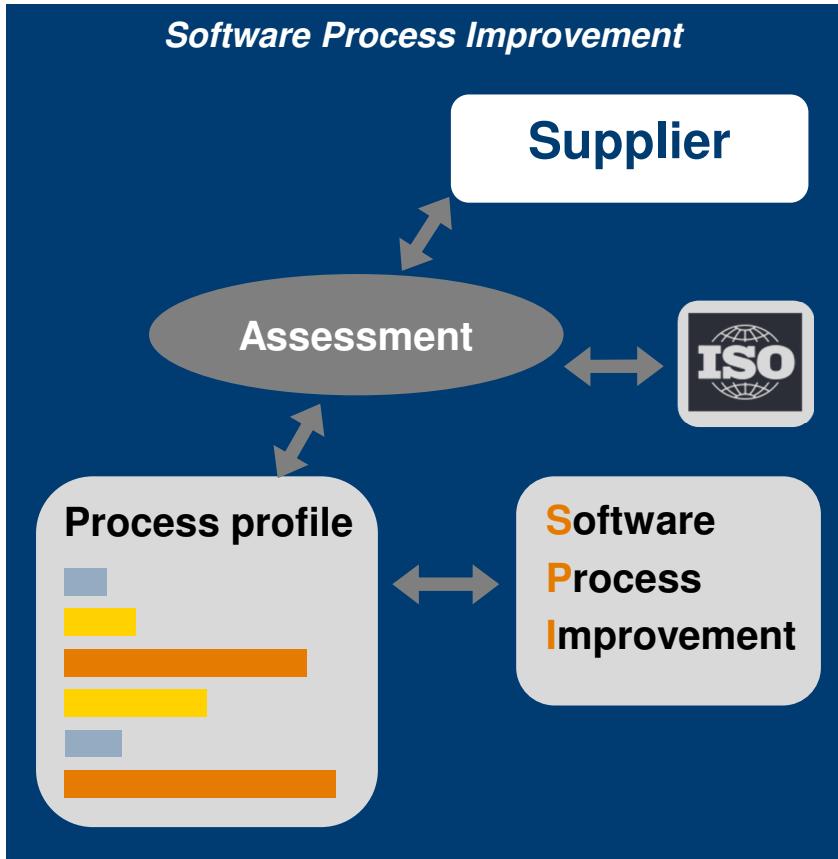
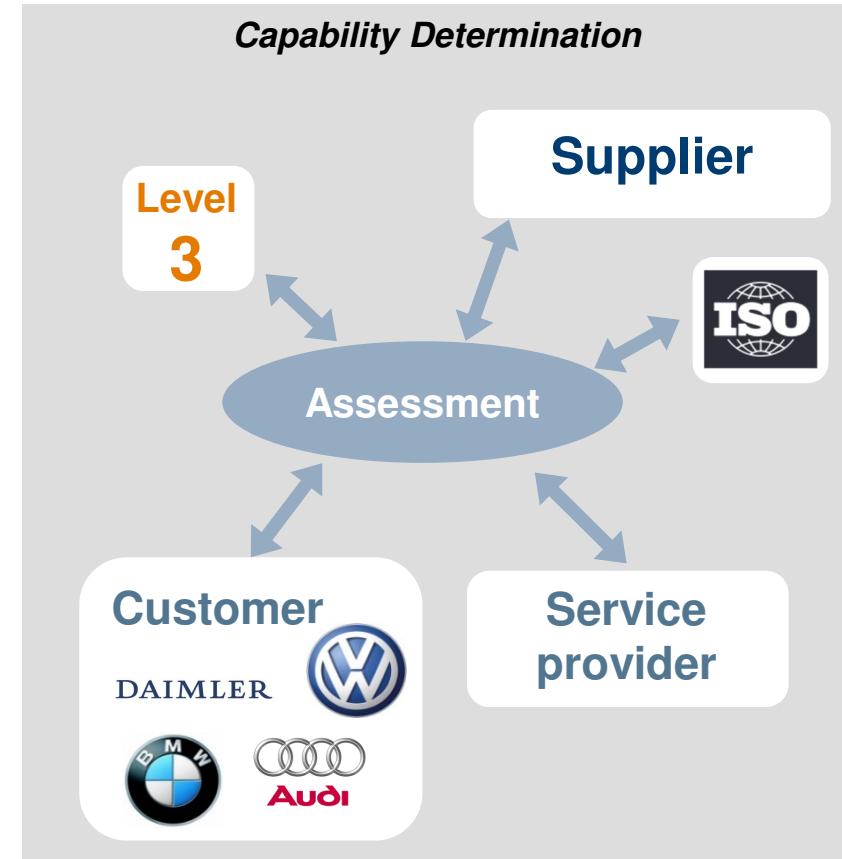


What's the scope of SPICE?



(Internal) assessments,
to identify actions for process improvement



(External) assessments,
to estimate the capability of a project

ISO/IEC 15504 permits to define industry specific process assessments models compliant to the ISO standard

Due to the demand for a standard adapted to the automotive industry, the largest European car manufacturers started the “Automotive SPICE” initiative (1st version published ~2005)

Automotive SPICE is based upon the ISO/IEC 15504
(www.automotivespice.com)

DAIMLER



Audi



VOLVO





Hersteller Initiative Software:



BMW Group

Audi

DAIMLER



PORSCHE



Innovation in modern vehicles is to a great extent realised by software in electronic control units. Therefore vehicle manufacturers must extend their competence in the basics and methods of software design and quality assurance for microprocessor based control units. This has motivated the vehicle manufacturers Audi, BMW, Daimler, Porsche, and Volkswagen to bundle their activities for standard software modules, process maturity levels, software test, software tools and programming of control units. The common goal is to achieve and use joint standards

source: <http://www.automotive-his.de>

How is "SPICE" organized?



SPICE



- Requirements, Rules, Guidelines and Instructions for Trainings, Certifiers and Assessors
- Working groups
- Support of Domains (e.g. Automotive)
- Verification of compliance (e.g. of Assessments)

Automotive SPICE®



- Common steering committee of German Car manufacturers
- Working groups for definition of unique Standards for the Automotive Domain



BMW Group DAIMLER



- Certification of SPICE-Assessors
- Events for SPICE (e.g. SPICE Days)
- GATE4SPICE



- Certification of Automotive SPICE®-Assessors



- Trainings provider for SPICE and Automotive SPICE®



SYNSPACE
Die Prozessmanufaktur

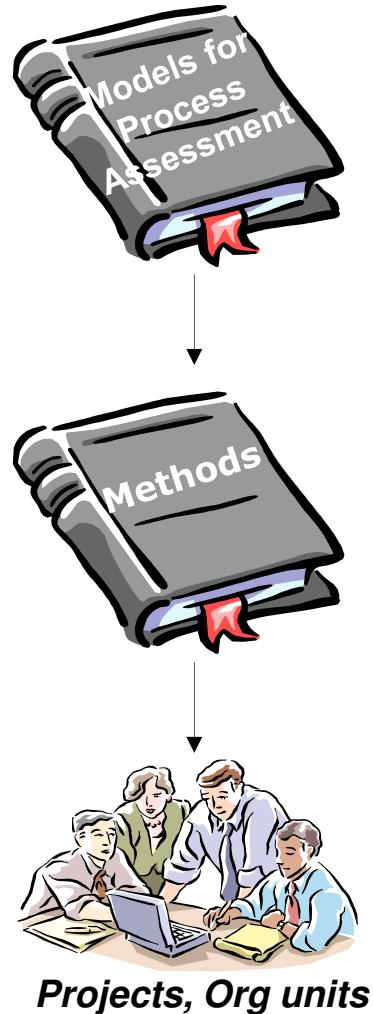
methodpark



MBtech
Mercedes-Benz technology

- Competence network (Meetings, Workshops, etc.) of the Community
- Working groups





The "**WHAT**" (the goals):

(What is to be done, and why, and what are the technical dependencies)

The "**HOW**" (the way to the goals):

(Lifecycle models, tools, templates, methods, metrics, best practice, guidance, procedures, roles & skills, tailoring guidance, "interweaving" all this to form workflows)

The "**DOING**":

(Tailoring, set-up, and project performance according to the tailored method)

Process Category
Process Group
Process

Primary Life Cycle Processes

Acquisition Process Group (ACQ)

- ACQ.1 Acquisition preparation
- ACQ.2 Supplier selection
- A H** ACQ.3 Contract agreement
- A H** ACQ.4 Supplier monitoring
- ACQ.5 Customer acceptance
- A** ACQ.11 Technical requirements
- A** ACQ.12 Legal and administrative requirements
- A** ACQ.13 Project requirements
- A** ACQ.14 Request for proposals
- A** ACQ.15 Supplier qualification

Supply Process Group (SPL)

- A** SPL.1 Supplier tendering
- A** SPL.2 Product release
- SPL.3 Product acceptance support

Engineering Process Group (ENG)

- A** ENG.1 Requirements elicitation
- A H** ENG.2 System requirements analysis
- A H** ENG.3 System architectural design
- A H** ENG.4 Software requirements analysis
- A H** ENG.5 Software design
- A H** ENG.6 Software construction
- A H** ENG.7 Software integration
- A H** ENG.8 Software testing
- A H** ENG.9 System integration
- A H** ENG.10 System testing
- ENG.11 Software installation
- ENG.12 Software and system maintenance

Operation Process Group (OPE)

- OPE.1 Operational use
- OPE.2 Customer support

A – Automotive SPICE **H** – HIS Scope

Supporting Life Cycle Processes

Support Process Group (SUP)

- A H** SUP.1 Quality assurance
- A** SUP.2 Verification
- SUP.3 Validation
- A** SUP.4 Joint review
- SUP.5 Audit
- SUP.6 Product evaluation
- A** SUP.7 Documentation
- A H** SUP.8 Configuration management
- A H** SUP.9 Problem resolution management
- A H** SUP.10 Change request management

Organizational Life Cycle Processes

Management Process Group (MAN)

- MAN.1 Organizational alignment
- MAN.2 Organizational management
- A H** MAN.3 Project management
- MAN.4 Quality management
- A** MAN.5 Risk management
- A** MAN.6 Measurement

Process Improvement Process Group (PIM)

- PIM.1 Process establishment
- PIM.2 Process assessment
- A** PIM.3 Process improvement

Resource and Infrastructure Process Group (RIN)

- RIN.1 Human resource management
- RIN.2 Training
- RIN.3 Knowledge management
- RIN.4 Infrastructure

Reuse Process Group (REU)

- REU.1 Asset management
- A** REU.2 Reuse program management
- REU.3 Domain engineering

Capability Levels

Optimizing

Quantitative measures are implemented to continuously improve the process

Level 5

Optimizing

Process Innovation
Process Optimization

PA.5.1
PA.5.2

Predictable

Metrics for the measurement and control of process performance and outcomes are applied

Level 4 Predictable

Process Measurement
Process Control

PA.4.1
PA.4.2

Established

Defined processes are tailored to specific projects, resources are managed

Level 3 Established

Process Definition
Process Deployment

PA.3.1
PA.3.2

Level 2 Managed

Performance Management
Work Product Management

PA.2.1
PA.2.2

Managed

Processes and work products are managed, responsibilities are identified

Level 1 Performed

Process Performance

Performed

Processes are intuitively performed, incoming and outgoing work products exist

Level 0 Incomplete

Incomplete
Chaotic processes

What rating values a PA can receive – Normative Reference ISO /IEC 15504-2

**N**

Not achieved

"There is little or no evidence of achievement of the defined attribute in the assessed process."

0% to 15 %

P

Partially achieved

"There is some evidence of an approach to, and some achievement of, the defined attribute in the assessed process. Some aspects of achievement of the attribute may be unpredictable."

> 15 % to 50 %

L

Largely achieved

"There is evidence of a systematic approach to, and significant achievement of, the defined attribute in the assessed process. Some weakness related to this attribute may exist in the assessed process."

> 50 % to 85 %

F

Fully achieved

"There is evidence of a complete and systematic approach to, and full achievement of, the defined attribute in the assessed process. No significant weaknesses related to this attribute exist in the assessed process."

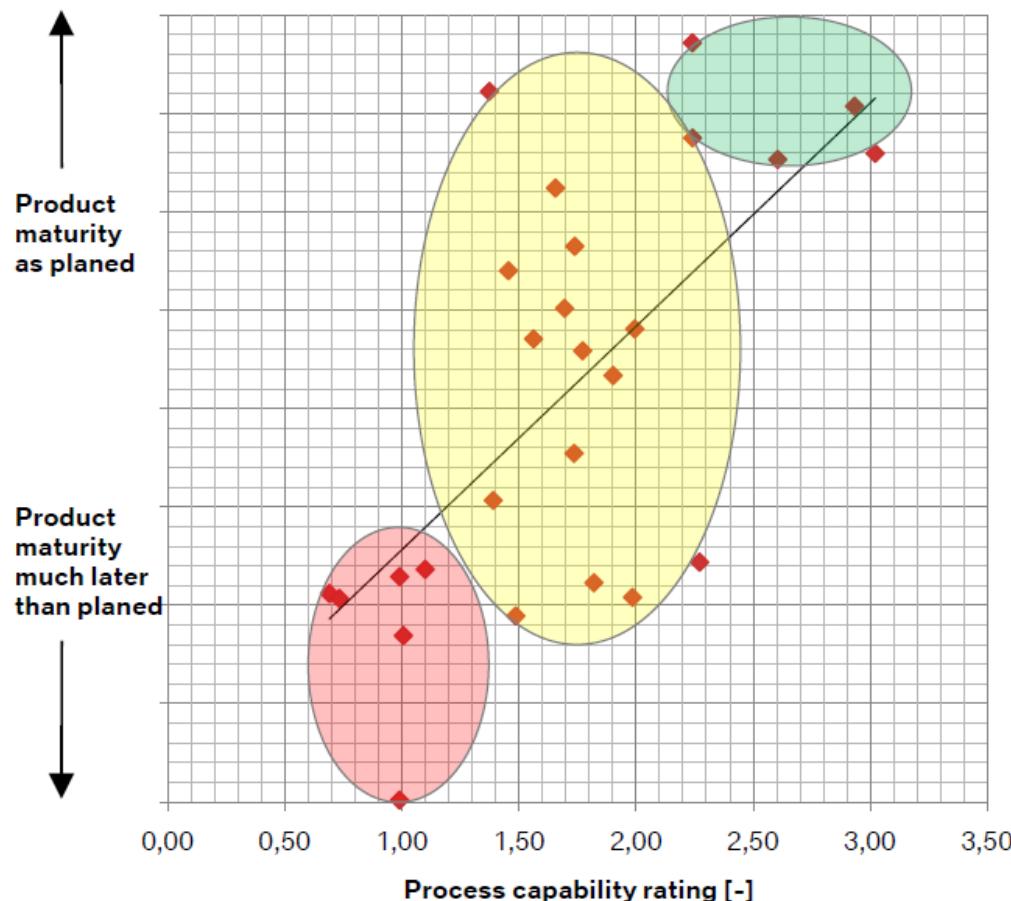
> 85 % to 100 %

1. Rate the BPs and GPs as N,P,L or F, even this is not required by ISO/IEC 15504-2
2. Calculate an “NPLF-mean”
However, this a rough guidance only...
3. ...because you have to rate the Process Attributes based on YOUR technical judgment of the considered context & situation and the objective evidence gathered, and the process risk that you see.

Rating approach in practice (2/2) – example for process “Supplier Monitoring”

| Indicator | | Rating |
|-----------|--|--------|
| BP 1 | Establish and maintain communication | L |
| BP 2 | Exchange information on technical problems | F |
| BP 3 | Review supplier performance | F |
| BP 4 | Monitor the acquisition | F |
| ... | ... | ... |
| GP 2.1.1 | Identify objectives | L |
| GP 2.1.2 | Plan and monitor process | L |
| GP 2.1.3 | Control performance | P |
| GP 2.1.4 | Define responsibilities | P |
| GP 2.1.5 | Identify resources | L |
| GP 2.1.6 | Manage interfaces | F |
| GP 2.2.1 | Define requirements for WP | L |
| GP 2.2.2 | Define req. for doc/control | F |
| GP 2.2.3 | Identify/document/control WP | F |
| GP 2.2.4 | Review/adjust WP | F |

Clear Correlation between Product Maturity and Process Capability*



Identified Clusters



Cluster 1:
Low process capability,
product maturity much
later than planned.

Cluster 2:
Transition phase,
projectmanagement
incomplete, product
maturity differs.

Cluster 3:
High process capability,
product maturity as
planned.

*) Source: J.Etzkorn, BMW Group, "Suppliers, SPICE & Beyond -A Decade's Experience Report", VDA Automotive SYS Conference, Berlin July 5th, 2011, Berlin

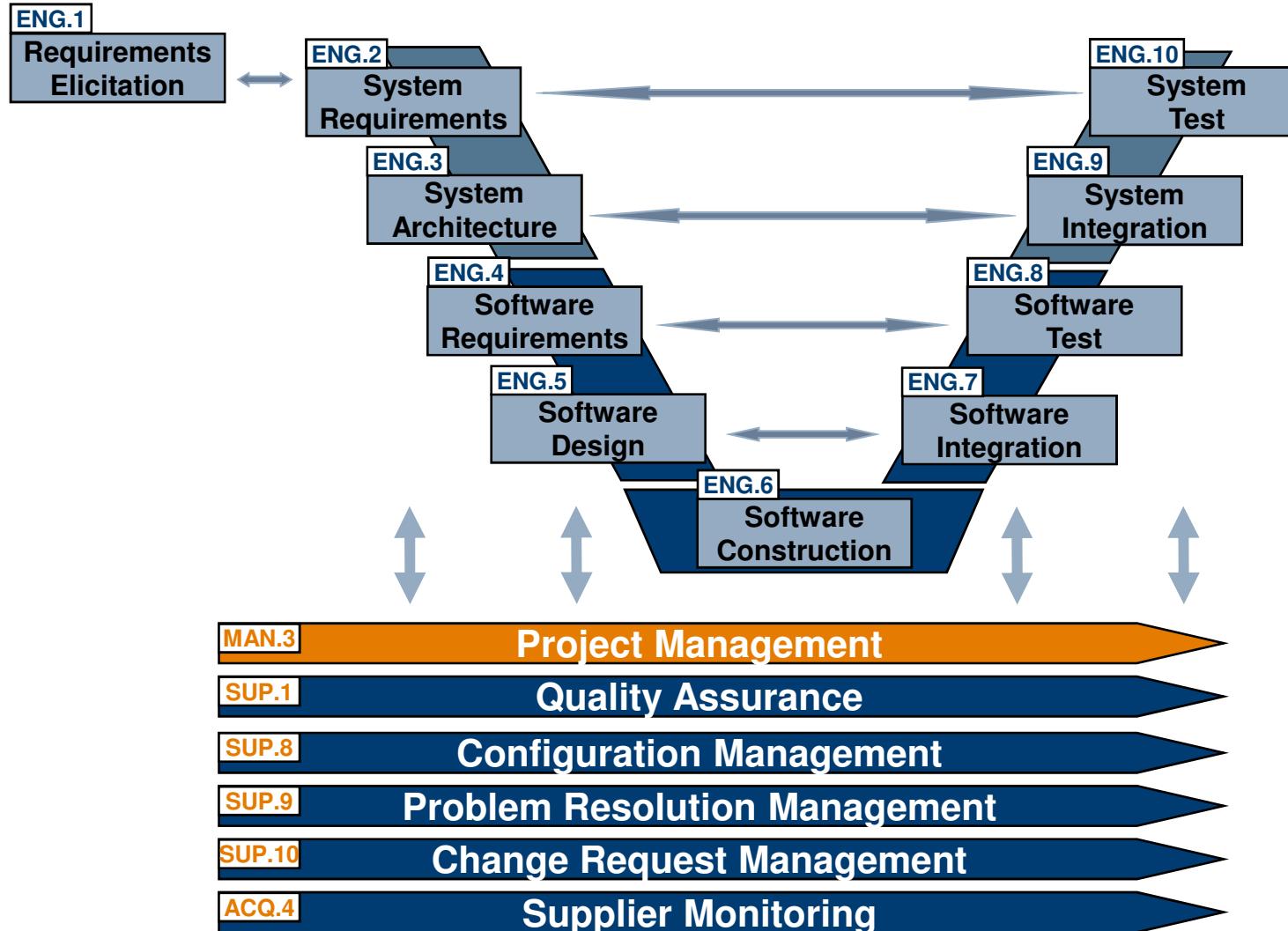
Automotive SPICE



| Process | Description | To Capability Level 3 |
|---------|--------------------------------|-----------------------|
| MAN.3 | Project management | |
| MAN.5 | Risk management | |
| SPL.2 | Product release | |
| SUP.1 | Quality assurance | |
| SUP.2 | Verification | |
| SUP.4 | Joint review | (Level 2) |
| SUP.8 | Configuration management | |
| SUP.9 | Problem resolution management | |
| SUP.10 | Change request management | |
| ENG.2 | System requirements analysis | |
| ENG.3 | System architecture design | |
| ENG.4 | Software requirements analysis | |
| ENG.5 | Software design | |
| ENG.6 | Software construction | |
| ENG.7 | Software integration test | |
| ENG.8 | Software testing | |
| ENG.9 | System integration test | |
| ENG.10 | System testing | |
| REU.2 | Reuse program management | (Level 2) |
| ACQ.4 | Supplier monitoring | |

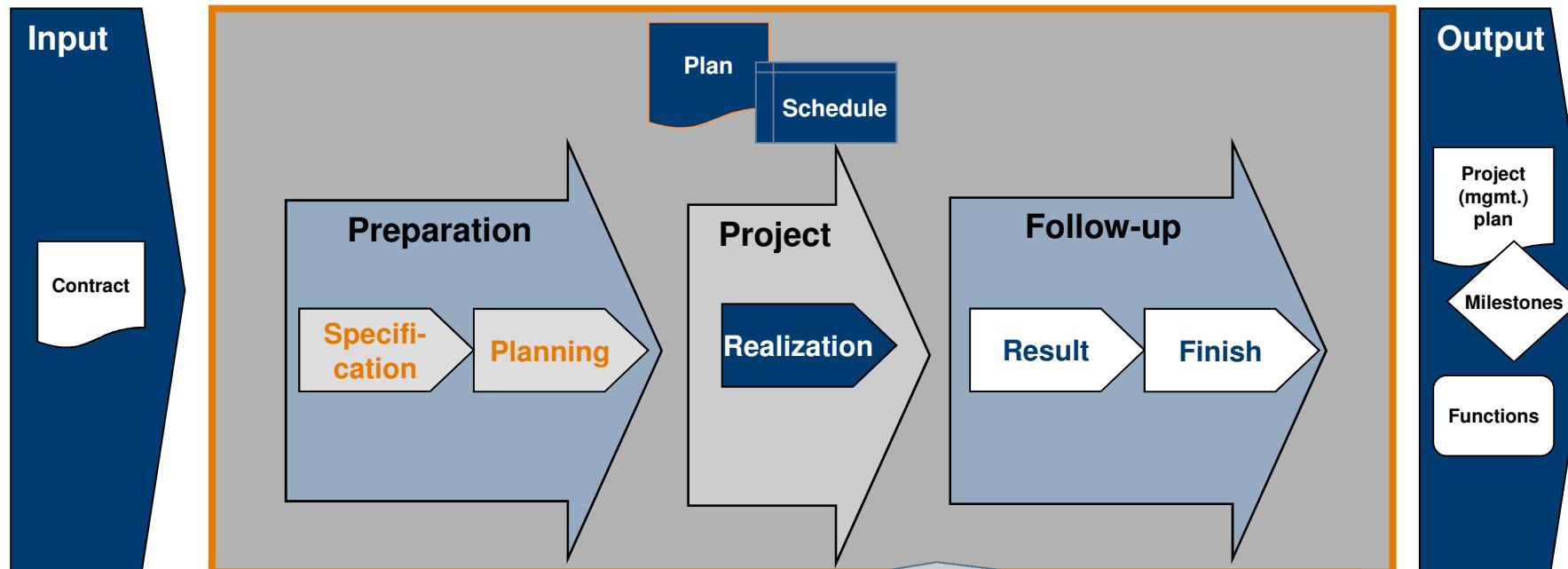
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Issue date: 2006-04-25, Security Class: <Proprietary>
Page 18





MAN.3: Project Management

Purpose is to identify, establish, plan, coordinate, and monitor the activities, tasks, and resources in the context of the project's requirements and constraints.

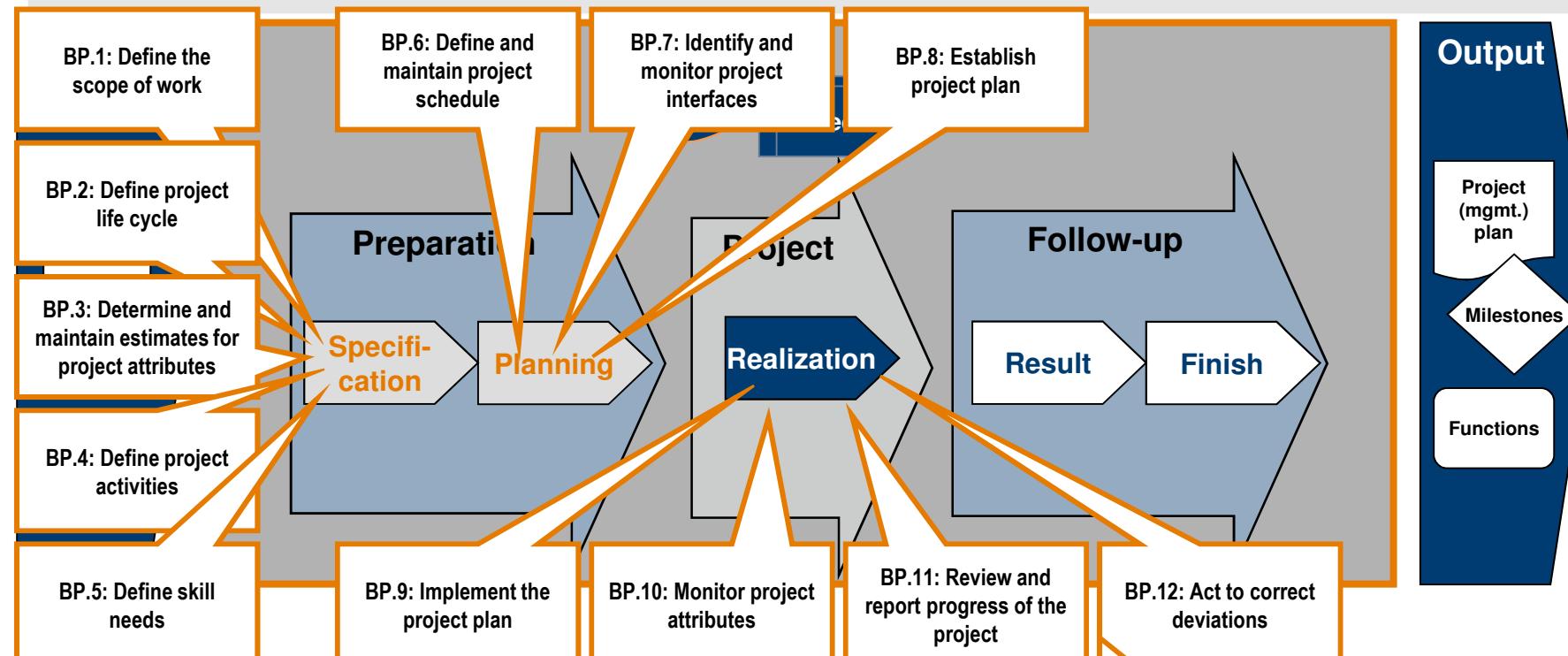


GOALS

Specify and plan the project
Control the realization
Use your experiences

MAN.3: Project Management

Purpose is to identify, establish, plan, coordinate, and monitor the activities, tasks, and resources in the context of the project's requirements and constraints.



GOALS

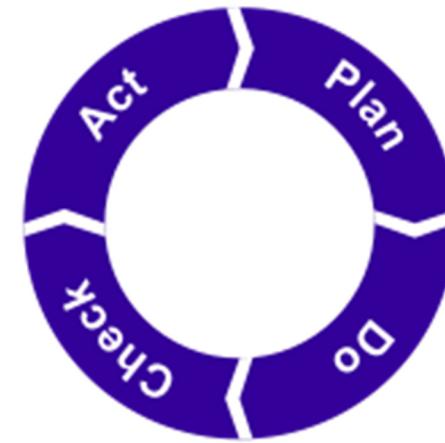
Specify and plan the project

Control the realization

Use your experiences

Typical Procedure in ASPICE:

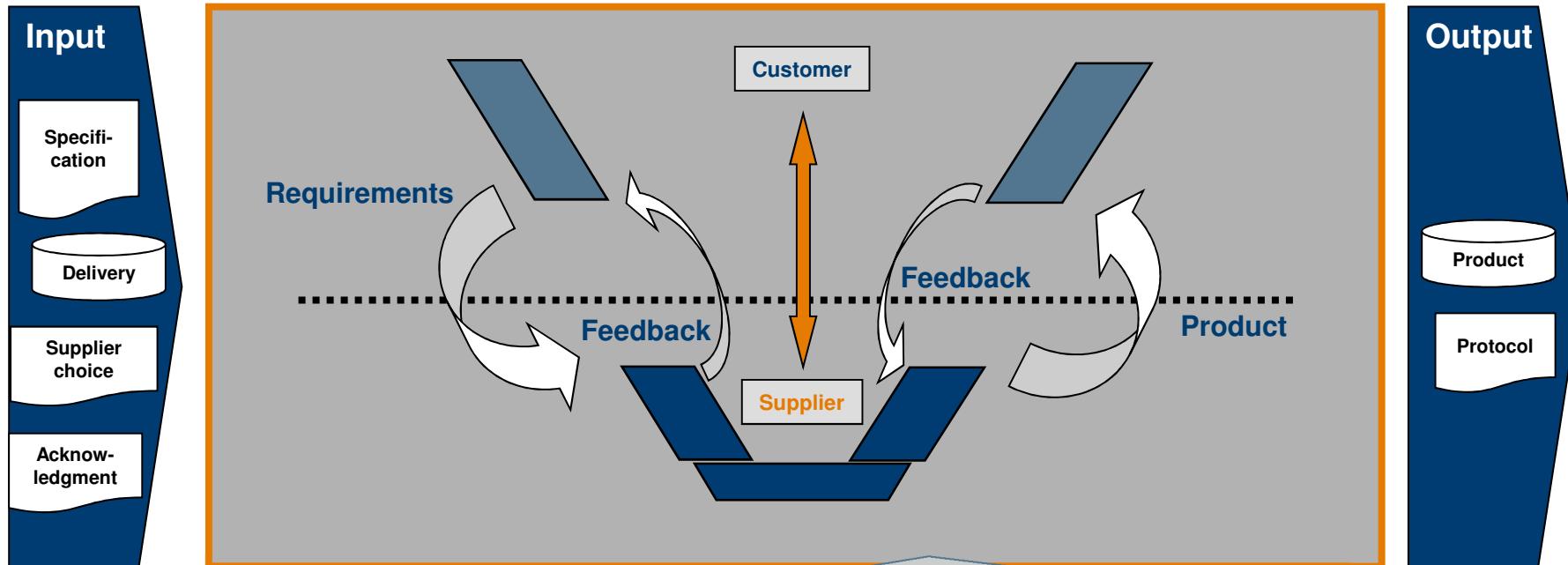
1. Objectives
2. Strategy to achieve the objectives
3. Detailed Planning
4. Implementation of the Plan
5. Monitoring / Reporting
6. Corrective Actions / Escalation



- This concept is more related to Capability 2,
- **but** sometimes this is also related to Capability Level 1:
 - *Important is:*
 - *Why I am doing this? (criteria for decision making & checklists)*
 - *Documentation of the decision making!*

ACQ.4: Supplier Monitoring

Purpose is to monitor the performance of the supplier against agreed requirements.

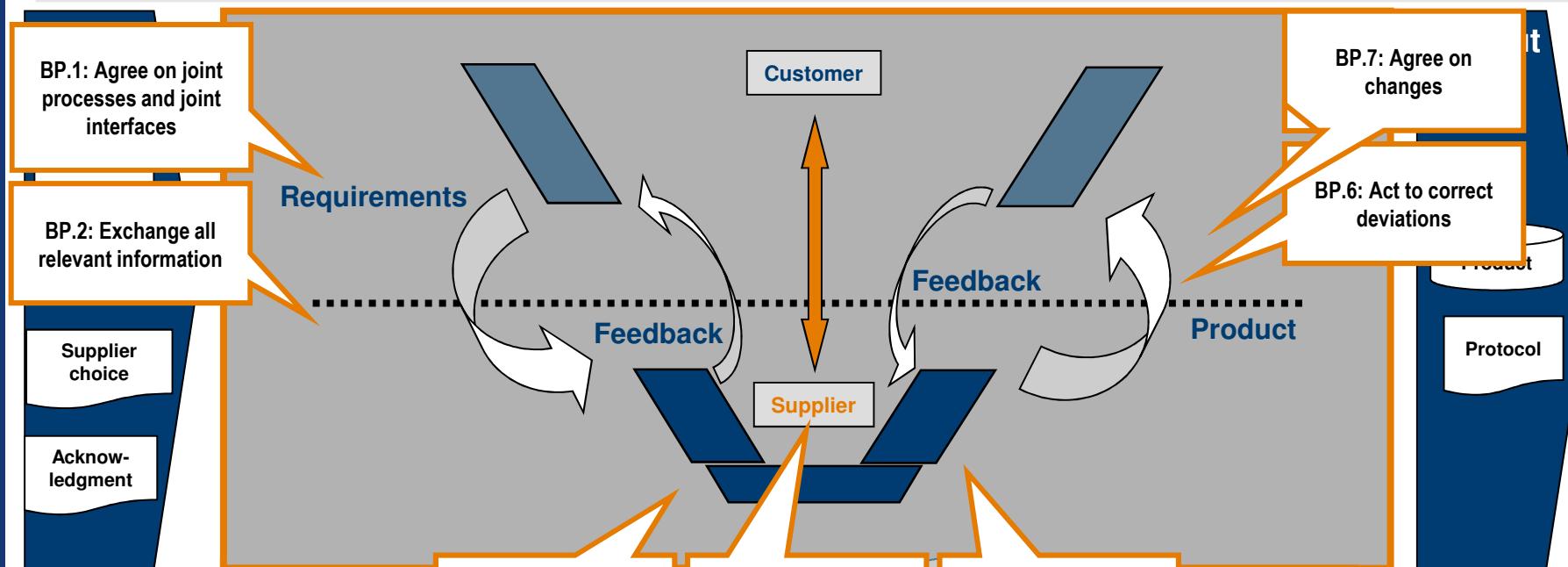


GOALS

Keep in contact with your supplier
Help your supplier (and yourself) to develop a product together, that really fulfills all necessary requirement

ACQ.4: Supplier Monitoring

Purpose is to monitor the performance of the supplier against agreed requirements.

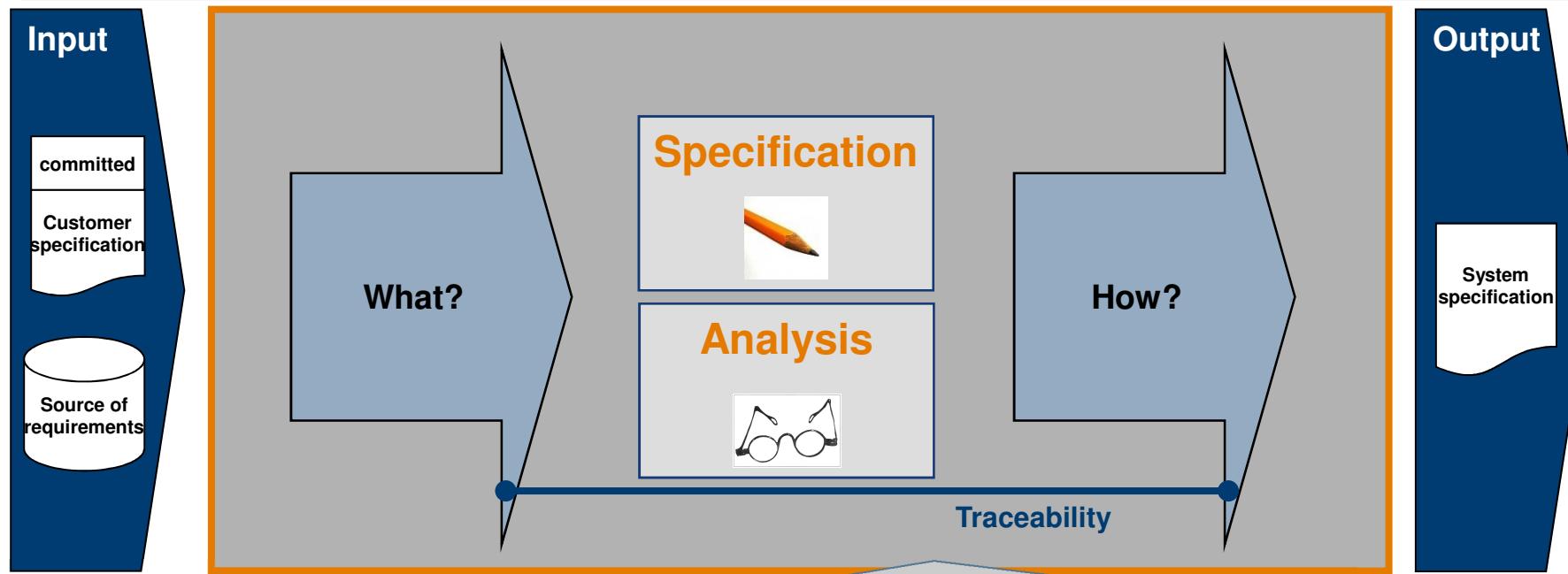


GOALS

- Keep in contact with you
- Help your supplier (and yourself) to develop a product together, that really fulfills all necessary requirement

ENG.2: System Requirements Analysis

Purpose is to transform the defined customer requirements into a set of desired system technical requirements that will guide the design of the system.

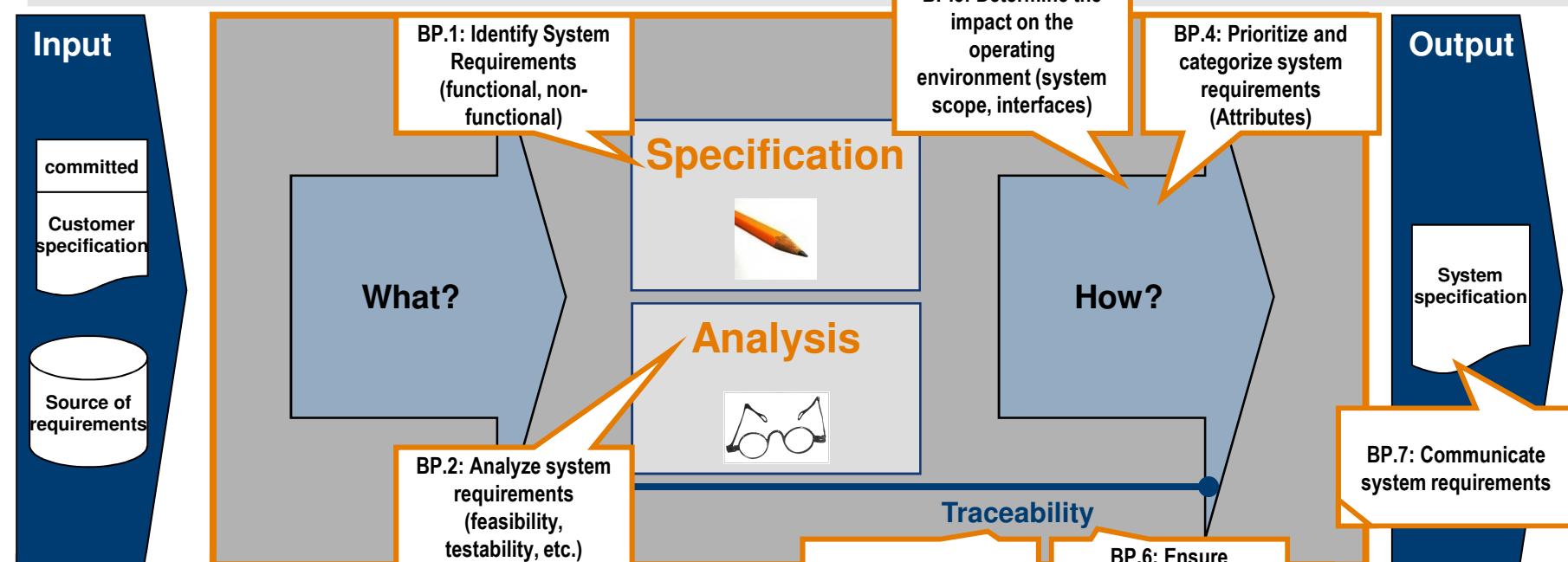


GOALS

- Transformation of customer requirements: Translate into supplier's "local technical site language", Thereby detailing them out
- Ensure feasibility & testability
- Consider documenting different requirements sets if architectural design alternatives are to be evaluated (see also ENG.3)

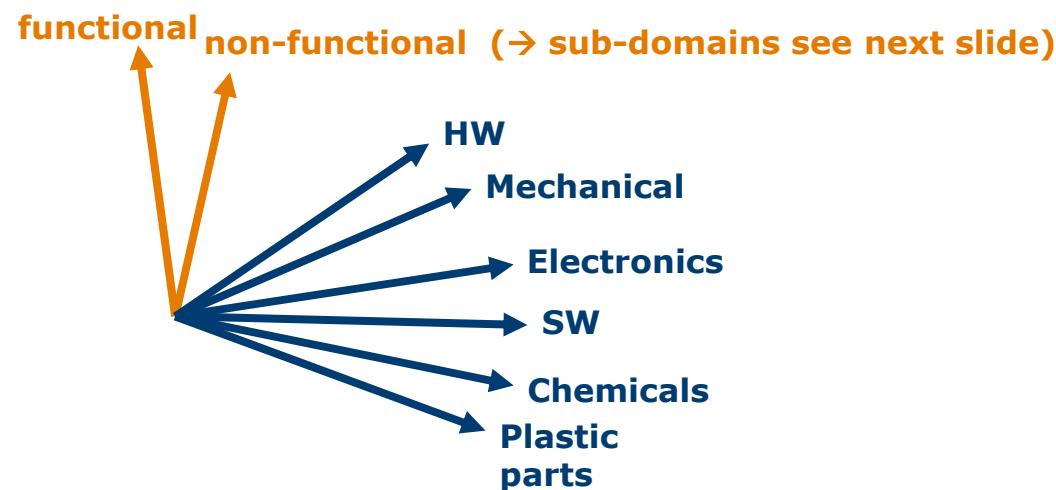
ENG.2: System Requirements Analysis

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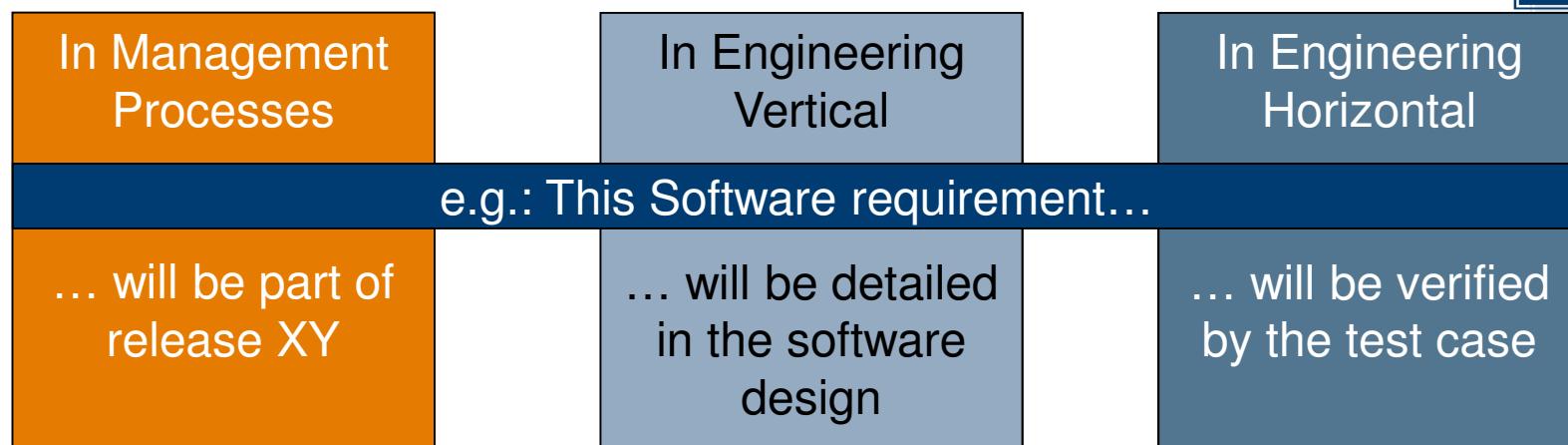
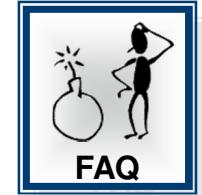
- Transformation of customer requirements: Translate “customer language”, Thereby detailing them out
- Ensure feasibility & testability
- Consider documenting different requirements sets if architectural design alternatives are to be evaluated (see also ENG.3)

- If not already done in ENG.1 context
 - agree on a development release strategy with customer
 - categorize requirements for all technical sub-domains into functional and non-functional dimensions (as suggested above):

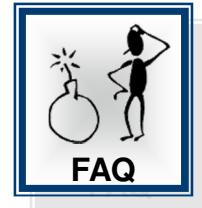


What's the meaning of "Traceability"?

- “Traceability” helps you to **trace** all relevant data to a specific (development) information.

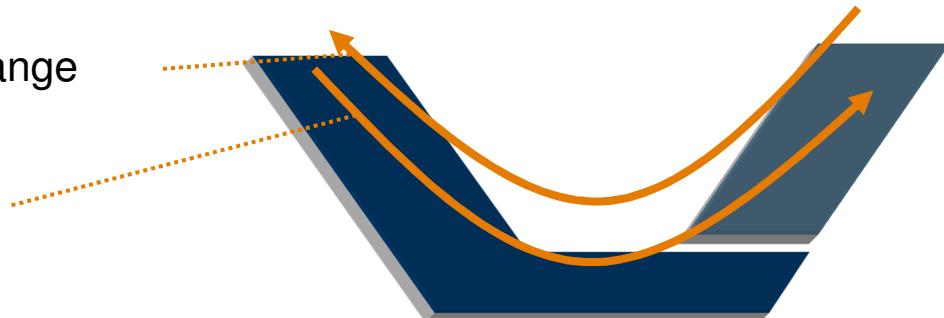


- **Bilateral Traceability** means that links between elements of the different development phases, e.g. system requirements vs. system architectural design, can be traced in both directions.
- Why is Traceability important?



Advantages:

- Analysis of coverage
- Information for queries (status of requirements)
- Support of test activities
- Support for the problem resolution (change and configuration) management
- Support for the impact analysis for change requests



Realization:

- Links (in Tools)
- References, Hyperlinks, Naming conventions
- Traceability matrices

1. Purpose



- Extent and granularity of traceability must *balance* value and maintenance effort

2. Coverage



- 100% Traceability coverage often is unrealistic
 - Consider taking a risk-based approach, e.g.
 - Local increase of change requests
 - Complexity
 - New technology
 - Document this as a strategy
 - Prove risk-based approach through metrics

3. Tooling



- Currently there is still no integrated tool solution

Mehrere Stufen von Requirements

- Kundenanforderungen
- Systemanforderungen
- Subsystemanforderungen
- Software / Hardware /
Hydraulik / etc Anforderungen

Stufen sind durch Architekturschritte
verknüpft

Für jede Stufe

- Unterschiedliche Stakeholder
- Unterschiedliche Sichtweisen
- Unterschiedlicher Detaillierungsgrad

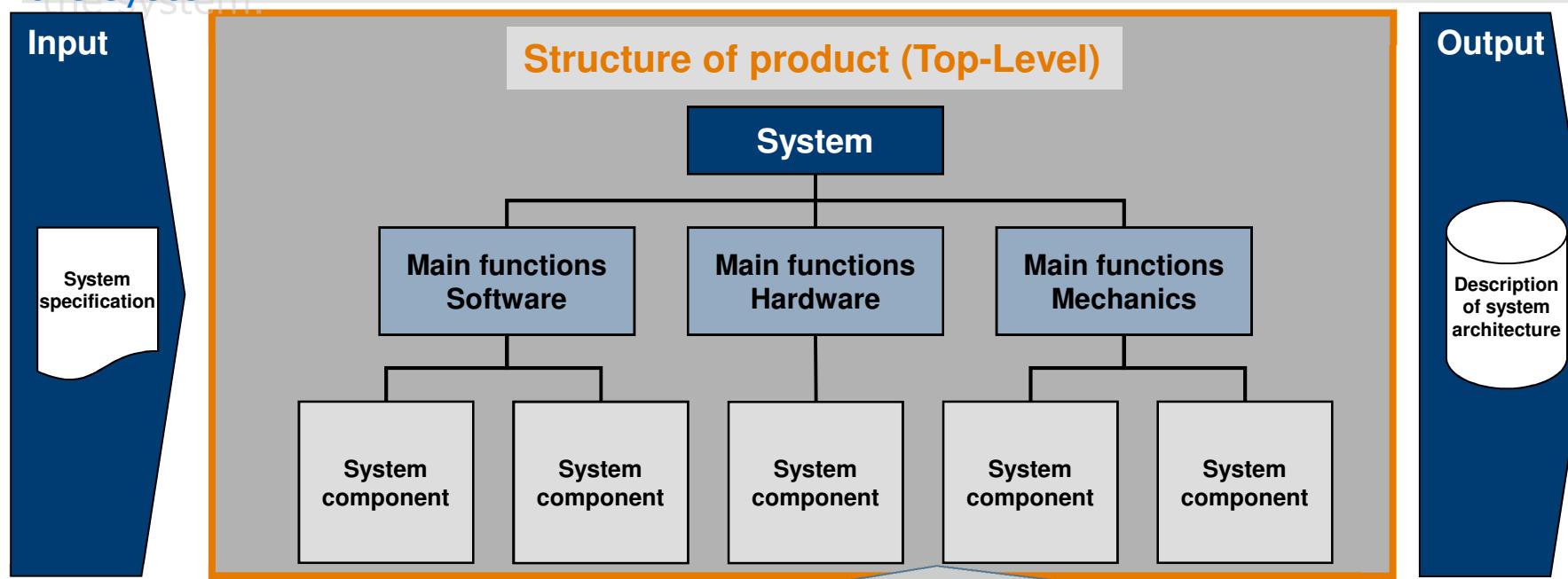
Beziehungen

- Zwischen den Stufen
- Aber auch innerhalb einer Stufe (z.B. zwischen Disziplinen)



ENG.3: System Architectural Design

Purpose is to identify which system requirements are to be allocated to which elements of the system.

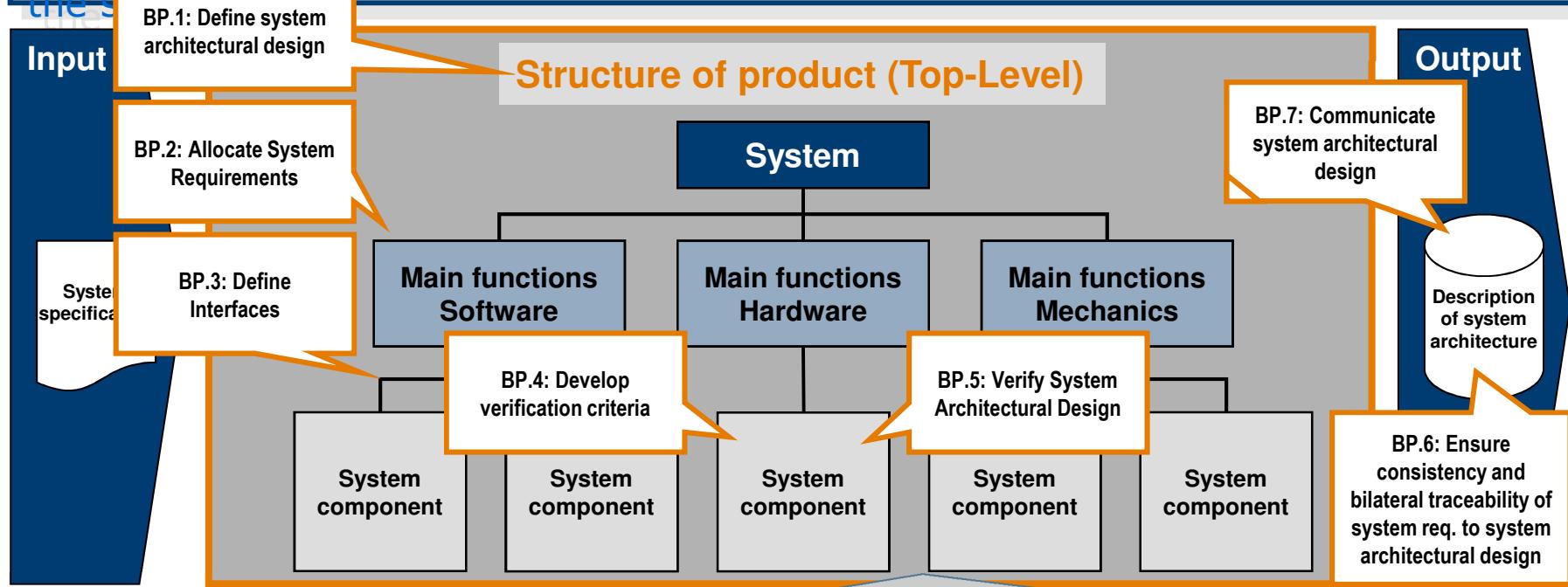


GOALS

Define solutions for the system requirements
Define requirements for detailed designs

ENG.3: System Architectural Design

Purpose is to identify which system requirements are to be allocated to which elements of the system.

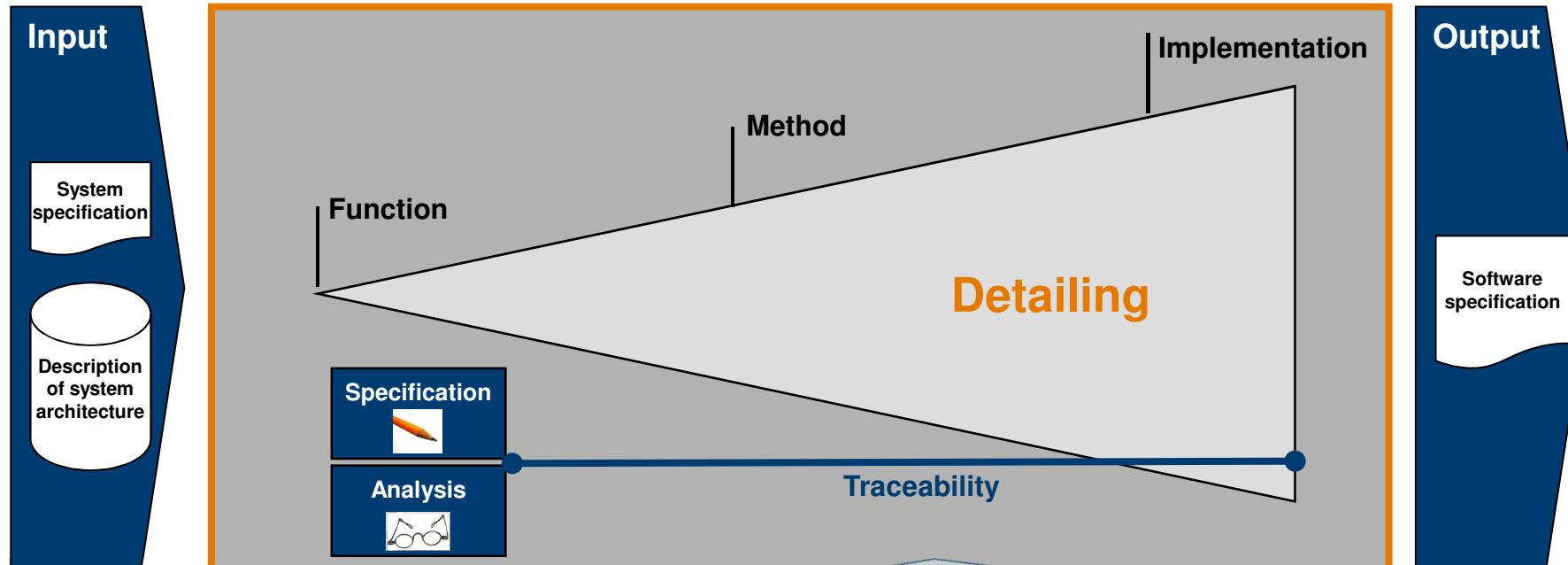


GOALS

Define solutions for the system requirements
Define requirements for detailed designs

ENG.4: Software Requirements Analysis

Purpose is to establish the software requirements for the system.

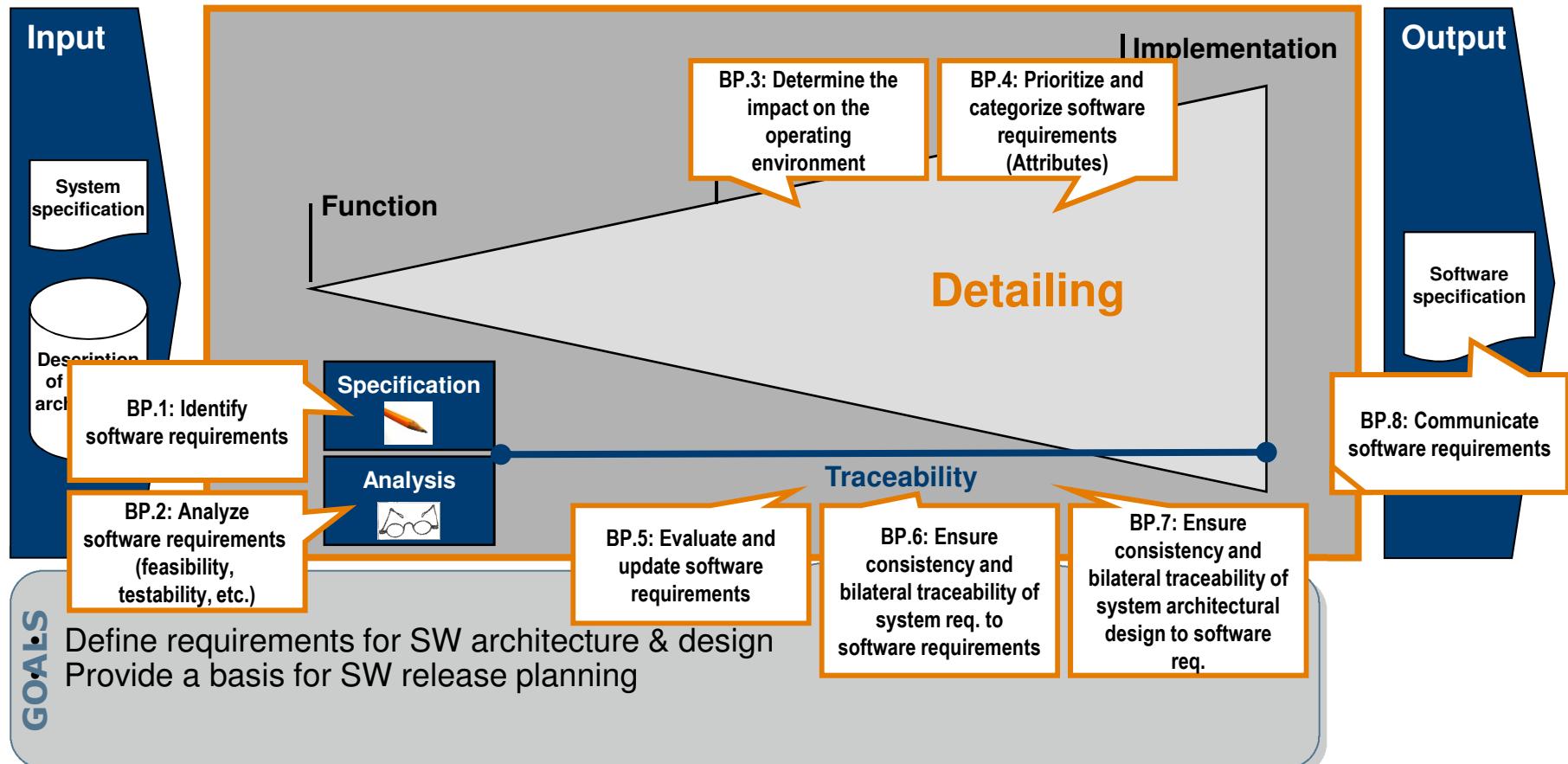


GOALS

Define requirements for SW architecture & design
Provide a basis for SW release planning

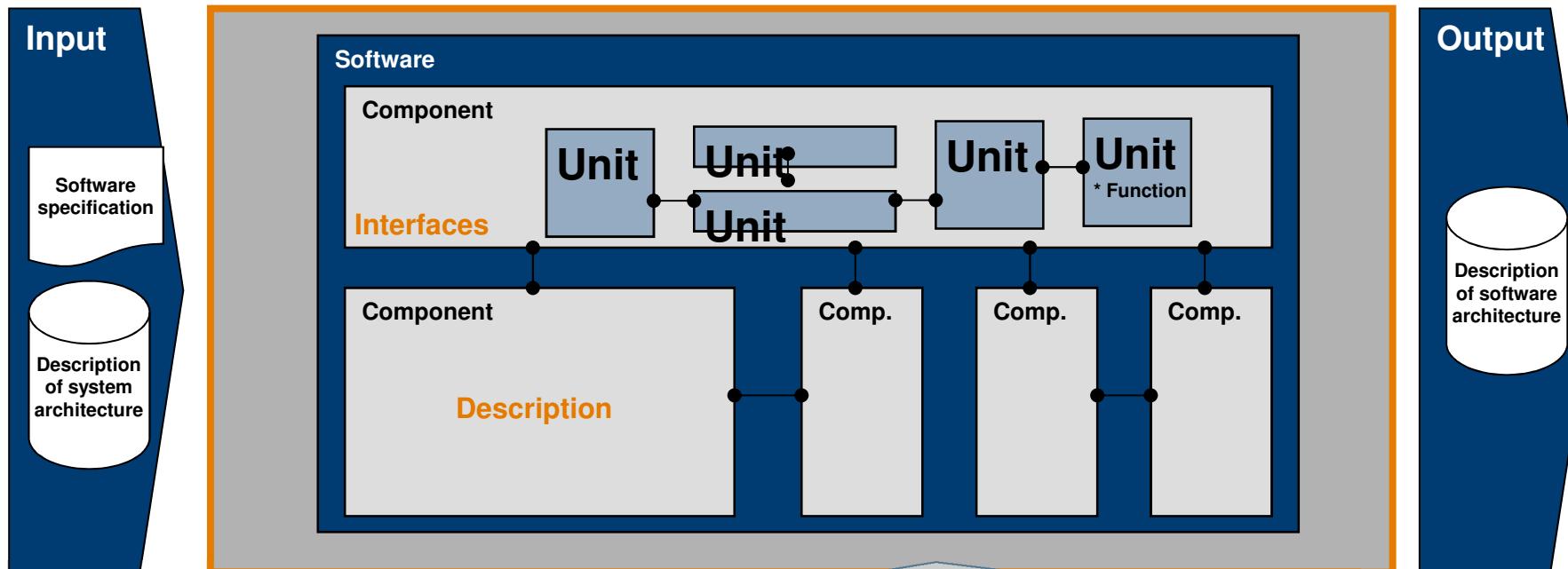
ENG.4: Software Requirements Analysis

Purpose is to establish the software requirements for the system.



ENG.5: Software Design

Purpose is to provide a design for the software that implements and can be verified against the software requirements.



GOALS

Derive a solution from the SW requirements: SW architecture
Detail out in a SW design

ENG.5: Software Design

Purpose is to provide a design for the software that implements and can be verified

Input

Software specification
Description of system architecture

BP.4: Describe dynamic behavior
BP.5: Define resource consumption objectives

Software
Component
Interfaces

Component

Description

BP.9: Ensure consistency and bilateral traceability of software req. to software architectural design

Unit

BP.3: Define interfaces

BP.2: Allocate software requirements

BP.1: Develop software architectural design

Unit
Unit
Unit
Unit

* Function

BP.6: Develop detailed design

BP.7: Develop Verification Criteria

Description of software architecture

BP.10: Ensure consistency and bilateral traceability of software architectural design to software detailed design

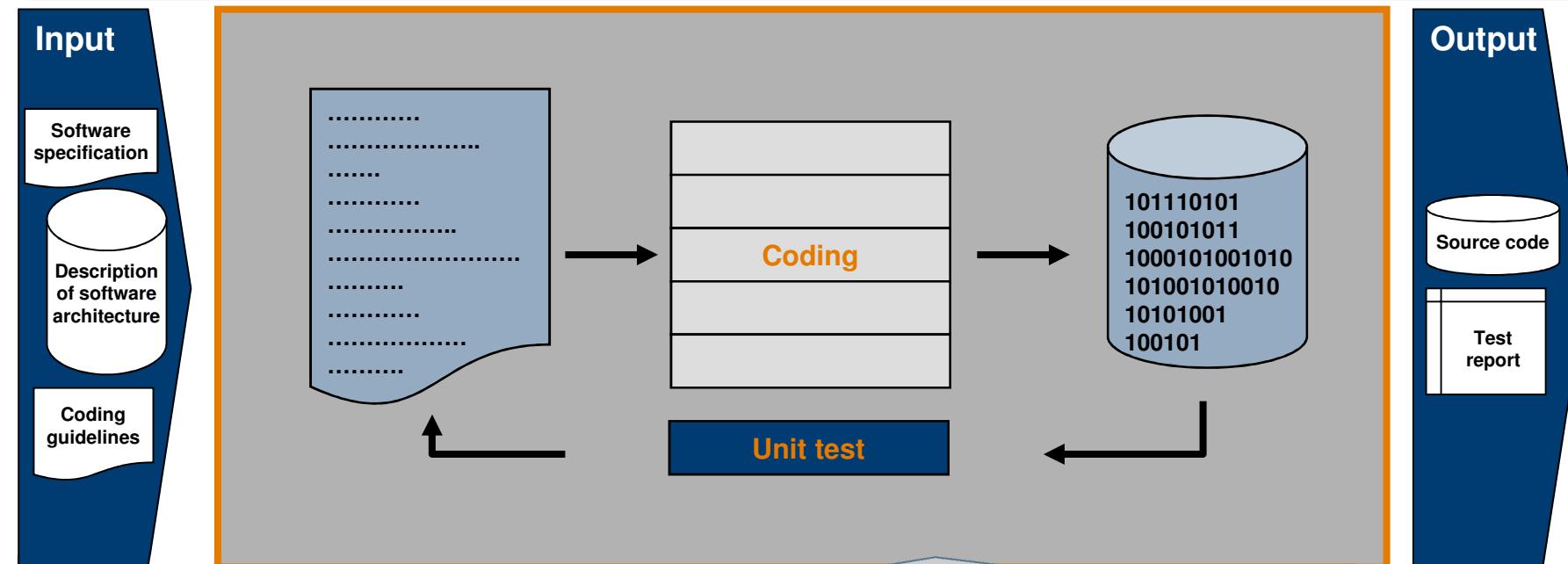
BP.8: Verify Software Design

GOALS

Derive a solution from the SW requirements: SW architecture
Detail out in a SW design

ENG.6: Software Construction

Purpose is to produce verified software units that properly reflect the software design.



GOALS

Transform detailed design into source code
Verify the source code

ENG.6: Software Construction

Purpose is to produce verified software units that properly reflect the software design.

Input

Software specification

Description of software architecture

Coding guidelines

GOALS

Transl.
Verify

BP.1: Define a unit verification strategy

BP.2: Analyze software units (complexity, interaction, risks, testability, etc.)

BP.3: Prioritize and categorize software units

BP.4: Develop software units

BP.5: Develop unit verification criteria

BP.9: Ensure consistency and bilateral traceability of software requirements to software units

...

BP.10: Ensure consistency and bilateral traceability of software units to test specification for software units

BP.8: Ensure consistency and bilateral traceability of software detailed design to software units

Coding

101110101
100101011
1000101001010
101001010010
10101001
100101

Unit test

BP.6: Verify software units

BP.7: Record the results of unit verification

Output

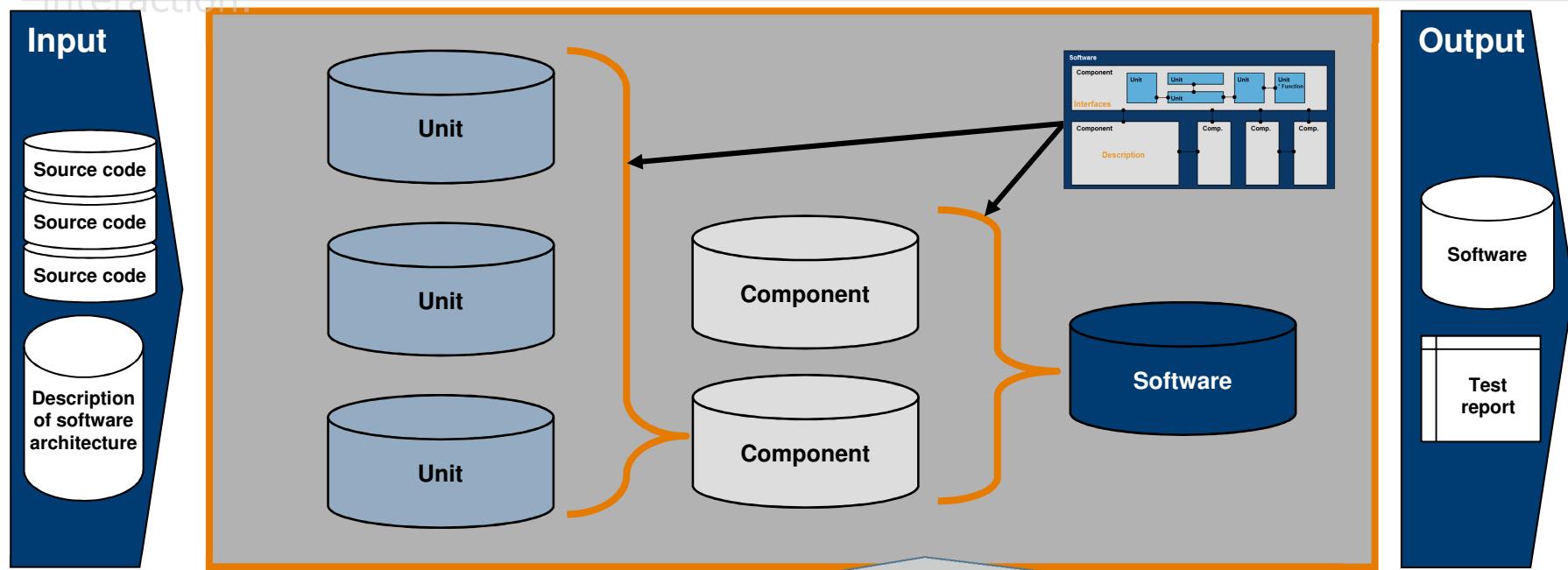
Source code

Test report

Sign into source code

ENG.7: Software Integration Test

Purpose is to integrate the software units into larger assemblies, producing integrated software consistent with the software design and to test the interaction.

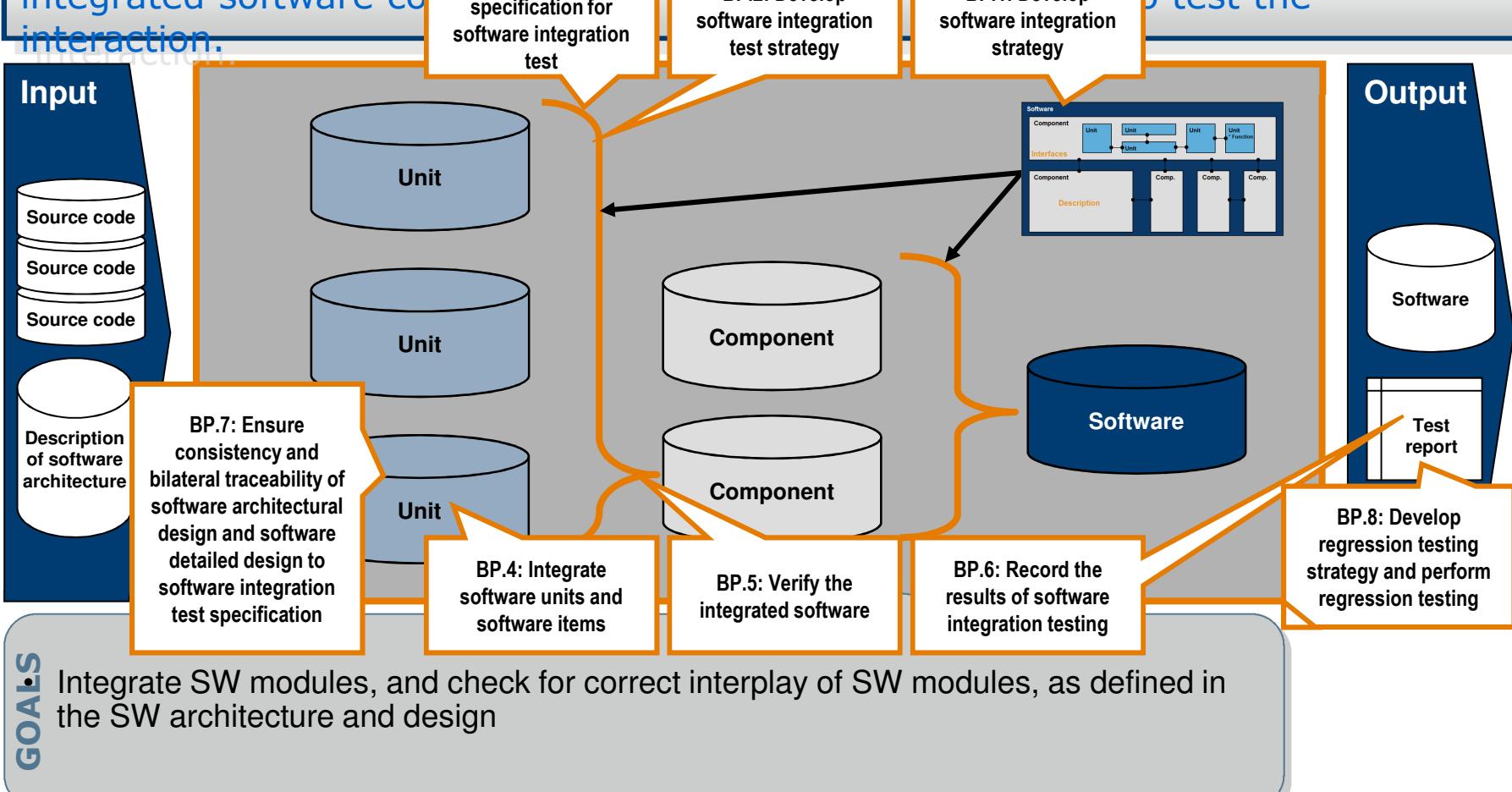


GOALS

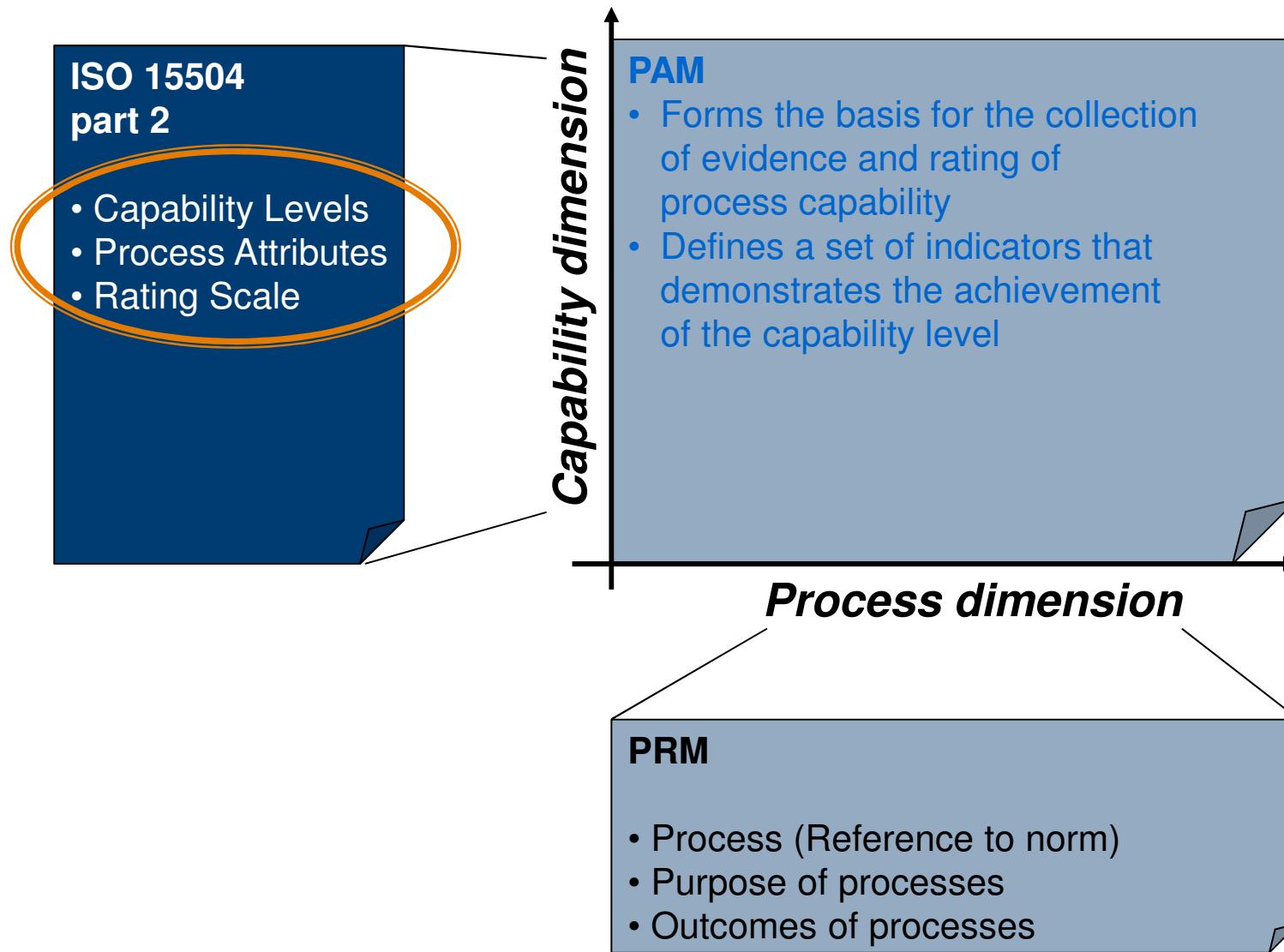
Integrate SW modules, and check for correct interplay of SW modules, as defined in the SW architecture and design

ENG.7: Software Integration Test

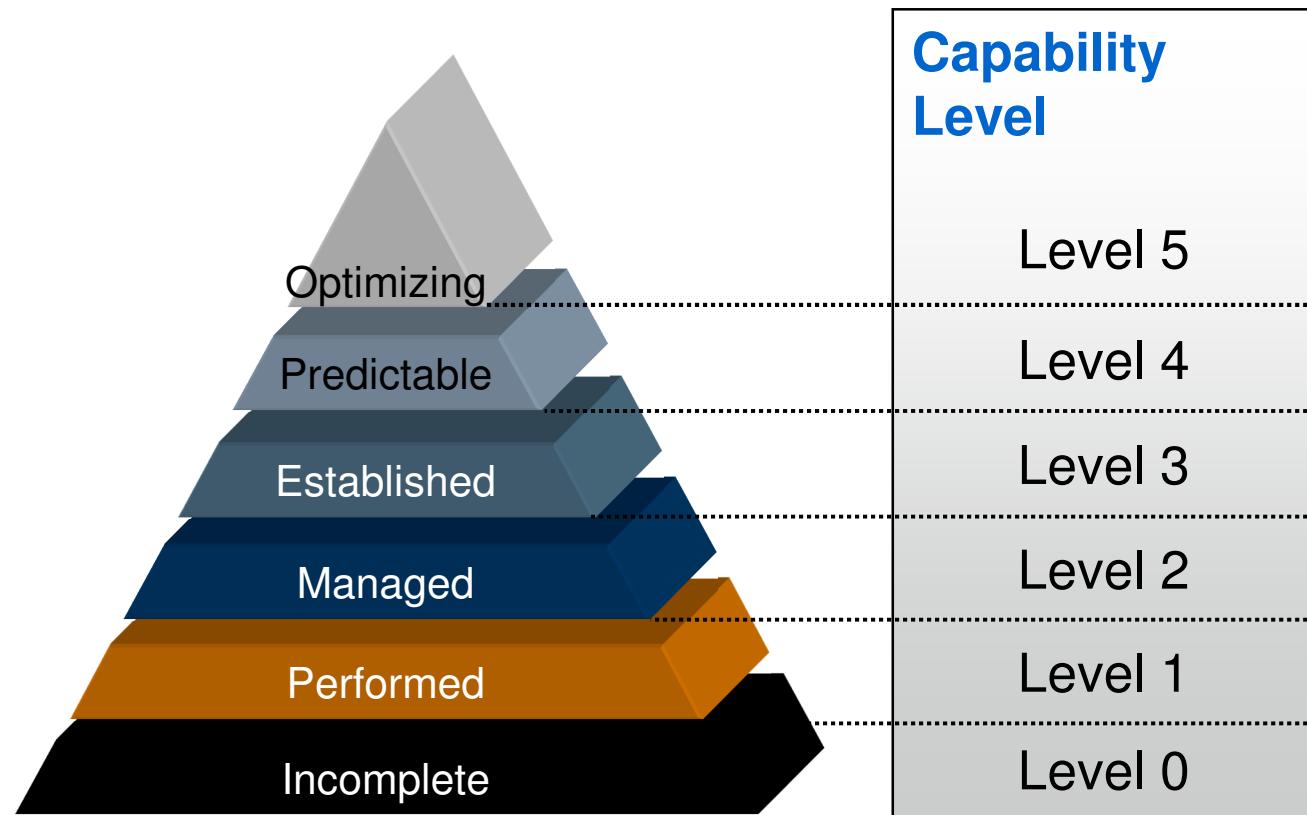
Purpose is to integrate the software units into larger assemblies, producing integrated software components and to test the interaction.



What are the two dimensions?



Scale for the capability of processes



How to achieve these levels?

5.1 Process Innovation
5.2 Process Optimization

Are innovations and process changes performed?
Are systematic continuous improvements performed?

4.1 Process Measurement
4.2 Process Control

Works the process between defined upper and lower control limits
with regard to the business goals?
Are metrics for the process been used?

3.1 Process Definition
3.2 Process Deployment

Are activities, interactions, roles, competencies, infrastructure, work
environment and methods for standard processes and its in- and
outputs and purposes described?
Are tailored versions of the standard process been used?

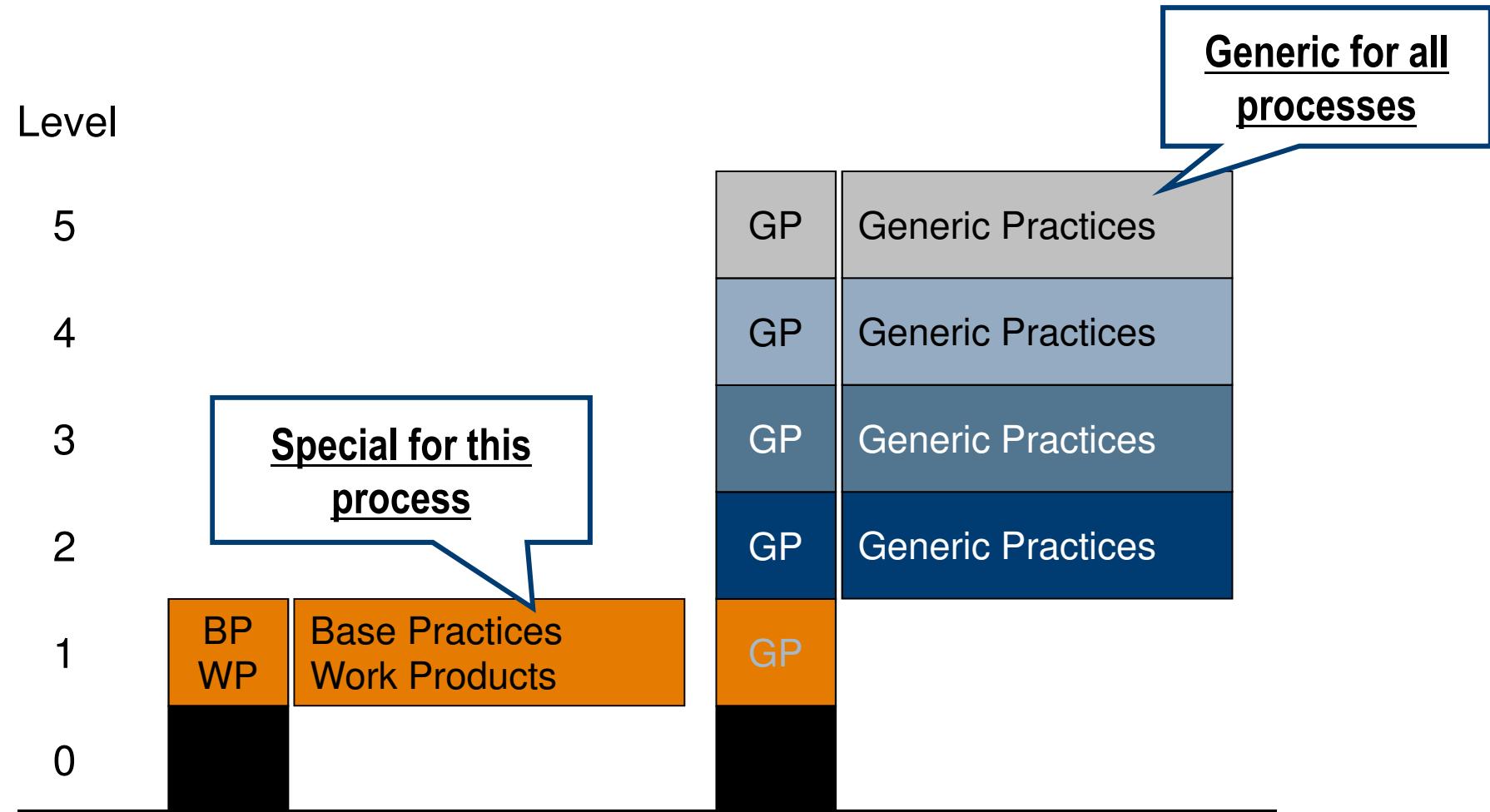
2.1 Performance Management
2.2 Work Product Management

Is the performance of the process been planned and monitored?
Are the work products systematically managed and its quality assured?

1.1 Process Performance

Are process outcomes achieved by implementation of „Base Practices“
and by creation of the “Work Products”?

What are Indicators?



Valid for all processes!

5.2 Level 2: Managed process

:

5.2.1 PA 2.1 Performance management attribute

The performance management attribute is a measure of the extent to which the performance of the process is managed. As a result of full achievement of this attribute:

a) *objectives for the performance of the process are identified;*

:

5.2.1.1 Generic Practices for PA 2.1

GP 2.1.1 Identify the objectives for the performance of the process.

NOTE: Performance objectives may include – (1) quality of the artefacts produced, (2) process cycle time or frequency (3) resource usage and (4) boundaries of the process.

Performance objectives are identified based on process requirements.

The scope of the process performance is defined.

Assumptions and constraints are considered when identifying the performance objectives.

:

Purpose of
the
attribute

Outcomes
of the
attribute

Generic
Practices

(GP)

Definition

PA 2.1 Performance management

- It's a measure of the extent to which the performance of the process is managed.

Outcomes

- a) Objectives for the performance of the process are identified.
- b) Performance of the process is planned and monitored.
- c) Performance of the process is adjusted to meet plans.
- d) Responsibilities and authorities for performing the process are defined, assigned and communicated.
- e) Resources and information necessary for performing the process are identified, made available, allocated and used.
- f) Interfaces between the involved parties are managed to ensure both effective communication and also clear assignment of responsibility.

Definition

PA 2.1 Performance management

- It's a measure of the extent to which the performance of the process is managed.

Generic Practices

GP 2.1.1 Identify the objectives for the performance of the process.

GP 2.1.2 Plan and monitor the performance of the process to fulfill the identified objectives.

GP 2.1.3 Adjust the performance of the process.

GP 2.1.4 Define responsibilities and authorities for performing the process.

GP 2.1.5 Identify and make available resources to perform the process according to plan.

GP 2.1.6 Manage the interfaces between involved parties.

Definition

PA 2.2 Work product management

- It's a measure of the extent to which the work products produced by the process are appropriately managed.

Outcomes

- a) Requirements for the work products of the process are defined.
- b) Requirements for documentation and control of the work products are defined.
- c) Work products are appropriately identified, documented, and controlled.
- d) Work products are reviewed in accordance with planned arrangements and adjusted as necessary to meet requirements.

Definition

PA 2.2 Work product management

- It's a measure of the extent to which the work products produced by the process are appropriately managed.

Generic Practices

GP 2.2.1 Define the requirements for the work products.

GP 2.2.2 Define the requirements for documentation and control of the work products.

GP 2.2.3 Identify, document and control the work products.

GP 2.2.4 Review and adjust work products to meet the defined requirements.



MAN.3 has influence on PA2.1 for all other processes, esp.

- GP 2.1.2 Plan and monitor the performance of the process to fulfill the identified objectives.
- GP 2.1.3 Adjust the performance of the process.
- GP 2.1.4 Define responsibilities and authorities for performing the process.
- GP 2.1.5 Identify and make available resources to perform the process according to plan.

SUP.8 has influence on PA2.2 for all other processes, esp

- GP 2.2.3 Identify, document and control the work products

SUP.1 has influence on PA2.2 for all other processes, esp.

- GP 2.2.1 Define the requirements for the work products.
- GP 2.2.4 Review and adjust work products to meet the defined requirements.

Definition

PA 3.1 Process definition

- It's a measure of the extent to which a standard process is maintained to support the deployment of the defined process.

Outcomes

- a) A standard process, including appropriate tailoring guidelines, is defined that describes the fundamental elements that must be incorporated into a defined process.
- b) The sequence and interaction of the standard process with other processes are determined.
- c) Required competencies and roles for performing a process are identified as part of the standard process.
- d) Required infrastructure and work environment for performing a process are identified as part of the standard process.
- e) Suitable methods for monitoring the effectiveness and suitability of the process are determined.

Definition

PA 3.1 Process definition

- It's a measure of the extent to which a standard process is maintained to support the deployment of the defined process.

Generic Practices

GP 3.1.1 Define the standard process that will support the deployment of the defined process.

GP 3.1.2 Determine the sequence and interaction between processes so that they work as an integrated system of processes.

GP 3.1.3 Identify the roles and competencies for performing the standard process. Competencies for performing the process are identified.

GP 3.1.4 Identify the required infrastructure and work environment for performing the standard process.

GP 3.1.5 Determine suitable methods to monitor the effectiveness and suitability of the standard process.

Definition

PA 3.2 Process deployment

- It's a measure of the extent to which the standard process is effectively deployed as a defined process to achieve its process outcomes.

Outcomes

- a) A defined process is deployed based upon an appropriately selected and/or tailored standard process.
- b) Required roles, responsibilities and authorities for performing the defined process are assigned and communicated.
- c) Personnel performing the defined process are competent on the basis of appropriate education, training, and experience.
- d) Required resources and information necessary for performing the defined process are made available, allocated and used.
- e) Required infrastructure and work environment for performing the defined process are made available, managed and maintained.
- f) Appropriate data are collected and analysed as a basis for understanding the behaviour of, and to demonstrate the suitability and effectiveness of the process, and to evaluate where continuous improvement of the process can be made.

Definition

PA 3.2 Process deployment

- It's a measure of the extent to which the standard process is effectively deployed as a defined process to achieve its process outcomes.

Generic Practices

GP 3.2.1 Deploy a defined process that satisfies the context specific requirements of the use of the standard process.

GP 3.2.2 Assign and communicate roles, responsibilities and authorities for performing the defined process.

GP 3.2.3 Ensure necessary competencies for performing the defined process.

GP 3.2.4 Provide resources and information to support the performance of the defined process.

GP 3.2.5 Provide adequate process infrastructure to support the performance of the defined process.

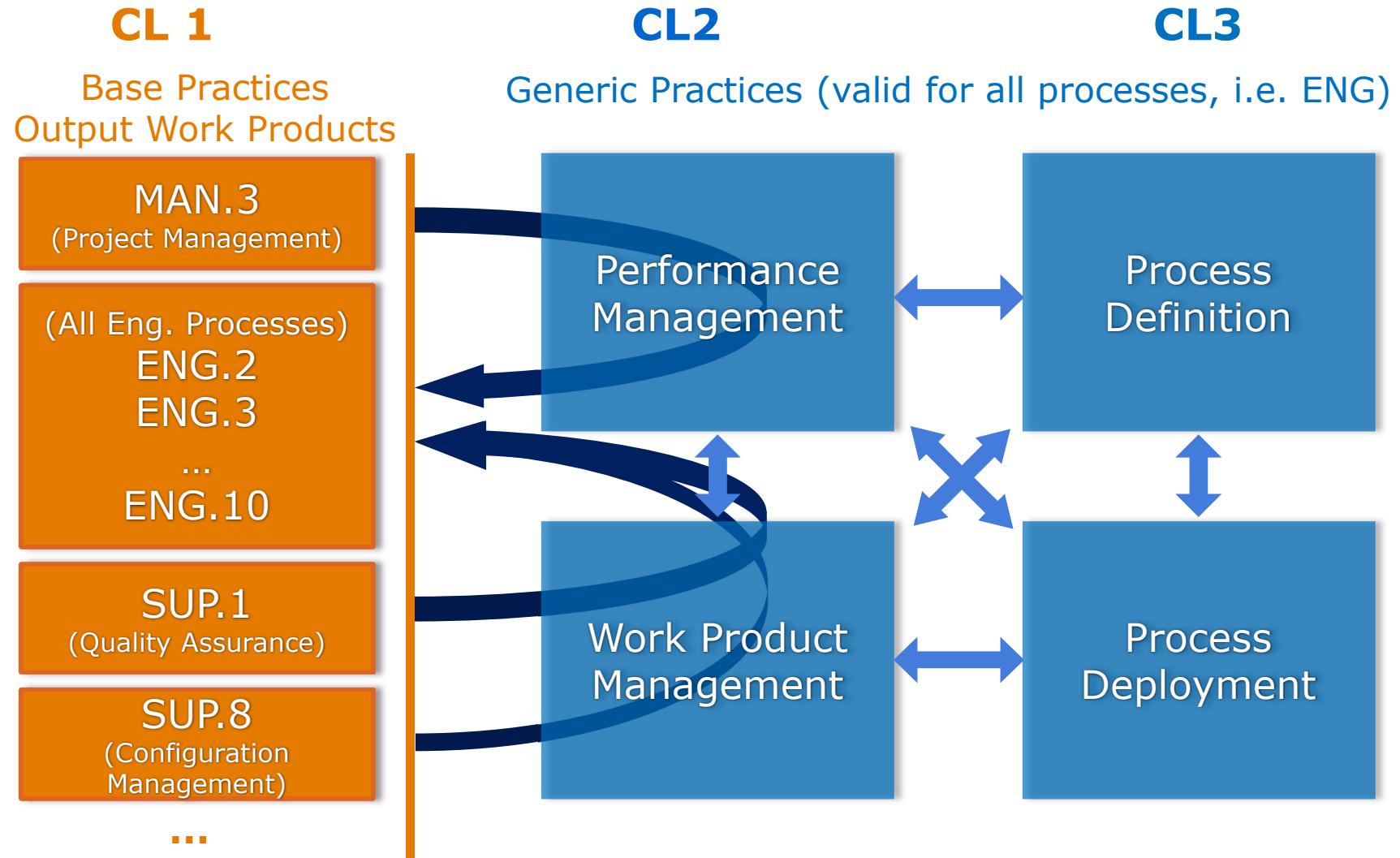
GP 3.2.6 Collect and analyse data about performance of the process to demonstrate its suitability and effectiveness..

Summary: Practices Required by a Project/Process for Achieving CL 1–3

| | | | | | | | |
|------|-----------------------------------|--|--|--|--|--|--|
| CL 3 | PA.3.2 Process Deployment | | | | | | |
| | PA.3.1 Process Definition | | | | | | |
| CL 2 | PA.2.2 Work Product Management | | | | | | |
| | PA.2.1 Performance Management | | | | | | |
| CL 1 | PA.1.1 Process Performance | | | (A set of base practices is defined for each process.) | | | (A set of outcomes is defined for each process.) |

Generic practices

Process specific practices



Level 1: Performed process

- Process Performance
 - Perform the intent of the base practices
 - Produce work products that evidence the process outcomes

Achievement through

- Performance of necessary actions
- Presence of work products!
 - Simple existence of work products is not sufficient
 - Evidence of contribution to achieving process purpose

Level 2: Managed process

Must Fully Achieve PA's of Capability Level 1 plus ...

Performance Management

- Processes now implemented in a managed fashion (planned, monitored and adjusted)

Work Product Management

- Work products are appropriately established, controlled and maintained.

Most important:

- Project Management
- Configuration Management
- Quality Assurance (Reviews)

PA 2.1:

- No clearly defined Process Performance Objectives
- Weak Estimation Process / Method
- Weak Planning, e.g.
 - Mixing up size/ effort / duration
 - Not all processes are estimated / planned/ monitored
- Weak resource planning
 - Do we have enough resources?
 - Overloaded resources?



PA 2.2:

- Weak configuration management strategy
- No systematic review planning, or even
- No documented reviews

Consequence:

- Typically it's not sufficient to implement "just" the Generic Practices of the next Capability Level!
- Example:
 - From CL 2 to CL 3: **Effort must be spend on PA 2.1/ PA2.2/ PA3.1/ PA 3.2**



| | | Capability level | | 1 | 2 | 3 | |
|-------|--------------------------------|-------------------|-----|-----|-----|-----|----|
| | | Process attribute | | PA | PA | PA | |
| | | Process | 1.1 | 2.1 | 2.2 | 3.1 | PA |
| ENG.1 | Requirements elicitation | | F | L | L | N | N |
| ENG.2 | System requirements analysis | | F | L | L | N | N |
| ENG.3 | System architectural design | | F | L | L | N | N |
| ENG.4 | Software requirements analysis | | F | L | L | N | N |
| ENG.5 | Software design | | F | L | L | N | N |

...

...

...



| 1 | 2 | 3 | 4 | 5 |
|-----|-----|-----|-----|-----|
| PA | PA | PA | PA | PA |
| 1.1 | 2.1 | 2.2 | 3.1 | 3.2 |
| F | F | F | L | L |
| F | F | F | L | L |
| F | F | F | L | L |
| F | F | F | L | L |
| F | F | F | L | L |

Level 3: Established process

Must Fully Achieve PA's of Capability Level 2 plus ...

Process definition attribute

- A standard process is maintained to support the deployment of the defined process

Process Deployment Management

- The standard process is effectively deployed as a defined process to achieve its process outcomes

Most important:

- Standard processes/ methods/ phases/ roles/ documents/ checklists/ tools/ trainings are defined
- Tailoring guidelines are defined
- Metrics on organizational level are defined
- All this is really used within the projects!!!
- Metrics are collected and analyzed for process improvement

PA 3.1:

- Incomplete process definitions
- Missing Tailoring Guidelines
- Missing Training Material/ Training Plans
- Missing definition of
“standard infrastructure”
- Missing metrics on organizational level



PA 3.2:

- Processes are not really used
- No trainings conducted
- No metrics on organizational level
collected and analyzed