

EXCERPT FROM WHITE PAPER

The role of the architect

Proposal, justification and choice of competing architectures



The Cercle CESAM
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CESAM
COMMUNITY

Proposal, justification and choice of competing architectures

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

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Preamble

The architect identifies the candidate solutions resulting from the analysis of the white box that can meet the needs according to the principles of collaborative engineering. With the right stakeholders, he defines the criteria for evaluating architectures (e.g. level of coverage of needs, QCD, Risk, Reuse, Quantification of novelty, etc.) then also documents their strengths and weaknesses by capitalizing on the associated justifications.

THE ESSENTIAL

The selection of an architecture among several competing architectures is done according to a selection process which must be justified based on criteria, chosen according to the principles of system engineering, criteria according to which the architecture can be evaluated based upon its strengths and his weaknesses.

THE MAIN PITFALLS

Among the main pitfalls:

- There are not enough candidate solutions. It is often induced by too many constraints: lack of time, means and sometimes imagination (we are already happy to have a solution that meets the needs)
- In fast iterative processes (including AGILE processes), it is sometimes difficult to position the identification of candidate architectures and justifications in the cycle. We tend to present the solution obtained.
- Absence of justification capitalized at design time, which leads to retro-engineering a posteriori, or the loss of information and difficulties in providing justifications during an audit, an impact analysis, or developments later.
- Insufficient black box analysis, which leads to bias in the selection of criteria, stakeholders, etc.
- Not anticipating the variability of needs in the evaluation of candidate architectures
- Poor choice of selection criteria between competing architectures: poor consideration of non-functional ones (scalability, resilience, etc.), difference criteria, etc.
- Disregard the architecture of the data model which is key on certain types of systems.

- Involvement of too few stakeholders or over-representation of certain stakeholders (marketing, customer, etc.).
- No "factualization" of the criteria: the evaluation is no longer objective.

BEST PRACTICES

Here are some good practices to consider:

- Plan this phase in the development process: impose, for example, a technical review regularly dedicated to this subject (once a month for example), or a criterion for the milestones of the project, or even a questioning every x sprints.
- Adjust the effort to the level of the risk and the associated problem according to the subjects.
- Bring out disruptive architectures by organizing creativity and innovation workshops.
- Implement good knowledge management (including old systems, technology watch and patents, etc.)
- Model and describe the different alternatives to help present them, validate them, and make informed choices.
- Communicate through architectural diagrams to use them as support for speech.
- Use processes for positioning architectures in relation to each other: Pugh matrix, risk/value analysis, effort/benefit, DSM matrix, etc.
- Use of software tools to quickly explore many architectures.
- Create a prototype for cases where the risk incurred justifies it (this is the principle of the POC)
- For developments, it is interesting to compare with the status quo to challenge the contribution of value.
- For the data model (of information systems), distinguish and link the conceptual model to the implementation model (e.g. a complete conceptual model - in the mathematical sense - can give a complex and costly implementation model)

TESTIMONIALS

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

- “ We include the identification of options and not a single architecture in the design process.
- “ We systematically ask ourselves the question of the issue linked to design. This is what motivates our choice of alternatives.
- “ We use a Novelty Ranking that rates the risk we take based on the number of deployments of the solution.

-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** (chapter published)
 - Validate the technical choices
- Architecture assessment
 - Assess the maturity of the architecture definition
 - Evaluate the conformity of the architecture to the priority needs / values
- 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.

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