Challenges and Best practices in Application SW Development using MBD Approach

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Challenges present in today’s automotive world

✓ Increased number of ECUs in vehicle
✓ Increased complexity of algorithms
✓ Increased number of SLOC in vehicle
✓ Increased cost contribution of embedded software to the value of vehicle
✓ Less product development time to enter into market with high quality software
Complex algorithms leads to increased number of SLOC

✓ Increase in power consumption of ECUs
✓ Increase in performance sensitivity
✓ Increase in complexity of Network ECU Integration Testing

→ Need for high efficient and optimized code
Areas of Optimization are at design Level, Source code level, compiler level, Assembly level.

Methods of optimization are dead code elimination, common computation redundancy, moving computation of loop invariant code.

→ Auto Code generators
Advantages of using Auto-coders

- Direct Conversion of graphical models into production code
- Optimizing code for specific to processor
- Providing an option to choose between fixed point and floating point code
- Generating code that is compliant with industry certified standards
- Eliminating manual coding errors.
- Reduction of software development time
Process followed in MBSD approach
✓ Implementation of logic in state-flow will help to generate Switch-Case type of code. This will help in reducing throughput.
Different initial values for State-flow output variable at Model explorer and default condition will cause problem during code generation.
- It is highly recommended to implement logic inside atomic subsystem, if old value is used more than once for calculations.
While implementing the algorithm in stateflow, it is recommended to use conditions for transitions to avoid generation of recursive functions for loops.
Though there are lot many challenges during embedded software development, it is highly recommended to use MBD along with Auto-code generators.
Thank You