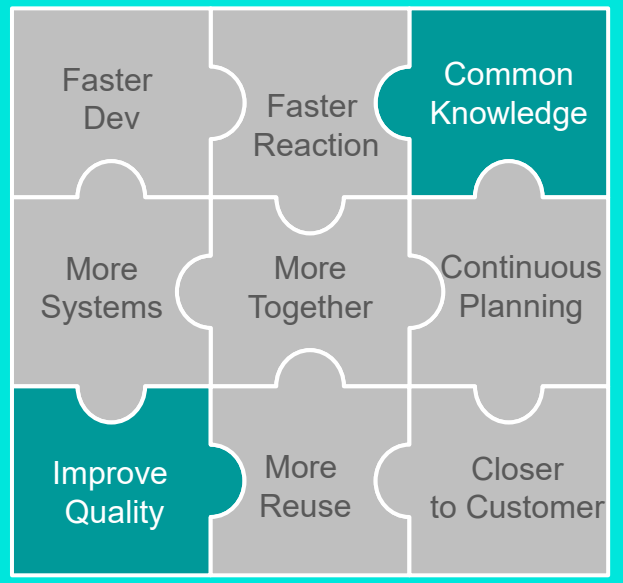

Quality of Requirements

Part II: Focus on quality criteria defined by standard

SIEMENS

Quality from various angles

SIEMENS

Quality characteristics for individual requirements

1

- Necessary *
- Correct *
- Appropriate *
- Verifiable *
- Conforming *
- Unambiguous *
- Complete *
- Singular *
- Feasible*
- Rated

* According IEEE 29148

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Quality characteristics for individual requirements

- **Necessary**

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Quality characteristics

Necessary

The requirement defines an essential capability, characteristic, constraint and/or quality factor. If it is not included in the set of requirements, a deficiency in capability or characteristic will exist, which cannot be fulfilled by implementing other requirements.

The requirement is currently applicable and has not been made obsolete by the passage of time. Requirements with planned expiration dates or applicability dates are clearly identified.

Quality characteristics for individual requirements

- Necessary
- **Correct**

SIEMENS

Quality characteristics

Correct

A requirements is correct if it precisely reflects the wishes and requirements of the Stakeholder.

This is in turn assumes that all stakeholders understand the requirements as it is formulated / presented .

-> This limits the forms of representation that can be used in the various phases.

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Quality characteristics for individual requirements

- Necessary
- Correct
- **Appropriate**

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Quality characteristics

Appropriate

The specific intent and amount of detail of the requirement is appropriate to the level of the entity to which it refers (level of abstraction appropriate to the level of entity).

This includes avoiding unnecessary constraints on the architecture or design while allowing implementation independence to the extent possible.

Quality characteristics for individual requirements

- Necessary
- Correct
- Appropriate
- **Verifiable**

SIEMENS

Quality characteristics

- Verifiable

A requirement must be described in such a way that test cases can be derived from it.

Quantify: Specify concrete limit values, environmental conditions, units of measurement, ...

Quality characteristics for individual requirements

- Necessary
- Correct
- Appropriate
- Verifiable
- **Conforming**

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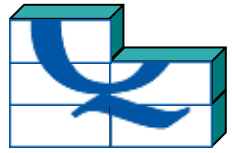
Quality characteristics

- Conforming

The individual items conform to an approved standard template and style for writing requirements, when applicable.



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Quality characteristics for individual requirements

- Unambiguous

SIEMENS

Quality characteristics for individual requirements

- Unambiguous

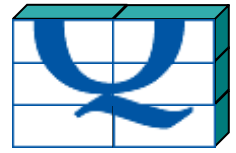
SIEMENS

Quality characteristics

- Unambiguous

The requirement is stated in such a way so that it can be interpreted in only one way.

The requirement is stated simply and is easy to understand.



Quality characteristics for individual requirements

- Unambiguous
- **Complete**

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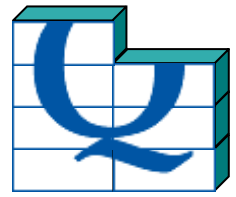
Quality characteristics

- Complete

The requirement sufficiently describes the necessary capability, characteristic, constraint or quality factor to meet the entity need without needing other information to understand the requirement.

Always mark incomplete requirements (e.g. with TBD)



Quality characteristics for individual requirements

- Unambiguous
- Complete
- **Singular**

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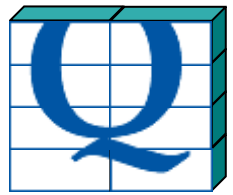
Quality characteristics

- Singular

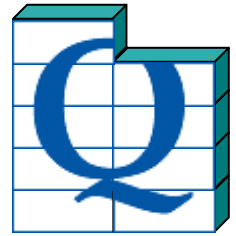
The requirement states a single capability, characteristic, constraint or quality factor.

Do not write a novel with many requirements ;-)



Quality characteristics for individual requirements

- Unambiguous
- Complete
- Singular
- **Feasible**



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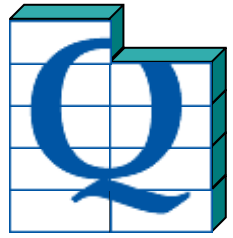
Quality characteristics

- Feasible

The requirement can be realized within system constraints (e.g., cost, schedule, technical) with acceptable risk.



Quality characteristics for individual requirements

- Unambiguous
- Complete
- Singular
- Feasible
- **Rated**

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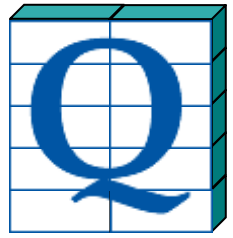
Quality characteristics

Rated

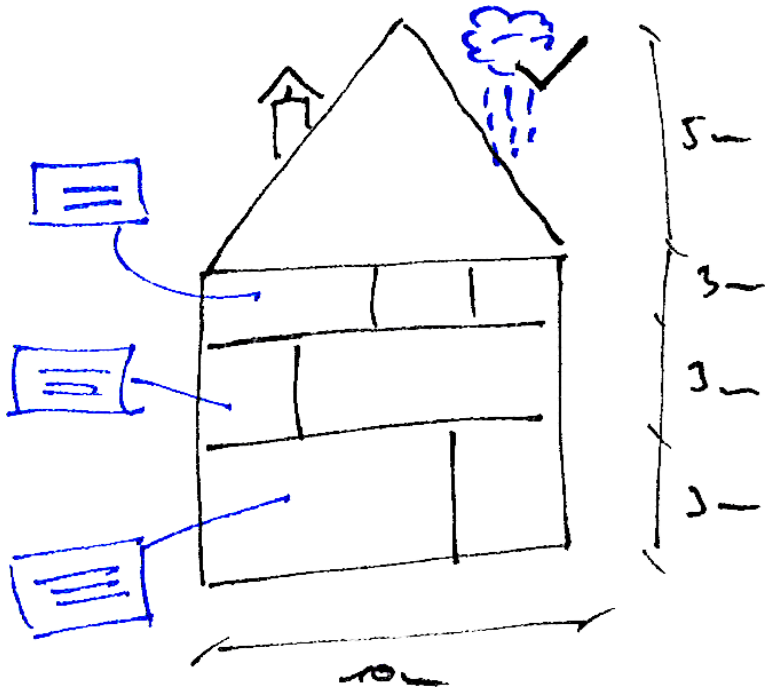
A requirement must be rated

- to distinguish requirements with high customer value from others, and
- to have a good basis for decision-making regarding the importance of the requirement in the event of cost and schedule problems in the project.



Let's apply the criteria for our project building a house

- Necessary
- Correct
- Appropriate
- Verifiable
- Conforming
- Unambiguous
- Complete
- Singular
- Feasible
- Rated



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Our example: Building a house

- Necessary

Original request:
We need three bathrooms. For the parents, for the children and for guests.

Is it necessary?

The house has two bathrooms.
Info: If guests visit us, we can organize it, that they can use the children's bathroom.

Our example: Building a house

- Correct

Original request:
We need two bathrooms.

Derived requirement:
The house has two bathrooms. They are close to the bedrooms. Each contains a sink, a toilet and a shower.

Does the requirement still reflect the stakeholder`s wish after the concretization ? Is it correct?

Our example: Building a house

- Appropriate

Original request:
We need two bathrooms. Both must be 4 x 4 m and the sanitary items are produced by “Villeroy&Boch”

Appropriate?
4 x 4 m is not a requirement. Normally you must ask: Why, why, why?
To get the requirements behind.
The manufacturar

Our example: Building a house

- Verifiable

The house has two bathrooms. They are close to the bedrooms. Each contains a sink, a toilet and a shower.

Verifiable?

The house has two bathrooms. Each is **on the same floor** as the related bedroom. Each contains a sink, a toilet and a shower.

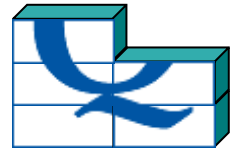
Our example: Building a house

Conforming

The house has two bathrooms. They are close to the bedrooms. Each contains a sink, a toilet and a shower.

Conforming?
As a parent, we can use my own bathroom,
... so that we don't have a time conflict when using the bathroom with children or guests
... so that the expensive furnishings are not broken by others
... so that only we can store our care products and other parental products separately
As a child or guest, I can use my own bathroom,
... so that I don't have a time conflict when using the bathroom with my parents or hosts
... so that the facility can be designed with children in mind

Acceptance criteria:
Each bathroom is located on the same floor as the associated bedroom.
Each bathroom contains a washbasin, a toilet and a shower.



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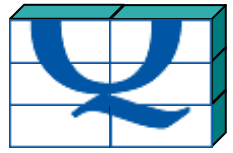
Our example: Building a house

- Unambiguous

The house has multiple bathrooms.

Unambiguous?

The house has two bathrooms.



Our example: Building a house

- Complete

The bathrooms are at least as big as in the current flat.

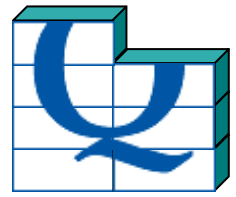
Complete?

The bathrooms are at least 5.32 sqm in size.

Info: 5.32 square meters is the size of the bathroom in the current apartment.

As a resident, I can use the toilet, bidet, shower, bathtub and washbasin in my bathroom.

As a resident, I can store 10 care products and 20 towels in my bathroom.



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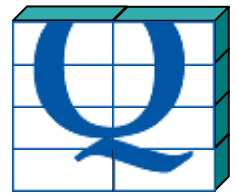
Our example: Building a house

- Singular

The house has two bathrooms. The walls of bath- and bedrooms are painted white, and the bathrooms have the same floor tiles as the kitchen.

Singular?

How many requirements I must change, if I want a different wall color in the bedroom?

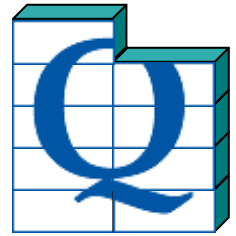


Our example: Building a house

- Feasible

The house can be moved into next month.

Another not feasible one
The shower rains from bottom to top.



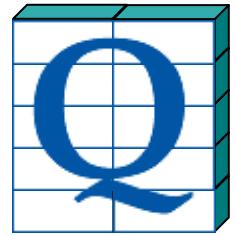
Our example: Building a house

- Rated

234: I can park my car in a garage,
so I don’t have to scrape the car free in winter.
235: I can control my lighting from my mobile.

What requirement should I drop due to a lack of money?

234: I can park my car in a garage,
so I don’t have to scrape the car free in winter. (Prio 23)
235: I can control my lighting from my mobile. (Prio 28)



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Quality characteristics for a set of requirements

- Complete *
- Consistent *
- Feasible *
- Comprehensible *
- Able to be validated *

* According IEEE 29148

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Quality characteristics for a set of requirements

- **Complete**

* According IEEE 29148

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Quality characteristics

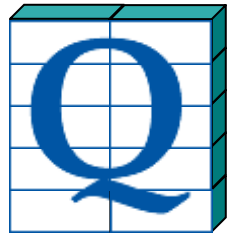
Complete

The set of requirements stands alone such that it sufficiently describes the necessary capabilities, characteristics, constraints or quality factors to meet entity needs without needing further information.

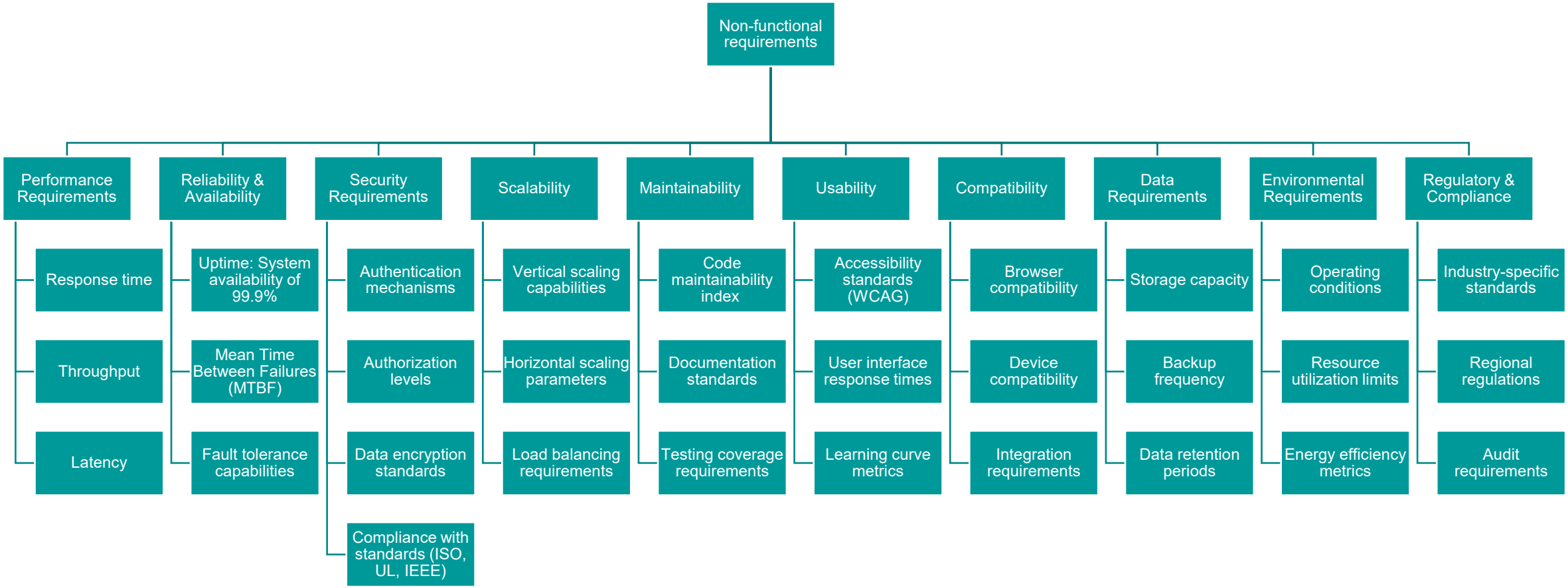
In addition, the set does not contain any To Be Defined (TBD) clauses.

Improvements by

- Including all requirements types relevant to the system under consideration;
- Accounting for requirements in all stages of the life cycle; and
- Involving all stakeholders in the requirements elicitation, capture, and analysis activity.



Quality characteristics : Completely



Often Forgotten : Non- functional Requirements

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Quality characteristics for a set of requirements

- Complete
- **Consistent**

* According IEEE 29148

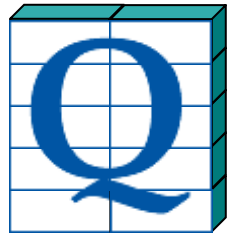
SIEMENS

Quality characteristics

- Consistent

The set of requirements contains individual requirements that are unique, do not conflict with or overlap with other requirements in the set, and the units and measurement systems are homogeneous.

The terminology used within the set of requirements is consistent, i.e. the same term is used throughout the set to mean the same thing.



Quality characteristics for a set of requirements

- Complete
- Consistent
- **Feasible**

* According IEEE 29148

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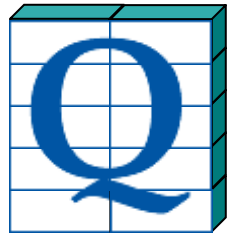
Quality characteristics

- Feasible

The complete set of requirements can be realized within entity constraints (e.g., cost, schedule, technical) with acceptable risk.



Quality characteristics for a set of requirements

- Comprehensible

* According IEEE 29148

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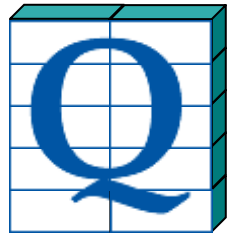
Quality characteristics

- Comprehensible

The group of requirements is written such that it is clear as to what is expected by the product/module and its relation to the system of which it is a part.



Quality characteristics for a set of requirements

- Comprehensible
- **Able to be validated**

* According IEEE 29148

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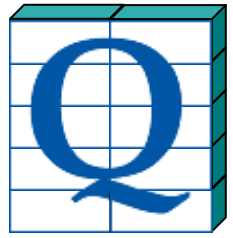
Quality characteristics

- Able to be validated

It is practicable that satisfaction of the requirement set will lead to the achievement of the product needs within constraints (e.g., cost, schedule, technical, legal and regulatory compliance).



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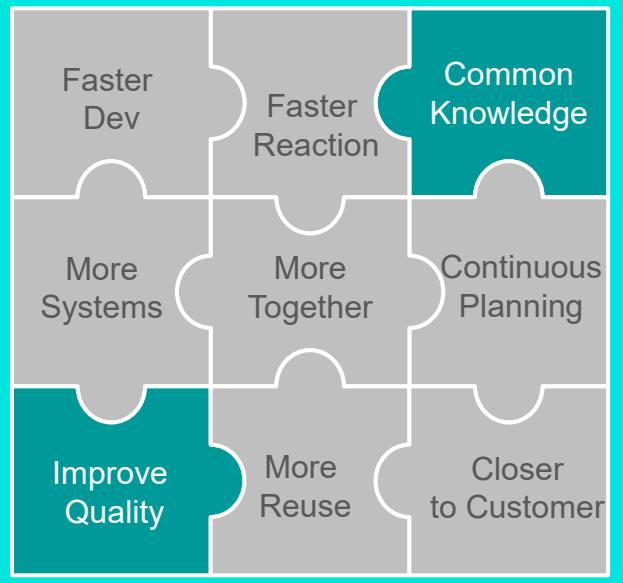

Quality of Requirements

Our stumbling blocks, our pitfalls, our experiences, our suggestions

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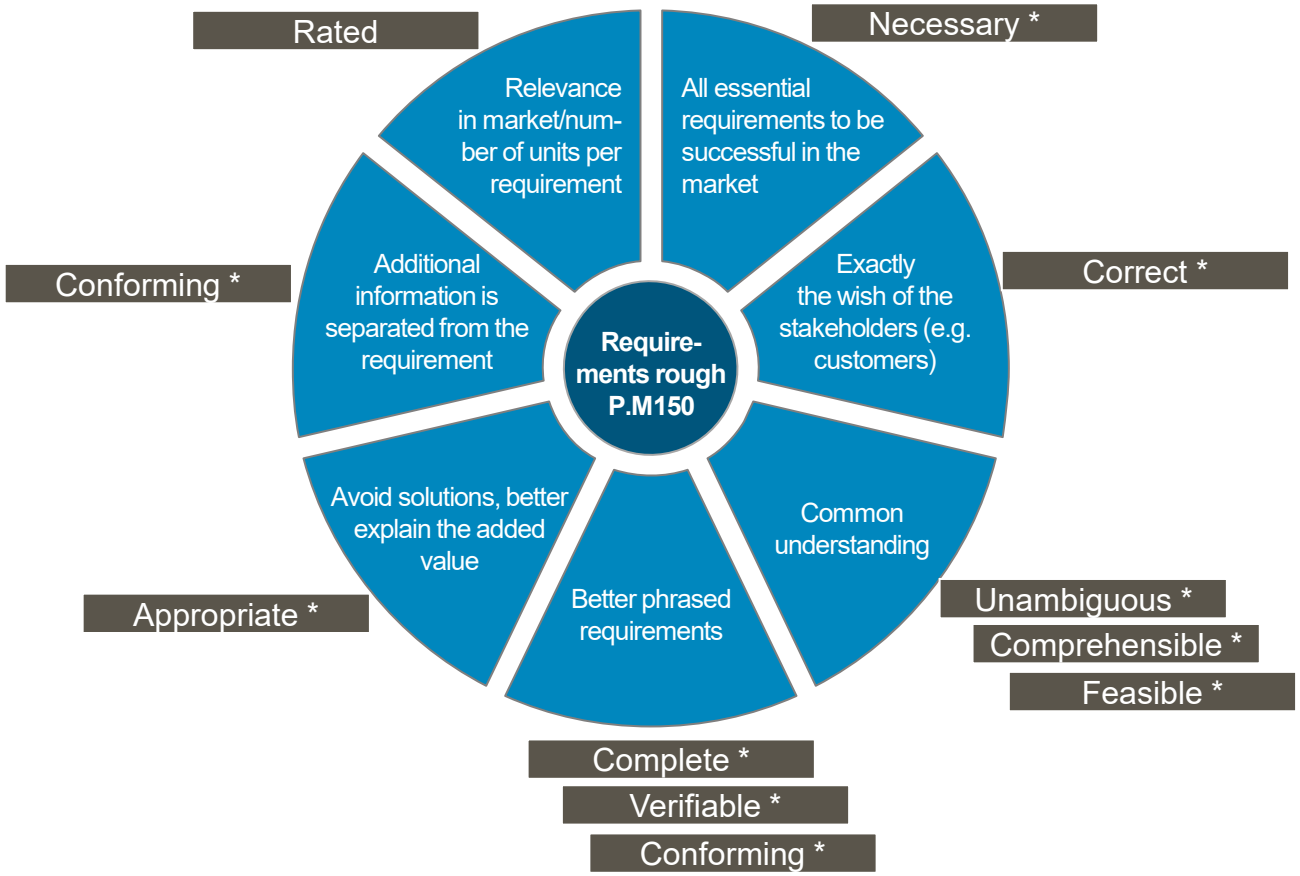
Some specific hints according to our stumbling blocks, our pitfalls, our experiences, our suggestions



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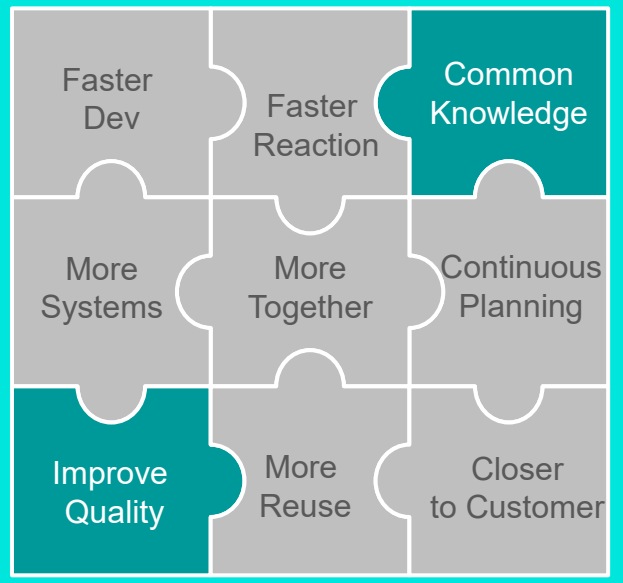
Short Checklist – Part I and Part II

- ❑ Pattern used: As a {ROLE}, I can {ACTIVITY}, so that {BENEFIT / VALUE}
- ❑ Present Tense used
- ❑ The sentence is simple
- ❑ Terms are defined
- ❑ No vague qualifiers or quantifiers
- ❑ Rated
- ❑ Necessary to be successful
- ❑ Verifiable
- ❑ Feasible
- ❑ Conforming



Quality of Requirements

Part II: Focus on quality criteria defined by standard

Q&A

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