
Integrating Joint Reviews with Automotive SPICE Assessment Results

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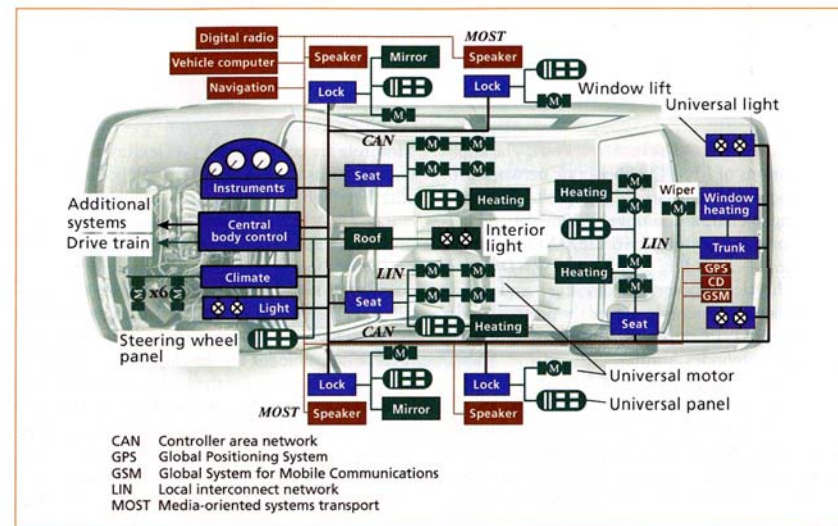
Fiat Group Automobiles – Torino (Italy)

Talk Outline

- Automotive Software: an Overview
- Software Supplier Management
 - Joint Reviews
 - Software Process Assessments
- Capability Determination vs. Project Performance
- SPI: Integration between JR and SPA
- A Pilot Initiative at Fiat Group Automobiles
- Conclusions

Automotive Software: an Overview

- Automobiles are today “computers on wheels”
- Software plays a key role: 80% of the whole project is for software
- High complexity of ECU interactions: problems in terms of integration
- Acquisition of software-intensive components a key process



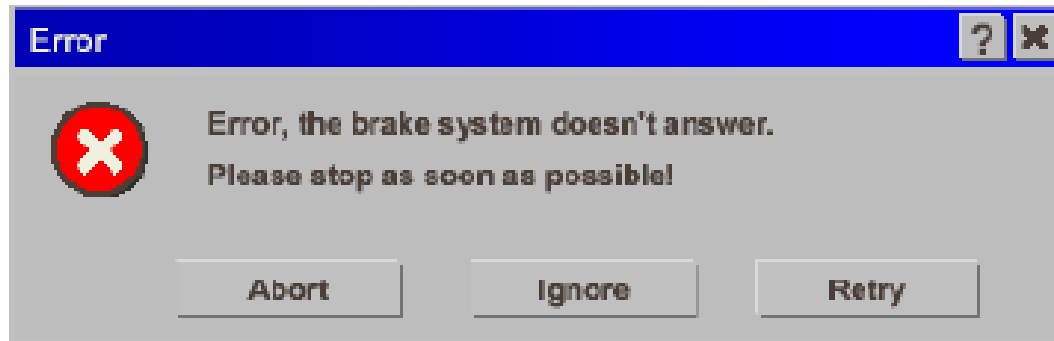


Photo courtesy of 

Intelligent Car **a computer on wheels !**

Software Suppliers' Management Joint Reviews

- Joint reviews are meeting where persons having different roles, responsibilities and perspectives join together to formally analyse the status of an activity or the content of work product.
- Purpose:
 - ensuring agreed objectives and requirements are satisfied
 - Monitoring the advancement of the project
- Object:
 - Technical solutions adopted in the project
 - Management choices
 - Quality of Work Products
 - Content of the Work Products

Software Suppliers' Management

Joint Reviews (cont.d)

■ Internal Joint Reviews

- Who: members of the software development team
- What: review of key work products at specific project's milestones (when a particular work product - e.g. software requirements, test plans - is to be released).

■ External Joint Reviews

- Who: both members of the supplier's software development team and customer representatives.
- What: review specific work products and verify managerial aspects of the supplier's software development project (e.g. respect of planning, compliance with process requirements, control of risks, ...)

Software Suppliers' Management Software Process Assessments

- ISO/IEC 15504 (the compliant assessment model - Automotive SPICE – since 2004) is widely used (mainly in Europe) to assess the capability of software process in automotive since a decade.
- Used by car manufacturers as a qualification mechanism for software suppliers (after the “automotive software crisis”)
- Benefits:
 - supplier selection (for car manufacturers)
 - supplier's project monitoring by car manufacturers
 - Relationship between customer and supplier
 - Identification of improvement areas

Process Capability Determination vs. Project Performance

- What PCD can provide:
 - A quantitative evaluation of the *best-the-supplier-can-do* in terms of software process
 - Identification of improvement areas
 - Knowledge of the *way* (practices, techniques, organization, resources) a supplier produces software-intensive components (if the assessment data are available)
- What PCD cannot provide
 - The assurance of the compliance to the process as it has been evaluated at assessment time.
(Will the specific project comply with the process considered at assessment time?)
 - Why? Is the assessment model defective? Is the Organization under assessment cheating? Are the assessors bad?

Integration between Joint Reviews and Software Process Assessments

- What JRs need to be really effective (i.e. able to let the customer have a complete look at the real project activities and outcomes) ?
 - Availability of project-related Work Products (not generic evidences)
 - knowledge of the actual status of the project
- What are common problems experienced by car manufacturers at JR?
 - Low quality and incomplete project evidences

SPI: Integration between JR and SPA

- JR and SPA can support each other for monitoring and controlling the supplier's projects
- 3-phases Mechanism:
 - Phase 1: SPA
 - Phase 2: Process Mapping
 - Phase 3: JR

SPI: Integration between JR and SPA

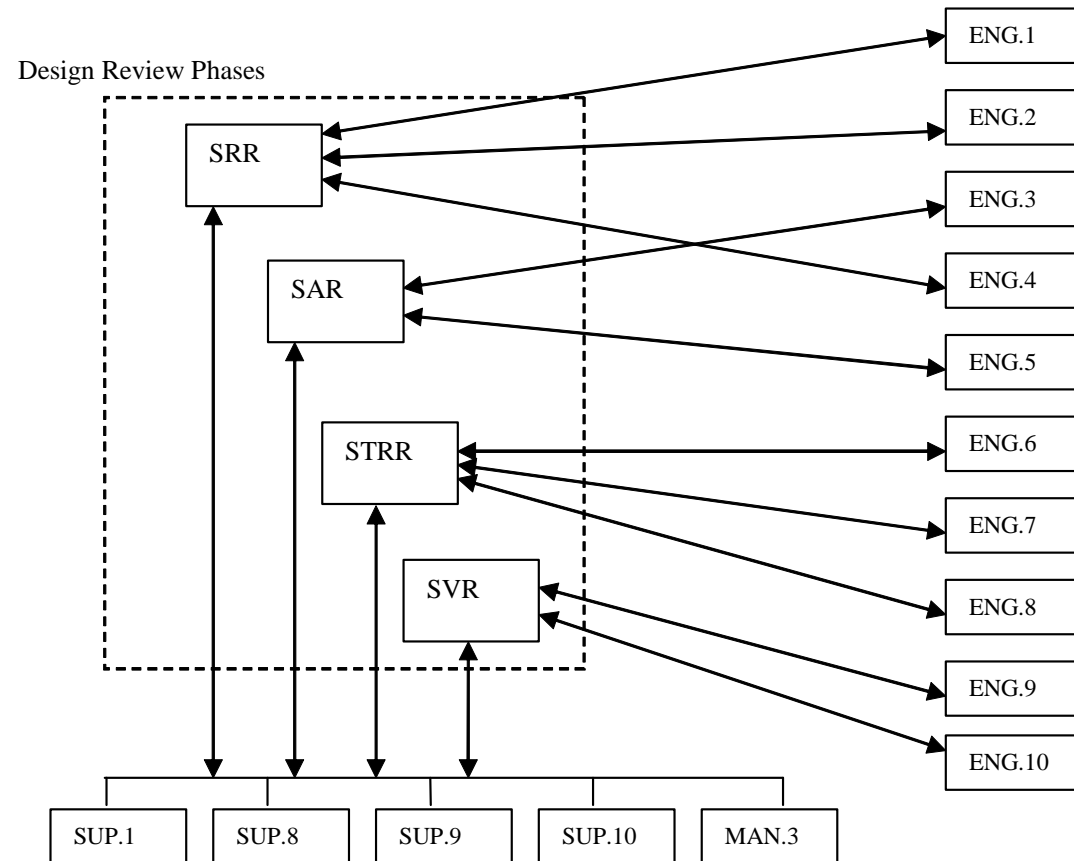
Phase 1: SPA

- Customer sponsors SPA to a group of *important* suppliers. The sponsorship allows the availability of assessment data.
- SPA should comply with ISO15504 Part 2 and should provide (not only the capability profile, but also) specific information to be used in JR

SPI: Integration between JR and SPA

Phase 2: Process Mapping

- Processes belonging to the assessment scope should be mapped on the JR planned for the specific project (each JR has a defined purpose, an input list and a scope)



SPI: Integration between JR and SPA

Phase 3: JR

- External JR prepared and conducted taking into account additional information from the SPA

Capability Level vs. JR

- The higher the capability level, the more the amount of useful information available
 - CL1: Info collected useful because it is possible to ask stand justification of under-management of the specific project management
 - CL2: the OU is able to manage the process-related activities. Info collected useful because it is possible to ask justification of non-compliances with the standard process. It shows the potentialities of the OU.
 - CL3: a standard process exists and is adopted

	A Technical solutions	B Management choices	C Quality of WP	D Content of WP
Capability Level 2	<ul style="list-style-type: none"> - Criteria for resource allocation exist (tools, facilities, infrastructures ...) 	<ul style="list-style-type: none"> - Definition of project's objectives in terms of quality of artefacts, process cycle, resource usage - Criteria for responsibility allocation in the project exist - Definition of skills profiles needs for the project 	<ul style="list-style-type: none"> - Definition of requirements for work products (structure) - Definition of review and approval criteria for work products - Identification of dependencies among work products 	<ul style="list-style-type: none"> - Definition of requirements for work products (contents) - Review and adjusting of work products
Capability Level 3	<ul style="list-style-type: none"> - Infrastructures and work environment needed identified - necessary infrastructures and work environment allocated - Data and analysis on the suitability and effectiveness of technical solutions used in project available 	<ul style="list-style-type: none"> - Tailoring guidelines exist - Interaction with other processes are described - Roles and competencies identified - Verification of the project conformance to the standard process - necessary competencies identified - Data available and analysis made on the suitability and effectiveness - necessary resources allocated to the project 	<ul style="list-style-type: none"> - Procedures to support the implementation of the standard process exist 	<ul style="list-style-type: none"> -Verification of the project conformance to the standard process (including work products)

Integration between SPA and JR

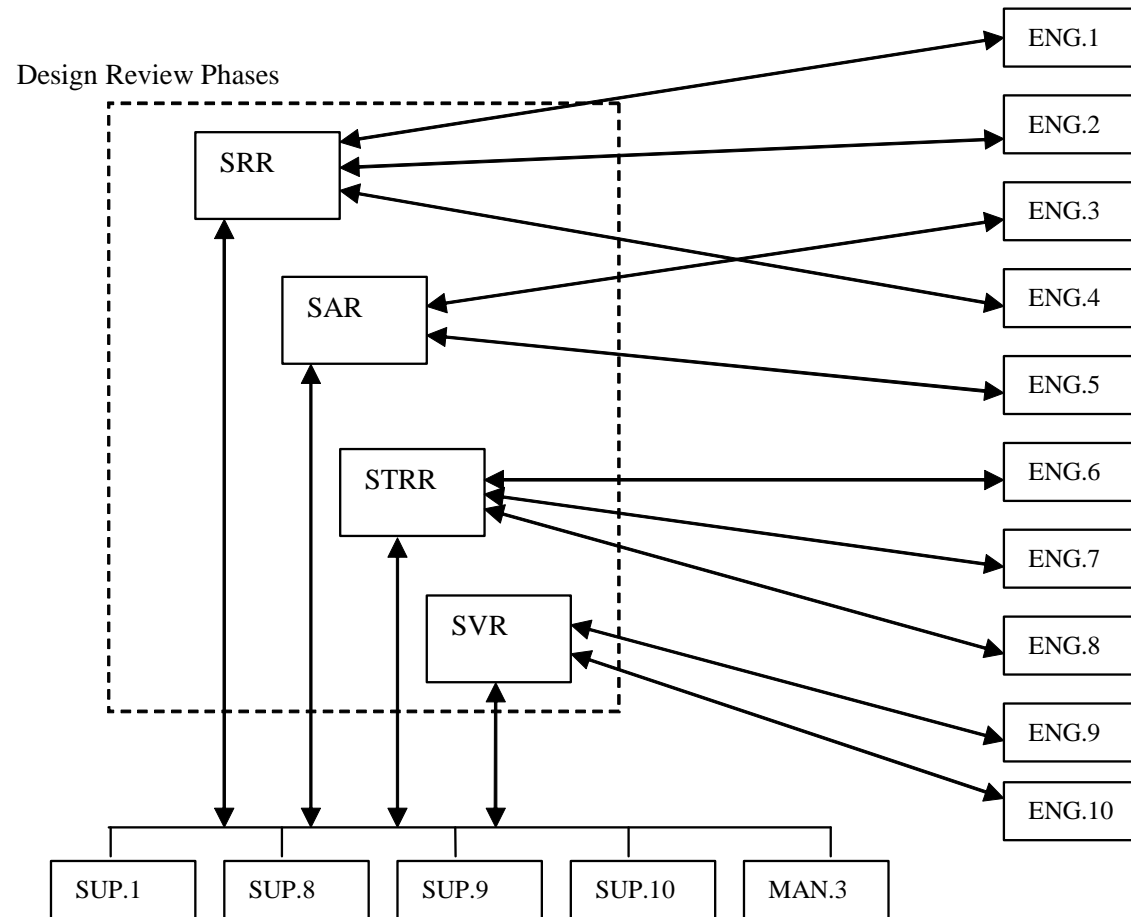
an example

- Process (Automotive SPICE): Software Requirements Analysis
- Capability level: 2
- Data on personal skills and correspondent responsibility allocation shall be available at JR. And, if the project is similar to the one used as process instance in the assessment, the human resources should be almost the same.

An Initiative at FIAT Group Automobiles

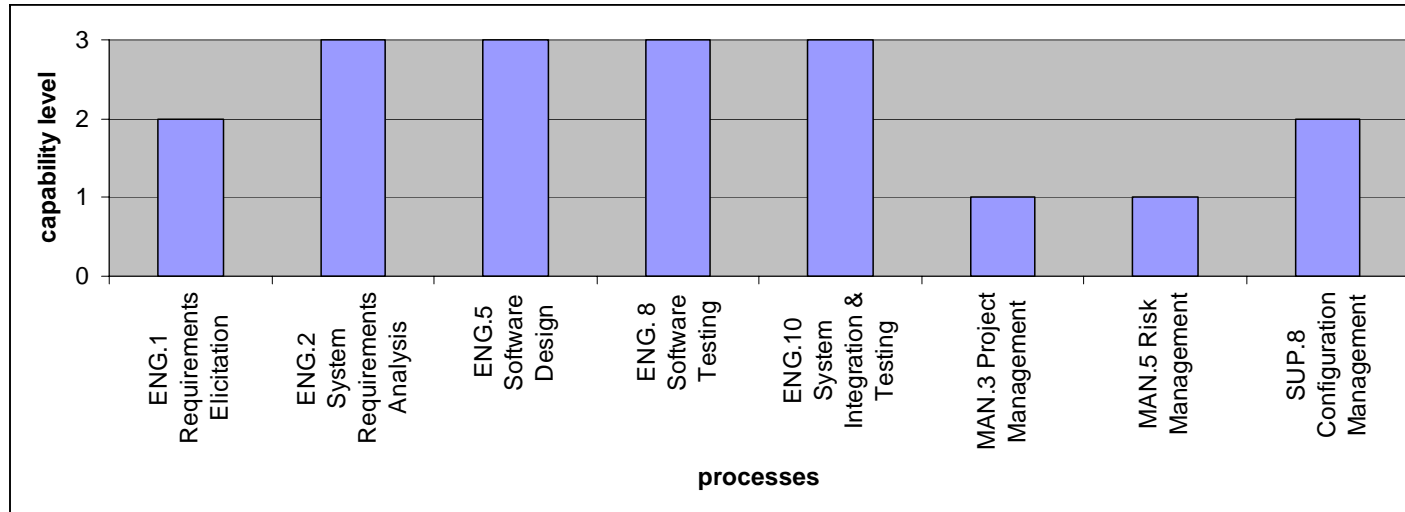
- Since year 2001 ISTI-CNR and FGA undertake a joint activity aimed at improving the capability of FGA in managing, controlling and driving the software acquisition process
- A supplier qualification mechanism has been defined based on a ISO15504 (since 2004 Automotive SPICE) capability profile used as qualification criterium
- FGA sponsored about 20 software process assessments on its suppliers executed by ISTI-CNR's qualified assessors
- FGA conducts regularly JR with its own suppliers to monitor their software projects
- JR:
 - Software Requirements Reviews (SRR)
 - Software Architecture Review (SAR)
 - Software Test Readiness Review (STRR)
 - SVR (Software Validation Review)

An Initiative at FIAT Group Automobiles



An Initiative at FIAT Group Automobiles

(cont.d)



- We added to the qualification capability profile 8 processes to improve the integration between SPA and JR:
 - ENG.3: System Arch. Design;
 - ENG.4: SW requirements analysis;
 - ENG.6: SW construction;
 - ENG.7: sw integration test;
 - ENG.9: System integration test;
 - SUP.1: Quality assurance
 - SUP.9 Problem resolution management;
 - SUP.10: change request management

Conclusions

- JR and SPA are two effective techniques but they are expensive
- Their systematic integration is able to add value to both
- We define a mechanism to integrate JR and SPA that is a way to conciliate the product-based and the process-based software evaluation

Thank you.

Questions?

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