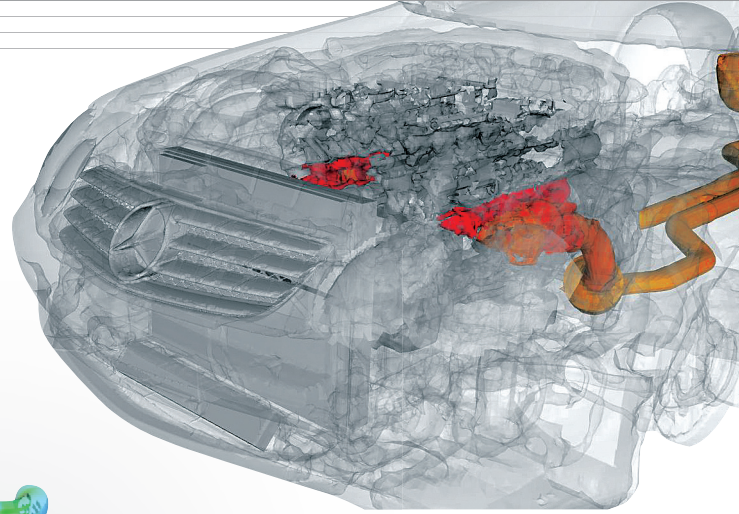
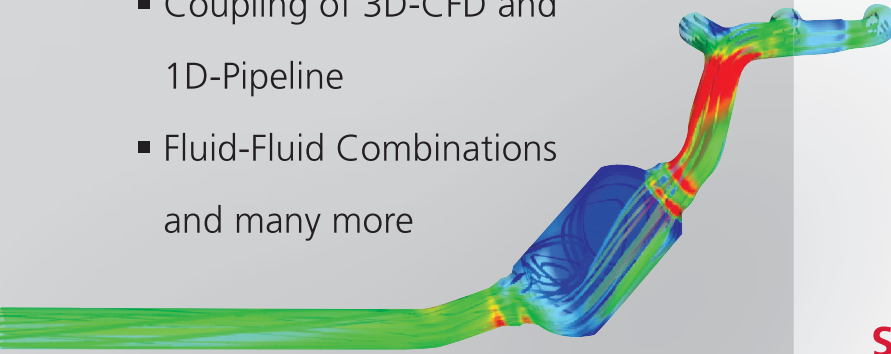


MULTI DISCIPLINARY AREAS

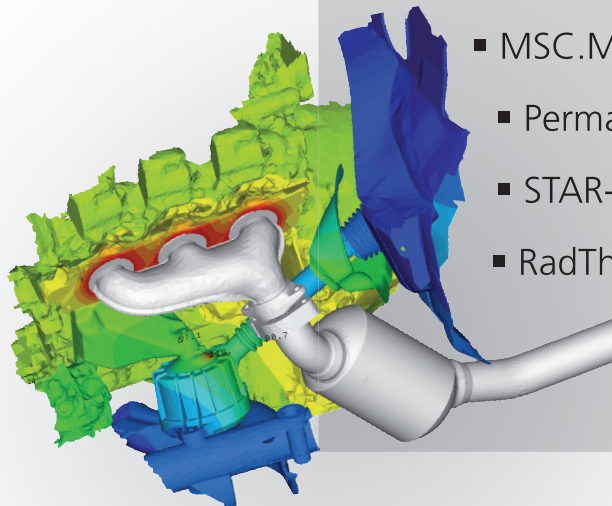
- Fluid-Structure Interaction
- Thermal Coupling and Radiation
- Thermo-Electrical Interaction
- Magneto-Hydro-Dynamics
- Coupling of 3D-CFD and 1D-Pipeline
- Fluid-Fluid Combinations and many more



Pictures by courtesy of DaimlerChrysler

SUPPORTED CODES

- ABAQUS
- ANSYS
- Flowmaster (in preparation)
- FLUENT
- FLUX
 - Icepak
- MSC.Marc
- Permas
- STAR-CD
- RadTherm and programmable interface for inhouse codes



Multidisciplinary simulation through code coupling with MpCCI

There is an increasing need for multidisciplinary simulations in various research and engineering fields. Fluid-structure interaction, magnetohydrodynamics, thermal coupling, plasma computations or coupled manufacturing processes define only a subset of recent multi physics activities.

There is a common feeling in the community that in most cases not a single (proprietary) simulation system can provide all necessary features but that coupling the best codes of each discipline will enable more flexibility and simulation quality to the end user.

The MpCCI interface has been accepted as a »de-facto« standard for simulation code coupling. MpCCI (Mesh-based parallel Code Coupling Interface) has been developed at the Fraunhofer Institute SCAI in order to provide an application independent interface for the coupling of different simulation codes. MpCCI is a software environment which enables the exchange of data between the meshes of two or more simulation codes in the coupling region. Since the meshes belonging to different simulation codes are not compatible in general, MpCCI performs a suitable

interpolation. In case of parallel codes MpCCI keeps track on the distribution of the domains onto different processes. MpCCI allows the exchange of nearly any kind of data between the coupled codes; e.g. energy and momentum sources, material properties, mesh definitions, or global quantities. The details of the data exchange are hidden behind the concise interface of MpCCI.

Within the MpCCI 3.0 system the code adapters establish a direct connection between the MpCCI Coupling Server and the codes themselves. The adapters make use of the APIs of the commercial codes and thus (in most cases) need no modified versions of these codes. A code adapter is a library which will be linked to the code either statically or dynamically. Any code adapter consists of two modules – the Coupling Manager and the Code Driver.

Additionally, there are specific scripts for each code to scan the model input data, to start the codes and finally to stop the codes properly.

The MpCCI environment supports the codes ABAQUS, Ansys, Fluent, Flux3D, ICEPAK, MSC.Marc, Permas, StarCD, and RadTherm. Adapters for further codes like the 1D pipeline code Flowmaster are under development.

MpCCI 3.0 provides a lot of new features for the coupling of simulation codes. Together with the MpCCI code adapters now a complete toolbox for multidisciplinary simulation is ready for use. Around 100 licensed users world wide demonstrate the applicability of this concept and the valuable outcome for the end users.

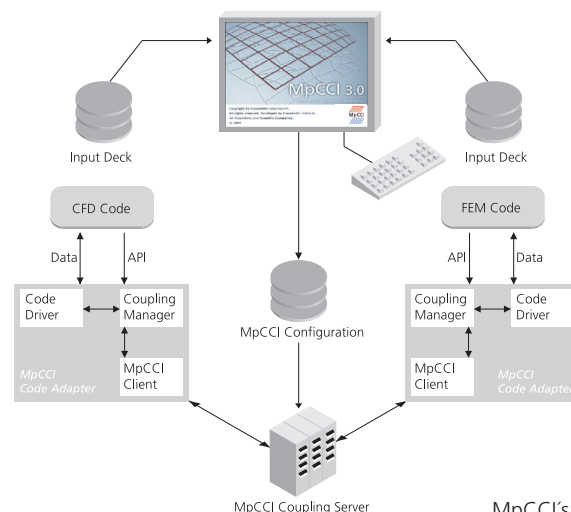
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MpCCI's modular architecture