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MODEL BASED DEVELOPMENT OF AUTOMOTIVE SOFTWARE

MATLAB | SIMULINK | ISO 26262 | AUTOSAR

A Handbook on MBD

AN INTRODUCTION TO THE PROCESS OF MODEL BASED DEVELOPMENT

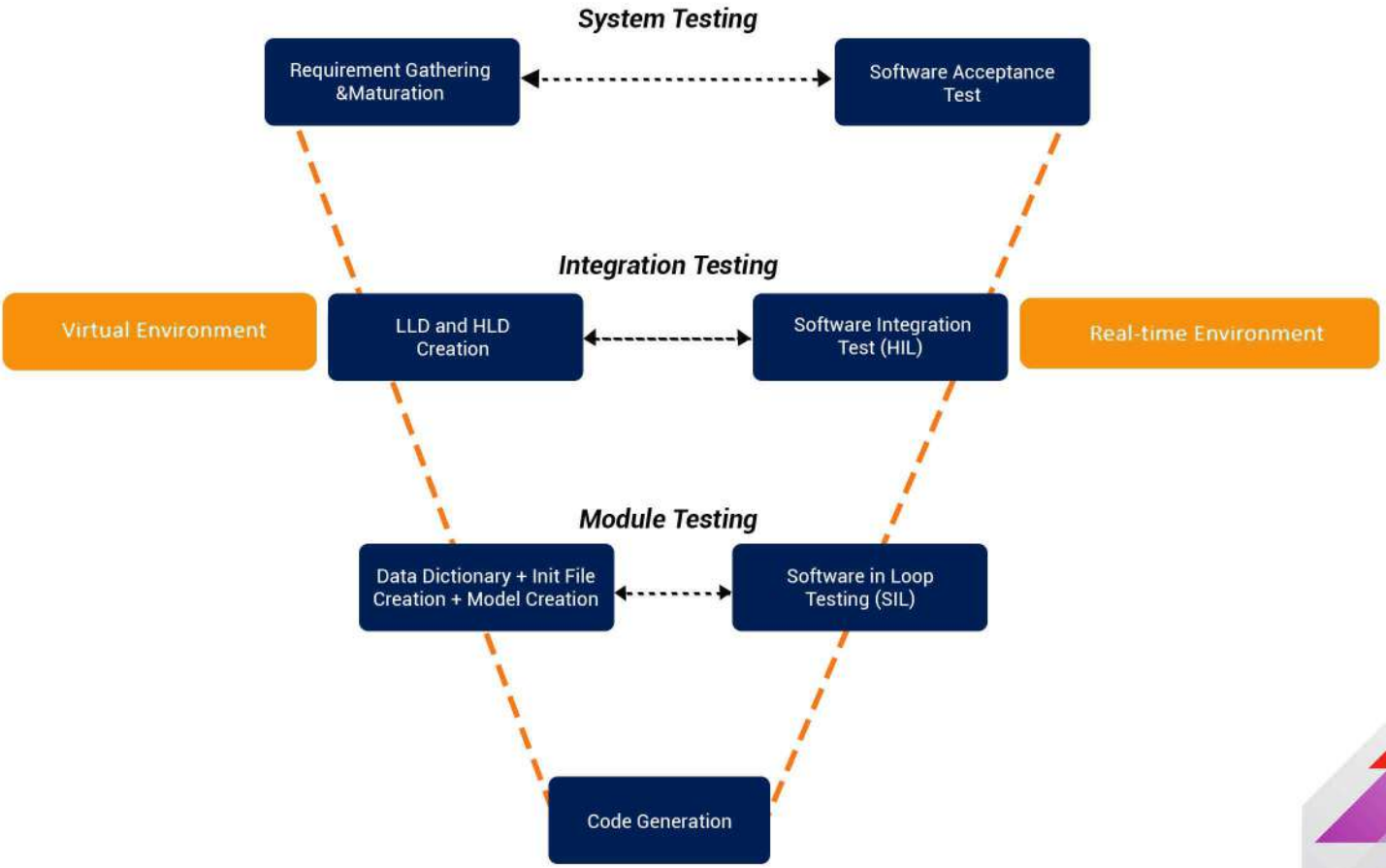
In the manual software development process, achieving shorter turnaround time for automotive software projects becomes difficult.

This is primarily due to the fact that writing code manually for new-age automotive software is a highly time-consuming process. Imagine the time and effort required to write 20 million lines of source code for an application like an Electronic Power Steering!

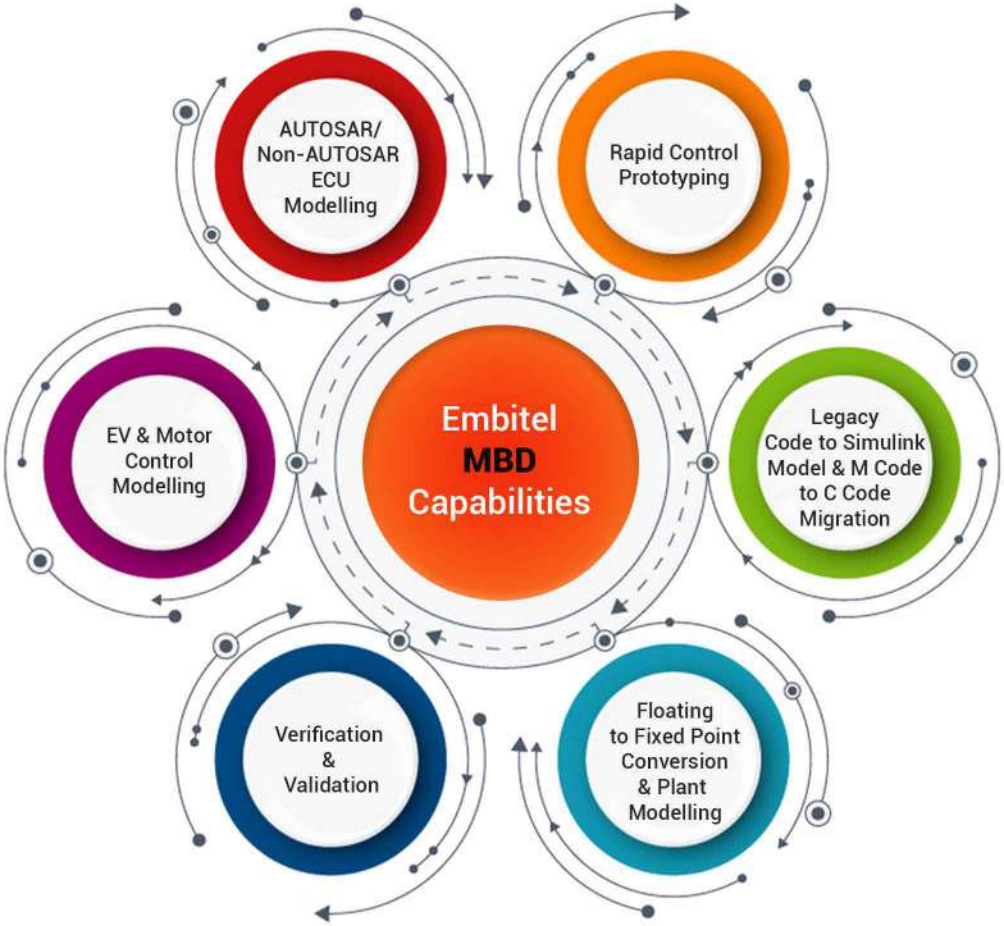
A Model Based Development approach shifts the emphasis on the function rather than the code for automotive software development.

A model, which is a diagrammatic representation of the solution, is created. And using this model, the code is auto-generated using tools like MATLAB and SIMULINK. These models are tested before code generation which minimizes the chance of errors in the code.

LET'S UNDERSTAND THE ENTIRE PROCESS OF MBD WITH THE HELP OF THIS DIAGRAM.



OUR CAPABILITIES IN MODEL BASED DEVELOPMENT OF AUTOMOTIVE APPLICATIONS



AUTOSAR and Non-AUTOSAR ECU Modelling: We perform MAAB and MISRA C compliant Application Layer Development based on MBD v-cycle. We have both AUTOSAR and non-AUTOSAR capabilities.

Rapid Control Prototyping: By supporting you in 'Rapid Prototyping' our MBD experts provide early proof that the control design will work in the target environment. We deploy SIMULINK to build rapid prototype from the model.

Migration to Model Based Development: We provide support for migration from legacy code to SIMULINK model and from the M Code (MATLAB code) to auto-generation of C code. As per project's requirements, we provide AUTOSAR and ISO 26262 compliant model based development.

Floating to Fixed Point Model Conversion: We deploy a proprietary Fixed Point Converter tool to support faster conversion and testing of the newly generated fixed point model.

Motor Control Solution for Electric Vehicle: One of our USPs, we help you develop motor control systems for Electric Cars, Electric Two-Wheelers, etc.

Verification and Validation Services: Support for MIL, SIL and HIL testing of SIMULINK model using tools like SIMULINK design verifier, VT Systems, and more

CUSTOMER SUCCESS STORIES

Our journey of collaborating with global customers for MBD projects has been an eventful one. We have delivered some of the most innovative and challenging projects. Here are snippets of few of our customer success stories:

1. Model Based Development of Automotive Seating Comfort System:

Our customer was a Tier-1 automotive supplier. We helped them resolve a critical business challenge for their innovative seating comfort system development project.

By using our proprietary conversion tool, we converted floating point model to fixed point. This resolved the on-chip memory issue that was hampering the intended execution of the solution.

2. MATLAB *(Simulink)* Based UI Development for Low Level Drivers of an Automotive Application:

Our customer required a configurable interface for managing the low-level drivers, model functionality and code generation.

We deployed the S Function architecture in MATLAB to develop the required User Interface.

OUR EXPERTISE IN TOOLS AND TECHNOLOGIES

- Target Link for MIL Testing and SIL Testing
- E-coder for code generation
- GT-Power, Amesis, Tesis for Environment Model Development
- ASCET, Statemate and SCADE for functional development
- AUTOSAR ERTL (for AUTOSAR compliant code)
- Custom Target Language Compiler (for customized compilation)
- Vector tools for Hardware in Loop (HIL) Testing

OUR TEAM STRUCTURE FOR MBD PROJECTS

An expert core team of Model Based Development Consultants, Project Managers and Automotive Engineers collaborate with you on the project.

Team Hierarchy commonly followed in MBD projects:

- **Senior Model Based Development Managers:** Their role is to ensure end-to-end V-cycle based MBD project execution. Compliance to various standards and organizational processes are also ensured by them.

- **Senior MBD Consultants:** They provide product (ECU)/application development and consulting support for critical automotive projects. They usually have more than 12 years of experience in the industry.

- **Senior MATLAB Programming Experts:** These experts are proficient in Model Based Development of automotive ECUs/applications as per the latest industry standards, including MAAB, AUTOSAR, and ISO 26262.

We Are on YouTube!

We have a goldmine of information on Model Based Development and other topics related to Automotive and IoT Embedded Solutions. Do check it out!

Our playlist of videos dedicated to Model Based Development, AUTOSAR and ISO 26262 can be accessed by visiting YouTube and searching for Embitel.

Show us some love by liking our videos and sharing it among your peers!

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