

EXCERPT FROM WHITE PAPER

# The role of the architect

Modeling of the system and value chains in architecture



The Cercle CESAM  
April 2023  
Excerpt 6, v0.9

**CESAM**  
COMMUNITY

# Modeling of the system and value chains in architecture

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

## EXCERPT FROM WHITE PAPER

### Preamble

From the elements collected from the different stakeholders, the architect formalizes logical models of the system, organized according to a system architecture framework. It is the guarantor of compliance with the syntax – more or less formal – given by the chosen modeling language and the modeling activities to be carried out. The precise meaning of each component of a systemic model must have been defined explicitly and unambiguously.

### THE ESSENTIAL

The work of the architect is based on the construction of models which make it possible to produce (in an automated way in an ideal vision) an exhaustive, coherent and unambiguous system architecture documentation.

### THE MAIN PITFALLS

Among the main pitfalls:

- Consider models only as communication and alignment tools and do not base architectural decisions on the exploitation of models,
- Do not set up traceability links between the models,
- Failing to explain the links between engineering models and architectural models,
- Not focusing enough on the form: an illegible diagram cannot be communicated and is therefore difficult to use,
- Not using models to highlight value chains and communicate them to stakeholders.

### BEST PRACTICES

Here are some good practices to consider:

- Proceed step by step in the implementation of model-driven engineering: first we formalize, then we share the models, we build architectures, we reuse architectures, we use them for simulation, then for specify etc
- Set up an architecture plan per project that instantiates the toolbox and the level of depth expected for each box (however, criteria must be given, for example, to model novelty)

- Attach the risk and value aspect to the models in order to have a shared global vision and use the models to highlight the perimeters on which to work (particularly relevant in a company with a strong history)
- Have an end-to-end modeling approach - from development to test (e.g. formalization of scenarios with a test perspective (traceability)), while taking into account the time allocated
- Communicate by always using the same models (so as not to lose people) and adapt the level of detail to the audience (so you need several levels for each model)
- Do not hesitate to add images or other to make the modeling more understandable and better communicate
- See a clear objective per model and a unique message per diagram: you have to know why you model. Feel free to create a second schema if you need to send a second message
- Information must be accessible without the tools being an obstacle
- Think carefully about the life cycle of the models created and in particular clearly define the way to manage them in configuration
- Throw away diagrams when they are no longer useful (stop maintaining them)

## TESTIMONIALS

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

- “ We use our architectural models to validate security analyses,
- “ We have set up a 150% model which is instantiated by project according to the context and the objectives to be achieved
- “ Our modeling tools: Visio, Draw IO, Enterprise Architect, Capella, Rhapsody, Tom Sawyer ("simple" automatic layout of connection to other tools).

**-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** (chapter published)
- Proposal, justification and choice of competing architectures
  - 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.

### **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

## **Copyright**

This work is subject to copyright. All rights reserved to C.E.S.A.M.E.S. whether in all or any part of the material, including rights of translation, reprinting, reuse of artwork, recitation, broadcast, reproduction on microfilm or in any other material, transmission or storage and retrieval, electronic adaptation, computer software, or by similar or different methodology now known or later developed.

The use of general descriptive names, trade names, trademarks, service marks, etc. in this publication does not imply, even in the absence of specific mention, that these names are exempt from the relevant protective laws and regulations and therefore free for general use.

Authorizations can be requested directly from the CESAM community.

## **Publisher**

CESAM Community is managed by the C.E.S.A.M.E.S association, a non-profit association under the law of July 1, 1901.

71 rue de Mirosmenil – 75008 Paris – France

email: [contact@cesam.community](mailto:contact@cesam.community)

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

SIRET: 518 815 741 00039

Photo credit: Fauxels (PEXELS)