

## PRACE SHAPE and OPTIMA Pharma: for cleaner clean rooms

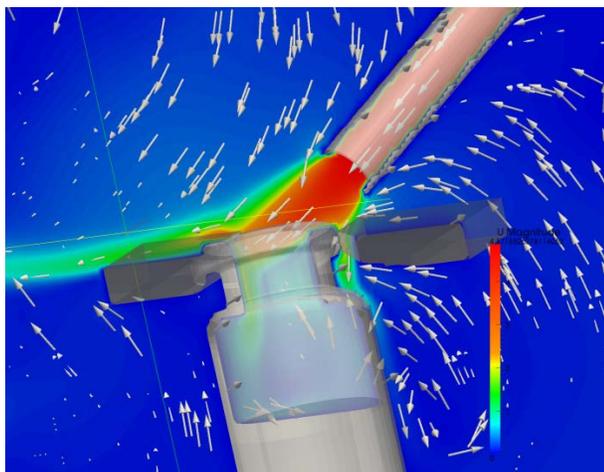
*OPTIMA pharma GmbH, the pharma division of OPTIMA packaging group GmbH, produces and develops filling and packaging machines for pharmaceutical products - sterile and non-sterile liquids - and pharmaceutical freeze drying systems as well as isolator (clean room) and containment technology. Their project supported by SHAPE simulated the airflow in clean rooms to make them even cleaner.*

Clean rooms are built to allow certain industrial processes to take place with minimum risk of contamination of the products, such as pharmaceuticals. Airflow around e.g. filling lines should prevent any remaining dust and impurities to reach the sterile materials. Such airflow was the topic of research of the SHAPE project **Optimizing mesh and solver parameters for clean room airflow simulations with OpenFOAM** which received 50.000 core hours on Hermit @ GCS@HLRS, Germany – located at the University of Stuttgart (<http://www.uni-stuttgart.de>) – through the 15<sup>th</sup> cut-off of PRACE Preparatory Access (<http://www.prace-ri.eu/preparatory-access-15/>).

The main topics of the project were parallel mesh generation, domain decomposition and mesh reconstruction, and turbulence modelling. The goal was to assess suitable CFD (Computational Fluid Dynamics) models capable of simulating the airflow in a whole clean room and meeting the requirements of industrial production.

*“OPTIMA pharma had already gained some experience with Tier-1 HPC systems, but this SHAPE project allowed us to scale out our models for a Tier-0 system on up to 1024 cores, resulting in an 80% reduction of the time needed to set up a CFD case, significantly reduced queuing times, and minimal waste of resources. Needless to say that these are essential improvements to a production process in a commercial environment,”* says Ralph Eisenschmid of OPTIMA pharma, GmbH.

The results of the project were presented during the SHAPE parallel track of PRACEdays14: <http://www.prace-ri.eu/pracedays14-presentations/>



Airflow simulations in pharmaceutical clean rooms with OpenFOAM Nitrogen flushing of vials (coloured by magnitude of velocity) © OPTIMA pharma GmbH



# PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

## Project details

**Title:** Optimizing mesh and solver parameters for clean room airflow simulations with OpenFOAM  
**Leader:** Mr. Ralph Eisenschmid, OPTIMA pharma GmbH, Germany  
**Collaborator:** B. Große-Wöhrmann, High Performance Computing Center (HLRS), Germany  
**Research field:** Engineering and Energy  
**Resource awarded:** 50.000 core hours on Hermit @GCS@HLRS, Germany

More detailed results of this project, as well as the other 10 first SHAPE projects are available on the PRACE website: <http://www.prace-ri.eu/SHAPE-Prototypes>

## About OPTIMA pharma GmbH

OPTIMA pharma GmbH, located at Schwäbisch Hall, Germany, produces and develops filling and packaging machines for pharmaceutical products - sterile and non-sterile liquids - and pharmaceutical freeze-drying systems as well as isolator (clean room) and containment technology. The company is operating worldwide with 600 employees, 350 of them in Schwäbisch Hall; it constitutes the pharma division of OPTIMA packaging group GmbH with 1800 employees worldwide. <http://optima-packaging-group.de/opg/pharma>

## About SHAPE

SHAPE, the SME HPC Adoption Programme in Europe is a pan-European, PRACE-based programme supporting HPC adoption by SMEs. The Programme aims to raise awareness and equip European SMEs with the expertise necessary to take advantage of the innovation possibilities opened up by High Performance Computing (HPC), thus increasing their competitiveness. <http://www.prace-ri.eu/shape>

## About PRACE

The Partnership for Advanced Computing in Europe (PRACE) is an international non-profit association with its seat in Brussels. The PRACE Research Infrastructure provides a persistent world-class high performance computing service for scientists and researchers from academia and industry in Europe. The computer systems and their operations accessible through PRACE are provided by 4 PRACE members (BSC representing Spain, CINECA representing Italy, GCS representing Germany and GENCI representing France). The Implementation Phase of PRACE receives funding from the EU's Seventh Framework Programme (FP7/2007-2013) under grant agreements RI-283493 and RI-312763. For more information, see [www.prace-ri.eu](http://www.prace-ri.eu)

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