

# Experience with Industrial In-House Application of FMI

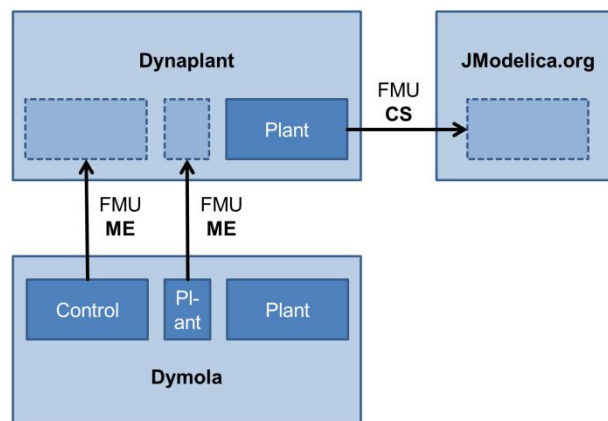
Kilian Link<sup>1</sup> Leo Gall<sup>2</sup> Monika Mühlbauer<sup>3</sup> Stephanie Gallardo-Yances<sup>4</sup>

<sup>1,3,4</sup>Siemens AG, Germany, {kilian.link, monika.muehlbauer, stephanie.gallardo}@siemens.com

<sup>2</sup>LTX Simulation GmbH, Germany, leo.gall@ltx.de

This paper discusses FMI usage in an in-house simulation tool landscape where it helps to open doors between different tools. The industrial application of Functional Mock-Up Interface (FMI) has already been discussed several times, e.g. (Bertsch, 2014). The goal of this paper is to add another aspect to this discussion. Our focus lies on the in-house applicability of FMI in coupling different tools and propriety models.

Two kinds of use cases are described in this chapter, one targeting the utilization of FMI for model exchange, the other addressing FMI for co-simulation, see Figure 1. Apart from different application areas major similarities exist: The use cases focus on tool interoperability, all FMUs reside in-house only and the models are huge with respect to number of parameters, dynamic states and internal/local variables.



**Figure 1.** Use Cases.

As the use cases require the implementation of FMI support in our in-house tool Dynaplant we try to share our experience with the implementation of FMI support. Even if the implementation of FMI support implies a great effort, it is useful for many different applications as shown in this paper. In principle, FMI can help or even enable some of the shown examples and some of our target applications, but still we face several limitations.

The existing scalar signal interface is definitely not powerful enough to allow the convenient application of FMI. A future FMI standard perfectly suited to our in-house applications would also need to support the concepts of acausal modeling - similar to the built-in behavior of Dynaplant and the basic principles of Modelica. Moreover, we face a mismatch between the intention of FMI to hide information and a need to reveal as much information as possible for in-house application. At the current state we want to encourage users to carefully investigate all implications before introducing FMI.

## References

Christian Bertsch, Elmar Ahle, Ulrich Schulmeister (2014): The Functional Mockup Interface - seen from an industrial perspective, *Proceedings of the 10th International Modelica Conference*, March 10-12, 2014, Lund, Sweden. doi:10.3384/ecp1409627