CANape Option Simulink XCP

**Product Information**

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1 Overview

1.1 Introduction

CANape provides mature functions for visualizing measured data from various sources – synchronously and with time precision. Option "Simulink XCP Server" lets you link CANape to models in Simulink and use CANape as a parameterization and visualization user interface for Simulink models. Parameter changes are easily made in CANape and transferred to the model. At the model's runtime, Simulink sends measured data from the model to CANape via the XCP on Ethernet protocol. You access parameters in Simulink exactly as though the application were running in an ECU. Simulink models are computed slower or faster than in real time (dependent on their complexity and processing power). After the computation cycle, you can analyze the data in CANape, adjust model parameters in CANape and then start the next computation cycle.

Option "Simulink XCP Server" can be used either with or without CANape.

1.2 Overview of Advantages

> Easily visualize signals and parameterize calibration parameters from Simulink models in CANape

> From CANape, you parameterize your model in Simulink (e.g. by loading parameter sets)

> You have read and write access to objects in binary components, such as DLLs in Simulink, and this lets you optimize the behavior of components that are unavailable to you as a model, because they come from a partner

> Stimulate the model with data from your measurement files. Here, the measurement file contents are fed into the model as an input vector via CANape. This lets you check the model's behavior with real data.

> Model instrumentation is not needed for measurement or parameterization

> CANape is a tool you can use over the entire ECU development process. This reduces the number of tools you need, software maintenance costs, training requirements, etc.
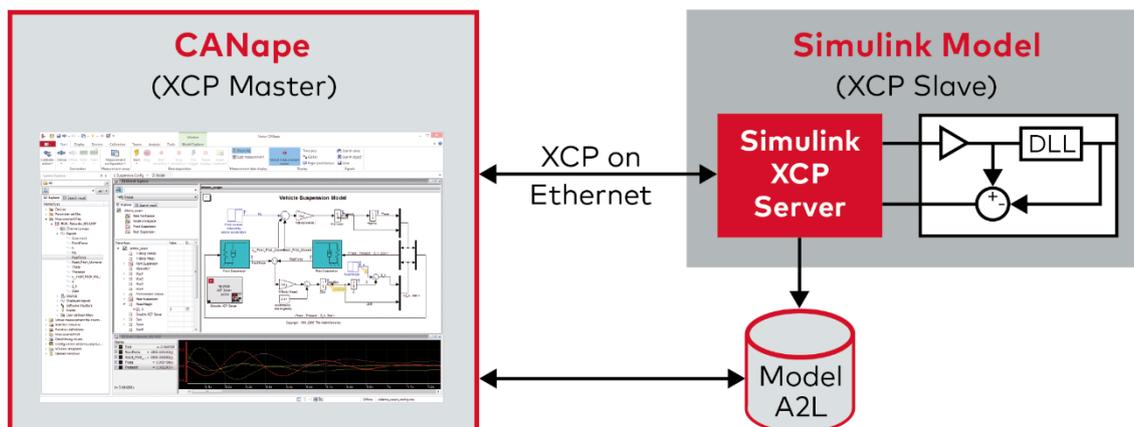
Figure 1: Conveniently measure and calibrate model parameters. CANape provides access to signals of the Simulink model via XCP on Ethernet and the Simulink XCP Server.

1.3 Application Areas

In the context of model-based software development, functions of the application are checked in an iterative process; the model is executed iteratively in Simulink from MathWorks. The Simulink XCP Server offers all function and software developers a convenient tool for managing parameters and efficiently measuring signals from the Simulink model without instrumentation. The CANape configuration used here can be reused in a later development phase.

1.4 Further Information

Various documents related to CANape are available on the Internet. With the demo version, you get sample configurations for various application areas and a detailed online Help function in which all CANape functions are described. However, no demos are available for use of the Simulink XCP server, because they require a related license. Please contact Vector Sales for a test license. Furthermore, you can benefit from valuable know-how in the form of technical articles, webinar recordings and application notes. For more information, go to the **Vector Download-Center**.

2   Functions

Communication between CANape and the Simulink model is realized via the standardized ASAM protocol XCP on Ethernet. Therefore, communication via the Simulink XCP Server is also available for other MC tools. At the press of a button, the hierarchical structure of the Simulink model is automatically reproduced in an A2L ECU description file. If you wish to simulate very large and complex models, standardized XCP on Ethernet communication gives you greater computing performance as well, because two separate computers are used.
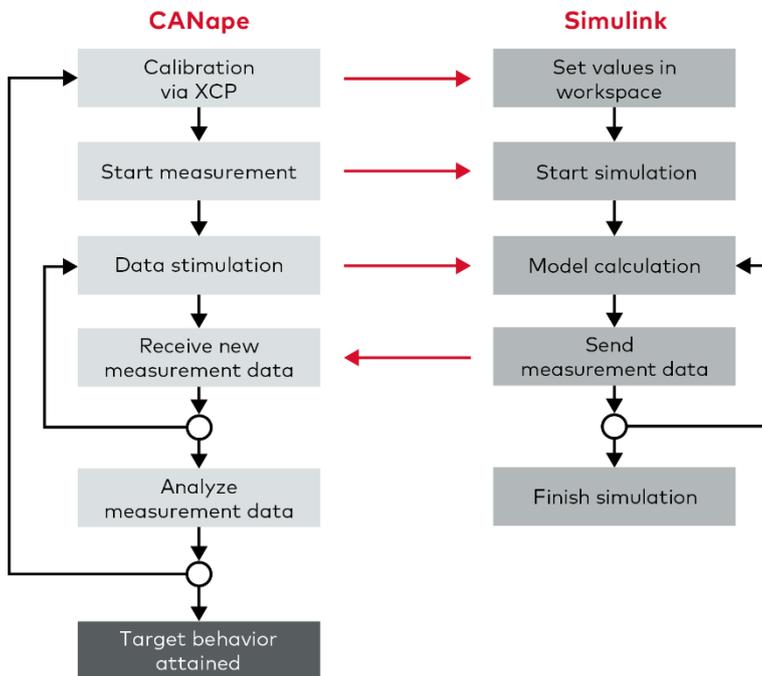

Figure 2: Overview of actions in CANape and their effects on the model in Simulink.

The data is transported to CANape at model runtime in Simulink. If the model runs significantly faster than in real time, offline visualization in CANape is used. After the test run in Simulink, the data is easily analyzed in CANape. The findings of the analysis lead to new parameter changes, which CANape also makes in Simulink.

CANape supports efficient analysis of model behavior with the following functions:

> All display windows in CANape are available for visualizing scalar parameters, characteristic maps, etc.

> You can use the Parameters window and CDM Studio (Calibration Data Management) to make changes to model parameters in Simulink

> Stimulation of the model requires feeding logged measurement data into the model as an input vector at runtime

> Signal-based instrumentation is not needed for stimulation of the model

> Signal-specific model instrumentation is not needed for measuring or parameterizing; all that is required, is to insert a single block from the Simulink CANape library into the model using drag & drop
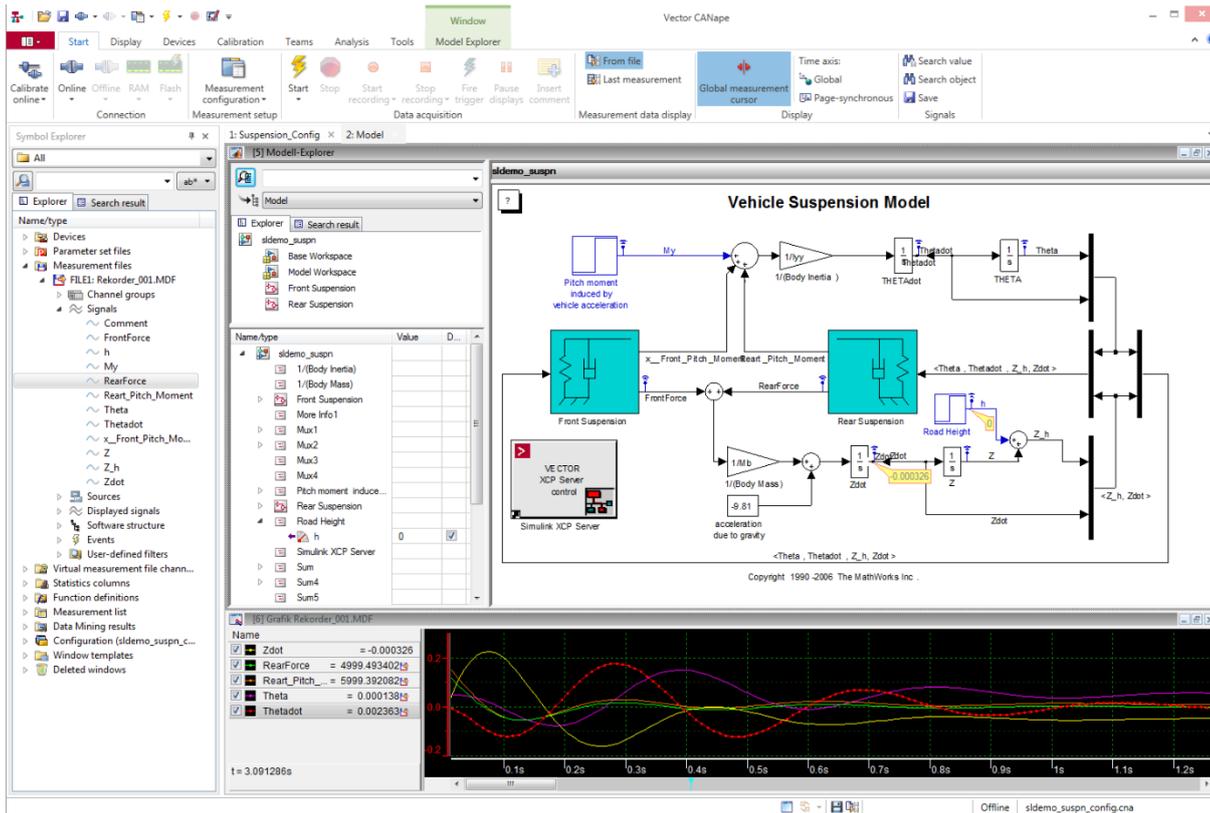
Figure 3: Configuration setup in CANape with visualization of the model, the time sequence of certain signals and a Parameters window for modifying parameters directly in the model.

3   Special Functions

The transfer of time stamps via XCP makes it possible to fully adapt CANape to Simulink's time behavior:

> For example, when you change the time behavior by use of the Simulink Debugger, CANape adapts to this and logs the data according to the received time stamps.

> If there are binary components in the model, e.g. S-functions from development partners, they can also be measured and calibrated with the help of an A2L file.

> Optional visualization of the model in CANape lets you conveniently put together your configuration in CANape by dragging and dropping objects from the visualization. Simulink users will feel right at home using their familiar model representation without requiring any conversion.

4   Simulink XCP Server Stand-Alone

You can use M-scripts to access objects in the Workspace, but not completely. If you receive a binary component (MEXW32/MEXW64) from a development partner, for example, which also runs in your model, you cannot use MATLAB/Simulink functions to access objects in the binary components.

You can access these objects from M-scripts with the Simulink XCP Server, even without CANape, using the object names and Set and Get commands. All that is needed is the A2L file of the binary component, and you can then optimize the parameters, e.g. script-driven, directly from your MathWorks environment.

4.1   System Requirements

> Windows 10/8.1/7 (32-bit and 64-bit)

> The Simulink XCP Server is supported starting at CANape 8.0

> MATLAB Version R2007b

5   Training

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