

EXCERPT FROM WHITE PAPER

The role of the architect

Manage functional and physical interfaces, internal and external



The Cercle CESAM

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CESAM
COMMUNITY

Manage functional and physical interfaces, internal and external

Extract of the white paper "The role of the architect"

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Preamble

Along with the definition of black box and white box architectures, the architect must identify the interfaces, external and internal (with external systems, between system functions and between its components).

Just as he must ensure that each function and each component is held accountable by a role, he must also put under control all the interfaces identified.

THE ESSENTIAL

The complexity of a system is also linked to the number of its interfaces which can condition the number of stakeholders to be involved. Interface management (human, physical, software, etc.) is a key activity in risk control on a project. In the black box part, the definition of the interfaces is a major element in the formalization of the scope of study and the integration of the system into its environment.

THE MAIN PITFALLS

Among the main pitfalls:

- Identify the external interfaces without asking the question of the need to be covered and go too quickly into technical detail (e.g. wanting to finely define the types of data to be transmitted). This is often amplified by a desire for reuse that is poorly framed in relation to the new context/need
- Not monitoring the maturity of interfaces, i.e. not managing an interface because it is still immature (this puts people on hold and generates potential delays) and/or not anticipating the fact that the definition of certain interfaces will evolve (which generates a redesign perceived as useless)
- Update the interfaces without informing the stakeholders affected by this modification
- Failing to identify responsibility for an interface
- Poor management of the configuration of the two organs on either side during the integration of the interfaces
- Interfaces well defined on specific aspects (ex: static mechanical functioning) which a priori allow integration but which are finally poorly defined on other aspects (ex: dynamic functioning)

- Diverting interfaces (in the context of reuse) and risking deviation from the nominal design of the interface (with associated stakes, which would be more expensive than defining the correct interface)
- A poor definition of external interfaces leading to an ambiguity on the perimeter (ex: the interface to authenticate the user: the client considers that he is inside and the software designer considers that he is outside its perimeter)

BEST PRACTICES

Here are some good practices to consider:

- Use architecture to identify interfaces
- Ensure that each interface is well supported (in responsibility)
- Set up an interface maturity management process
- In the context of reuse, the question of the need to be answered with each interface
- Put polarizers (Poka-Yoke) on physically identical but functionally different interfaces (ex: polarizer on empty wall outlets and oxygen in hospital rooms)
- Define all the characteristics of the interface (the nominal and the robustness at the output of the nominal)
- Use MBSE to define all interfaces as comprehensively as possible
- Standardize the way to define interfaces
- Rely on the mastery of interfaces to optimize interactions with stakeholders (e.g. the management of several interfaces with the same stakeholder can increase the communalization between these interfaces)

TESTIMONIALS

We have compiled here several verbatim statements from project managers or system architects from different companies, which echo this phase:

- “ We have set up a process for managing the maturity of interfaces, in particular for monitoring mechanical interfaces. Each interface document has a defined and displayed maturity level, which makes it possible to share the risks associated with each interface.
- “ On the software systems, we proceed with an early integration rather than a gradual increase in maturity of the interface. (Be careful, however, that this practice is not duplicated by the pitfall mentioned above on questioning the need to be covered).
- “ For the hardware: we are rather on the implementation of a virtual integration stage (integration of digital business models - 3D, hydraulics, electrical, etc.) to anticipate integration problems
- “ Implementation of a tooled management of interfaces using the CESAM framework in Xatis (Safran)

-END

PRELIMINARY SUMMARY OF THE WHITE PAPER

– Architect assignments

- Manage the architecture lifecycle
- Black box architecture
 - Capture the needs of internal / external customers and consolidate them** (published)
 - Analyze customer needs and translate them into requirements** (published)
 - Define the uses** (published)
- White box architecture
 - Design a system that meets the needs/constraints of the stakeholders with the expected performance, justify the choice of architectures, propose alternatives and make the subsystems converge towards the overall optimal solution** (published)
 - Dysfunctional analysis
- Modeling of the system and value chains in architecture** (published)
- Proposal, justification and choice of competing architectures** (published)
 - Validate the technical choices
- Architecture assessment
 - Assess the maturity of the architecture definition** (published)
 - Evaluate the conformity of the architecture to the priority needs / values**
 - Assess the technical maturity of the solution choices
- Interfaces
 - Manage internal and external functional and physical interfaces**
- Link to product line
 - Ensure consistency with the standard product (when it exists)
 - Implement the product line strategy in the multi-project case
- Impact analysis
 - Analyze the impacts of modification and development requests
- V&V
 - Validate the technical configurations of the product/system
 - Check the design of the subsystems: it covers the needs with the expected performance
 - Compliance with requirements
 - Test
 - Prepare the deliverables of appropriate maturity according to the life phases: pre-project, development, production, support
- Contribution to project management
 - Sharing of responsibility between the architect and the project manager** (published)
 - Contribution of the architect to the activities carried out by the project manager
- Ensure the technical coordination of the project
- Model architecture
- Competitive intelligence / open-mindedness
- System engineering support
- Tips for structuring an architecture team

– The architect in the company

- The architect's interfaces
- Focus on the interface with the business lines
- Focus on the interface with the product lines
- Focus on the interface with the projects
- Focus on the interface with customers

– How to start system architecture

– The profile of the architect

- Inventory in terms of training and certification
- Technical skills
- Transversal skills
- Typologies of architects
- Can everyone become a good architect?

ABOUT THE CERCLE CESAM

The CESAM Community has been developed by the CESAMES Association since 2010. Its objective is to share best practices in Enterprise Architecture and System Architecture. Through CESAM certification, it certifies the ability of players to implement these best practices. The CESAMES association has thus formed the largest community around the MBSE (today, more than 8,500 Professionals are trained or certified in the CESAM method). It relies on major partners, whether academic, institutional or professional.

The Cercle CESAM is a working group whose objective is to develop and share a pragmatic international system architecture standard and to apply it to each major industrial field. For the commercial benefit of its members.

Today the Cercle has about fifteen members, including ITER, Sagemcom, Safran (SHE, SAE, SED), Dassault Systèmes, Idemia, Airbus, Somfy.

The 2 areas of work of the Cercle are: Method and tools (formalization and sharing of applications of the CESAM method by major sectoral areas (case studies, good practices, method tools, etc)) and Professionalization (contribute to the professionalization of the profession as a system architect to promote architects within their organizations).

The Cercle is currently working on the white paper "the role of the architect" which will be published in 2023.

Cercle members who contributed to this publication

Anthony Ferrer, System Architect (MBSE), SAGEMCOM

Cécile Beyssac, Principal System Architect & Head of ACADEMY, CESAMES

Jean-Marc Cherel, Chief Engineer, IDEMIA

Nicolas Gueit, Model-Based Systems Engineering Framework Referent, SAFRAN LANDING SYSTEMS

Pierre Colin, Physical and Functional Integration division Head, ITER

Rahid Djafri, System Architecte (MBSE), SAGEMCOM

Regis Vincent, Systems Engineering Senior Expert / Lean Sigma Manager, SAFRAN HELICOPTER ENGINES
Chief System Architect, SOMFY

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71 rue de Mirosmeuil – 75008 Paris – France

email: contact@cesam.community

Website: <https://cesam.community/fr/>

SIRET: 518 815 741 00039

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