



Vertical AUTOSAR System Development at John Deere

Jim Sachs

System Engineering Manager
Enterprise Electronics Group



JOHN DEERE



Jim Sachs
System Engineering Manager
Enterprise Electronics Group
11 years at John Deere

25 Years of Experience

- System Engineering
- Program Management
- Agriculture & Automotive

Education - University of Notre Dame

- BA Economics
- BS Electrical Engineering
- MS Electrical Engineering

Infrastructure Delivery

- Model Based System Engineering
- Model Based S/W Design
- Network Architecture and Management
- Diagnostic Architecture and Management
- Reprogramming Infrastructure
- MIL/SIL/HIL Testing Infrastructure

Electrical Complexity



- ~2300 electrical signals
- ~800 pins of I/O
- 20 controllers
- ~400 Features
- Vehicle + Factory
- Electric Hydraulic Control

Challenges

Customer

- New Features
 - Most have an electrical component
 - Data and Connectivity
 - Greater Automation

Technology

- Complexity Increasing Exponentially
- Networks Growing

Business

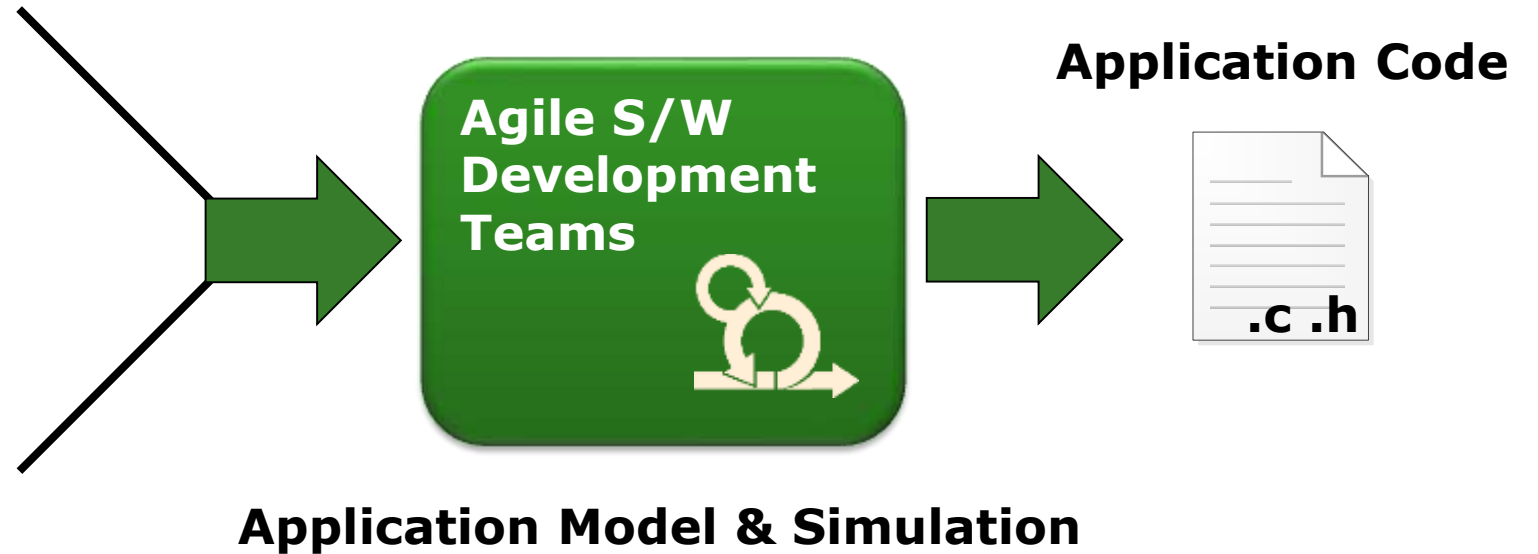
- Get to Market Faster
- Shorter Design Cycles
- Expectation of High Quality



How to Optimize Software Development

“Software is now the long lead and the majority of the development cost. Not Hardware!”

How to provide better requirements, context, and direction?

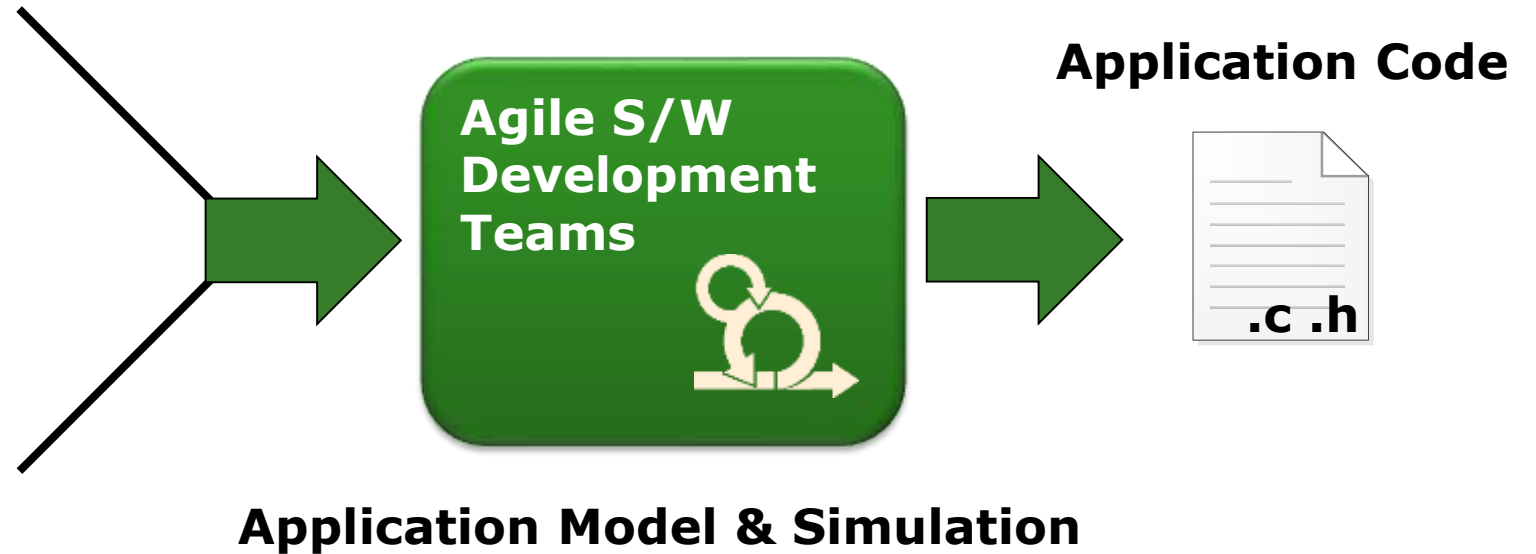


How to Optimize Software Development

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S/W Architecture

- Feature/Function Based
- Provides Context
- Focused on Interfaces



Drive Efficiency in System / Software Development

Reuse

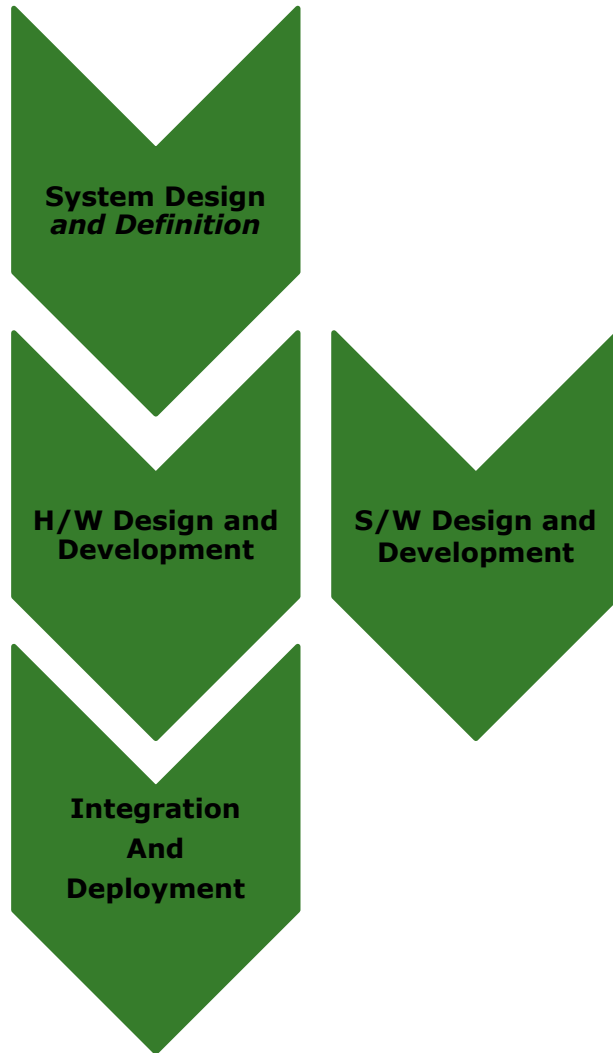
- Design it Once
- Define it Once
- Applicable at different levels

System Engineering

- Requirements
- Functional Decomposition
- Logical Architecture
 - Drives S/W and H/W Architectures



Vertical Value Chain



- Primarily development is in house
- H/W and S/W are separate
- Families of electronic controllers
- Communication is informal and flexible

A vertically integrated tool chain enables :

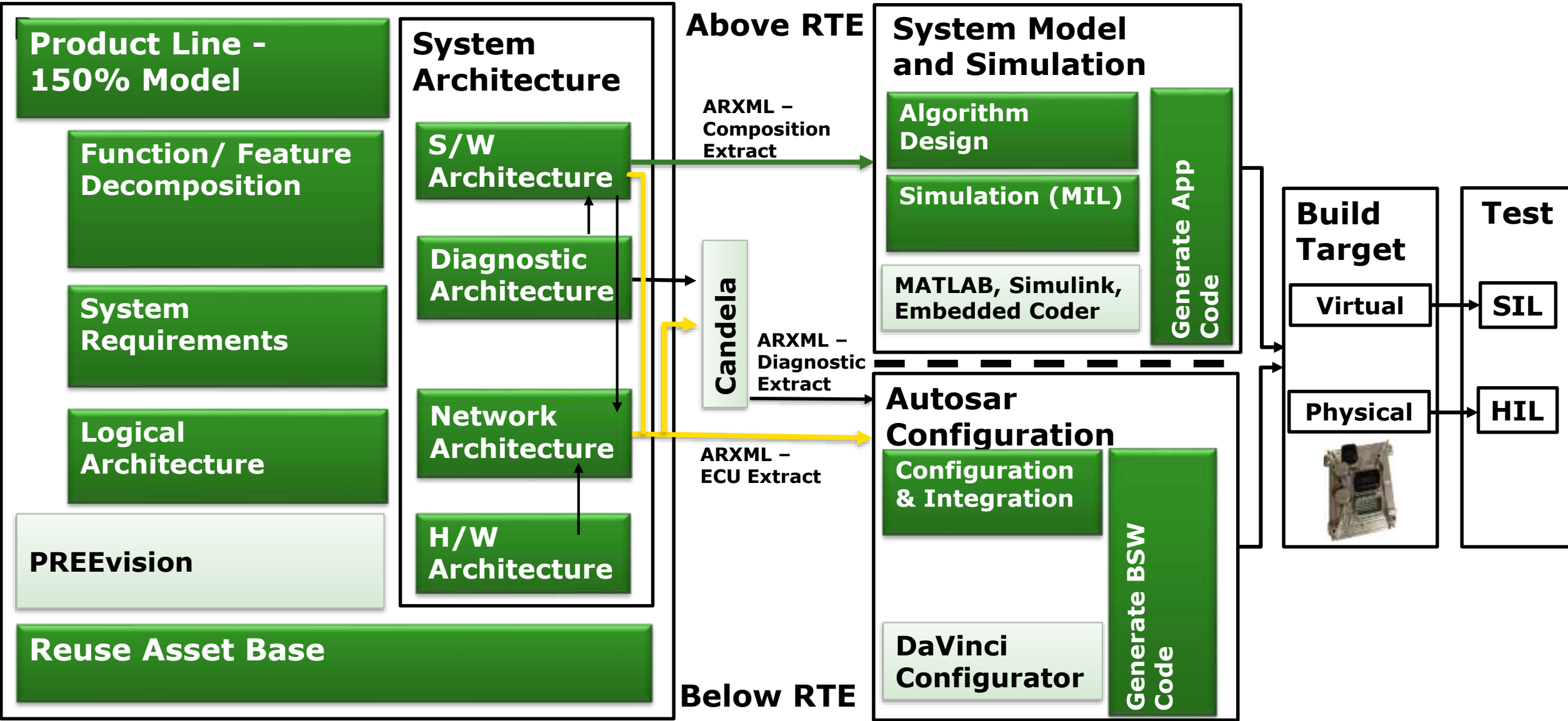
Error proofing

Process acceleration

Integrated data interfaces

Automation

Workflow and Tool Chain





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