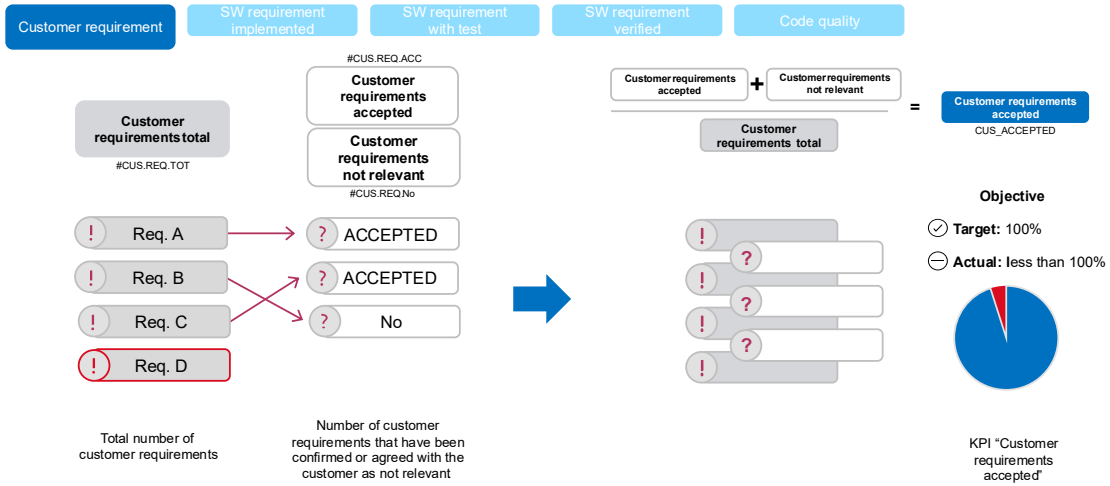
Key figures for software quality
“Agreed customer requirements” [CUS_ACCEPTED]

VDA QMC
Verband der Automobilindustrie
Qualitäts-Management-Center

Objective
Proof that all customer requirements have been agreed upon.
Clarification with the customer has been completed.

Explanation
- Customer requirements that are not relevant to the project, have not been agreed upon, or cannot be fulfilled must be coordinated and confirmed between the organization and the customer.
- Customer requirements are requirements from the customer's specifications. Requirements can be functional and non-functional requirements for the product.
- Customer requirements are requirements for the product and can relate to the software, mechanics, hardware, or proce.



Format
Percentage of customer requirements that have been coordinated.

Risk
If 100% is not achieved, there are customer requirements that have not been agreed upon and therefore may not be implemented.

Data feedback:

#CUS.REQ.ACC: Customer request status accepted

#CUS.REQ.NR: Customer request not relevant to project / rejected

#CUS.REQ.TOT: Total number of customer requests

CUS_ACCEPTED: (#CUS.REQ.ACC + #CUS.REQ.NR) / #CUS.REQ.TOT

Key figures on software quality
“Customer requirements accepted” [CUS_ACCEPTED]

Verband der Automobilindustrie
Qualitäts-Management-Center

Customer requirement | SW requirement implemented | SW requirement with test | SW requirement verified | Code quality

Customer requirements total

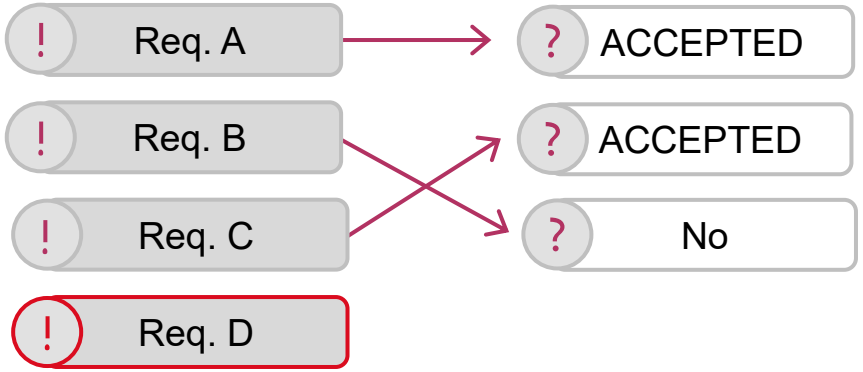
#CUS.REQ.TOT

#CUS.REQ.ACC

Customer requirements accepted

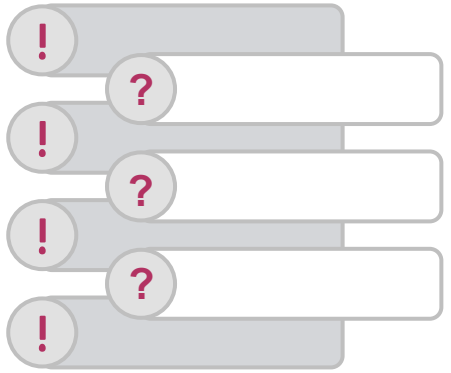
Customer requirements not relevant

#CUS.REQ.No



Total number of customer requirements

Number of customer requirements that have been confirmed or agreed with the customer as not relevant.



Customer requirements accepted + **Customer requirements not relevant** = **Customer requirements accepted**

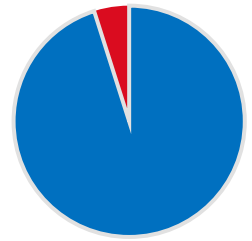
Customer requirements total

CUS_ACCEPTED

Objective

Target: 100%

Actual: less than 100%



KPI “Customer requirements accepted”

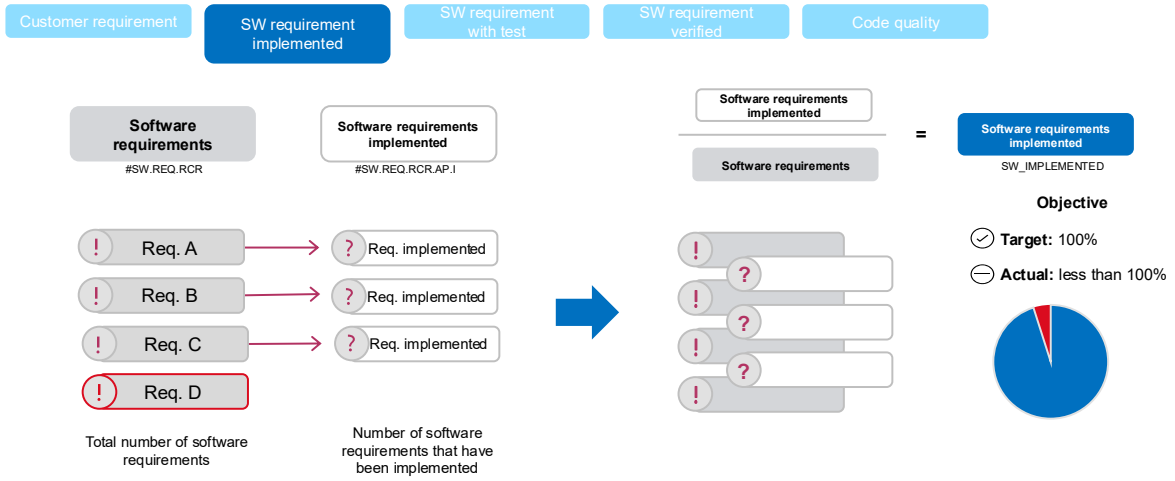
Key figures on software quality
“Software requirements implemented” [SW_IMPLEMENTED]

VDA QMC
Verband der Automobilindustrie
Qualitäts-Management-Center

Objective
Proof that all software requirements have been implemented.

Explanation
- Software requirements are requirements that are derived from customer/system requirements or other sources and are implemented in the software.
- Sources according to WG13: PAM4.0
  Stakeholder req., SYS req, architectural req, design constrains, …

Format
Percentage of software requirements implemented.



Risk
- If 100% is not achieved, there are software requirements that are not implemented in the software.
- Potentially, functional/non-functional requirements may not be implemented.

Data feedback:

#SW.REQ.RCR.AP.I: Software requirement status released and implemented

#SW.REQ.RCR: Software requirements for current release

SW_IMPLEMENTED: #SW.REQ.RCR.AP.I / #SW.REQ.RCR

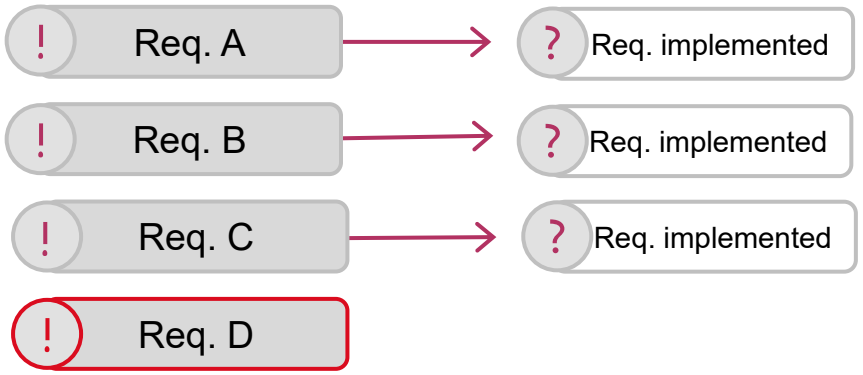
Key figures on software quality
“Software requirements implemented” [SW_IMPLEMENTED]

Verband der Automobilindustrie
Qualitäts-Management-Center

Customer requirement | **SW requirement implemented** | SW requirement with test | SW requirement verified | Code quality

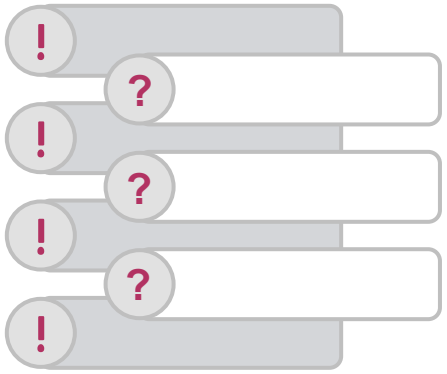
Software requirements
#SW.REQ.RCR

Software requirements implemented
#SW.REQ.RCR.AP.I



Total number of software requirements

Number of software requirements that have been implemented

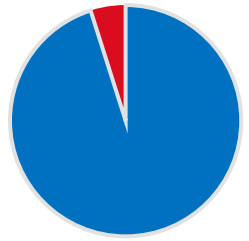


Software requirements implemented / **Software requirements** = **Software requirements implemented**
SW_IMPLEMENTED

Objective

Target: 100%

Actual: less than 100%



Key figures on software quality
“SW requirements with verification” [SW_TC]

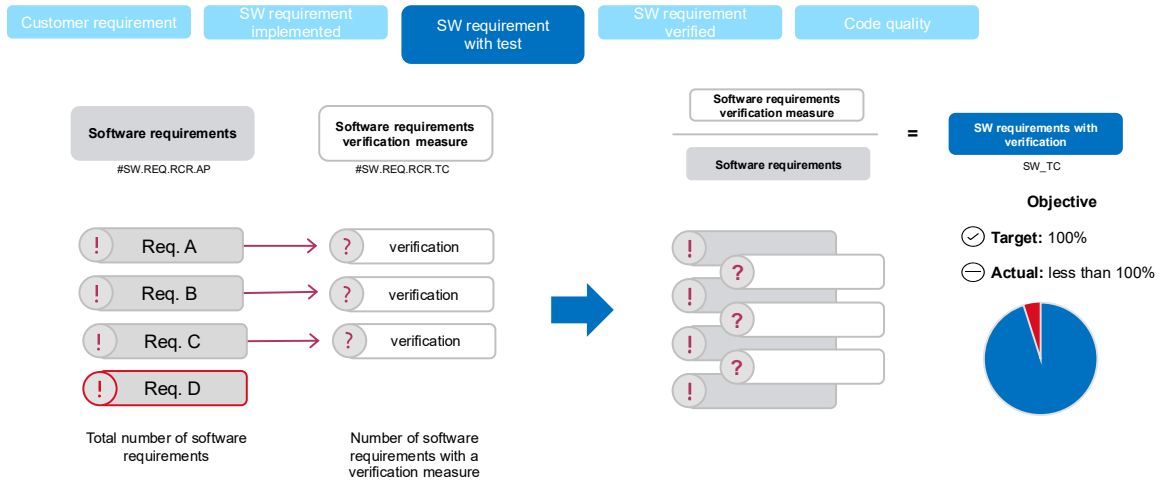
VDA QMC
Verband der Automobilindustrie
Qualitäts-Management-Center

Objective
Proof that at least one verification measure has been assigned to all software requirements.

Explanation
- Verification measures can include test cases or reviews, for example.
- The number of appropriate verification measures is defined in the verification strategy.
- Verification measure, see VDA glossary.

Format
Percentage of software requirements to which at least one verification measure is assigned.

Risk
- If 100% is not achieved, there are software requirements that cannot be verified.
- Functional/non-functional requirements may potentially not be verifiable.
- The completeness of the verification measures is not covered by the key figure.



Data feedback:

#SW.REQ.RCR.TC: Software requirements with a verification measure

#SW.REQ.RCR: Software requirements for current release

SW_TC: #SW.REQ.RCR.TC / #SW.REQ.RCR

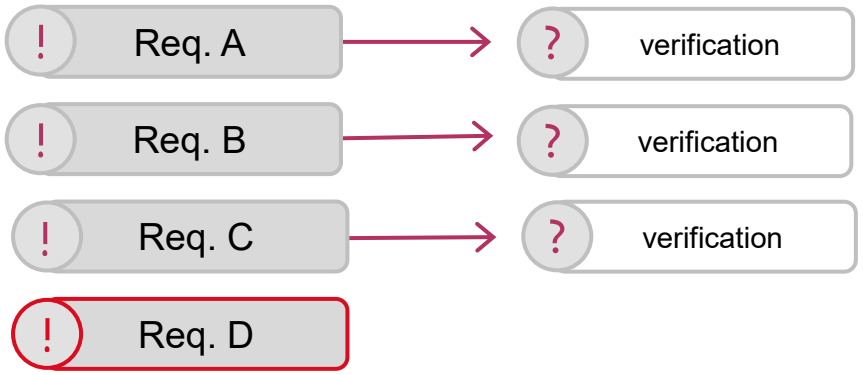
Key figures on software quality
“SW requirements with verification” [SW_TC]

Verband der Automobilindustrie
Qualitäts-Management-Center

Customer requirement | SW requirement implemented | **SW requirement with test** | SW requirement verified | Code quality

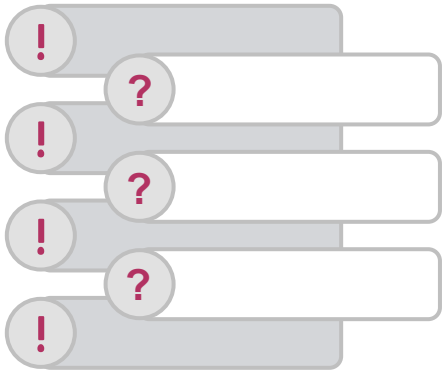
Software requirements
#SW.REQ.RCR.AP

Software requirements verification measure
#SW.REQ.RCR.TC



Total number of software requirements

Number of software requirements with a verification measure

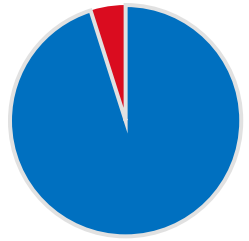


Software requirements verification measure / **Software requirements** = **SW requirements with verification**
SW_TC

Objective

Target: 100%

Actual: less than 100%



Key figures on software quality
Version 1 “SW requirements with verification measures passed” [SW_VERIFIED]

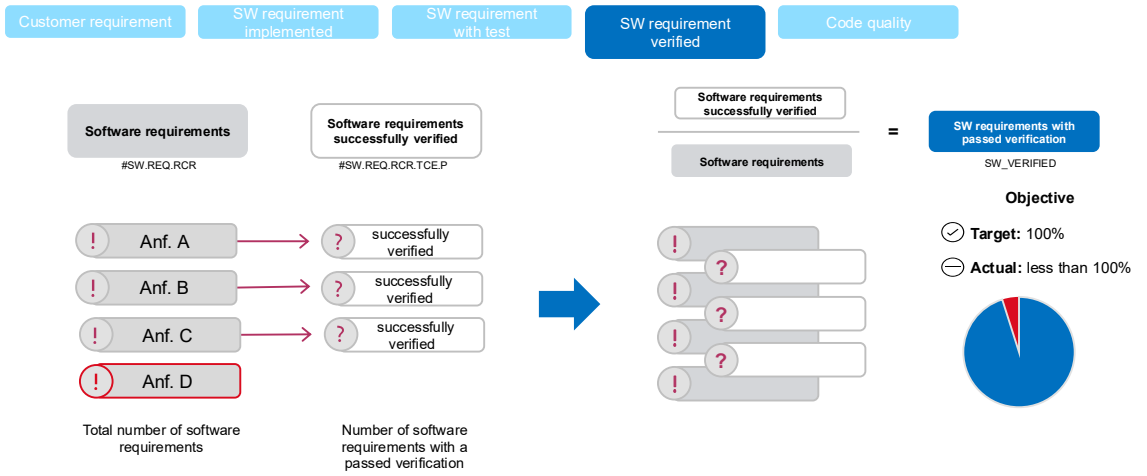
VDA QMC
Verband der Automobilindustrie
Qualitäts-Management-Center

Objective
Proof that all verification measures assigned to the software requirements have been carried out and passed.

Explanation
All verification measures have been carried out and the expected result has been achieved.

Format
Percentage of software requirements for which all assigned verification measures have been carried out and passed.

Risk
- If 100% is not achieved, there are software requirements for which assigned verification measures exist that have not been performed or have not been passed.
- Potentially, functional/non-functional requirements are not fully verified or not fully met.



Data feedback:

#SW.REQ.RCR.TCE.P: Software requirements with a passed verification

#SW.REQ.RCR: Software requirements for current release

SW_VERIFID: #SW.REQ.RCR.TCE.P / #SW.REQ.RCR

Key figures on software quality
Version 1 “SW requirements with verification measures passed” [SW_VERIFIED]

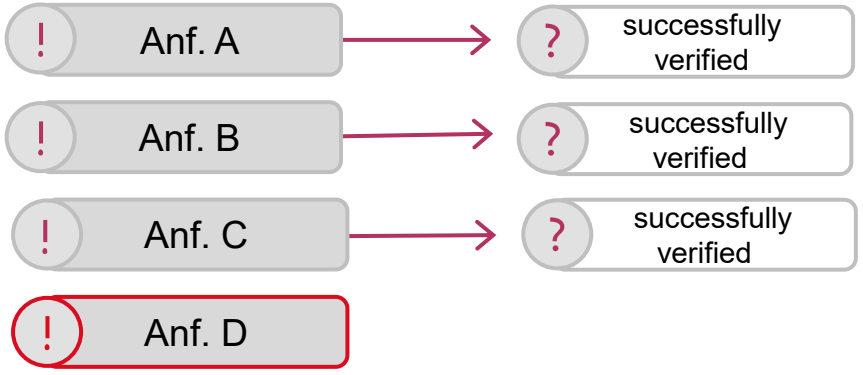
Verband der Automobilindustrie
Qualitäts-Management-Center

Customer requirement | SW requirement implemented | SW requirement with test | **SW requirement verified** | Code quality

Software requirements
#SW.REQ.RCR

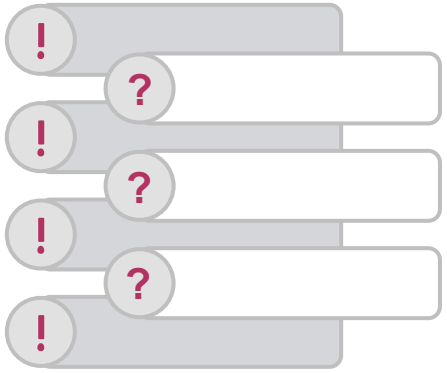
Software requirements successfully verified
#SW.REQ.RCR.TCE.P

Software requirements successfully verified / **Software requirements** = **SW requirements with passed verification**
SW_VERIFIED



Total number of software requirements

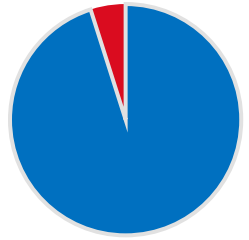
Number of software requirements with a passed verification



Objective

Target: 100%

Actual: less than 100%



Key figures on software quality
Version 2 “Software verification passed” [SW_TC_VERIFIED]

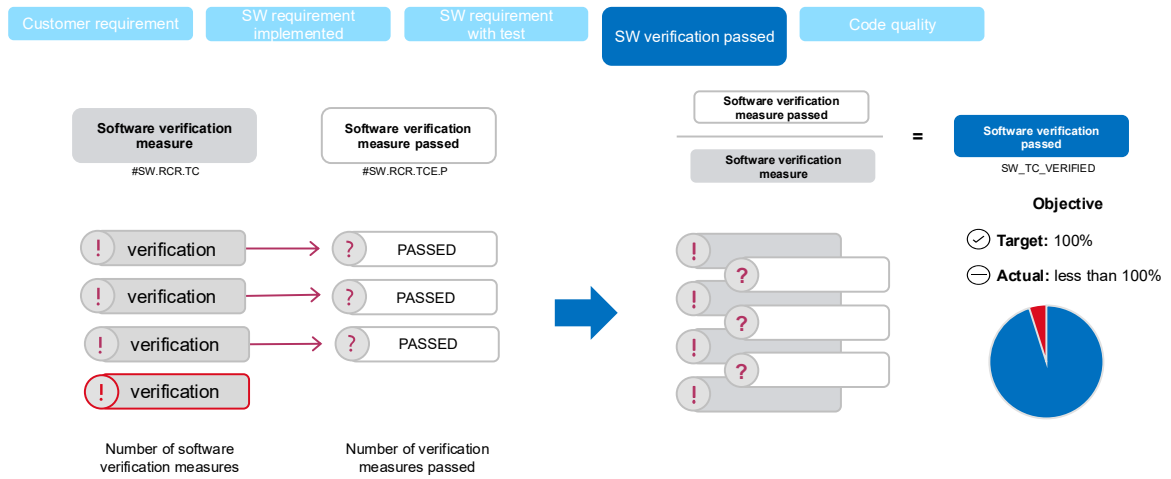
Verband der Automobilindustrie
Qualitäts-Management-Center

Objective
Proof that all verification measures have been carried out and passed.

Explanation
All verification measures have been carried out and the expected result has been achieved.

Format
Percentage of verification measures passed.

Risk
- If 100% is not achieved, there are verification measures that have not been carried out or that have not been passed.
- Potentially, functional/non-functional requirements are not fully verified or not fully met.



Data feedback:

#SW.RCR.TCE.P: Software verification measure passed

#SW.RCR.TC: Software verification measure

SW_TC_VERIFIED: #SW.RCR.TCE.P /#SW.RCR.TC

Key figures on software quality
Version 2 “Software verification passed” [SW_TC_VERIFIED]

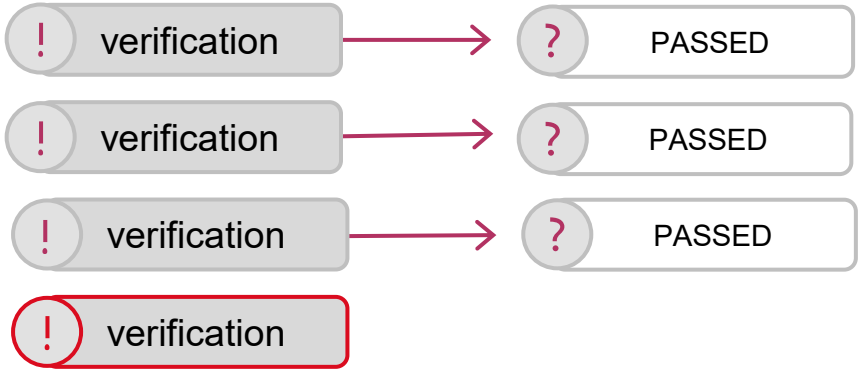
VDA QMC
Verband der Automobilindustrie
Qualitäts-Management-Center

Customer requirement | SW requirement implemented | SW requirement with test | **SW verification passed** | Code quality

Software verification measure
#SW.RCR.TC

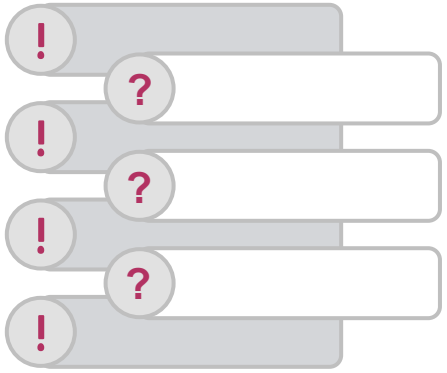
Software verification measure passed
#SW.RCR.TCE.P

Software verification measure passed / **Software verification measure** = **Software verification passed**
SW_TC_VERIFIED



Number of software verification measures

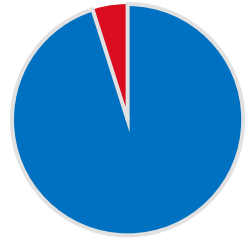
Number of verification measures passed



Objective

Target: 100%

Actual: less than 100%



Key figures on software quality
„Code Quality“ [CODE_QUALITY]

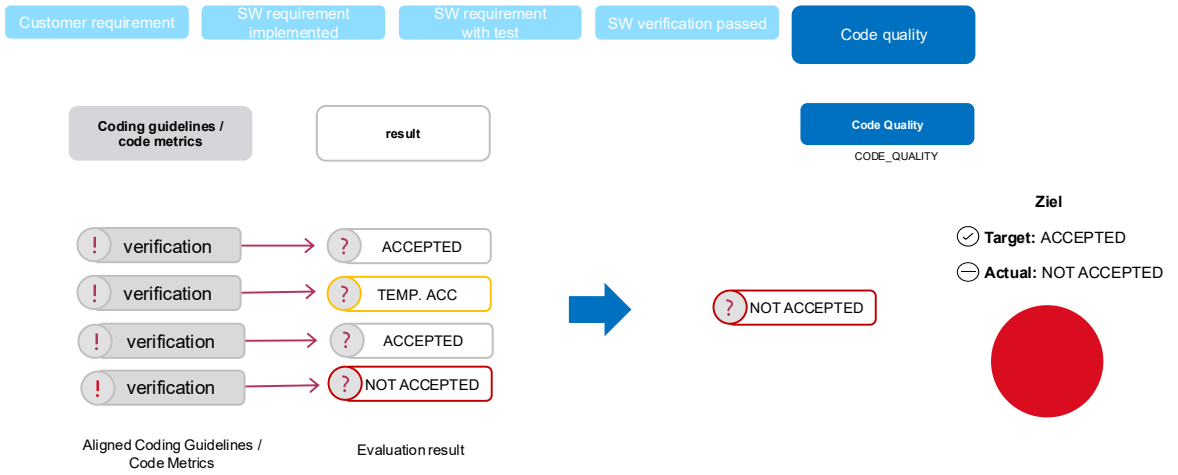
VDA QMC
Verband der Automobilindustrie
Qualitäts-Management-Center

Objective
Proof that all agreed coding guidelines and code metrics have been complied with and that implementation has been evaluated.

Explanation
- The code has been checked against the coding guidelines and code metrics, and the results are available.
- The results must be evaluated by an independent party (dual control principle). Deviations may be accepted.

Format
Decision:
- Acceptable, no outstanding deviations.
- Temporarily acceptable, deviations must be eliminated by a defined release date.
- Unacceptable, deviations cannot be accepted.

Risk
- Failure to comply with the specifications can lead, e.g., to software instability, non-maintainability, non-expandability, etc.



Data feedback:

CODE_QUALITY: ACCEPTED / TEMP. ACCEPTED / NOT ACCEPTED

Key figures on software quality
„Code Quality“ [CODE_QUALITY]

Verband der Automobilindustrie
Qualitäts-Management-Center

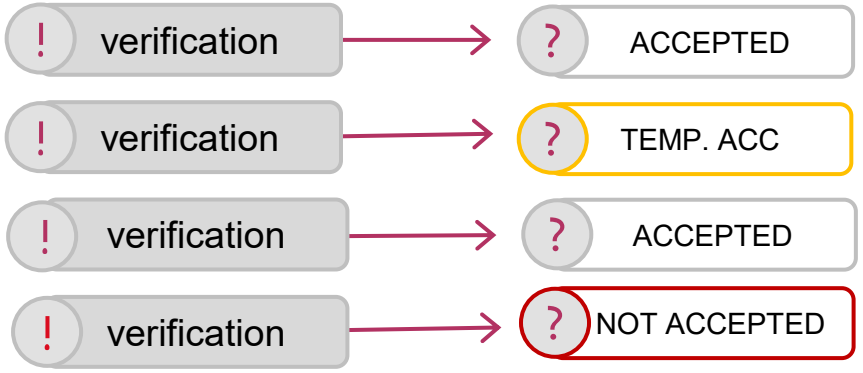
Customer requirement | SW requirement implemented | SW requirement with test | SW verification passed | Code quality

Coding guidelines / code metrics

result

Code Quality

CODE_QUALITY



Aligned Coding Guidelines / Code Metrics

Evaluation result

NOT ACCEPTED

Ziel

Target: ACCEPTED

Actual: NOT ACCEPTED