



VMAP

VMAP is a vendor-neutral standard for CAE data storage and transfer to enhance interoperability in virtual engineering workflows.

- a defined international standard
- software library available to read/write VMAP data files
- supported by a strong VMAP Standards Community

The VMAP standard and import/export interface tools provides users with a vendor-neutral methodology of transferring material and engineering data between different CAE software along the whole simulation process chain.

Further features:

- meta and user data
- coordinate and unit systems
- parameters for [material] models
- tutorials and test cases
- geometry and discretization
- result and state variables
- based on HDF5

CAE Tool implementations (to date):

VMAP has been directly integrated into 4a FiberMap/MicroMec, Beta CAE Ansa, DYNAMore Envyo (supporting LS-DYNA), e-Xstream Digimat, SCAI MpCCI Mapper and Simcon CADMould.

VMAP has been linked via an external wrapper with Autodesk Moldflow, ESI Visual Environment, inuTech Diffpack, MSC Marc, OpenFOAM and Simulia Abaqus.

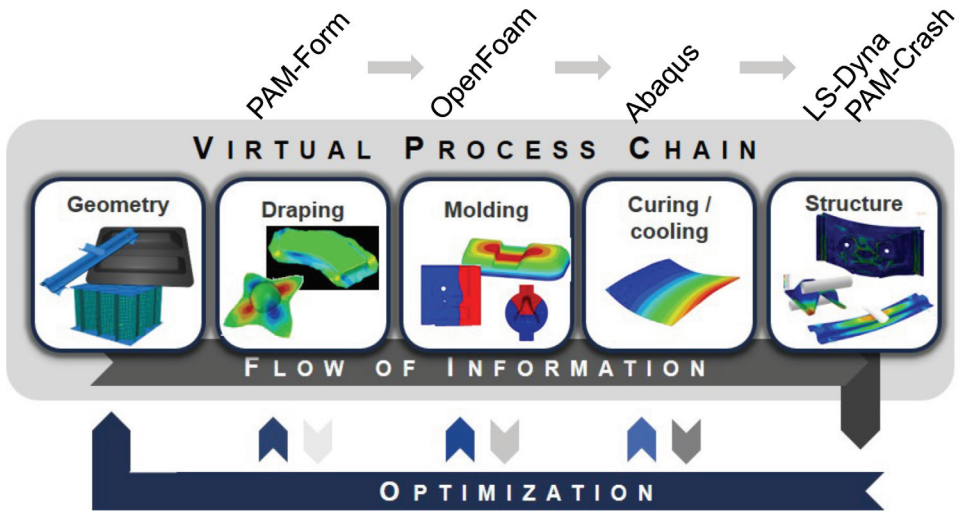
Implementations are under development for ANSYS Mechanical, Autodesk FUSION 360Platform and Forge (Transvalor).

The VMAP project objectives are endorsed by Audi, Bosch, EDAG, Rikutec and Philips.



Use Case Example – Composite Lightweight Vehicle (AUDI)

Codes integrated in this workflow are: PAM-Form (draping), OpenFOAM (moulding), Abaqus (curing and cooling) and LS-Dyna resp. PAM-Crash (structural analysis).



Kärger, L.; Bernath, A.; Fritz, F.; Galkin, S.; Magagnato, D.; Oeckerath, A.; Schön, A.; Henning, F. Development and validation of a CAE chain for unidirectional fibre reinforced composite components. Composite Structures 132: 350–358, 2015. dx.doi.org/10.1016/j.compstruct.2015.05.047

VMAP Standards Community

The VMAP Standards Community (VMAP-SC) has been established to drive the standards and software development effort during and after the initial project. The VMAP-SC is controlled by its ByLaws and decides on future VMAP work and development projects. We are open to all experts and entities who require successful VMAP standards and tools so please contact us. vmap.eu.com/community

Complex workflow?

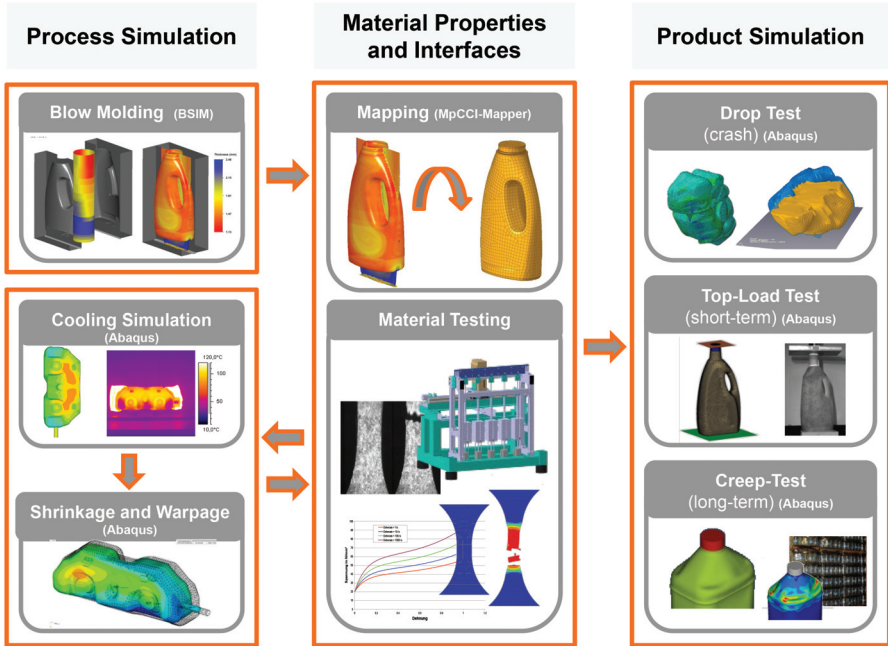
Difficult material data transfer?

The more simulation processes that are looked at, the better the VMAP Standard will be in a shorter period. Please contact us if you would to discuss your process and consider it for inclusion into VMAP.

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Use Case Example – Extrusion Blow Moulding (Rikutec)

Codes integrated in this workflow are: B-Sim (blow moulding), Abaqus (cooling & shrinkage), Abaqus resp. RADIOSS (structural performance and crash).



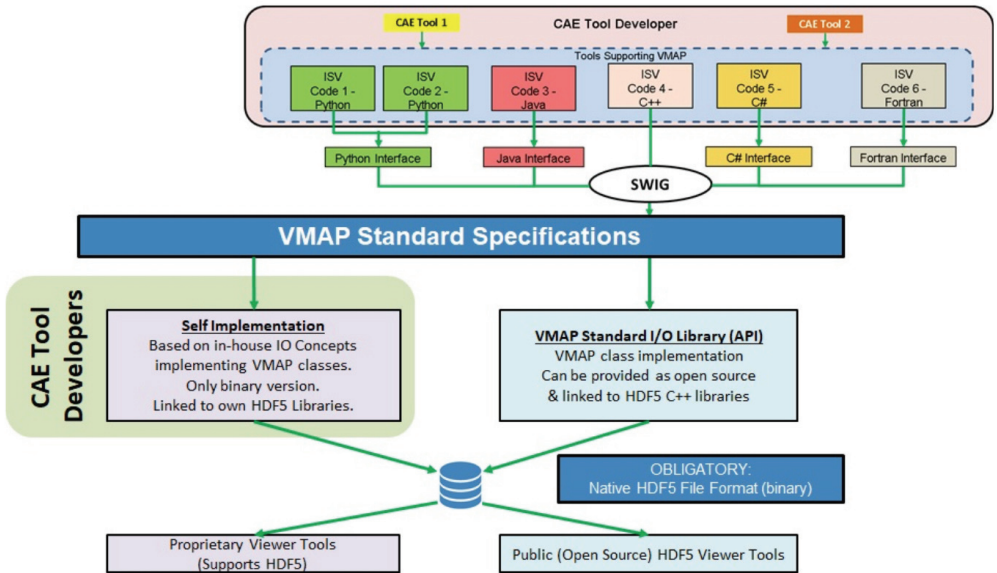
VMAP help for software developers

To enable quick and efficient incorporation of the VMAP standards into any CAE software VMAP provides a set of Input/Output software tools to read/write directly with the VMAP standard database implemented on top of **HDF5** (hdgroup.org).

These tools should be placed in a **SWIG** wrapper (swig.org) that enables CAE software written in any programming language to directly call the VMAP IO tools.

Alternatively, Independent Software Vendors may create their own IO routines for direct and efficient reading/writing of the HDF5 VMAP standard database.

Included in the tools provided for developers are a series of small test cases that can be used to check the functionality of any implementation.



The project “VMAP: A new Interface Standard for Integrated Virtual Material Modelling in Manufacturing Industry” is organised via the [ITEA programme \(itea3.org/project/vmap.html\)](https://itea3.org/project/vmap.html). The project period is from October 2017 to September 2020

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ITEA is the EUREKA Cluster programme supporting innovative, industry-driven, pre-competitive R&D projects in the area of Software-intensive Systems & Services (SiSS). ITEA stimulates projects in an open community of large industry, SMEs, universities, research institutes and user organisations.

ITEA is a EUREKA Cluster, the community is founded in Europe based on the EUREKA principles and is open to participants worldwide. <https://itea3.org>