

# RT-LAB USAGE AT RENAULT

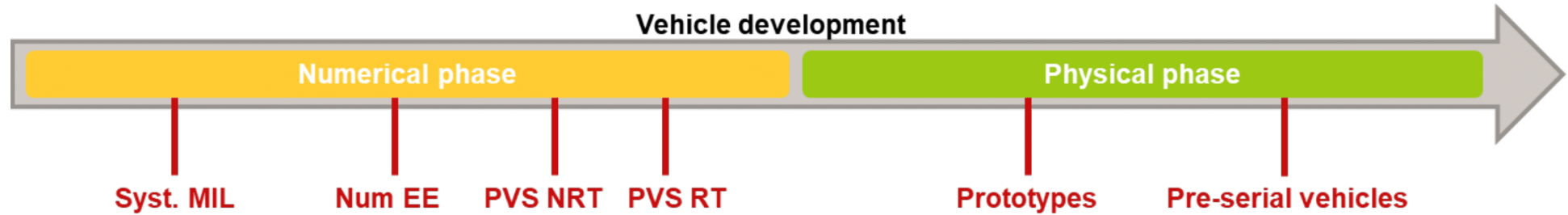


**OPAL-RT**  
TECHNOLOGIES

**GROUPE RENAULT**

# RUNNING RT-LAB AT NUMERICAL PHASE

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- **Systems MILs – few models level**
- **Numerical EE archi – car level**
- **PVS NRT – car level**
  - ADAS manual validation
  - ADAS massive simulation
- **PVS RT – car level**
  - Simulator preparation
  - Simulator usage
- **All platforms**
  - CAN representative
  - Custom GUI



# MIL & SYSTEMS MIL

- **Follow single MIL in validation logic**

- **Key data**

*Domains: Vehicle access, lighting...*

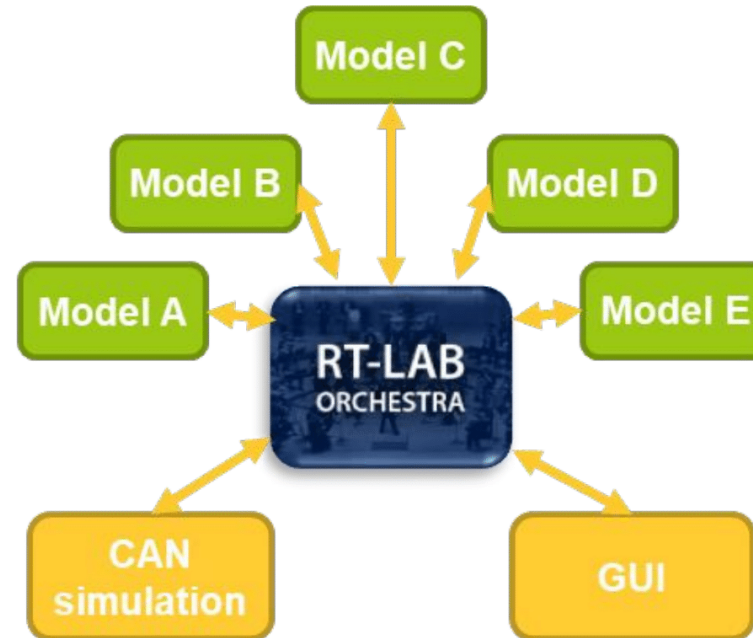
*Model under validation: 2 to 3*

*Model for environment: 15 to 20*

*Exchanged signals: 4 000 @1ms*

- **Goal of validations**

*System software behavior*



# NUMERICAL EE ARCHITECTURE

- **Follow single MIL in validation logic**

- **Key data**

*Domains: Vehicle inter-systems*

*Model under validation: 11*

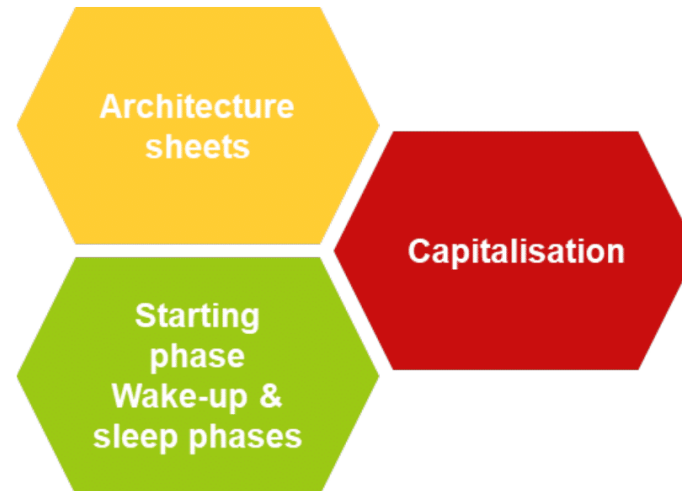
*Model for environment: 15*

*Exchanged signals: 15 000 @1ms*

- **Goal of validations**

*Functionnal testing*

*Disfunctionnal testing*



- **System Validation Platform (PVS)**

*Application: No-Real Time*

*Domains: AD/ADAS*

*System under validation: 1*

*Model for environment: 15 to 20*

*Exchanged signals: 20 000 @1ms*



- **MANUAL**

- **Goal of validations**

*Prepare & debug for massive simulation  
(Re)play focused test-cases*



- **MASSIVE SIMULATION**

- **Goal of validations**

*Campaign tests > Millions of KM  
Reduce validation time  
Increase tests coverage*

# FOCUS ON CHALLENGES FOR MASSIVE SIMULATION

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- **Switch to massive simulation**

- **Key data**

*OS:* Linux required

*Environment:* HPC and/or Clouds

*Automation:* From installation to post-treatment

*Licensing:* Availability and performance constraints



## ■ System Validation Platform (PVS)

*Application: Real Time*

*Domains: AD/ADAS*

*System under validation: 1*

*Model for environment: 15 to 20*

*Exchanged signals: 20 000 @1ms*



### ■ PREPARATION

#### ■ Goals

*Prepare & debug for driving simulators*

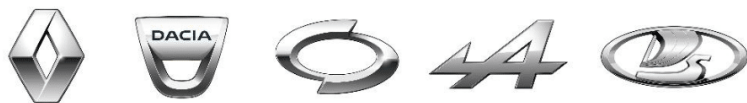


### ■ DRIVING SIMULATIONS

#### ■ Goal of validations

*Human in the loop testing*

*Performance level*



**THANK YOU**