

# **SIMulation Workbench (SimWB)**

## **FMI Support**



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# SimWB - FMU Advantage

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- ❑ Easy to import FMUs
- ❑ Run single FMU that uses multiple cores
- ❑ Run multiple FMUs on multiple cores
- ❑ Run FMUs with other models
- ❑ No special hardware configuration

# SimWB Overview

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- ❑ Framework to simulate models in real-time
- ❑ Drive hardware with model signals
- ❑ Interact with model signals and parameters
- ❑ Log model signals and parameters
- ❑ Create and use custom graphical widgets to control model signals and parameters

# SimWB Benefits

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- ❑ Hard real-time HIL Solution
- ❑ COTS hardware
- ❑ Multi-Core support
- ❑ Model Independent I/O
- ❑ Thousands of I/O points
- ❑ Multiple models on different cores

# FMI Interface Workflow

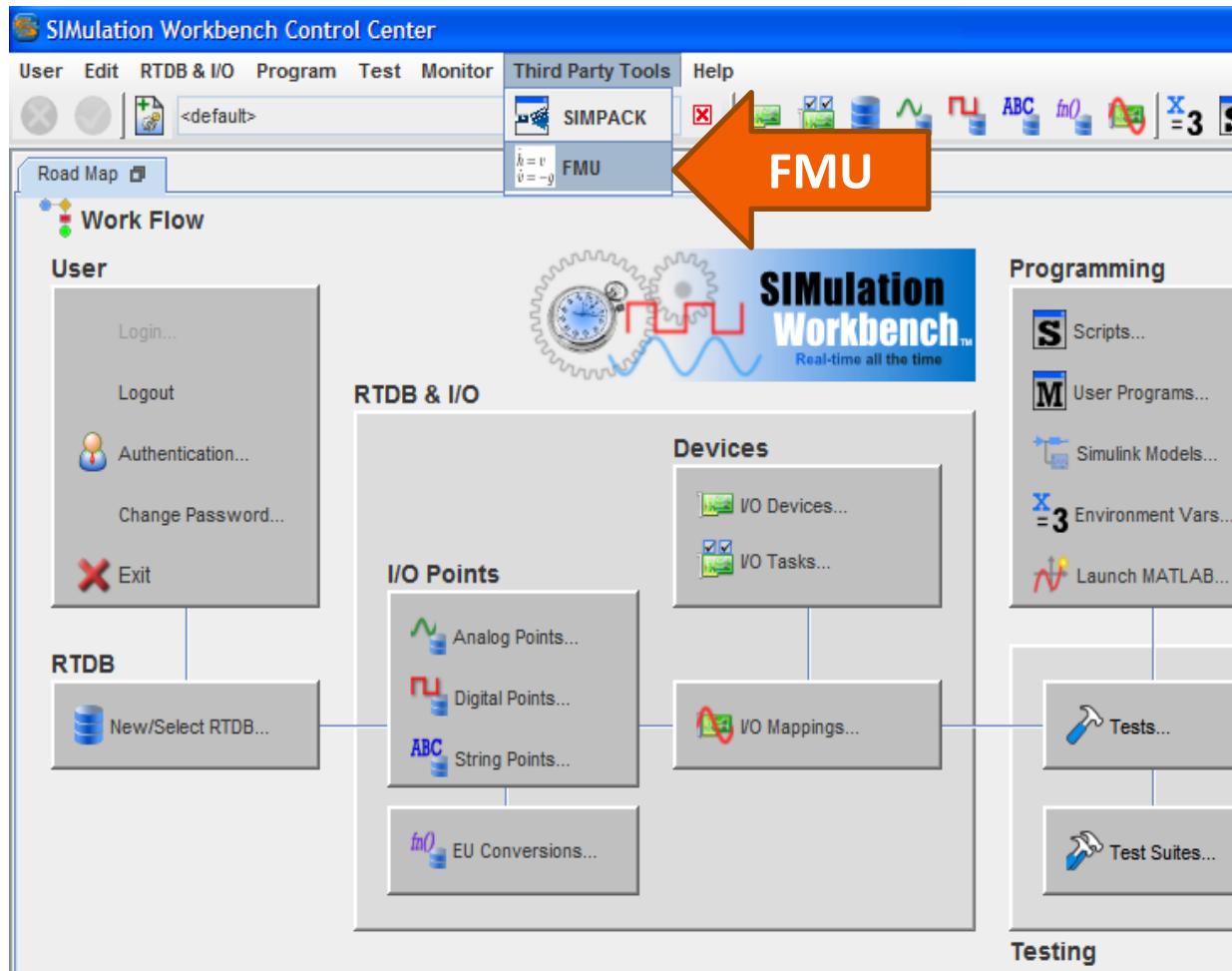
**In Dymola or  
other modeling  
tools**

- Create model
- Define input and output
- Simulate and Verify output
- Export FMU file

**In SimWB**

- Import FMU in SimWB
- Create FMU model object
- Create Test

# SimWB FMU Import



# SimWB FMU Import

## FMU Model Properties

Select FMU file

FMU file : H:\Projects\FMNDymola\0210\MotorDriveTestPK.fmu

Import

Parse FMU >

Model version : 2

Description :

Model name : MotorDriveTestPK

☐ has linux32 binary ☒ has linux64 binary ☒ has source

Generation tool : Dymola Version 2015 Alpha (32-bit), 2014-01-30

Model Variables :

Name	Item Name in RTDB	Type	Include in RTDB ▼
phi	phi	Output	<input checked="" type="checkbox"/>
u	u	Input	<input checked="" type="checkbox"/>
r		Parameter	<input type="checkbox"/>
m		Parameter	<input type="checkbox"/>
motor.Ra.R		Parameter	<input type="checkbox"/>
motor.Ra.T_ref		Parameter	<input type="checkbox"/>
motor.Ra.alpha		Parameter	<input type="checkbox"/>
motor.La.L		Parameter	<input type="checkbox"/>
motor.emf.k		Parameter	<input type="checkbox"/>

Generate RTDB >

Model RTDB :

Group : default

☐ New RTDB

Install FMU >

[FMU build output](#)

Command line options :

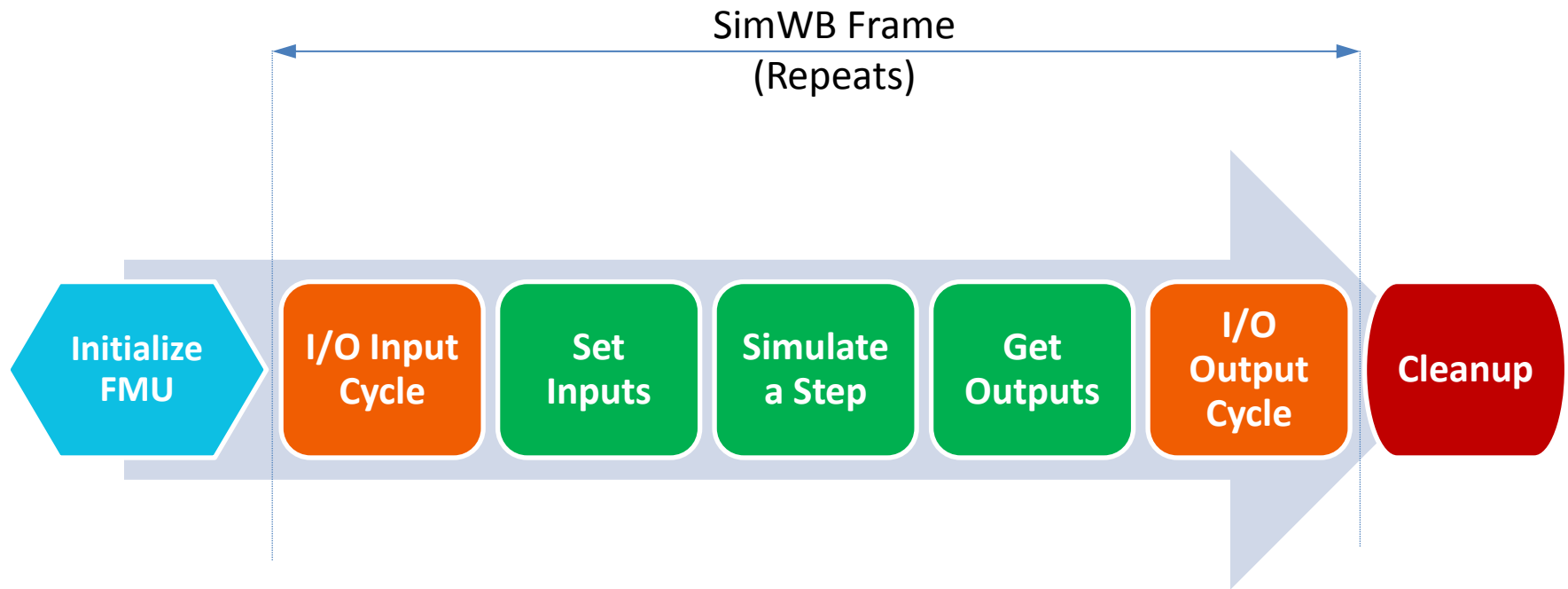
☐ Rebuild FMU

CPU cores : 5

Create FMU Model >

[Model build output](#)

# How SimWB Runs an FMU

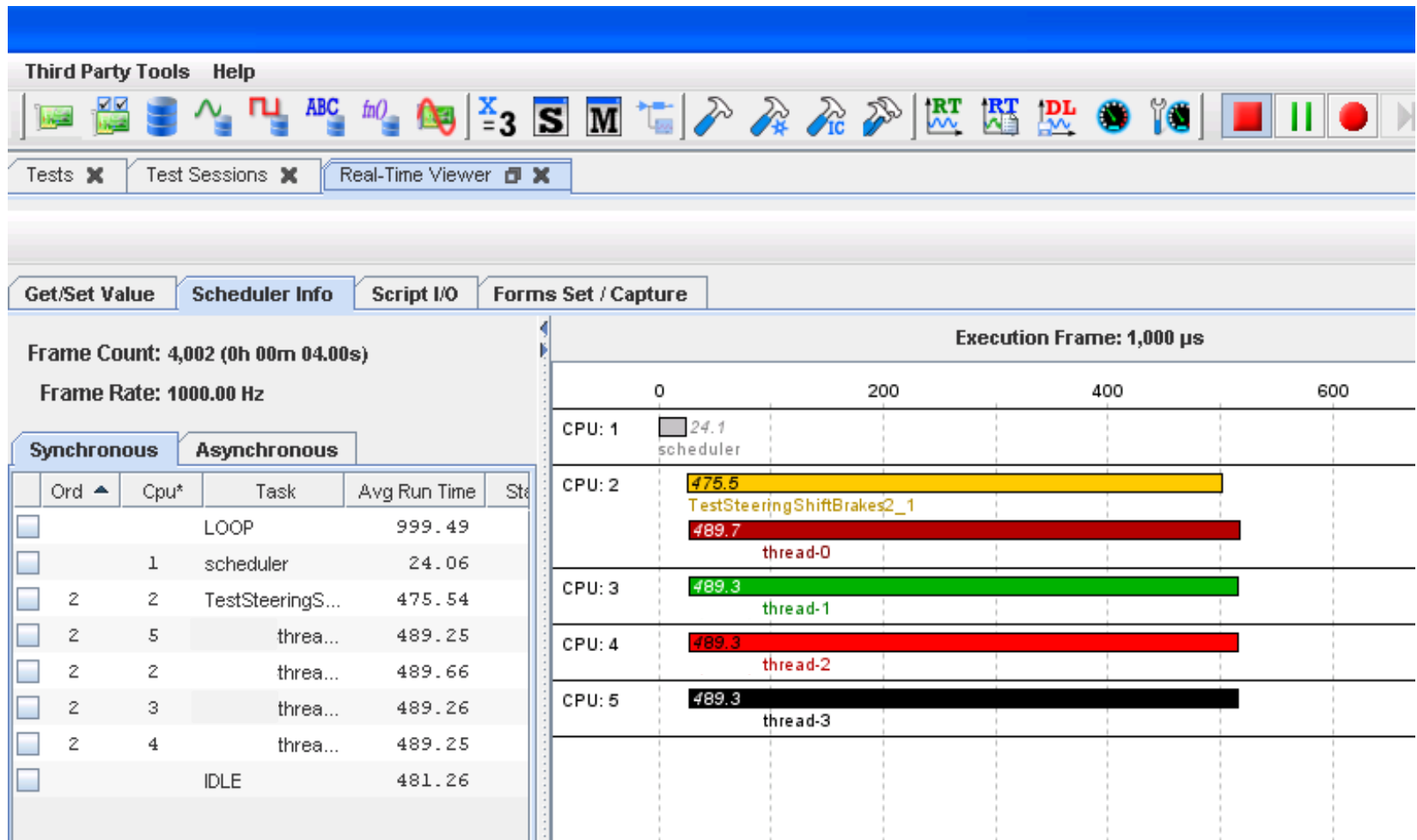




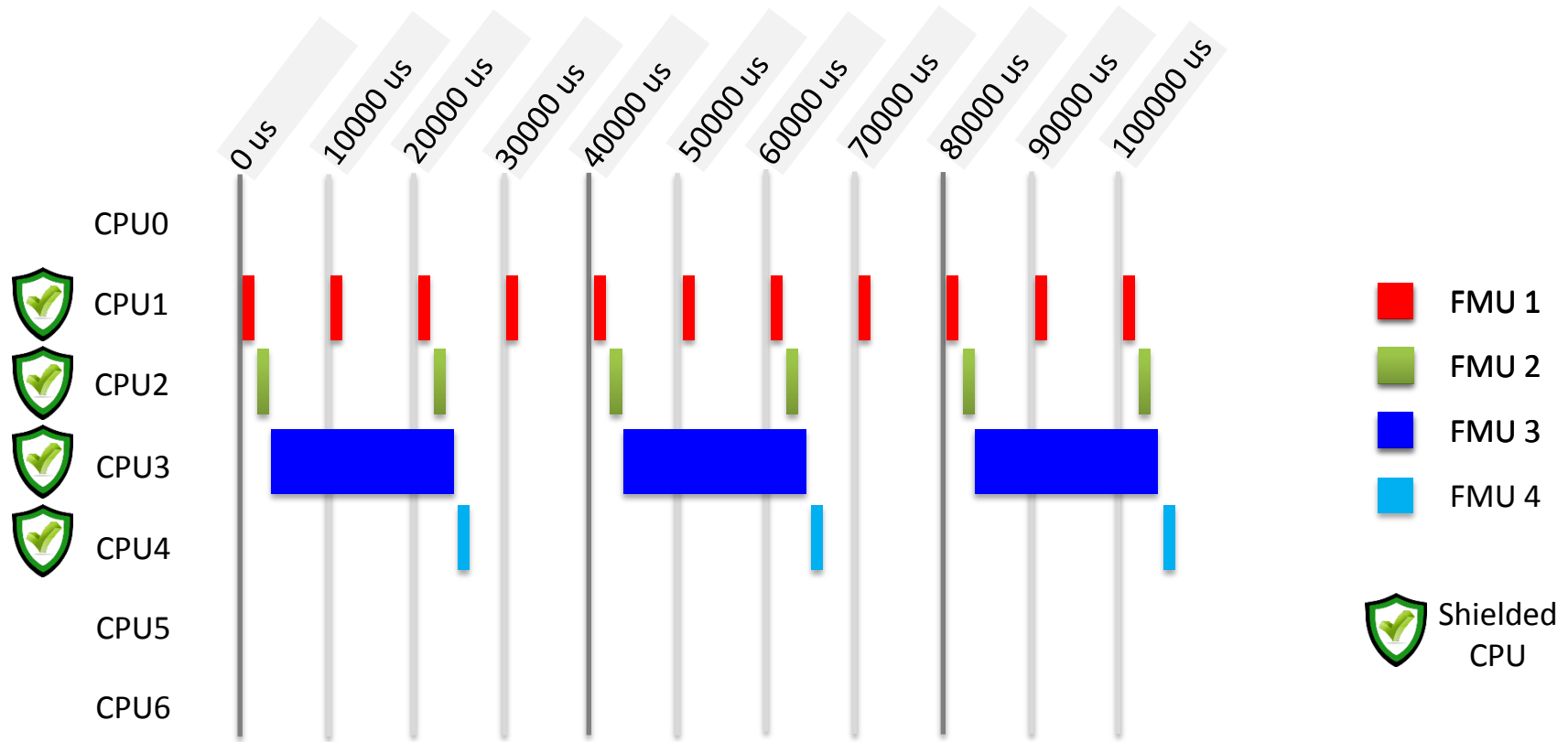
# Multi-Core FMU Support

- ❑ Support multiple threads in FMU
- ❑ Improve performance
- ❑ Example: Model with
  - **320** continuous-time state variables
  - 20000 time-varying variables
  - Target 1000  $\mu$ s frame
  - Single thread execution time  $\sim$  1500  $\mu$ s

# Multi-Core FMU Support



# Multiple FMU Models



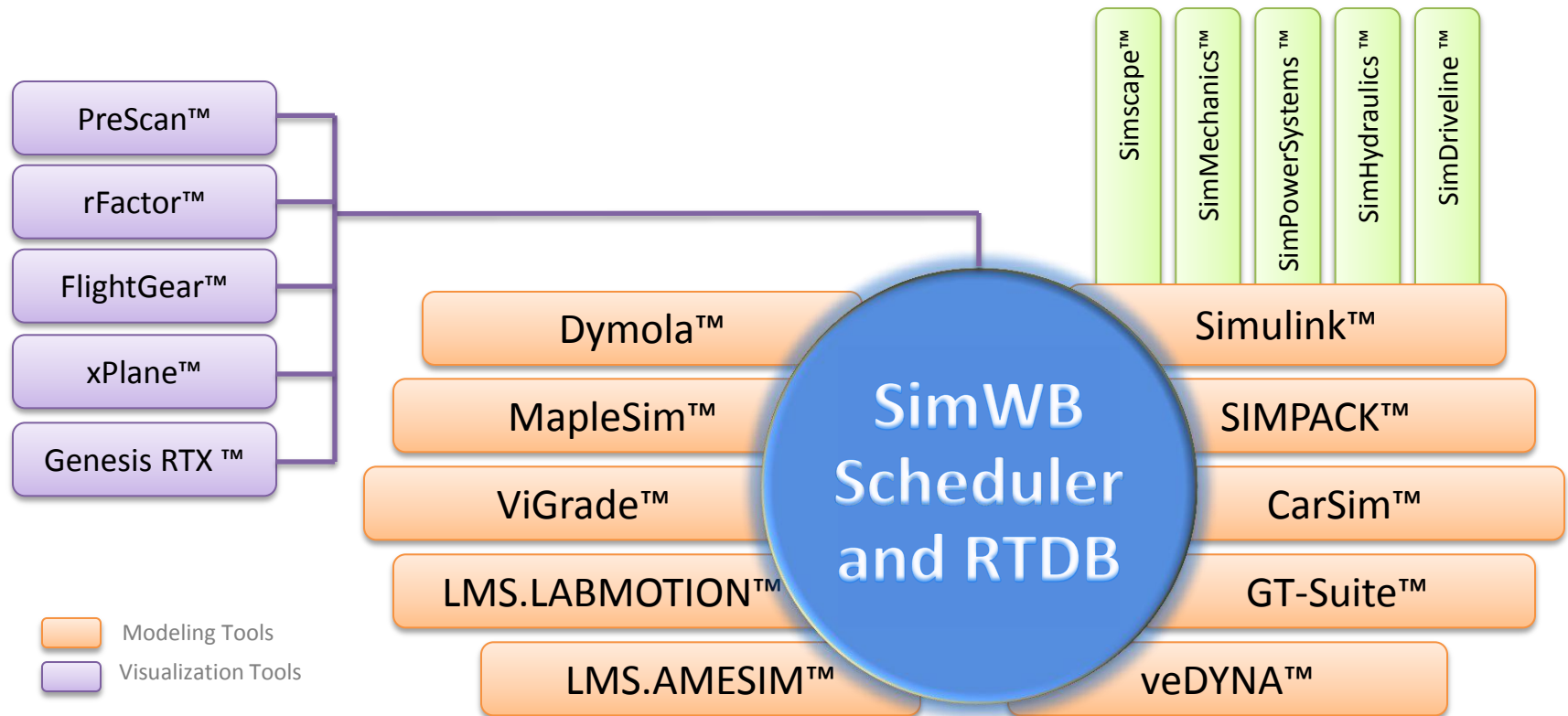
- Run multiple FMUs on multiple cores

# Multiple FMU Models



- Reassign CPU cores on the fly in real-time
- Run models from multiple vendors in multiple cores

# Multi-Vendor Model Integration Platform



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# THANK YOU!

<http://wiki.simwb.com>

<http://real-time.ccur.com/>

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