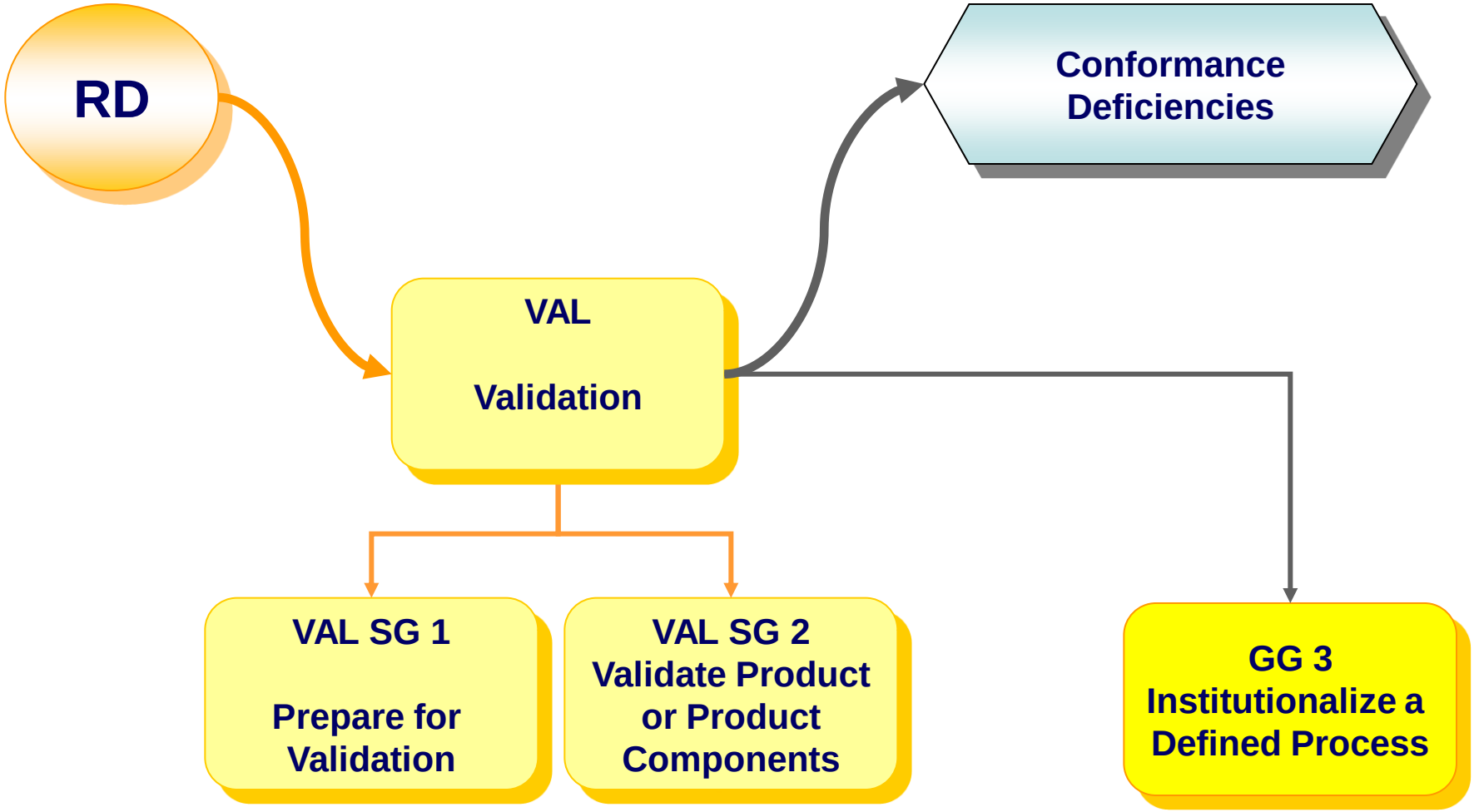
Validation


VAL
Validation
VAL SG 1
Prepare for Validation
VAL SG 2
Validate Product or Product Components
GG 3
Institutionalize a Defined Process
Preparation for validation is conducted

Validation


VAL
Validation
VAL SG 1
Prepare for Validation
VAL SG 2
Validate Product or Product Components
GG 3
Institutionalize a Defined Process
The product or product components are validated to ensure that they are suitable for use in their intended operating environment

Validation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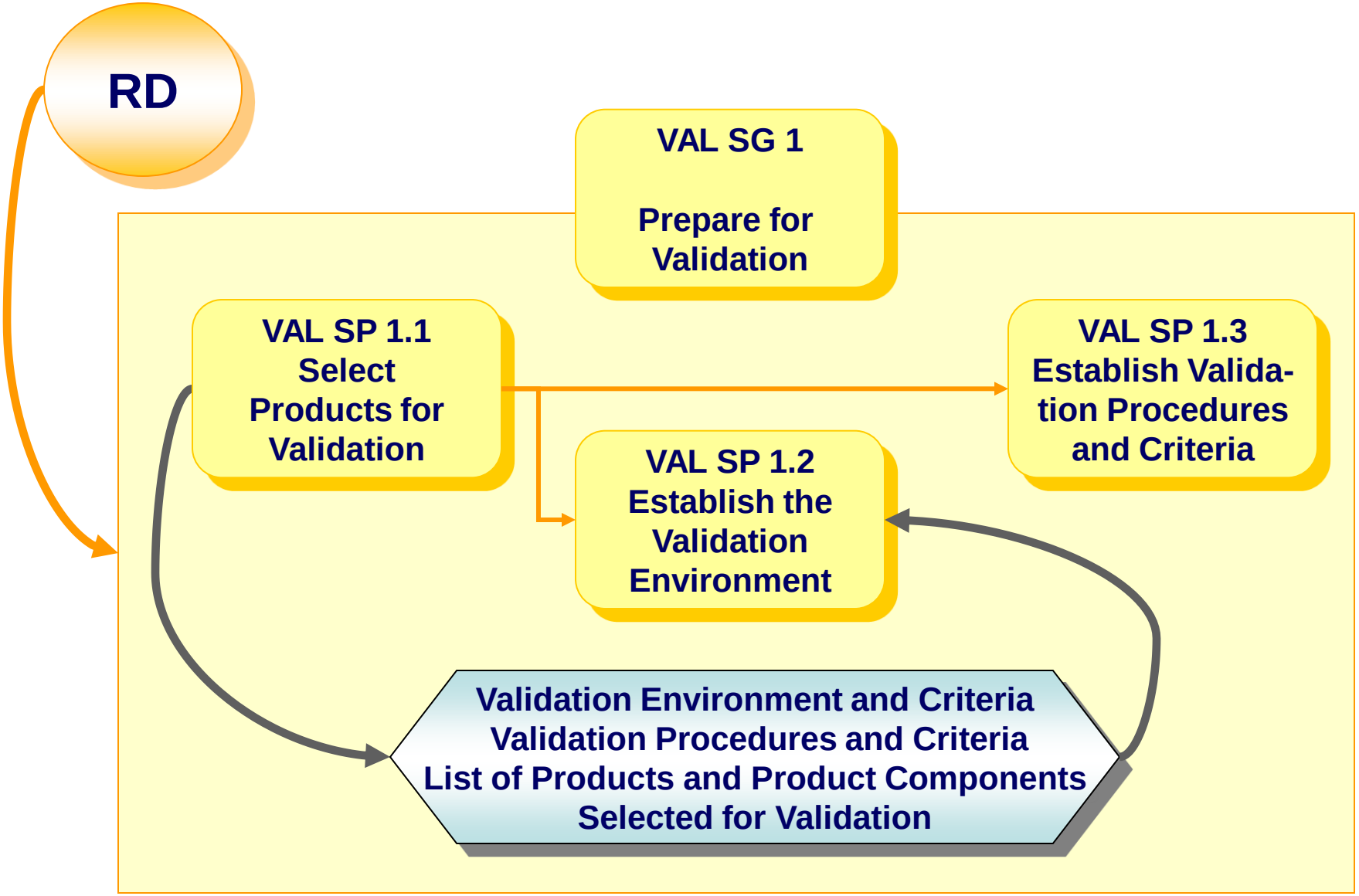
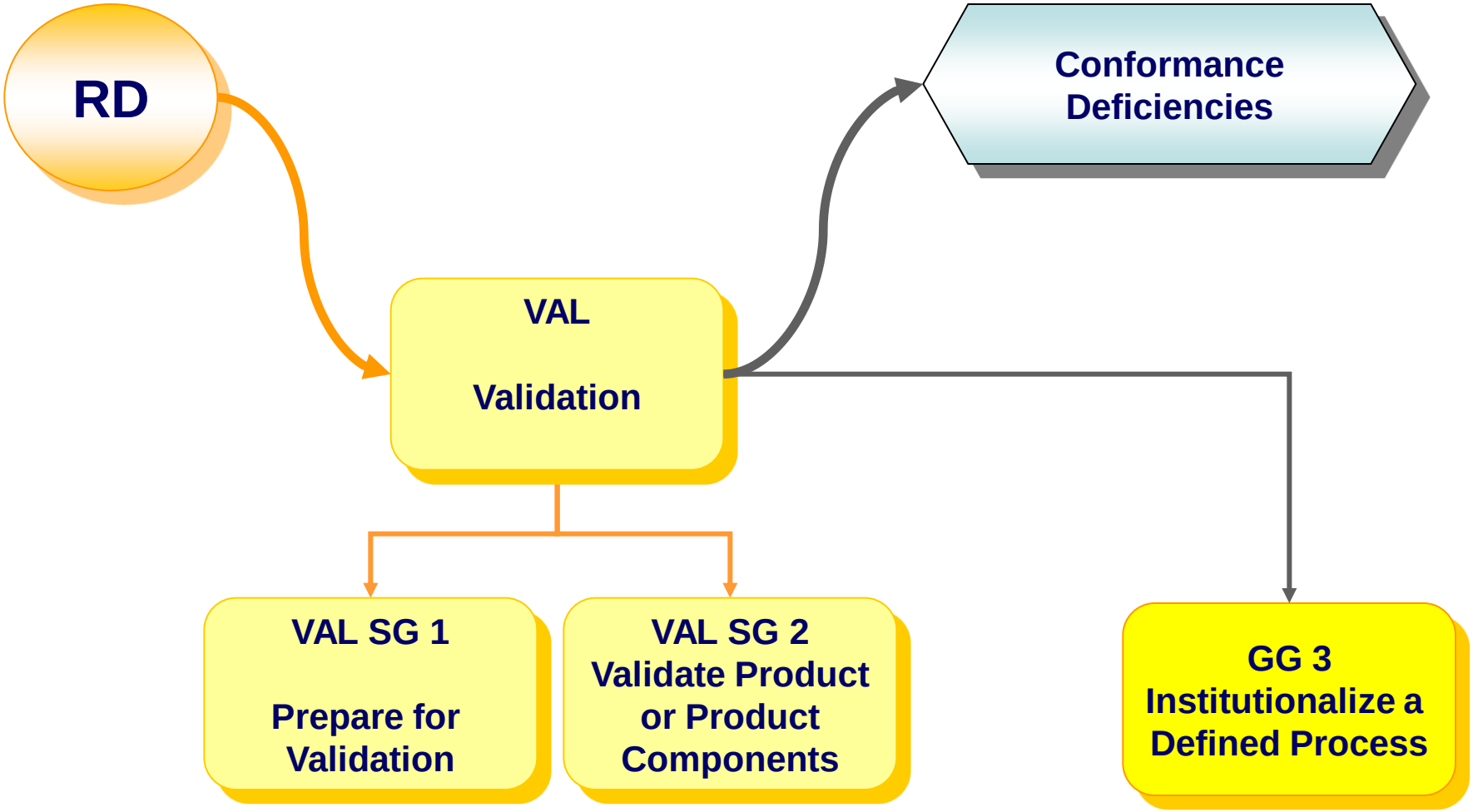

RD
VAL SG 1
Prepare for Validation
VAL SP 1.1 Select Products for Validation
VAL SP 1.3 Establish Validation Procedures and Criteria
VAL SP 1.2 Establish the Validation Environment
Validation Environment and Criteria
Validation Procedures and Criteria
List of Products and Product Components Selected for Validation

Validation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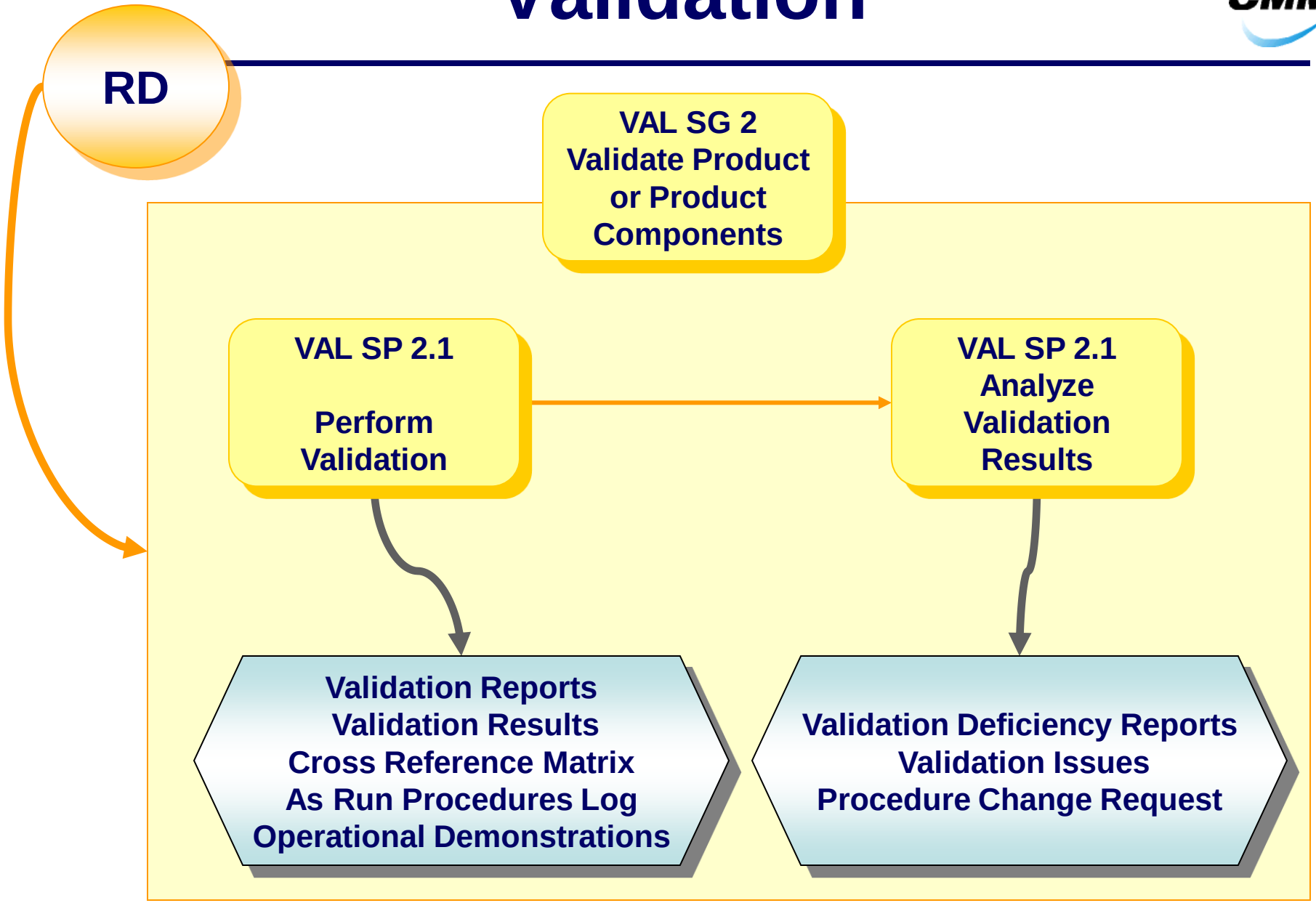
RD
VAL SG 2
Validate Product or Product Components
VAL SP 2.1
Perform Validation
VAL SP 2.1
Analyze Validation Results
Validation Reports
Validation Results
Cross Reference Matrix
As Run Procedures Log
Operational Demonstrations
Validation Deficiency Reports
Validation Issues
Procedure Change Request

Validation

- **Specific Goals**
  - SG 1 Prepare for Validation
    - Preparation for validation is conducted.
  - SG 2 Validate Product or Product Components
    - The product or product components are validated to ensure that they are suitable for use in their intended operating environment.

SG 1 Prepare for Validation

- SP 1.1 Select products and product components to be validated and the validation methods that will be used for each
  - Typical Work Products
    - Lists of products and product components selected for validation
    - Validation methods for each product or product component
    - Requirements for performing validation for each product or product component
    - Validation constraints for each product or product component

SG 1 Prepare for Validation

- SP 1.1 Select products and product components to be validated and the validation methods that will be used for each
  - Note
    - Incremental validation should be planned and taken place along the way
      - » according to test best practices
      - » system test and other end-of-life-cycle activities should not be relied on to find all defects
      - » end-of-development test simply confirms confidence in the product

SG 1 Prepare for Validation

- SP 1.2 Establish and maintain the environment needed to support validation
  - Typical Work Products
    - Validation environment

SG 1 Prepare for Validation

- SP 1.3 Establish and maintain procedures and criteria for validation
  - Typical Work Products
    - Validation procedures
    - Validation criteria
    - Test and evaluation procedures for maintenance, training, and support
  - Examples of sources for validation criteria include the following:
    - Product and product-component requirements
    - Standards
    - Customer acceptance criteria
    - Environmental performance
    - Thresholds of performance deviation

SG 2 Validate Product or Product Components

- SP 2.1 Perform validation on the selected products and product components
  - Typical Work Products
    - Validation reports
    - Validation results
    - Validation cross-reference matrix
    - As-run procedures log
    - Operational demonstrations
- SP 2.2 Analyze the results of the validation activities and identify issues
  - Typical Work Products
    - Validation deficiency reports
    - Validation issues
    - Procedure change request

Agenda

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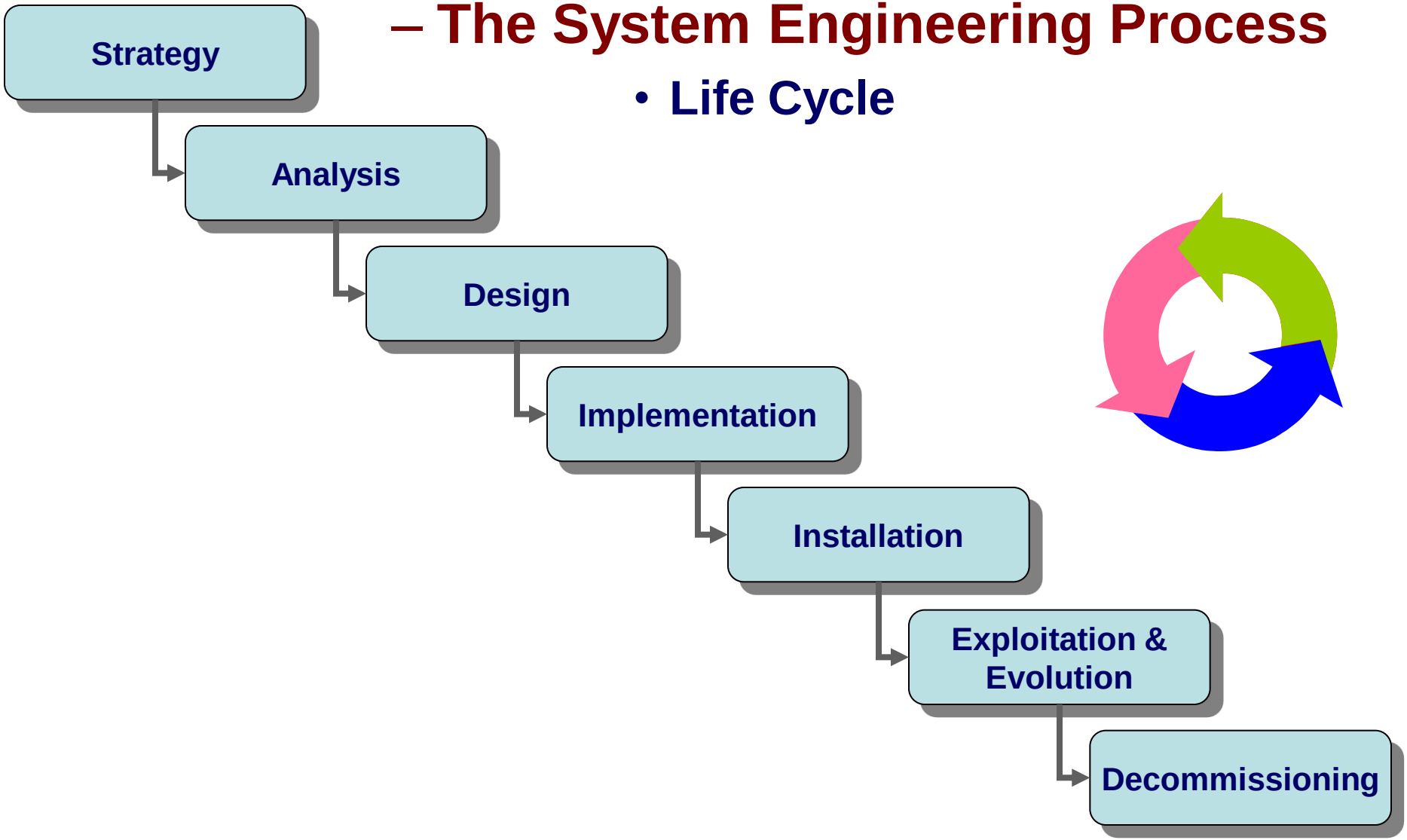
SEP vs. CMMI Engineering

– The System Engineering Process

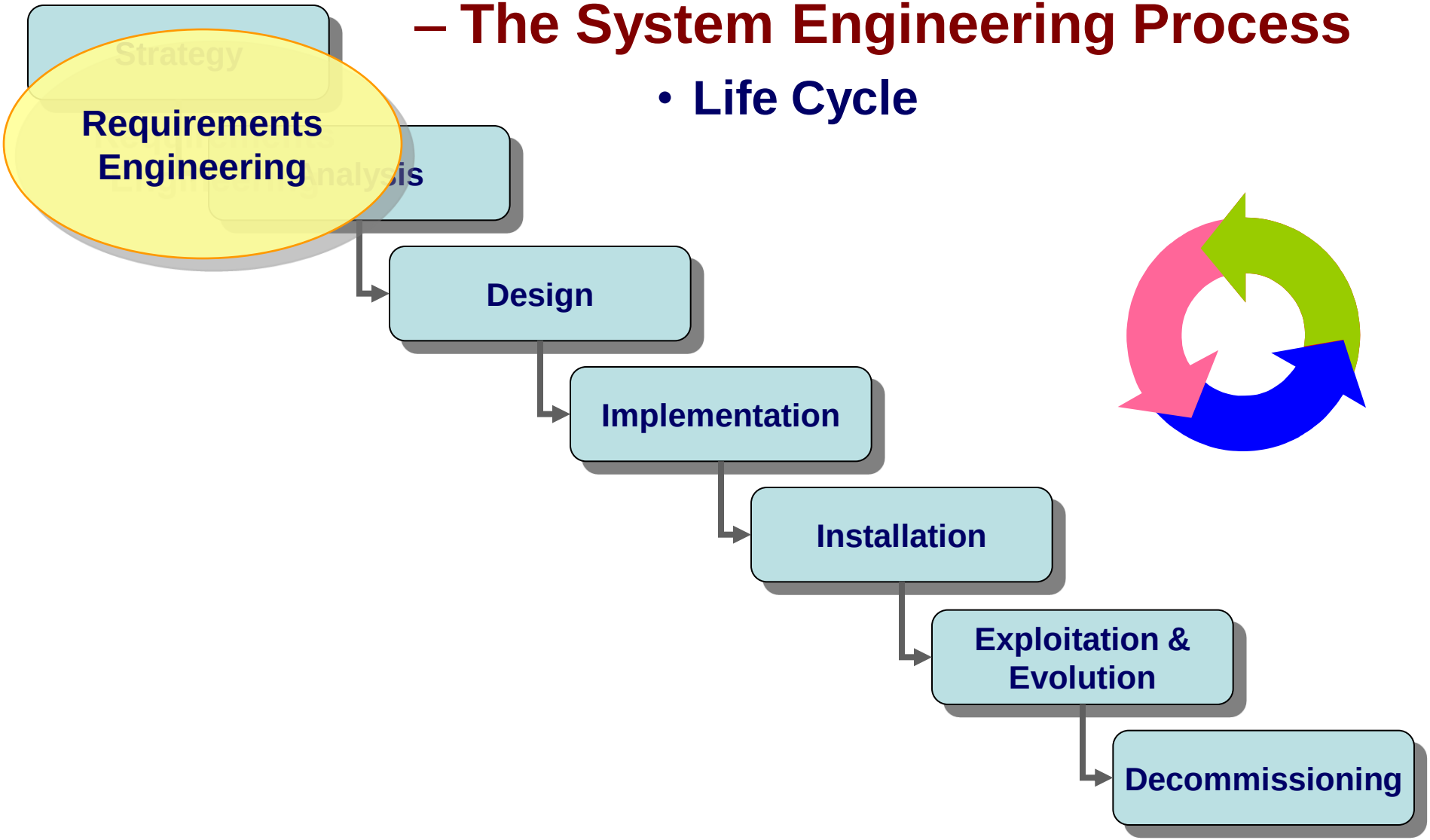
- Life Cycle



SEP vs. CMMI Engineering

– The System Engineering Process

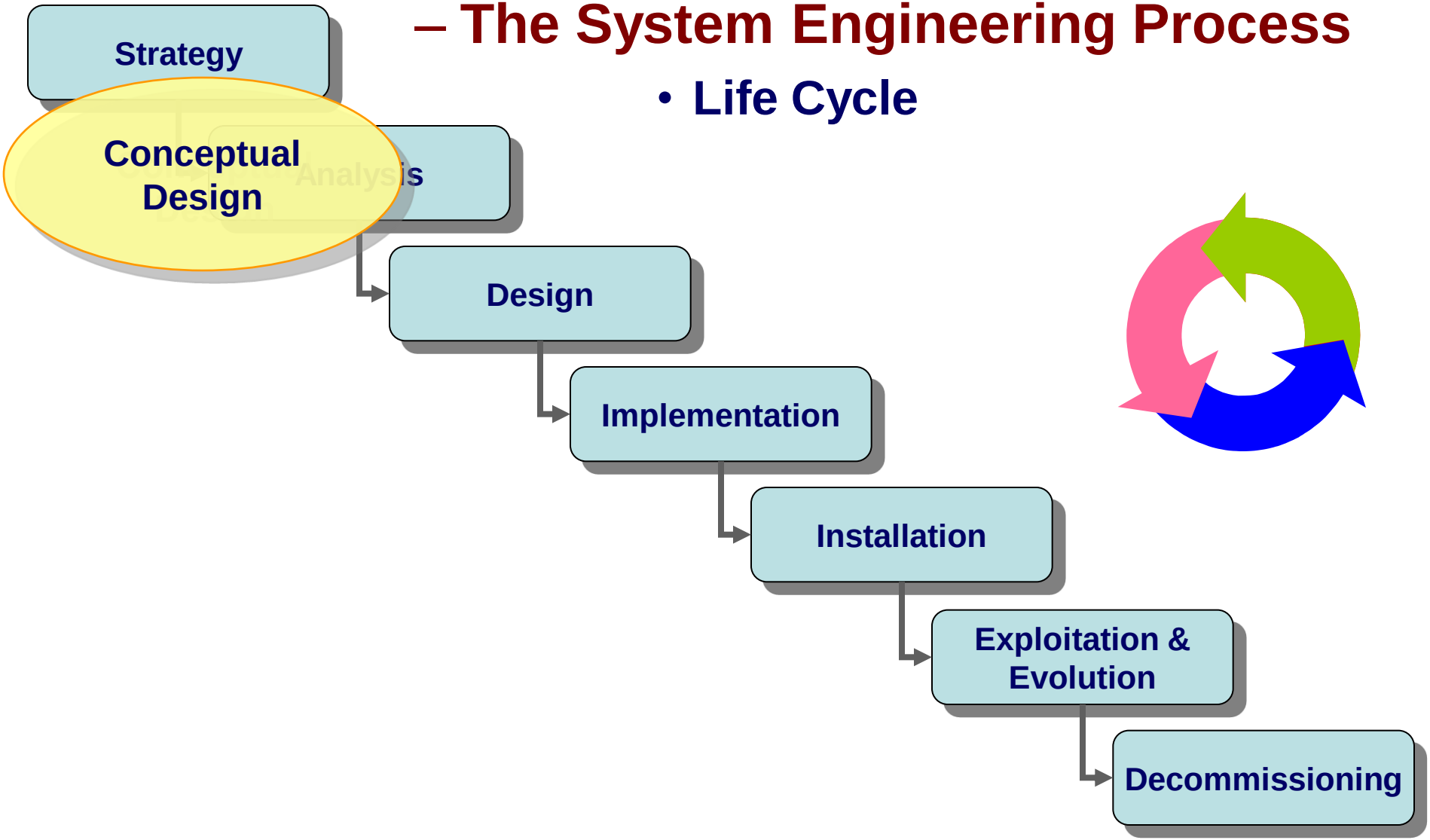
- Life Cycle



SEP vs. CMMI Engineering

– The System Engineering Process

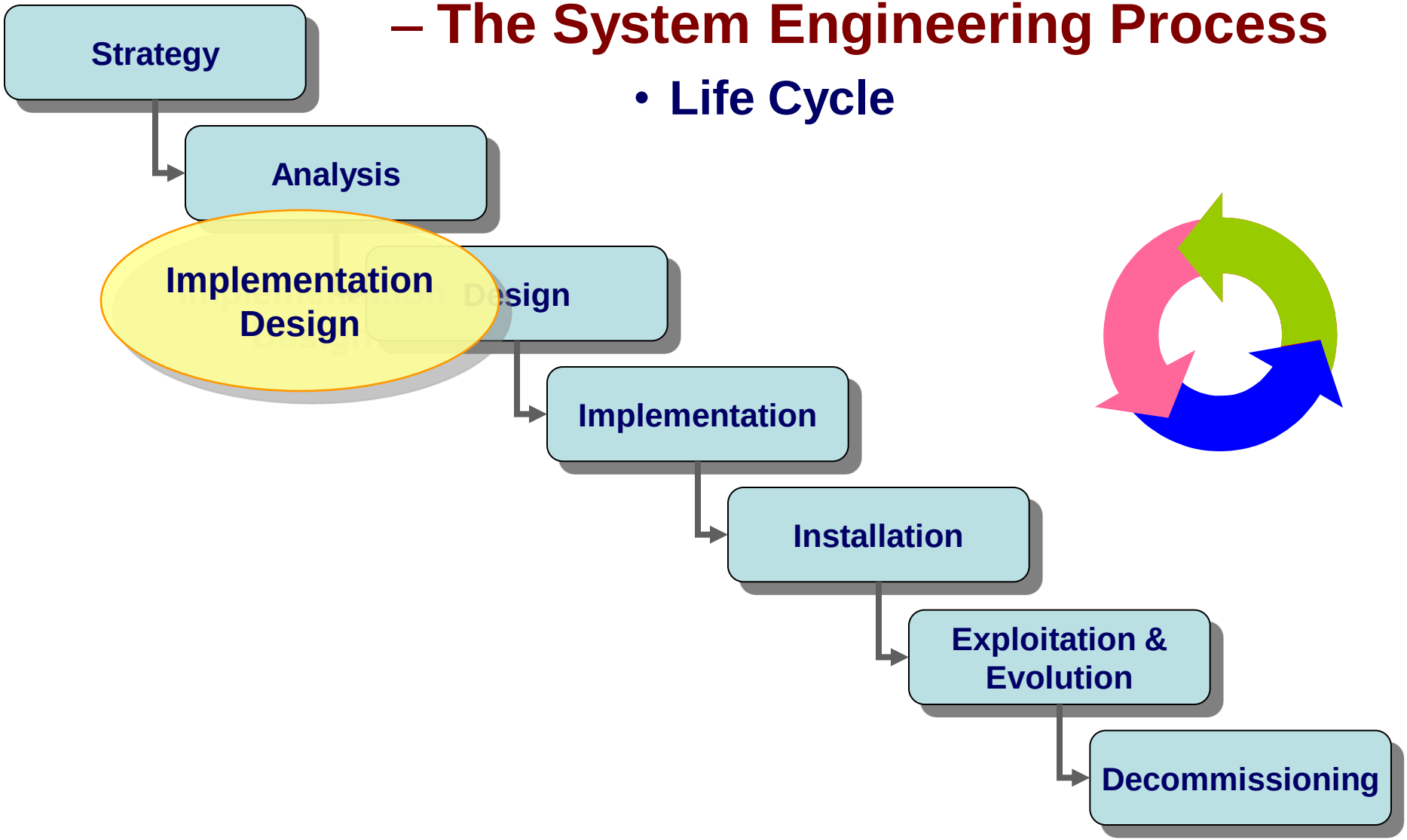
- Life Cycle



SEP vs. CMMI Engineering

– The System Engineering Process

- Life Cycle



SEP vs. CMMI Engineering

– The System Engineering Process

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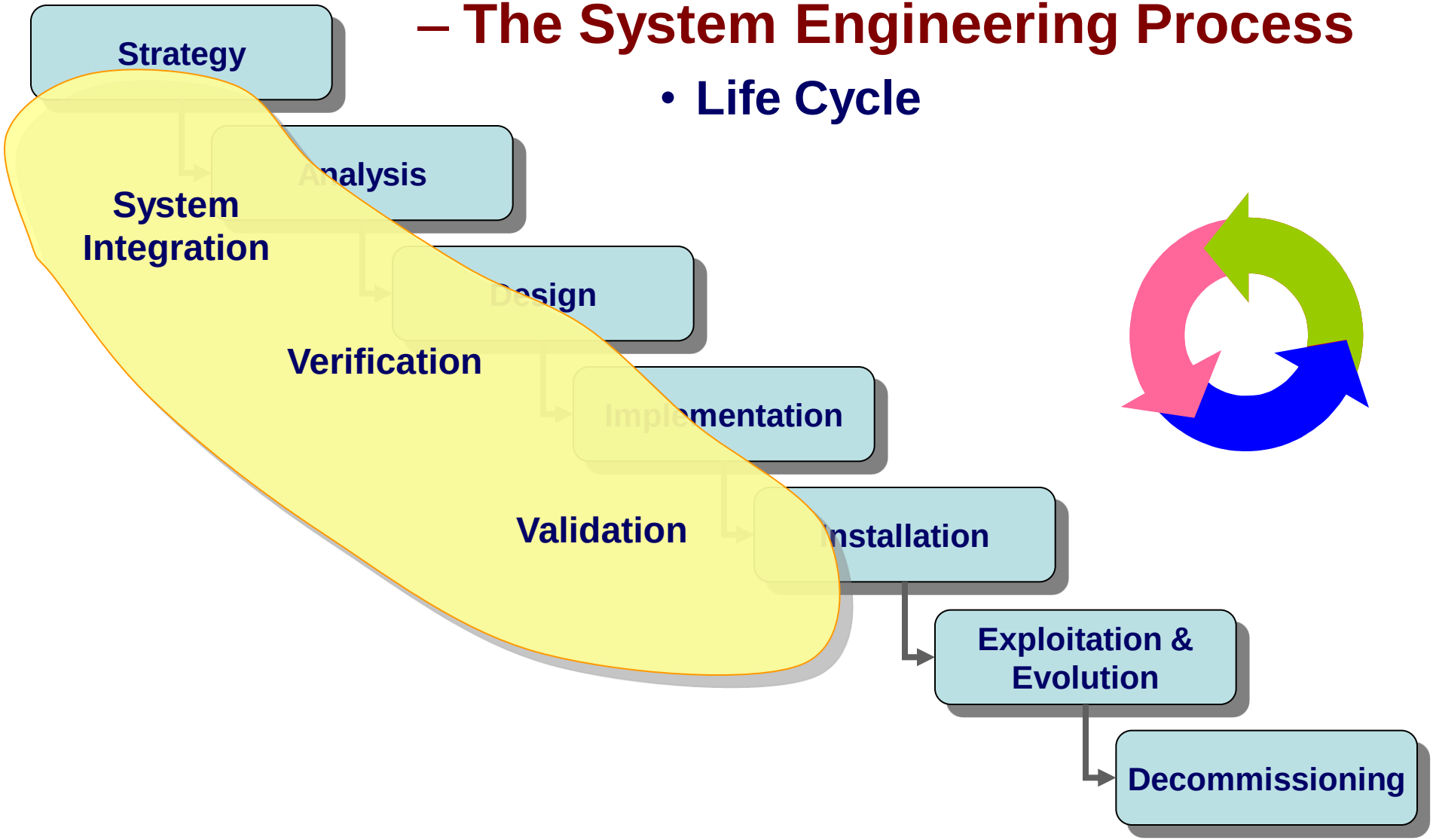

SEP vs. CMMI Engineering

– The System Engineering Process

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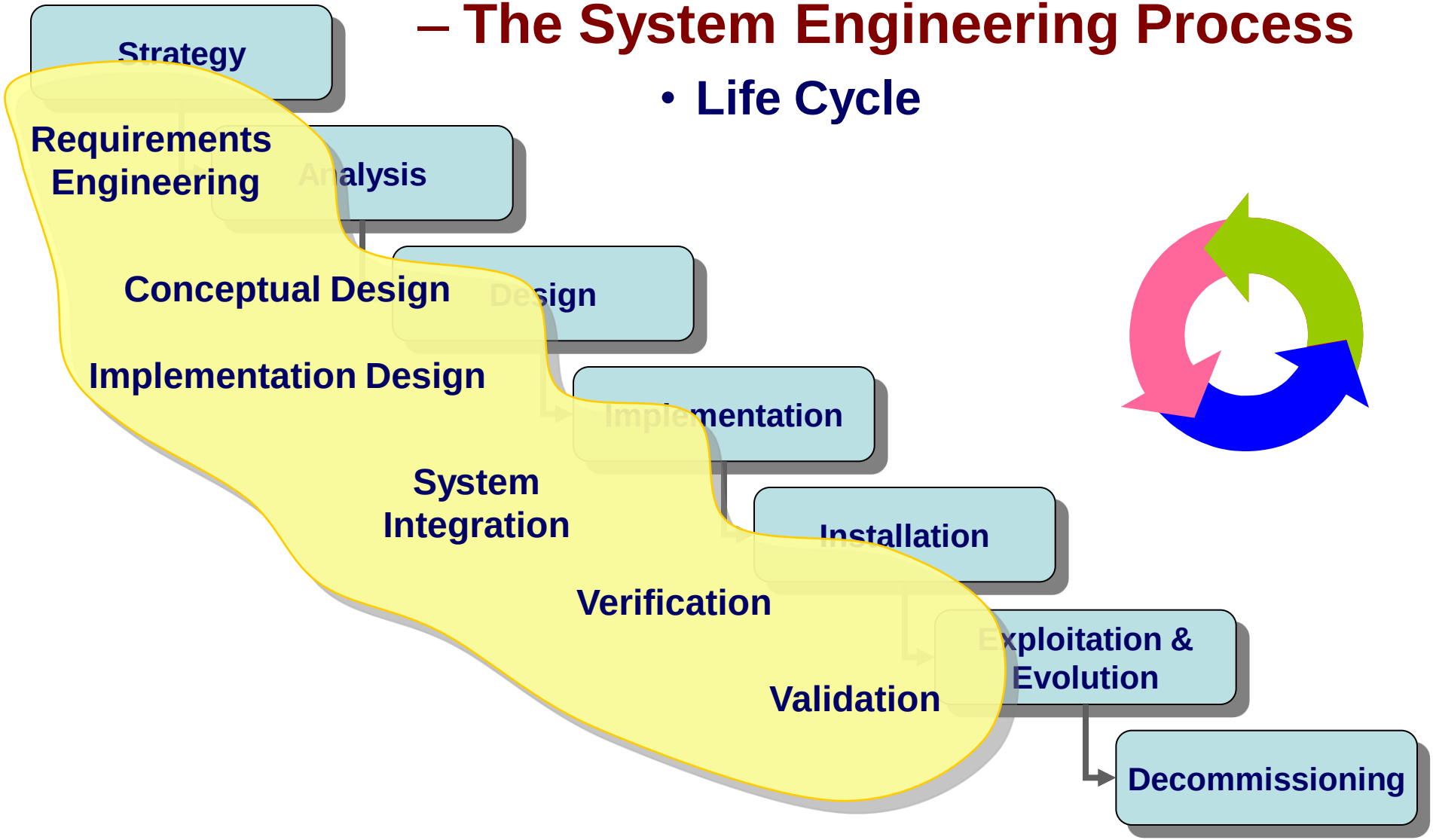
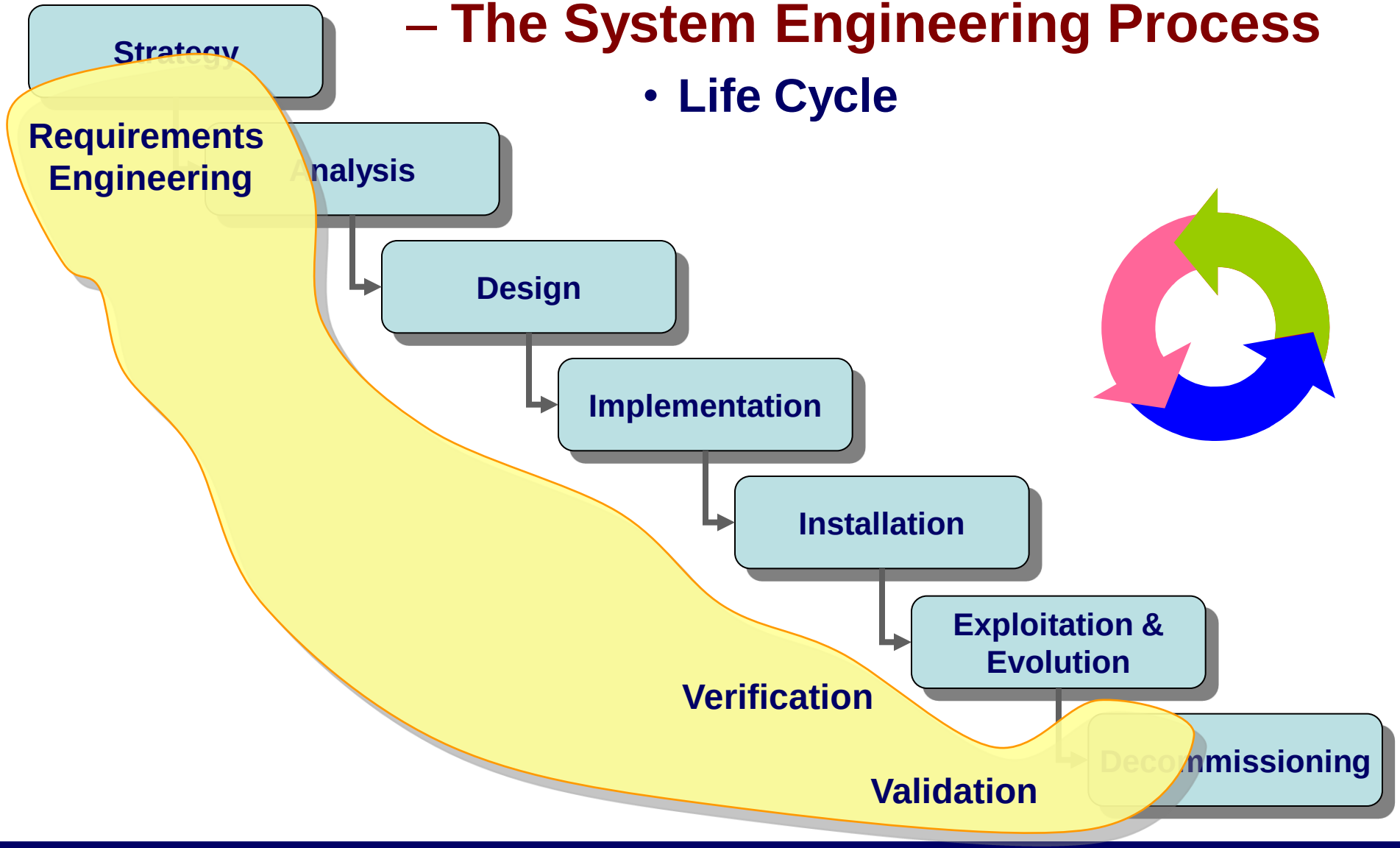


SEP vs. CMMI Engineering

– The System Engineering Process

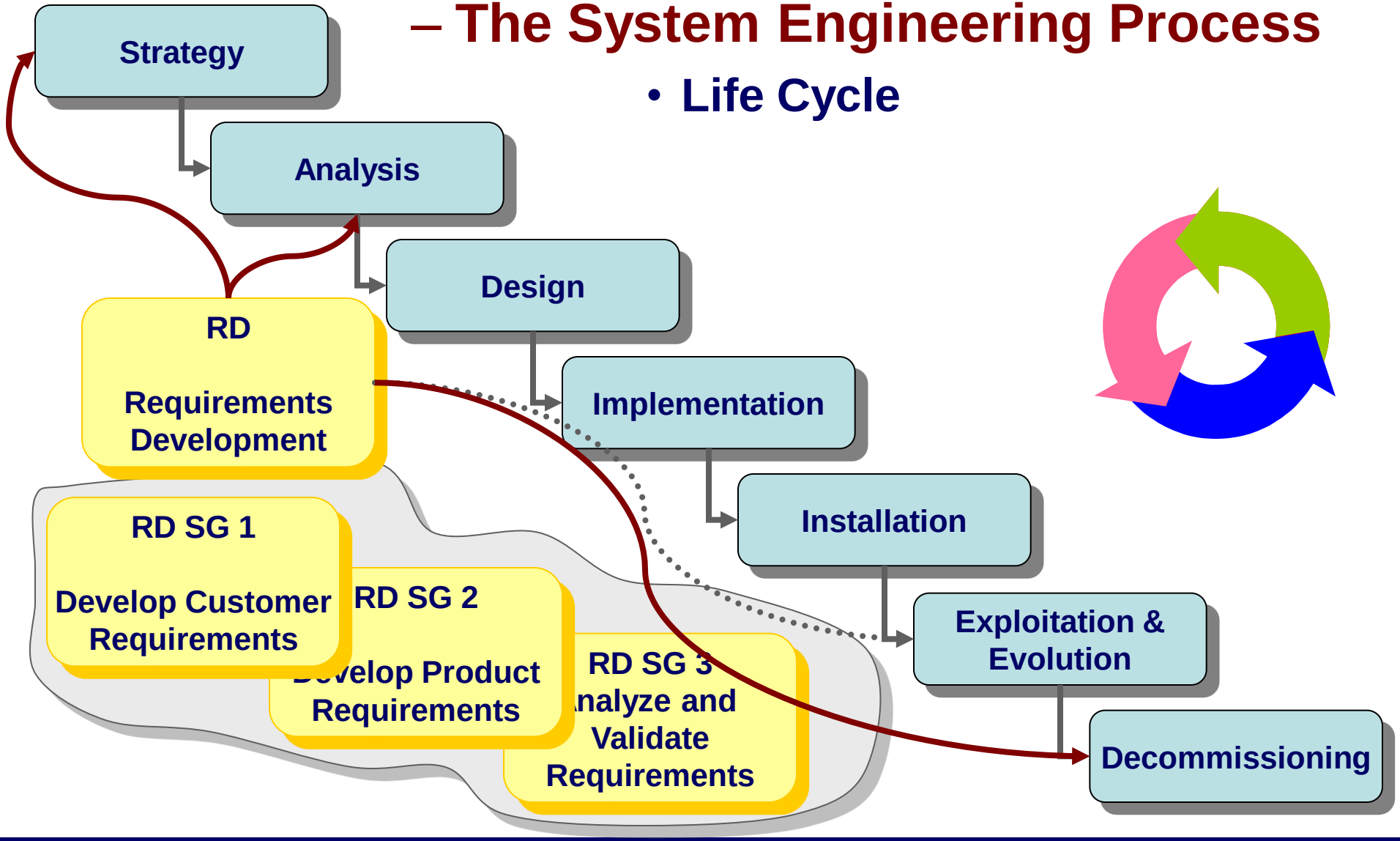
- Life Cycle



SEP vs. CMMI Engineering

– The System Engineering Process

- Life Cycle



SEP vs. CMMI Engineering

– The System Engineering Process

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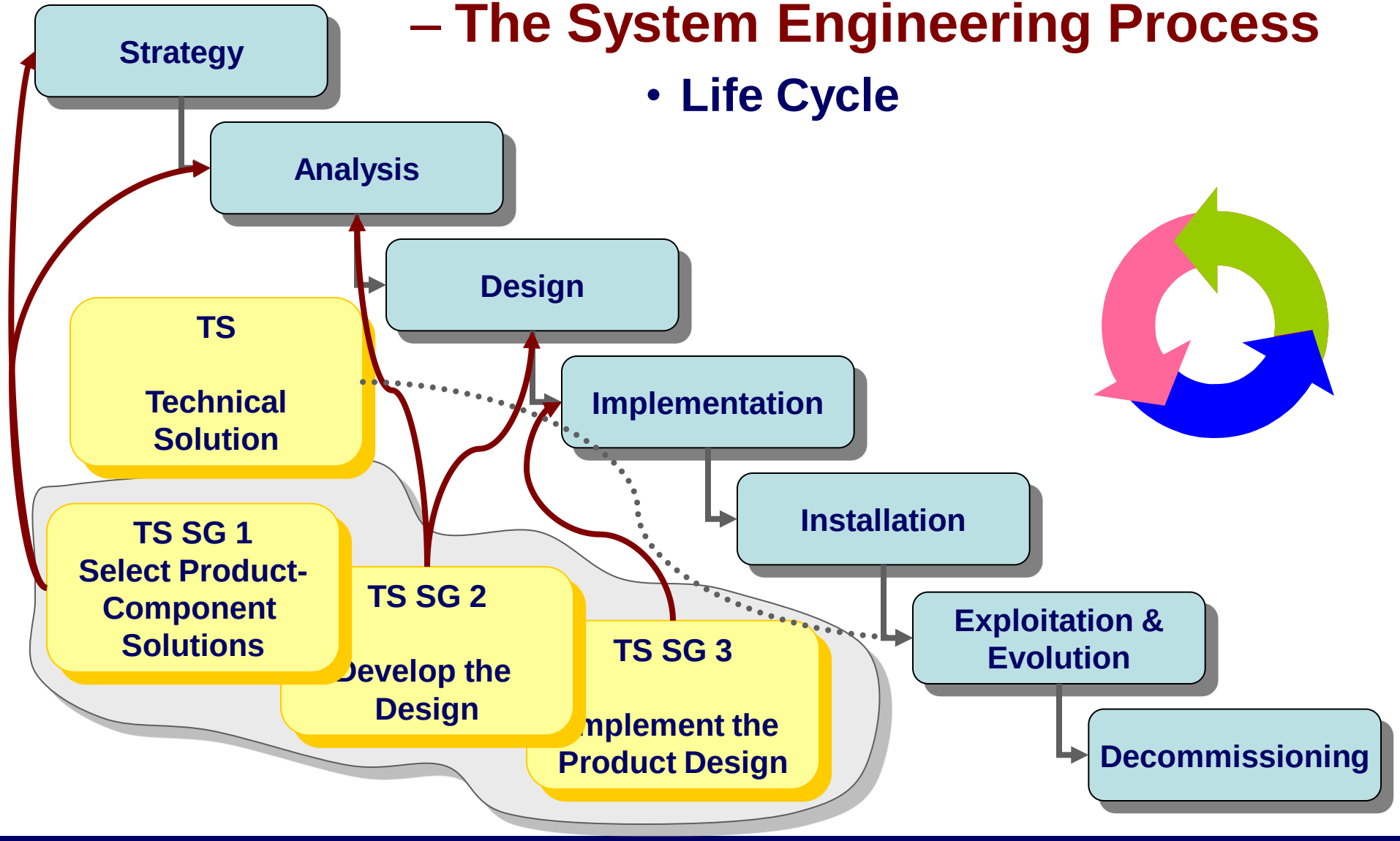
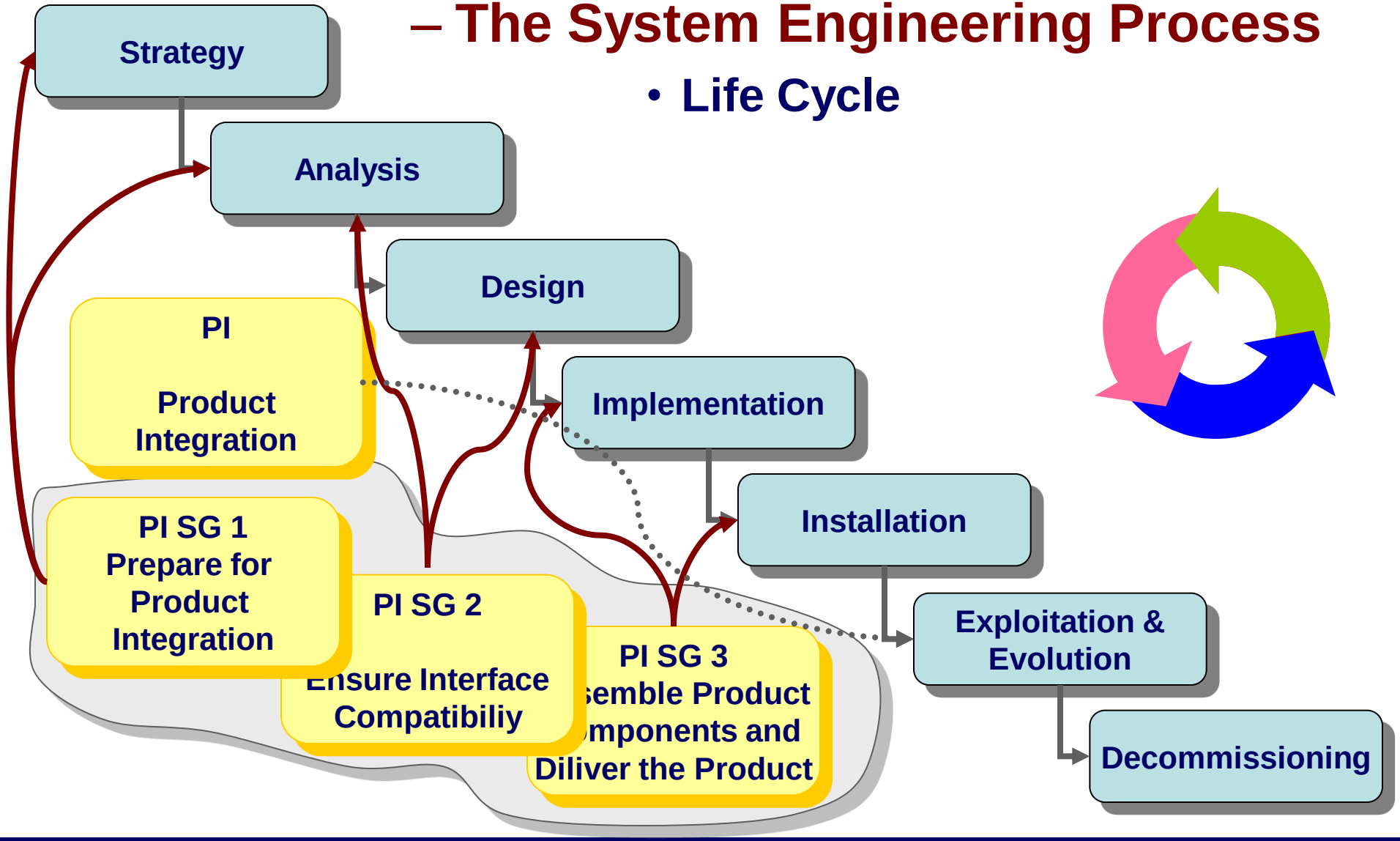


SEP vs. CMMI Engineering

– The System Engineering Process

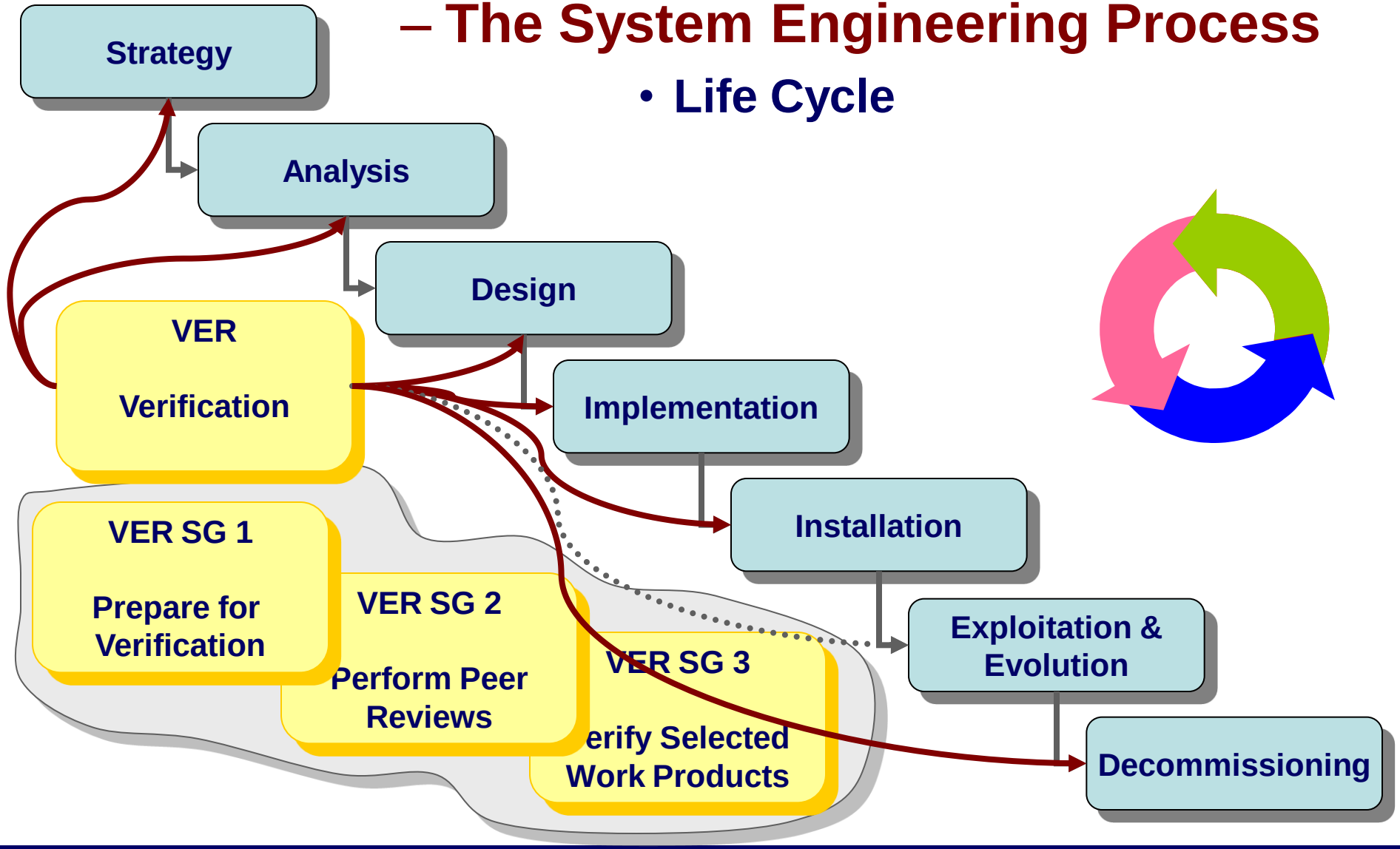
- Life Cycle



SEP vs. CMMI Engineering

– The System Engineering Process

- Life Cycle



SEP vs. CMMI Engineering

– The System Engineering Process

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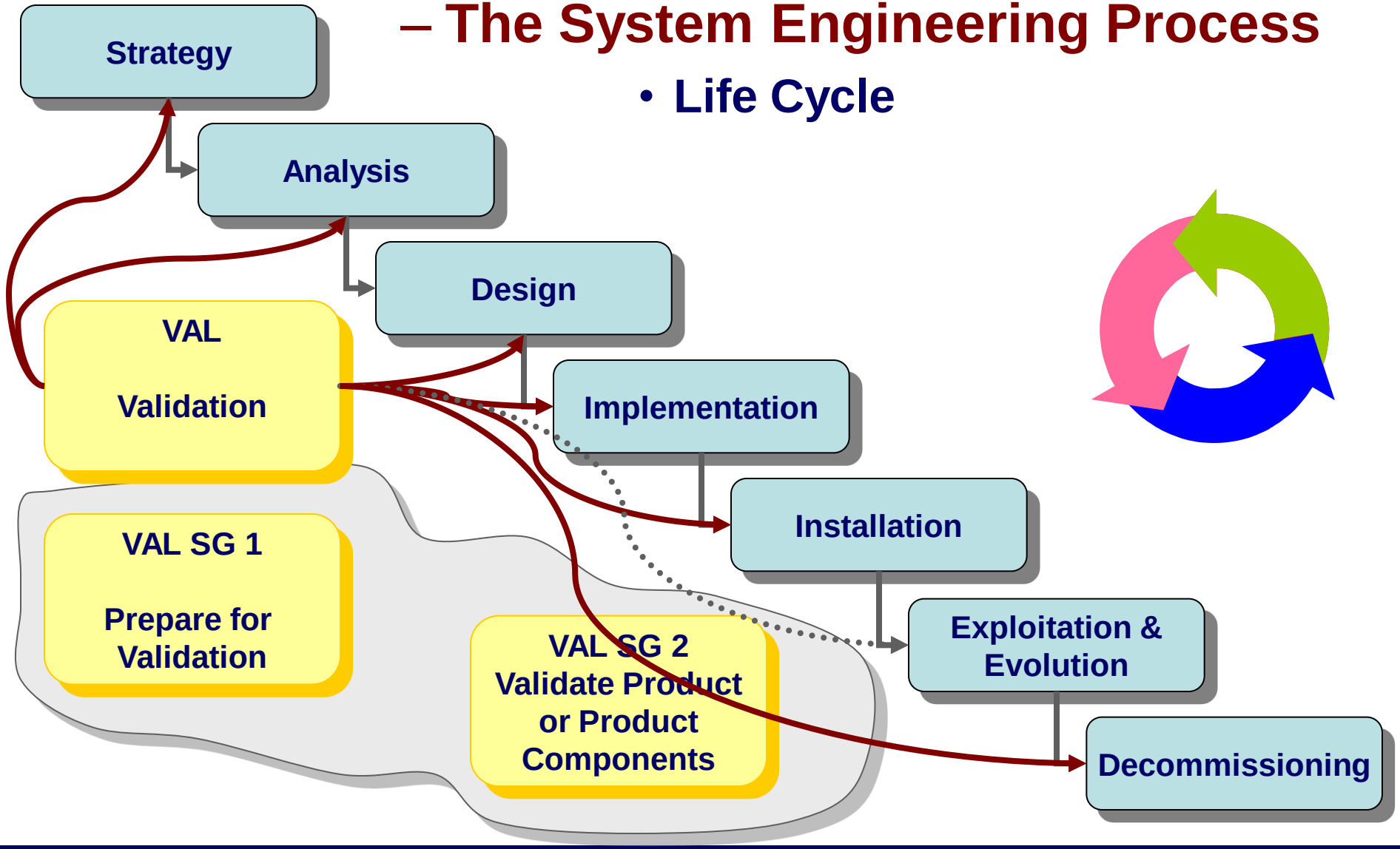
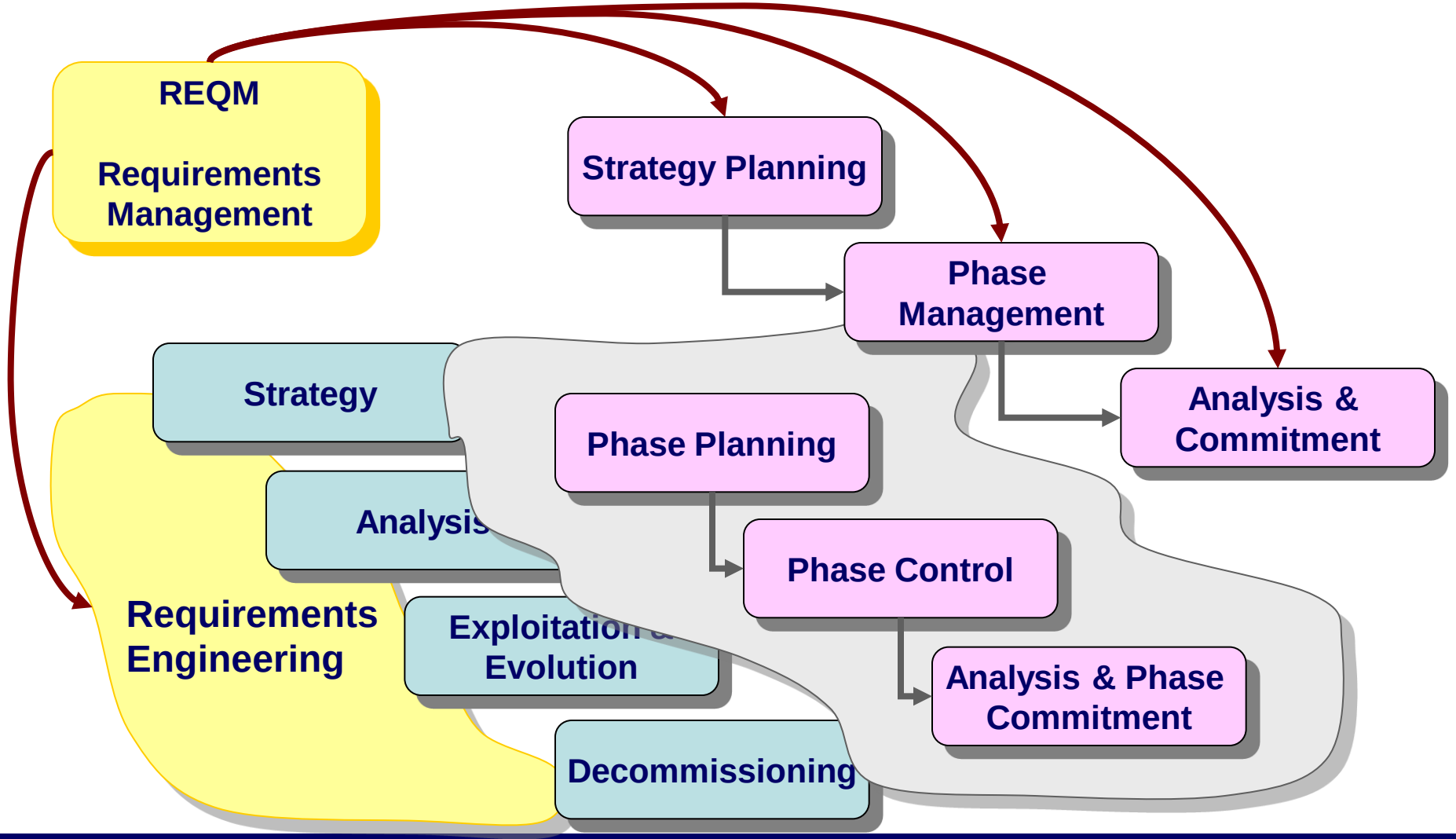


SEP vs. CMMI Engineering

– The Management Process in System Eng.



Summary

- Global scope
- RD Requirements Development
- REQM
- TS
- PI
- VER Verification
- VAL Validation
- SE Process vs. CMMI Engineering

Product Development 1 (RD, REQM)
Product Development 2 (TS, PI, VER, VAL)

Summary

- Global scope
- RD Requirements Development
- REQM Requirements Management
- TS
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- VER Verification
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RD SG1 Develop Customer Requirements
RD SG2 Develop Product Requirements
RD SG3 Analyze and Validate Requirements

Summary

- Global scope
- RD Requirements Development
- REQM Requirements Management
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REQM SG1 Manage Requirements

Summary

- Global scope
- RD Requirements Development
- REQM Requirements Management
- TS Technical Solution
- PI Product Integration
- VER
- VAL
- SE Process ... Engineering

TS SG1 Select Product-Component Solutions
TS SG2 Develop The Design
TS SG3 Imlement The Product Design

Summary

- Global scope
- RD Requirements Development
- REQM Requirements Management
- TS Technical Solution
- PI Product Integration
- VER Ver
- VAL
- SE Pro

PI SG1 Prepare for Product Integration
PI SG2 Ensure Interface Compatibility
PI SG3 Assemble Product Components and Diliver the Product

Summary

- Global scope
- RD Requirements Development
- REQM Requirements Management
- TS Technical Solution
- PI Product Integration
- VER Verification
- VAL Val
- SE Pro

VER SG1 Prepare for Verification
VER SG2 Perform Peer Reviews
VER SG3 Verify Selected Work Products

Summary

- Global scope
- RD Requirements Development
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- VAL Validation
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VAL SG1 Prepare for Validation
VAL SG2 Validate Selected Work Products

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The System Engineering Process (Life Cycle)
Requirements Engineering
Conceptual Design and Implementation Design
System Integration
Verification, Validation
The Management Process in System Engineering

Questions

Review Questions

1. List the PAs belonging to Product Development 1.
2. List the PAs belonging to Product Development 2.
3. What is the purpose of RD?
4. What are the specific goals of RD?
5. Describe the notion of "allocated requirement".
6. Describe the notion of "derived requirement".
7. What are the specific practicies for RD SG3: "Analyze and Validate Requirements"?
8. What is the purpose of REQM?
9. What are the specific goals of REQM?
10. Describe the notion of "requirement traceability".
11. What are the specific practicies for REQM SG1: "Manage Requirements"?

Review Questions

12. What is the purpose of TS?
13. What are the specific goals of TS?
14. Describe the notion of "tech data package".
15. Discuss the differences between "operational scenario" and "operational concept".
16. What are the specific practicies for TS SG2: "Develop The Design"?
17. What is the purpose of PI?
18. What are the specific goals of PI?
19. What are the specific practicies for PI SG1: "Prepare for Product Integration"?
20. What are the specific practicies for PI SG2: "Ensure Interface Compatibility"?

Review Questions

21. What is the purpose of VER?
22. What are the specific goals of VER?
23. What are the specific practicies for VER SG2: "Perform Peer Reviews"?
24. What is the purpose of VAL?
25. What are the specific goals of VAL?
26. What are the specific practicies for VAL SG2: "Validate Product and Product Components"?
27. Discuss the nature of relationship between RD and TS.
28. Discuss the nature of relationship between RD and TS.
29. Discuss the nature of relationship between TS and PI.
30. Discuss the nature of relationship between PI and DAR.

Review Questions

31. Discuss the impact of RD on Requirements Engineering in System Engineering Process (SEP).
32. Which phases in SEP Life Cycle covers TS?
33. Which phases in SEP Life Cycle covers PI?
34. Which phases in SEP Life Cycle covers VER?
35. Which phases in SEP Life Cycle covers VAL?
36. Discuss the impact of REQM on SEP and Managament of SEP.

THE END

Engineering

CMMI for Development V.1.2

Module 3