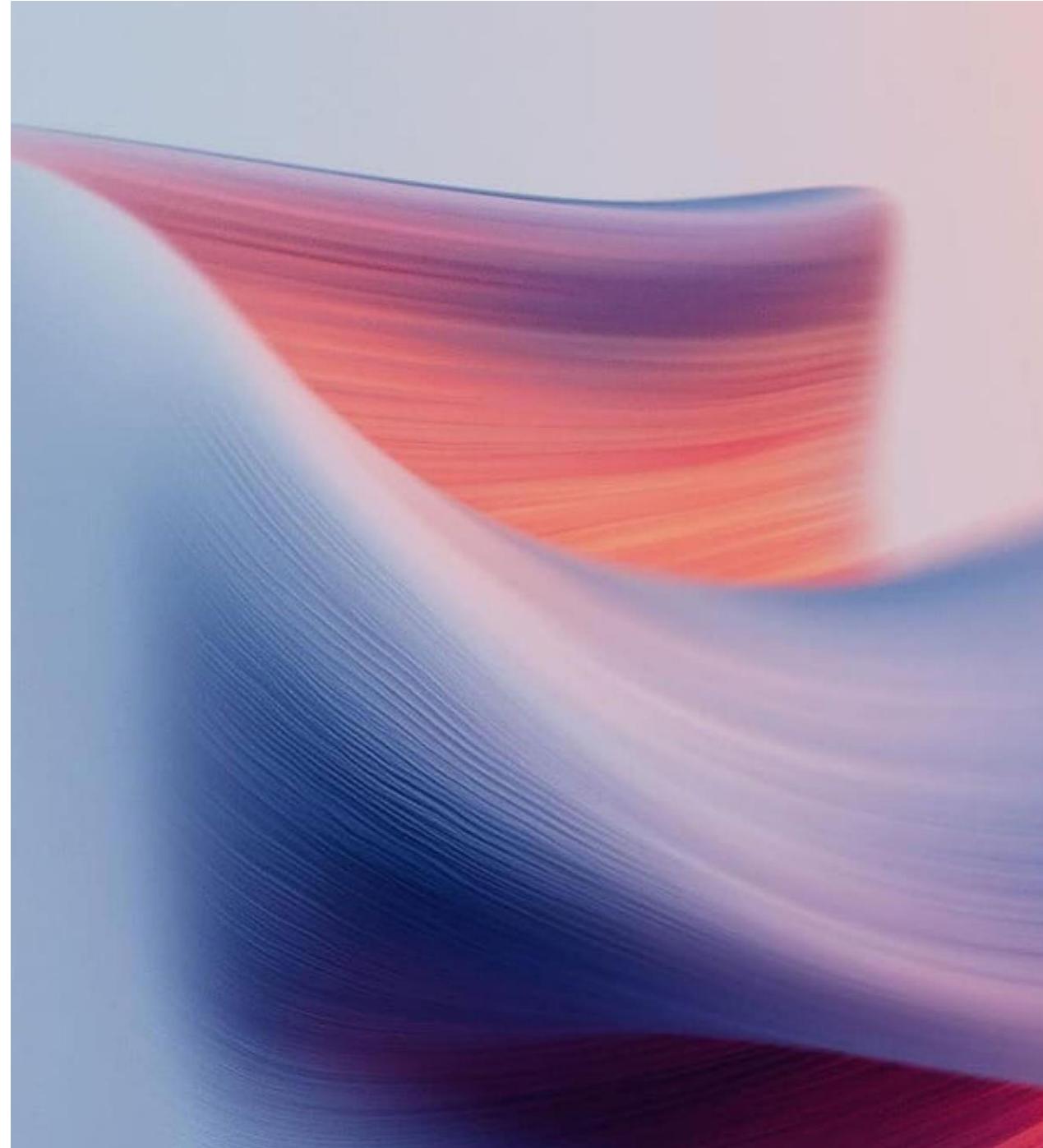




MBSE by efs

Systems Engineering at it's best

MBSE by efs offers a comprehensive approach to PMT development, training, and appropriate operationalization.



The problem

Traditional systems engineering still offers a lot of potential in terms of efficiency, communication, traceability and dealing with complexity management, in terms of collaboration and adaptability.

Our solution

Our Model-Based Systems Engineering (MBSE) approach provides a unified modeling environment, enhances traceability, fosters collaboration, and enables agile responses to change, streamlining system development and improving outcomes.

THE CHALLENGES

Five challenges shaping the future of systems engineering

Efficiency

To ensure efficient workflows in the future, it is crucial to mitigate delays, rework, and increased coordination requirements in development through a model-based approach.

Traceability

A high degree of traceability is necessary to ensure consistency, analyze cause and effect and comply with the obligation to provide evidence.

Managing Complexity

To be able to master the increasing complexity, it is necessary to expand evaluated methods and to take the step towards model-based development.

Collaboration

Through a model-based approach and sensibly chosen tool chains, collaborative work is strengthened and leaves room for innovation.

Adaptation to Change

The model-based approach makes it possible to react quickly to changes and their effects. This gives you the best possible chances of surviving in a fast-paced environment.

OUR MBSE JOURNEY

For almost a decade we deliver MBSE services

Decision to implement SE / MBSE within the Volkswagen Group through a dedicated program

Strategic decision to establish a dedicated team focused on model-based system architecture development

Continuous operationalization of methods and modeling in productive projects at VW / Audi / CARIAD / Porsche to date

Development of an MBSE method "FAME" commissioned by VW Group by 2023

Establishment of the internal MBSE training program for the Volkswagen Group to date

Establishment of an internal MBSE training program

Additional productive projects within the Volkswagen Group to date

Certified employees with SE-Certified Systems Engineer (GfSE) Level C and Level B

Projects outside automotive sector to leverage our experiences from various industries for the benefit of our clients

Partnership with TECHNIA as a central training platform

2016

2017

2018

2019

2020

2021

2022

2023

2024

2025

Process Methods Tools Development

MBSE by efs

PMT Development

Processes, Methods, and Tools

We have years of experience developing PMT solutions for automotive clients, from needs to implementation.



ONTOLOGY

Analysis of existing information objects to capture the problem space



PROCESS

Deriving processes from ontologies and documentation as a process model



METHOD

Development and optimization of methods following predefined processes



TOOL IMPLEMENTATION

Tool customization, development of scripts and plugins, creation of reports, creation of metrics and tool integration

Trainings

MBSE by efs

Trainings

Our trainings provide value through modular design and through high practical components.

CUSTOMER CENTRICITY

- Several training formats and contents
- Trainings designed for your audience by your needs
- Trainings off-the-shelf
 - i.e. Cameo 9-day training cycle
 - i.e. Cameo 6-day intensive

MODULAR DESIGN

- Modules can be sequenced as needed, to match trainees' availability and prior knowledge
- The staggered timing of the modules allows participants to deepen their learned knowledge in everyday situations and reflect on their experiences with trainer

PRACTICAL COMPONENT

- Participants increasingly engage with the relevant tools (i.e. Cameo Systems Modeler)
- Different stages of user actions (from basics of using these tools to creation of own models with guidance, while also working independently)

MBSE by efs

Training Overview (Example)

Our 9-day training cycle contains 4 modules and enables you to succeed in MBSE.

DAY 1

MBSE Fundamentals

- Development according to the MBSE approach
- Fundamentals of requirements engineering
- Fundamentals of functional and logical architectures

DAY 2 and 3

Cameo Reader with SysML

- Overview of system modeling approach
- Tool operation and navigation
- Diagrams and elements of SysML

DAY 4-6

Cameo Writer Structure

- Overview of structure diagrams
- Classification of structure diagrams in the overall context
- Understanding and modeling a system structure

DAY 7-9

Cameo Writer Behavior

- Overview of behavior diagrams
- Classification of behavior diagrams in the overall context
- Understanding and modeling system behavior

Module 1

Module 2

Module 3

Module 4

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Our Training Standard

Goal is to learn how to create models, this requires knowledge of methods, tool operation, and the language used.



METHOD

Throughout all training components, methods and steps necessary for model creation are explained in a modular approach.

TOOL

Participants are systematically introduced to the operation of the tooling through practical components.

LANGUAGE

The language elements of SysML, along with their extensions through the chosen tool, are taught and then practiced

Operationalization

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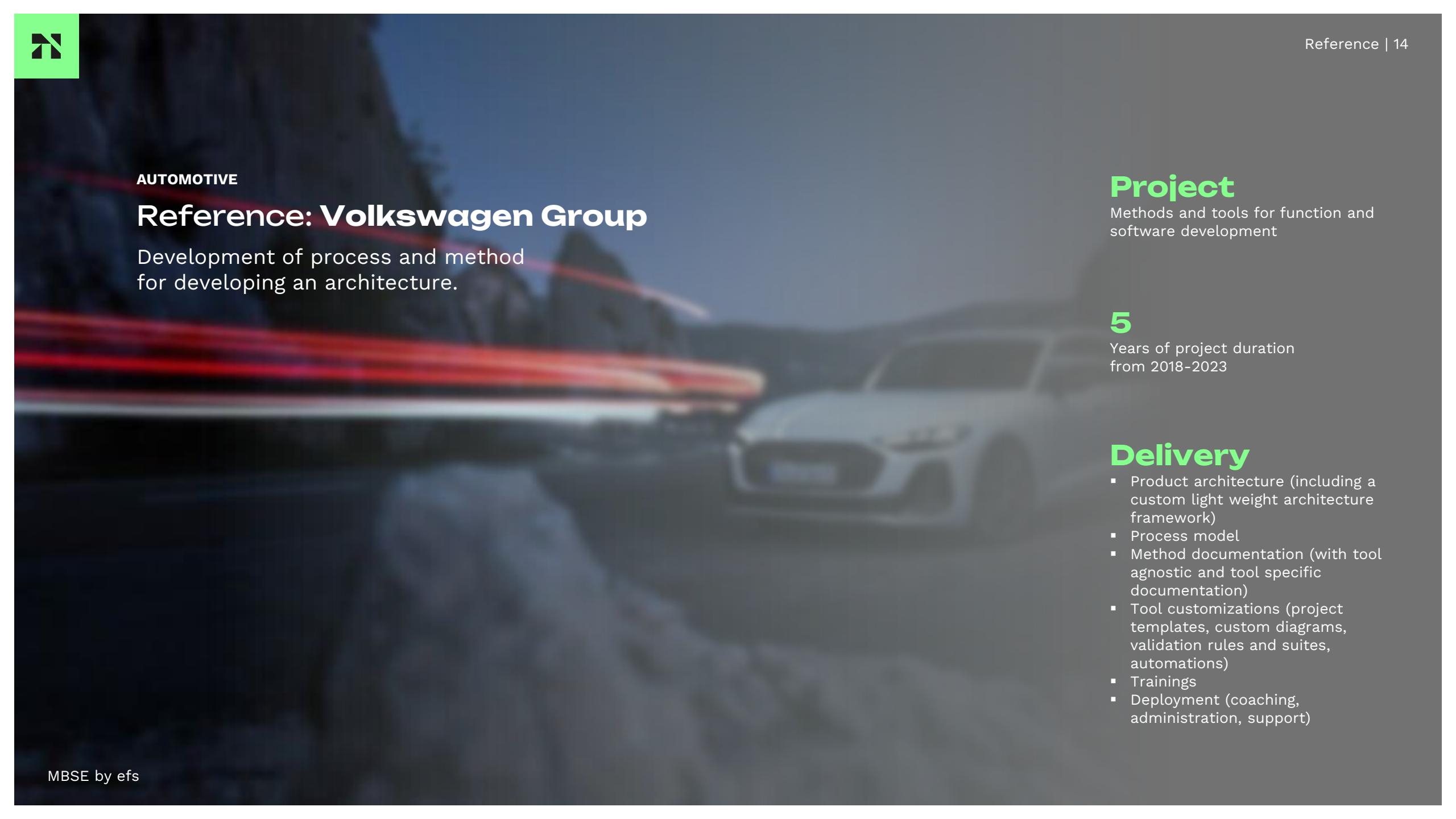
Operationalization

An implementation concept is necessary to establish PMT in a company. We focus on the following aspects:





Our References

A blurred background image of a car's interior, showing the steering wheel and dashboard, suggesting motion or a driving environment.

AUTOMOTIVE

Reference: Volkswagen Group

Development of process and method for developing an architecture.

Project

Methods and tools for function and software development

5

Years of project duration from 2018-2023

Delivery

- Product architecture (including a custom light weight architecture framework)
- Process model
- Method documentation (with tool agnostic and tool specific documentation)
- Tool customizations (project templates, custom diagrams, validation rules and suites, automations)
- Trainings
- Deployment (coaching, administration, support)

AUTOMOTIVE**Reference: Volkswagen Group**

Development of process and method
for developing an architecture.

**Project**

Typical operationalization project

3+

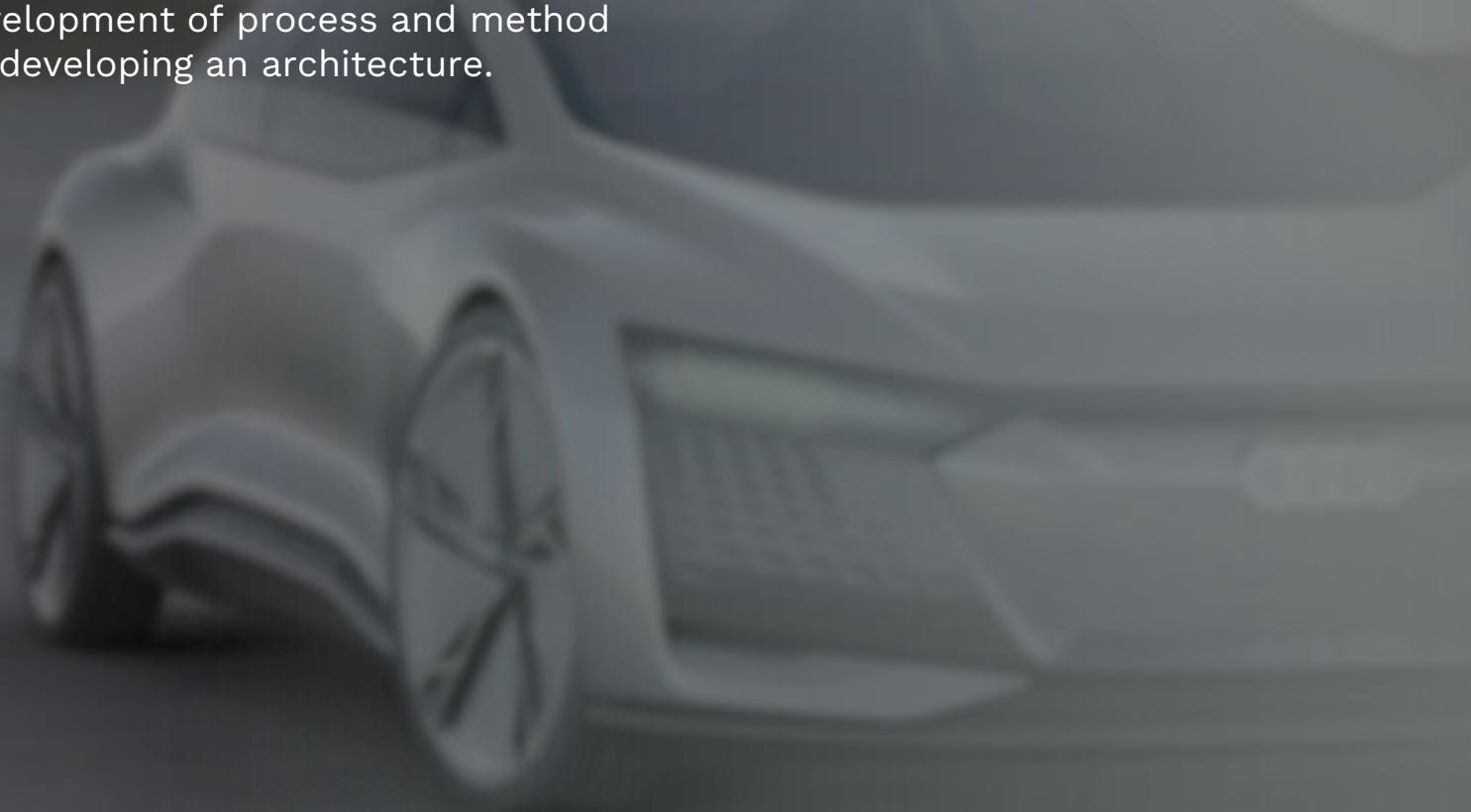
Years of project duration
from 2020-today

Delivery

- Tailoring of architecture process
- Adapting methods
- Development of scripts for automation
- Modelling of content
- Coaching
- Generating a PoC
- Business consulting
- Technical consulting

AUTOMOTIVE**Reference: Volkswagen Group**

Development of process and method
for developing an architecture.

**Project**

Audi Landjet

4+

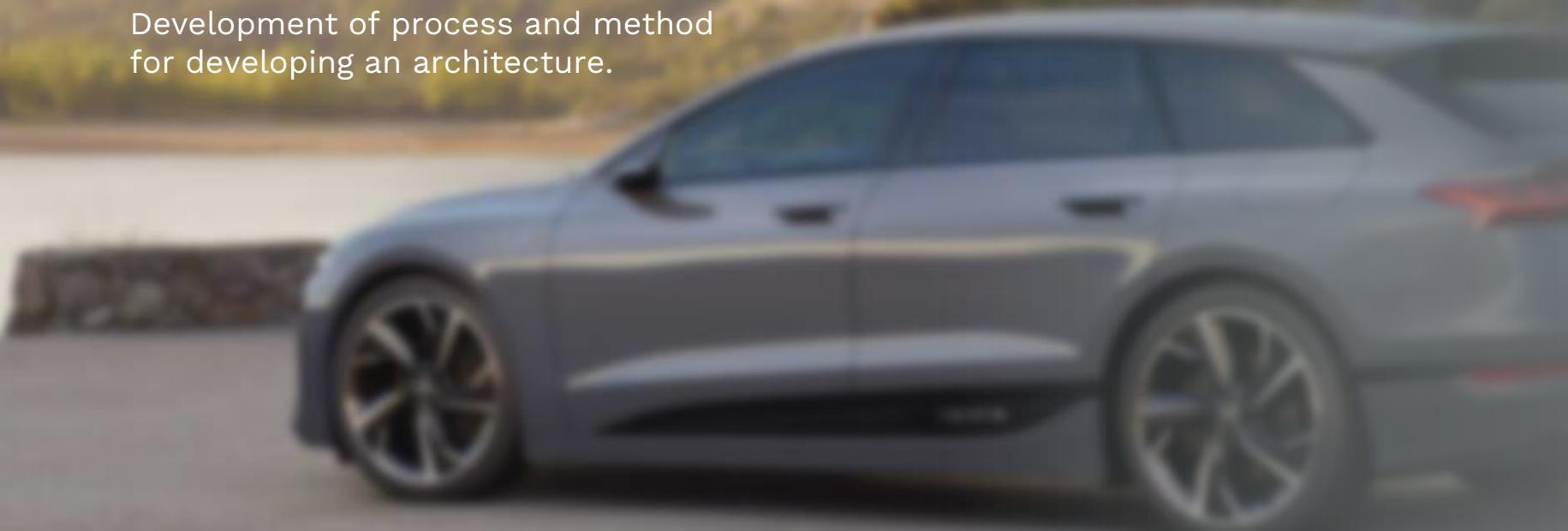
Years of project duration
from 2022-today

Delivery

- Modelling of content
- Modelling in several system levels
- Structuring several system
- Providing additional value to explicit models due to overview and broad vision

AUTOMOTIVE**Reference: Volkswagen Group**

Development of process and method
for developing an architecture.

**Project**

SysML modeling of customer
experience aspects in Cameo
Systems Modeler

2+

Years of project duration
from 2023-today

Delivery

- Extending PMT by "sales language"
- Consulting
- Tool adaptions
- Modelling

A blurred background image of a car's steering wheel and dashboard with a digital display.

AUTOMOTIVE

Reference: Volkswagen Group

Development of process and method
for developing an architecture.

Project

SysArch in CAMEO for steering

2

Years of project duration
from 2023-today

Delivery

- PMT: adapting methods to Cameo
- creating tooling for automated transfer from Enterprise Architect to Cameo Systems Modeler
- Creating tool interfaces to existing tools
- Consulting
- Tool adaptions
- Modelling

AUTOMOTIVE**Reference: Volkswagen Group**

Development and execution of various trainings and coaching formats for several entities within VW Group.

Project

Trainings – 9-day training cycle

5

Years of project duration
from 2020-today

Delivery

- Training modules
 - MBSE basics
 - Cameo Reader with SysML
 - Cameo Writer
- Defining training concepts
- Elaborate content for trainings (including training models)
- Execute trainings

AUTOMOTIVE and other industries

Reference: TECHNIA and other partners

Development and execution of various trainings and coaching formats for several clients.

Project

Trainings

2

Years of project duration
from 2023-today

Delivery

- Training modules with TECHNIA
 - CATIA Magic Cyber Systems Engineer Beginner and Expert
- Defining training concepts
- Elaborate content for trainings (including training models)
- Execute trainings

Why TechHub by efs?

MBSE by efs

Six reasons why we are your trustworthy partner for MBSE

Customer centricity

Maxime: customer enthusiasm. Everything we do is focused on meeting the needs of our customers.

Experience

High competence and experience through multiple projects and various industries.

Broad vision

Holistic method development (questioning processes, creating methods, and enabling tools)

Foresight

Challenging development process regarding re-usability of artifacts in later development steps. Building bridges between architecture and IVV

Approach

Independent consulting, training and implementation from a single source in the context of MBSE development.

Higher faster further

Through an approach coordinated with the customer, we reduce costs, increase the quality of the products and become faster

MBSE by efs

Examples for “Higher faster further”

Building Know How

We support your employees to build up missing know-how and deepen existing knowledge.

Transparency and Clarity

We increase the transparency in your development and ensure clarity in the individual development steps.

Getting into the Flow

We take care of process gaps, missing methods and preventable tool breaks to get in the flow with you.

Time Savings

We look for time wasters. Automation and plug-ins as well as effective use of models and information are effective ways to save time.

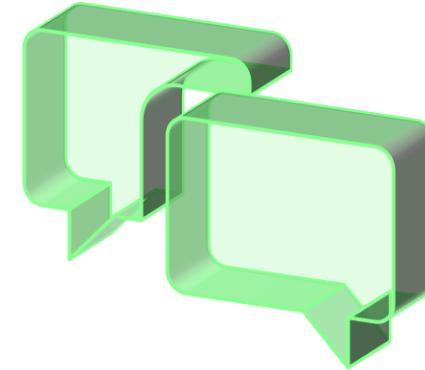
Speaking the same language

We enable your team to speak in models. Less emails, less PowerPoint, less meetings, less ambiguous communication.

Workforce

We offer you a team that takes care of your needs. Strengthen your team with additional manpower and womanpower by efs.

**Questions?
Contact me**



PROGRAM MANAGER

Tilmann Gänsch

tilmann.gaensch@efs-techhub.com

+49 162 2882 002



PEOPLE LEAD

Marcus Jacob

marcus.jacob@efs-techhub.com

+49 162 2854 293