



Measurement for Automotive SPICE

Written by

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The Automotive Special Interest Group, representing most of the car industry, have stated that:

“From 2007 the suppliers of the automotive industry will be assessed in accordance with the requirements of ISO/IEC 15504-2: 2003”, and further “From 2007 it is expected that all assessments will be performed using Automotive SPICE™ Process Assessment Model and that assessments based on the ISO-TR 15504 (1999) process assessment model will no longer be used.”

Origin of Automotive SPICE

Many factors concur to make modern day cars more complex: the regulatory environment is more rigorous, energy sources are becoming scarcer and motorists' expectations of their vehicles are increasing.

Increasingly there are demands on software to ensure that the functionality embedded in cars can be responsive and efficient enough for the modern day drivers. One of the main areas of concern has been how to regulate the quality of this increasingly complex software.

The Automotive Special Interest Group launched a special initiative leading to the publication of a new capability framework, the Automotive SPICE. This constitutes a framework by which the capability of the automotive suppliers is now assessed.

Automotive SPICE has clearly understood that measurement is at the core of any quality improvement programme and is a vital support for the supplier managing its activity. The Measurement Process explicitly prescribes the measurement of the products, the processes, and the projects. This clearly makes a distinction between two complementary measurements: the measurement of a project and the measurement of the product resulting from this project (the size of a project is not the same as the size of a piece of software!) This distinction, not always well understood, is the way forward for all businesses wanting to improve their efficiency.

Modern software measurement methods (such as COSMIC) can contribute to the effectiveness of all software process improvement models, and are particularly well-suited to the requirements of Automotive SPICE for measurements to correspond to business needs. Effective collection and application of the right metrics makes for effective management.

Main features

Automotive SPICE is made up of a Process Assessment Model (PAM), used to assess the capability of the suppliers, and a Process Reference Model (PRM) which in association with ISO/IEC 15504-2 provides support and consistent scaling enabling PAM to evaluate performances and capabilities.

Automotive SPICE describes a set of processes and provides a structure of these processes representing the need of the automotive industry in managing their large number of technical suppliers.

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....measurement is at the core of any quality improvement programme

The main category of process is the Primary Life Cycle Process within which there are three Process Groups: the Acquisition Process Group, the Engineering Process group and the Supply Process Group.

This sequence of processes accurately reflects the need of the automotive industry, which is to acquire the sub-component, engineer the higher level components and to supply them to the car manufacturer. The Primary Life Cycle Process needs to be supported and managed, which is the role of two other categories of processes: the Supporting Life cycle Process and the Organizational Life Cycle Process.

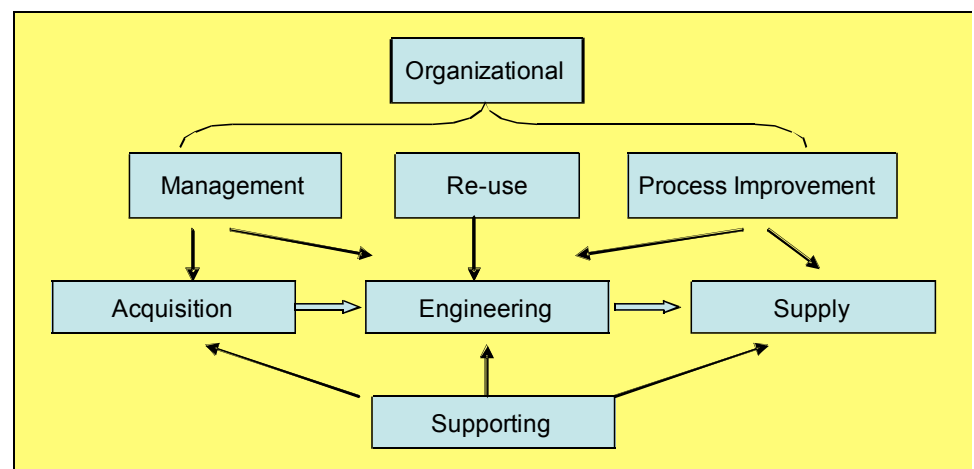


Figure 1: The Process Groups of Automotive SPICE

The Supporting Life Cycle Process Group includes all the processes ensuring quality in the products and processes, for example; quality assurance, verification, problem resolution, configuration management, change requests and joint review.

The Organizational Life Cycle Process is primarily comprised of:

- ◆ the Reuse Process Group - to systematically exploit the reuse opportunities from the suppliers,
- ◆ the Process Improvement Group - aiming at ensuring that no opportunity for improvement is forgotten,
- ◆ and the Management Process Group - whose processes may be of use by whoever manages projects or processes in the organisation.

The Management Process Group is a key player in Project Management, Risk Management and Measurement. This was to be expected considering the criticality of project management and risk management due to the shorter time to market the new vehicle. It is reassuring to note measurement being given a place where it could be immediately useful to project and risk management.



Measurement in Automotive SPICE

Automotive SPICE does not prescribe any particular technique of measurement – the only prescription is that it should correspond to business needs as expressed by management. This has the advantage of leaving the door open to choosing modern software measurement methods such as COSMIC (ISO/IEC 19761, 2003), which has just released the latest version 3.0.

The proposed measurement process appears to be very comprehensive, and recognises that management and staff commitment to measurement is critical to its success.

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This strategic commitment is crucial to any measurement and improvement programme, whatever model is used, including Automotive SPICE. Each measurement is specified, performed, analysed, and used to inform decision-making. The measures should be communicated to all affected supplier personnel, and referred to when examining potential improvements to the processes, the products and the way they are developed.

Capability Assessment

Automotive SPICE enables the assessment of the suppliers by involving the standard ISO/IEC 15504-2. A system of process attributes are defined and are evaluated on a four point ordinal scale of achievement, as defined in ISO/IEC 15504-2. This helps defining the capability achieved by the supplier according to a scale of six capability levels as follows:

Level 0: Incomplete process

*The process is not implemented, or fails its **process purpose**. Little or no evidence of any systematic achievement of the process purpose.*

Level 1: Performed process

*The implemented process achieves its **process purpose**.*

Level 2: Managed process

Performed process is now implemented in a managed fashion and its work products are appropriately established, controlled and maintained.

Level 3: Established process

*Managed process is now implemented using a defined process that is capable of achieving its **process outcomes***

Level 4: Predictable process

*Established process now operates within defined limits to **achieve its process outcomes**.*

Level 5: Optimizing process

*Predictable process is continuously improved to meet relevant current and **projected business goals**.*



The processes presented in Figure 1 are itemized in terms of “Process Performance Indicators” (i.e. set of Base Practices and Work Products). Their performance must be at least largely achieved for Level 1 but must be fully achieved in order to reach any of the other levels. For Levels 2 to 5 a number of Process Attributes, with their own Generic Practices and Work Products, must be achieved to justify the acquisition of a particular capability level.

There is an obvious analogy with the CMMi® which also offers a series of structured levels to better assess the capability of software. While CMMi® has been devised to capture the needs of the software industry in general, Automotive SPICE has been created to address the particular needs of the automotive industry and in that sense would be a more appropriate process improvement structure for suppliers of that industry and by extension the car manufacturing business.

SMS’ core expertise in measurement and quality can be applied to the Automotive SPICE framework as it does to all software process improvement models.

Ref:

- (i) - Automotive SPICE Process Assessment Model, by Automotive SIG, 2007-05-05, Status: RELEASED
- (ii) - Automotive SPICE Process Reference Model, by: Automotive SIG, 2007-05-05, Status: RELEASED

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Author Biography



Bernard Londeix is an SMS Principal Consultant with extensive consulting experience supporting clients in the improvement of quality, development methodologies and Cost/Time Software Estimation practice.

He is also an effective trainer, delivering courses on Function Point Analysis (COSMIC, IFPUG and MkII FPA), estimating (COCOMO II) and software metrics in the UK and France. He has also counted and audited a substantial number of applications using appropriate standards and holds SEI CMMI Staged Representation v1.2 certification.

Bernard Londeix has delivered Information Technology consulting services to the Finance, Banking, Insurance, and Telecommunications industries as well as to Government institutions, bringing to his assignments a value-added focus for the economics and predictability of the software processes and their deliverables.

He was in the forefront of using Functional Size measurement to control and improve the predictability of software development control and continues to be in the vanguard of developments in functional size measurement. He holds considerable expertise and experience in COSMIC, the functional size measurement developed to measure modern software projects. He has also developed the MeterIT tool-chain which comprises a series of project measurement and estimation tools.

A French national, resident in the UK, Bernard is also an SMS Account Manager working with clients – particularly French-speakers - to develop solutions to the challenges presented by using software-intensive systems.

Software Measurement Services is a specialist, independent UK consultancy working with decision-makers in blue-chip companies and government departments to improve the results delivered by the development of software and computer systems. Our consultants are at the forefront of developing and supporting best practice in managing software process performance.

The substantial expertise of SMS consultants in helping the software industry improve its processes, can be applied to any improvement framework.

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