



ISG and AsaP – BSSE Technology and Innovation

1. Description

By ISG (Instantaneous System and Software Generation) and AsaP (Automated Software Production) large software systems can automatically be generated without human intervention. They allow to create software systems on a high level of abstraction. By ISG a system engineer can establish a sophisticated distributed real-time system, not being an expert in real-time processing at all. AsaP automatically generates an arbitrary amount of proven code within seconds to minutes. Both, ISG and AsaP cover automated verification, validation and automated testing.

The current organisation of software development applies a sequential approach starting by requirements capture, followed by design, coding, testing, integration, acceptance and maintenance. Due to the phase-oriented execution a number of human interventions are required which consume a lot of human resources and time, and risks are identified rather late. While in other industrial areas like car mass production the organisation has been optimised towards minimum human intervention, obviously this did not happen in the area of software development.

ISG introduces an organisation scheme (process model) which only requires human activities at the beginning of the generation process and after provision of the evaluation report by ISG at the end. The organisation of the development process has been changed such that all the generation steps between provision of system specification and reading of the evaluation report can be automated. In fact, the ISG process model is driven by the goal of maximum automation.

Due to automation the generation process is very fast and does not require a lot of human resources. Hence, development costs and time are significantly reduced. Results from the executable system are immediately available. Therefore the final system can incrementally be approached by a number of iterations. Due to the immediate response from the real system, risks can be identified and removed rather soon.

The first versions of a system-under-development can automatically be generated and executed without any need to write source code in a programming language like C.

Current development approaches are mainly concentrating on production of software, but not on testing, verification and validation. In fact, more software is produced than can be tested. This leads to poor quality and a number of problems during development and later operation.

ISG ensures that what is automatically produced can also be automatically checked and tested. In fact, it reduces by construction rules the continuum of test cases to a discrete number. Also, the construction rules allow for a high degree of reuse of development experience.

ISG allows for transparent distribution, i.e. the application can automatically be generated for every user-defined topology without any need to change source code, even for heterogeneous platforms based on different processor hardware and operating systems.

ISG does not only reduce development time and costs by introduction of an automated process model, but it does also improve quality.

Due to the automated generation of the infrastructure no deep knowledge on the operating system is required, this saves time and allows a system engineer to carry out system development activities.

While ISG covers the area of distributed and/or real-time systems, AsaP (Automated Software Production) extends the ISG approach towards algorithmic programming and handling of user-defined data types.

2. Benefits

ISG and AsaP shorten the development time, reduce risks and costs. Hence, companies which introduce the AsaP/ISG approach into their organisation will become more competitive and they can sooner provide more products at higher complexity. They are not limited any more by the availability of human resources and engineers trained in software engineering. And - last but not least - such companies can increase the quality of their products, which also leads to a significant competitive advantage.

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