

SRM: Systematic Requirements Management

Main Features

- Interdisciplinary and domain-independent, multi-domain capability
- Multi-team and multi-site capability
- Application and customer-specific notation
- Discipline-oriented task distribution across team members
- Classification of requirements
- Formal verifiability of requirements
- Automatic identification of incorrect and missing requirements
- Provision of correction instructions by the tool
- Automatic version comparison
- Impact analyses (What-if)
- Automatic reporting
- Integratable in existing infrastructure
- Supported interfaces to conventional RE tools (e.g. DOORS, or similar)
- Interfaces for using the requirements for design and approval
- Interconnections to project management
- Requirements-based testing

Benefits

- Goal-oriented management in capturing all requirements
- Higher efficiency through guidance (faster, cheaper)
- Particularly efficient with (highly) complex systems and products
- Inherently verified and validated requirements
- Permanent control of "Zero Defect"
- Automatic derivation of system test cases
- Quantifiable assessments through metrics
- Automatic identification of all dependencies
- Inherent minimisation of dependencies through encapsulation
- Cost efficient and agile methodology

SRM: THE efficient way of achieving complete, correct and consistent requirements

efficient – user-centric – target-oriented – verifying

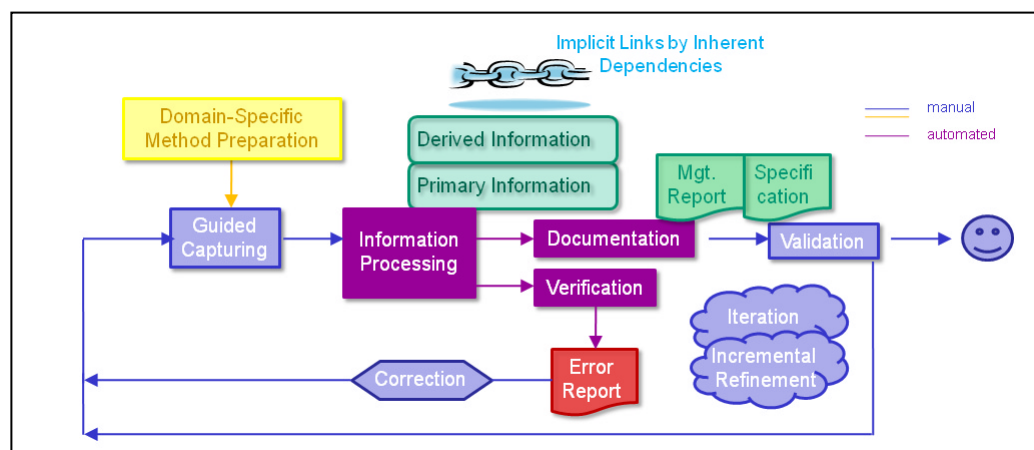
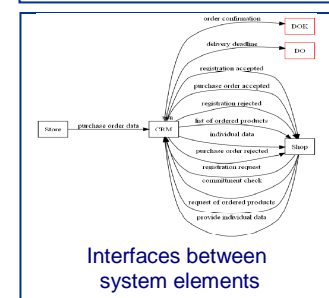
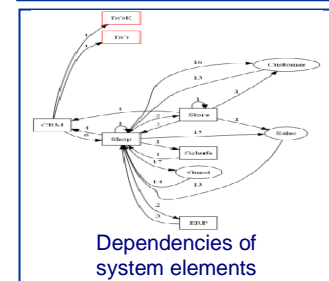
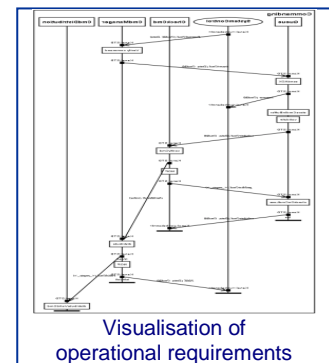
Immediate correction instructions from method and tool
 Quantitative and objective assessment of the specification
 Contractual problems through imprecise requirements disappear
 Clear structures eliminate long/complicated discussions
 Automatic reporting (Multi View)
 Visualisation of all contents and interrelationships

Systematic Requirements Management (SRM) increases the efficiency of requirement management and the quality of requirements through systematic classification of requirement elements, tailored to the respective application area.

The systematic capability implies an immediate verifiability of requirements and guidance of the user aimed at resilient, i.e. complete and high-quality specifications without any contradictions. With an iterative approach and incremental refinement a check can be carried out after every step and errors can be immediately corrected. The ultimate goal, which can be achieved with SRM, is the "Zero Defect" status of the requirements.

Approach

- **Domain-specific orientation:** For each domain principal requirement elements are classified and linked through rules. The schemes for recording them are defined in agreement with the user or are already defined.
- **Guided specification:** the user utilises the predefined schemes and the methodology feedback to identify the requirements (Requirements Elicitation).
- **Derived information:** SRM automatically derives further implicit requirements (derived information) about the specified product, respectively service, from the primary requirements defined by the user.
- **Reports:** the user defines the content of the reports from a list of documentation modules for text and graphics. Three principal reports are generated: on the content of the requirements (requirements documentation, specification), inputs to project management and on errors.
- **Checking / verification:** SRM checks the provided requirements against the rules and identifies errors.
- **Checking / validation:** SRM visualises original and derived requirements, enabling the user to assess the result of all requirements in the total context from different perspectives and to compare them with the intended goals. The user must identify deviations between desired intentions and actual situation.
- **Iterative:** errors are corrected or requirements are modified.
- **Incremental:** the requirements are refined through a top-down process and the number of requirements increases.



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Multi-team and multi-site capability

Classifying the requirements minimises dependencies:

- **Working in teams:** teams can be assigned precisely defined requirement areas
- **Dependencies** are clearly administrated and documented via interfaces
- **Work at different sites:** minimising dependencies as with multi-team; the user's existing infrastructure can be used for shared access to information and data.

Deriving test cases

The systematic organisation enables the direct and automated identification of test cases at system level:

- **Stimuli** per component
- **Data structures** for stimulation and derivation of results

Test case	System	Process	Data
Commitment check	CRM	Shop purchase order	None
Rejected configuration	Shop	Shop configuration	Commented configuration
Finalise purchase order	Shop	Shop purchase order	None

Automatically derived system test cases

Impact / What-if Analysis

From a list of requirements those that are dependent on this are identified and marked in the requirements document. The following interfaces are identified to:

- **Objects** as affected macro elements of the requirements: in the ICT these are, for instance, systems and channels.
- **Project management** such as affected work packages, employees, deadlines.

Version comparison

Two quantities of requirements related by modifications (basic quantity and modification) are compared.

- **Differences** in requirements are marked in modified document.
- **Markings:** the standard process of RTF is used for showing changes.

Linking with Project management

Requirements can be correlated with project planning by correlating requirements with:

- **Work packages**
- **Tasks** with person in charge, date and status
- **Releases**
- **Costs and effort estimates** for following lifecycle phases
- **Project structure** through automatic generation of work packages and their contents
- **Measuring complexity and quality**

Description	Source	Planning source
User specific configurations	Shop	
shall be preserved after the end of a session.	Shop	Release 1
shall be restored at the beginning of the next session.	Shop	Release 2
Following standards shall be applied:	Shop	
enabled entries in black color	Shop	All
disabled entries in gray color	Shop	All

Requirements and planning sources

Requirement ID	Descr.	Defined in	Rel	Clarification
VV-GR-329	GR8	c_GR.xls, Z16	2	RQ Review
VV-GR-330	GR9	c_GR.xls, Z17	3	RQ Review
VV-GR-331	GR10	c_GR.xls, Z18	4	RQ Review

Arranged according to planning criteria

Requirement ID	AP	Action	Date	MA	Status
VV-GR-322	WP1.1	Provide	31.01.00	RGs	unresolved
VV-GR-332	WP1.1	clarify 2	15.01.00	TF	processing
VV-GR-333	WP1.1	clarify 3	31.01.00	WW	resolved

Arranged according to assigned work packages

Type of error	No.
Context missing	0
Element undefined	12
Data element undefined	4
Name already used.	0
Inconsistent channel use	2
Requirement incomplete	1
Invalid data object	1
Invalid version attribute	0
TOTAL	20

Error evaluation

RQ Type	No.
Process flows	1
Roles???	4
Systems	104
Actions	58
Global RQ	3
Documents	6
Process steps	136
Channels	3
Data objects	7
Authorisations	57
References	7
TOTAL	386

Statistics on complexity

Integration into existing infrastructures

Interfaces to existing infrastructure and other tools can be set up or already exist.

- **DOORS** for administrating requirements
- **Tools** for following lifecycle phases
- **Information transfer** via specific or standard formats such as XML and XMI

Inherent linkage minimises effort and costs

The classification enables automatic and inherent linkage of requirements through:

- **References** between documents and requirements and between requirements of different abstraction levels in the sense of traceability
- **Derivation** of additional information from original information

DOC ID	Document	Type	Affected requirements
ApplDoc-Config	RD Config Procedure	doc	Shop-PA-41, Shop-PA-34, ...
ApplDoc-Login	RD Login Procedure	doc	Shop-PA-9, Shop-PA-11, ...

Automatically generated cross references

Channel	Data rate (MB/s)	#Pak/d	Volumes MB/d
Shop-IF-CRM	10	2000	49.3
Shop-IF-Portal	10	11000	443.9
Shop-IF-Store	10	4000	356.2

Original and derived requirements

SRM

is based on the open Eclipse platform.

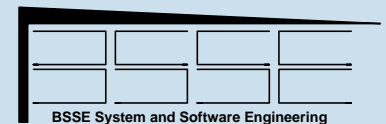
Integration with other applications upon request possible.

Documentation

Reports are automatically generated in RTF format. Errors are marked in the input data sheets.

Further methods and tools

- Generation of executable code from requirements at the touch of a button including test environment(s) set up.
- Systematic Project Planning (SPM)
- Fully automated testing (Ada, C) DARTT and DCRTT



Dr. Rainer Gerlich - BSSE System and Software Engineering

Phone : +49 (0)7545 911258
 Fax : +49 (0)7545 911240
 F-mail : info@bsse.biz

Support services from BSSE und TF Consulting:

- **Support** in establishing specifications, requirement and functional specifications
- **Transfer** of conventional text specifications in verifiable form
- **Quality analysis** and quantitative assessment of specifications that already exist
- **Training** for the Systematic Requirements Engineering (SRM)
- **Complexity and feasibility analyses** of independent, neutral reviewers
- **Early risk identification** through using SRM