Panel-Discussion on Networking Features [CTRQ, COCORA, PESARO]; Tuesday, April 19

Capturing Non-Operational Requirements for Telecommunications Systems

Panelists:

- Wolfgang Leister, Norsk Regnesentral, Norway, moderator
- Bernhard Hulin, Deutsche Bahn AG, Germany

Introduction and Presentation by Wolfgang Leister, Norsk Regnesentral:

Definition of Operational requirements; from thefreedictionary.com:

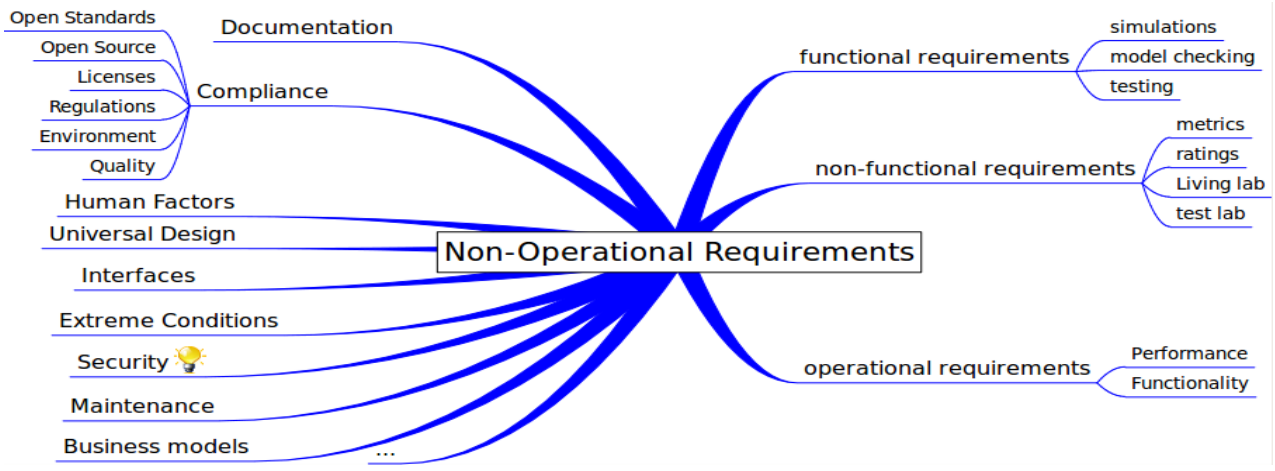
1. A formatted statement containing performance and related operational parameters for the proposed concept or system.
2. Qualitative and quantitative parameters that specify the desired capabilities of a system and serve as a basis for determining the operational effectiveness and suitability of a system prior to deployment.

Derivation of Non-operational requirements:

- Requirements beyond the core operation of a telecommunication system; that is
  - Beyond necessary functionality
  - Beyond necessary performance (non-functional)

Non-functional and Non-operational are not identical; e.g., performance of a telecommunication system is non-functional (in the sense that it defines the system's function), but operational.[1]

The following mindmap defines aspects of the terms functional vs. non-functional, and operational vs. non-operational:



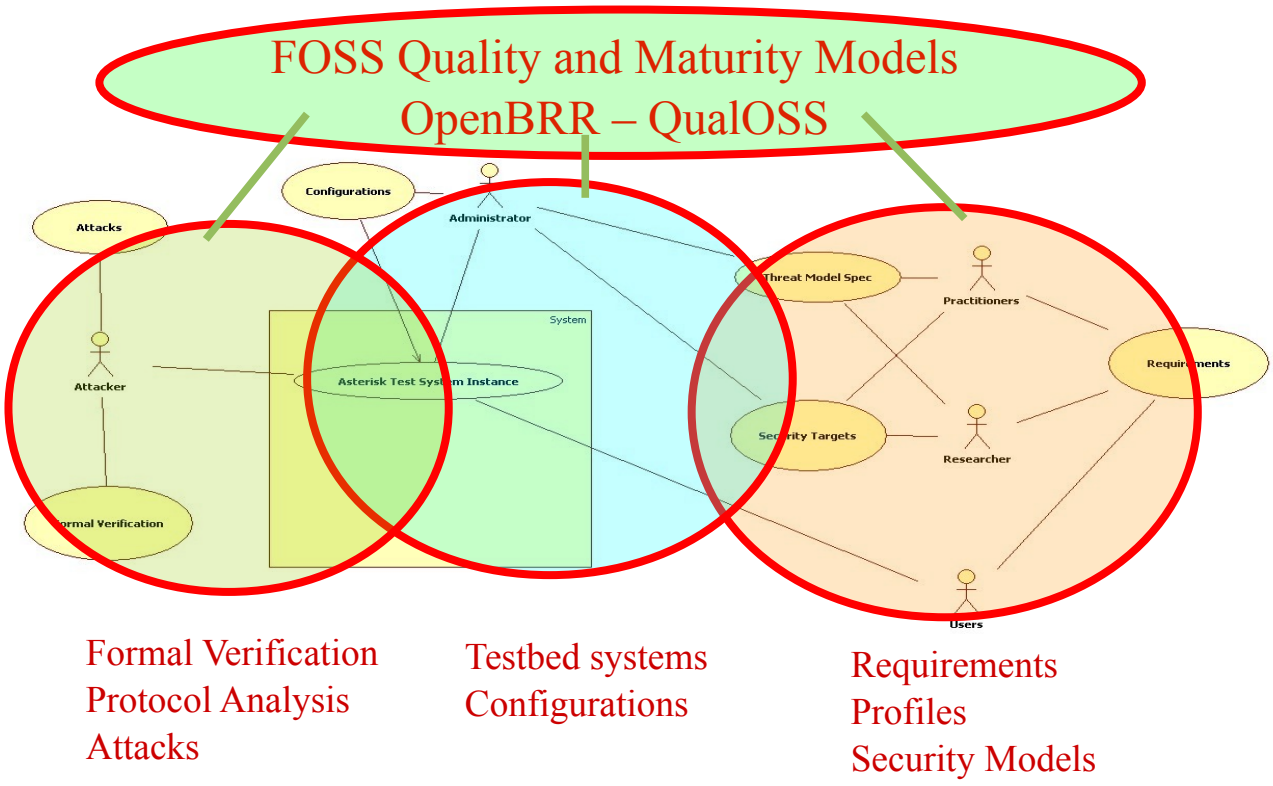
1 Note that during the discussion the term “functional” was partly used as being able to “define a function”.

How can non-operational requirements be captured?

- Definition of metrics[2] ? Metrics for performance (compromises necessary).
- OpenBRR – QualOSS – software quality measures
- Labs – Living Labs – Testlabs
- Simulation – Model checking – Testing
- Protocol analysis – for security, privacy, etc.
- Compliance tests

Some examples from projets at the Norwegian Computing Center (NR) as illustrations:

- EUX2010 SEC project; example from Buskerud County Administration
  - Is Open Source Software secure?
  - Maturity of Open Source Software?

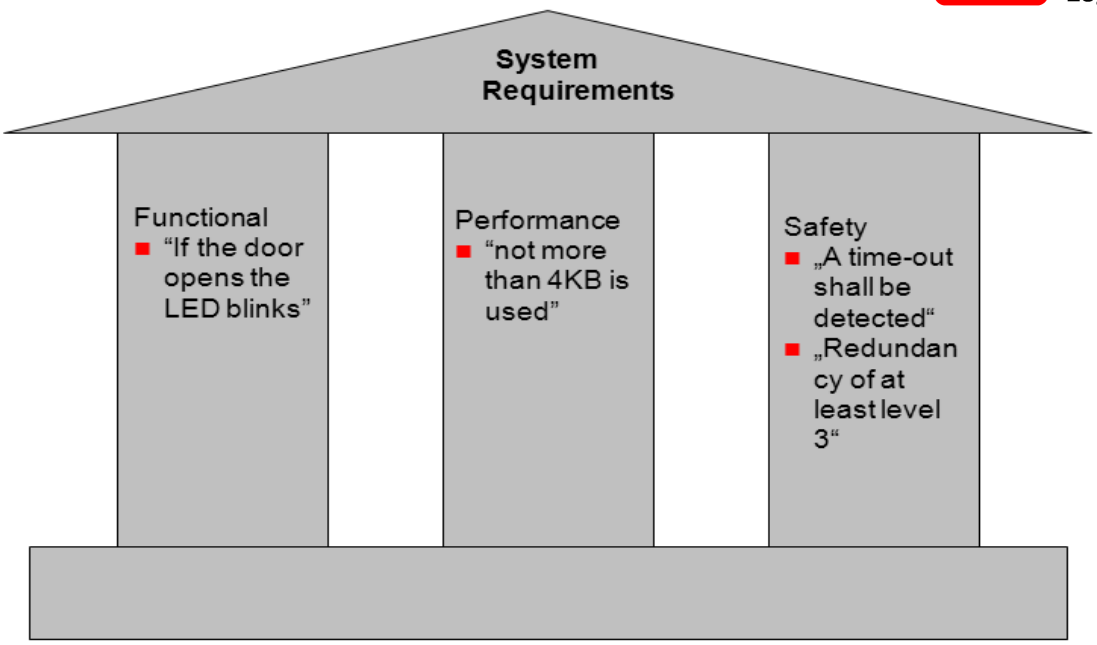


- (Biomedical) Sensor Networks:
  - Security, QoS
  - Use of standards (e.g., MPEG-21)
  - Modelling, model checking, simulation, testing
- Universal Design vs. Security ?
  - Universal Design mandatory (regulations)
  - Security – usability
  - How can persons with disabilities use public services?

2 Metrics can be used to define **functions** that can be used to evaluate requirements.

Presentation by Bernhard Hulin, Deutsche Bahn, Fahrzeugsoftware:

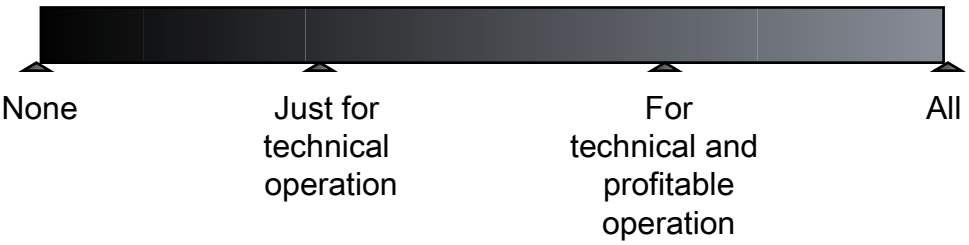
Requirement with respect to EN50128:



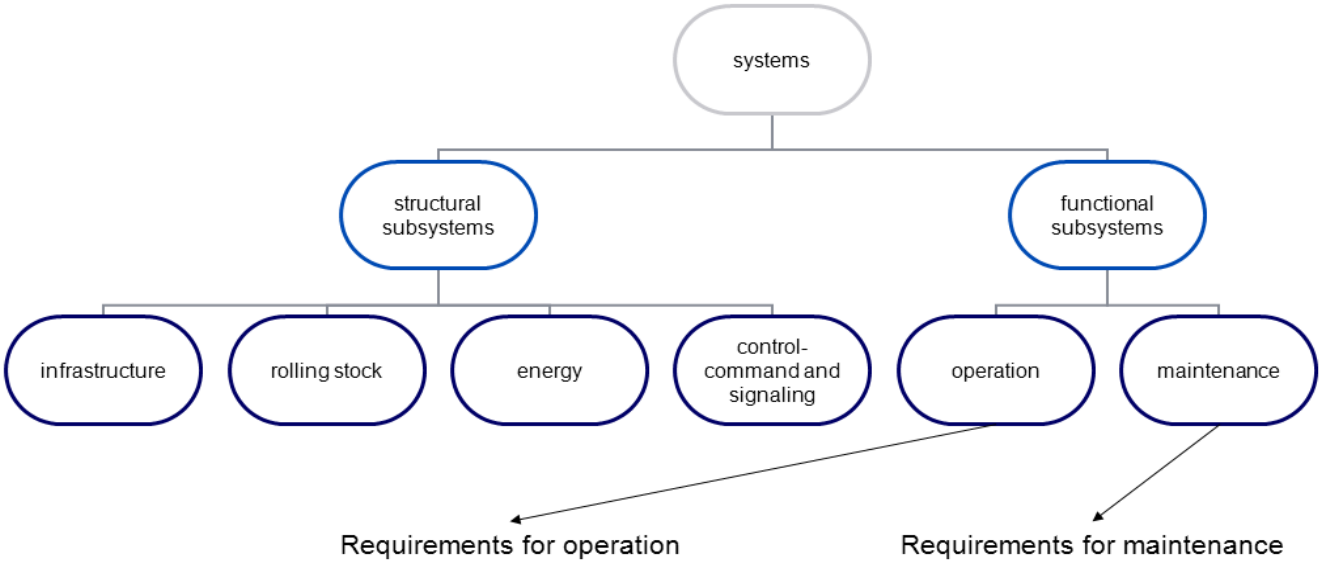
More requirements

- Commercial requirements
- Price
- Payment time
- Guarantee
- Costs for deployment of bug-fixes
- Documents
- Block drawings
- Test reports
- Delivery of Software
- Media type (CD, E-Mail, Master-EPROM)
- Level (executable, source code)

What requirements are necessary for operation?



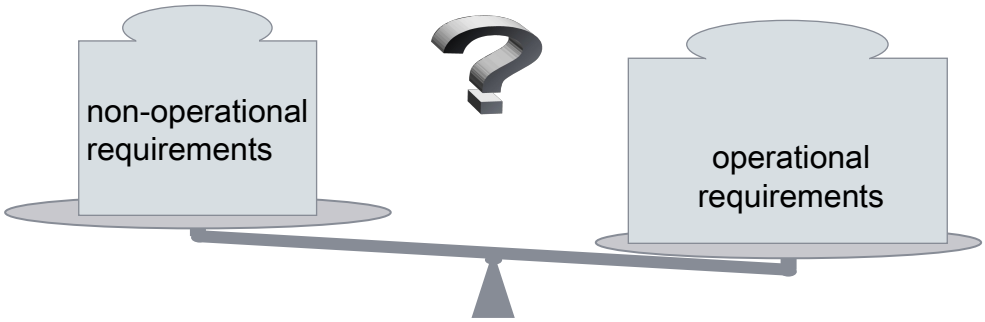
Distinction to TSI (technical specification for interoperability for railways)



Functional requirement is a superset of operational requirements:

- Non-operational requirement is the conjunction of
- requirements for maintenance
- requirements for structural systems

Weighting



Cupholder discussion

Is a reformulation of a non-functional requirement into an functional one always possible and preferable?

Cup-holder discussion

requirement for US cars: cup-holder shall be installed

Requirement based on reason: Americans shall be able to drink coffee while driving

Possible solutions
Install a coffee automata
Install a cup-holder
…

classification: Non-functional requirement

classification: functional requirement

Discussion Elements

- Which non-operational requirements do we find in telecommunication systems?
- Where are the borders ?
- How to specify ?
- How to model ?
- How to evaluate ?
- How to simulate / test ?
- Are these functional or non-functional ?

Discussion

- How to prioritize the non-operational requirements?
- Functional and non-functional requirements are related.
- What is the scope of the operation? This defines the (non-)operational requirements.

	operational	**Non-operational**
functional	After closing the doors the LED shall blink	? (unclear whether these exist)
non-functional	The weight of a train must be less than *w*	Color of the phone

- Execution quality vs. Evolution quality
- Non-operational requirements are important for the future maintenance
- Non-operational requirements as expressed as functions (cf. Metrics), and are thus functional
- functional requirements are easy to capture;
- non-functional requirements represent the system as a whole
- recapture the cup-holder discussion: What is the function of a car? Are these essential? Functional requirements are different. It depends also on the use-case.
- Living-labs
- tools: analysis, usability testing, experts, humanities; user feedback is very important when analysing; most accurate: experimental way
- unknown requirements (not visible when engineering) are a challenge.