

FEV Signature Solutions

Holistic Vehicle E/E – Architecture

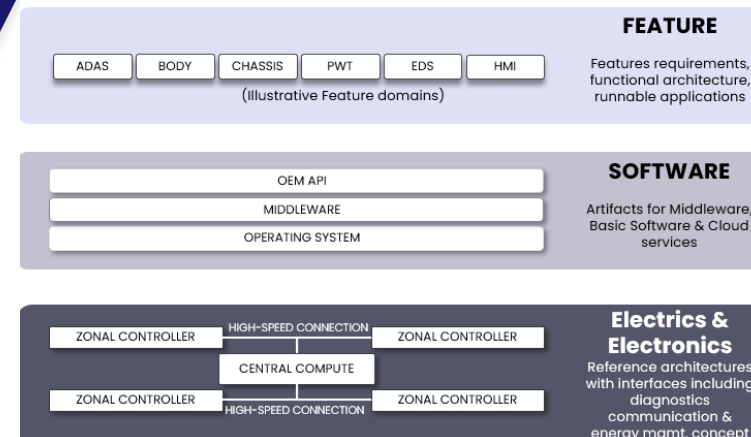
Cut time-to-SOP and cost of E/E – backed by FEV's proven artifact library

FEV offers

- ▶ Architecture design using FEV's library of ready-to-use, reusable components including
 - artifacts, reference architectures and product solutions
 - comprehensive feature description across all decomposition layers in model and text
 - information architecture for vehicle, system and component level created in Vector Preevision
- ▶ Compliant with key automotive standards (e.g., ISO 26262, ASPICE)
- ▶ Model based system engineering approach to cut rework and late changes
- ▶ For many automotive applications, including passenger cars, light duty and heavy-duty vehicles
- ▶ Applicable from use case down to vehicle reference architecture

Why FEV

- ▶ 45+ years of automotive expertise – your trusted partner from concept to SOP
- ▶ Global footprint and mature partner network
- ▶ Dozens of E/E programs delivered with measurable savings
- ▶ Full-service provider for library adaptation, integration, and customization to meet your project needs
- ▶ Option to use library components for your further programs



FEV.io E/E Architecture references

Reference Project: FEV.io E/E Platform development for a BEV Truck

Truck OEM wants to bring its first battery electric truck based on existing ICE vehicle platform focusing on minimized time to market.

FEV involvement

- Top-down feature driven SE approach combined with bottom-up functional and component-based development to drive integrated design decisions
- Overall EE Architecture development
- Function Development of entire vehicle
- In Vehicle Network adaptation including 2D and 3D LV&HV Wiring Design and Diagnostics specification (CDD/ODX) on component level
- Technical responsibility for 22 main controllers and Supplier Management
- Electrical System Integration
- Verification and Validation on component benches, Integration Bench / LabCar and Prototype Vehicles

Minimize time to market
with minimal changes of the existing ICE vehicle platform

Cost effective
To create market attractive products



Reference project FEV.io Build first SDV (ZONAL) EE Architecture for passenger car OEM

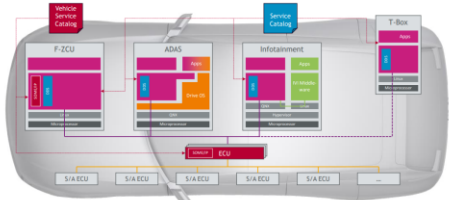
A passenger car startup aims to launch its first vehicle, targeting a fully software-defined vehicle. Key artifacts include a Zonal EE architecture and an abstracted software architecture on a high-performance computer (HPC). FEV is responsible for entire EE Development

FEV involvement

- Support development organization build up:
 - Implementation of Systems Engineering
 - Automation of workflows according CIDCT
- Design of a high-performance computer targeting maximum SW Abstraction
- Development of zonal EE vehicle topology including ethernet based communication and diagnostics using SOVD
- Developing a comprehensive cybersecurity and functional safety concept on vehicle level

Software focus
ensuring reusability and offering of new business models

Efficient Integration
off third party elements for maximized user experience



Reference project FEV.io EE system integration & gateway development based on two donor EEA

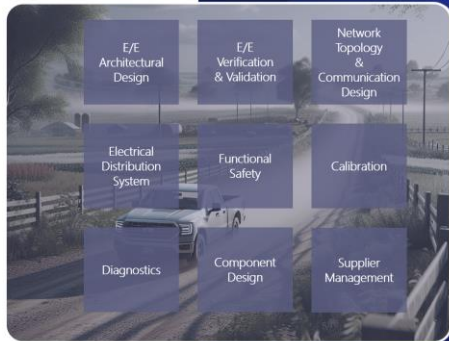
Two OEM create joint venture to develop new vehicle based on two donor EE architectures

FEV involvement

- Overall responsibility for complete E/E system incl. diagnostics, coding, EoL testing
- Release & supplier management
- Development of a new gateway component to connect the EE subsystems
- Functional Safety management and alignment of safety requirements for the vehicle & powertrain
- Development/Adaption of electric distribution system

Time to Market
ensure timeline with planned SOP

Efficient Integration
with minimal changes of the donor architecture



Reference project FEV.io EE Platform development for super sports car

Customer wants to develop a high-performance sports vehicle in small series maximizing the customer satisfaction and managing development costs

FEV involvement

- Requirements creation and EE architecture development with focus on maximum usage of off the shelf components
- Wiring harness and vehicle network design
- Realization of a unique interior design for steering wheel, switches & (analogue) displays
- System ownership for Body control module and brake control module
- Support in prototype commissioning and vehicle test conduction

CUSTOMER SATISFACTION
with unique driving experience and interior design

COST EFFECTIVENESS
via maximum usage of off the shelf elements



FEV.io Library – our global artifact database to speed up your program



LIBRARY ATTRIBUTES

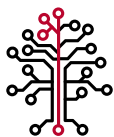
Holistic library starting from use case to vehicle reference architecture



Comprehensive feature description across all decomposition layers in model and text



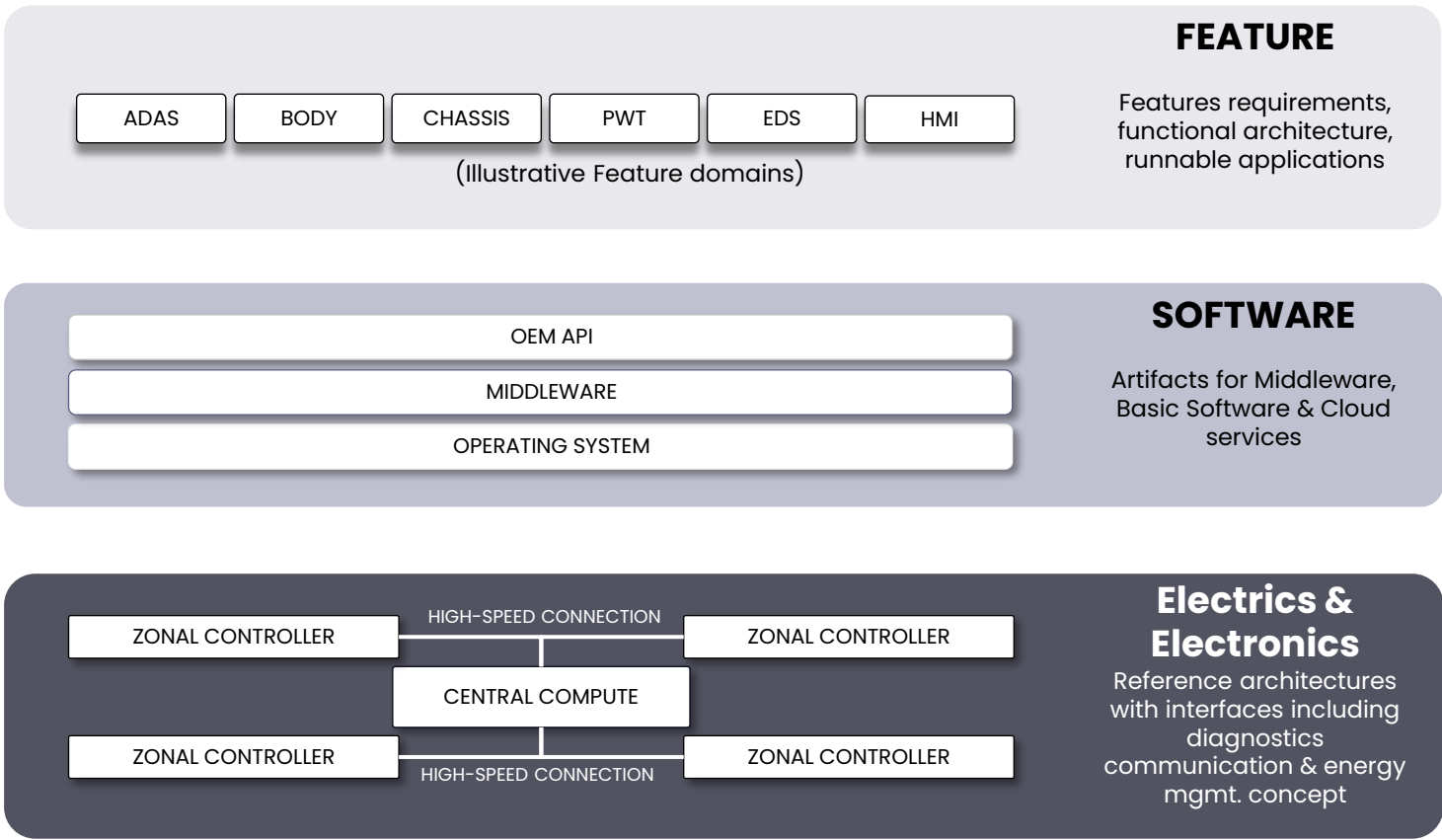
Information architecture for vehicle, system, and component level created in Vector Preevision



Artifacts full compliant to automotive regulations



FEV.IO LIBRARY BUILDING BLOCKS



FEV.io

The screenshot displays the Visual Studio IDE with the Requirements Explorer and Requirements List. The Requirements Explorer on the left shows a tree structure with folders for 'All Branches', '1.1 Requirements', '2.1 Requirements', and '3.1 Requirements'. The Requirements List on the right shows a table of requirements with columns for ID, Name, Type, and Priority. The table lists various requirements such as '1.1 TechnicalRequirements', '1.1.1 Storage', '1.2 Miscellaneous', '2.1 LoggingRequirements', '2.1.1 Authentication', '2.2 SessionTimouts', '3.1 Lighting', '3.1.1 NaturalLight', '3.1.1 Climate', '3.2 DeviceControl', '3.2.1 PowerTrain', '3.2.1 Brake', '3.2.1 CruiseControl', '3.2.1.1 CruiseControl', '3.2.1.1 AdaptiveCruiseControl', '3.2.1 DriveTrain', and '3.2.1 Steering'.

System Requirement	System	Neutral Technical ...	Status
Attention Control Horn Decibel Performance - EE_...	Attention	Horn Actuation	In Clarification
Attention Control Horn Decibel Performance - EE_...	Attention	Horn Actuation	In Clarification
Attention Control Horn Decibel Performance - EE_...	Attention	Horn Actuation	In Clarification
Horn Failure Identification - EE_REQ_80580 - /-0 (Re...	Body C	Body Control M...	In Clarification
Horn Input Arbitration - EE_REQ_80584 - /-0 (Req...	Body C	Arbitration of Ho	In Clarification
Horn Actuation Command to Actuator - EE_REQ_80...	Attention	Horn Activation	In Clarification
Telematic Control Expected Horn State Logical Out...	Telematic	Telematic Contr	Ready for Review
Gateway Drive Horn Request Routing - EE_REQ_806...	Gateway	Gateway Driver V	In Clarification
Gateway SDS Horn Request Logical Input - EE_REQ...	Gateway	Gateway SDS Ho	In Clarification
Horn Actuation with Emergency Pattern - EE_REQ_8...	Body C	Horn Warning Pa	In Clarification
Body Control Driver Horn Logical Input - EE_REQ_8...	Body C	Body Control M...	In Clarification
Horn Actuation with Warning Pattern - EE_REQ_80...	Body C	Automatic Horn	Released
Horn Actuation Profile Assignment as per Available...	Body C	Horn Warning Pa	In Clarification
Plausibility of Touchpad Horn Input - EE_REQ_805...	Touchp		
Event Recording of Horn Logical Input - EE_REQ_8...	Crash D	Event Data Recor	In Clarification

JModelica
 Manual Activation of Steady High Beam Illumination - REQ_472001943 - /O (Requirement (shall))
 Use Cases: 1 of 1 entities are shown
 Use Case: Common Variant
 Product Goals

Full traceability between Requirements & Use Case

[illegible]

The diagram illustrates the system architecture, organized into three primary layers:

- Top Layer (Body Control Modules):** Includes modules such as Body Control Module, Power Window, Door Lock, and others.
- Middle Layer (Powertrain Control Modules):** Contains modules like Engine Control Unit (ECU), Transmission Control Unit (TCU), and Clutch Control Unit.
- Bottom Layer (Chassis Control Modules):** Features modules such as ABS, ESP, TCS, Steering Angle Sensor, and Suspension Control.

Interconnections are shown through CAN bus networks, indicating a distributed control system where different modules communicate over shared communication channels.

Get in touch with us for further information



[www.fev.com/en/
signature-solutions](http://www.fev.com/en/signature-solutions)