
CLOUDFLOW: COMPUTATIONAL CLOUD SERVICES AND WORKFLOWS FOR AGILE ENGINEERING

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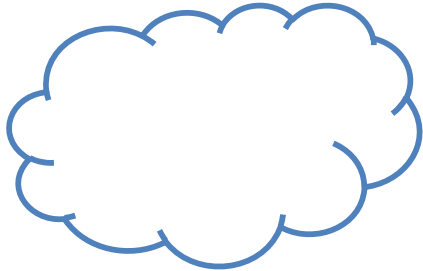
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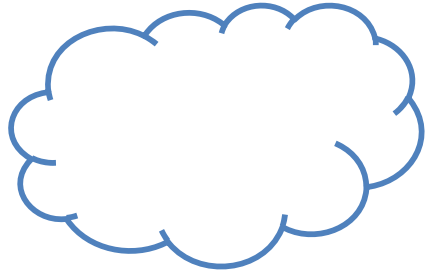
info@eu-cloudflow.eu

IDEA

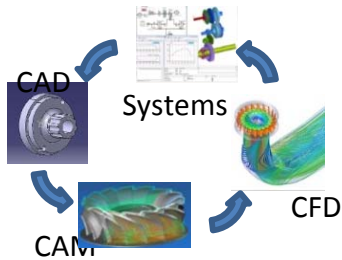


Cloud Computing

IDEA

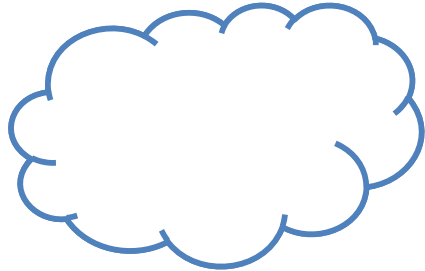


Cloud Computing

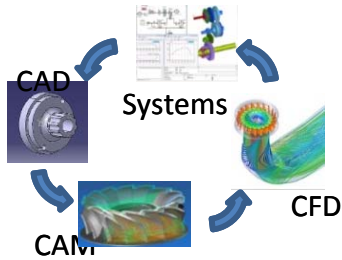


Work Flow

IDEA



Cloud Computing



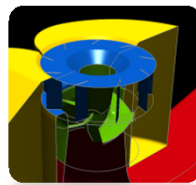
Work Flow



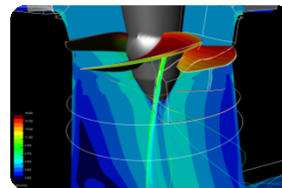
DRIVEN BY END USER **stellba** Hydro

■ Water turbine maintenance, repair and overhaul (MRO)

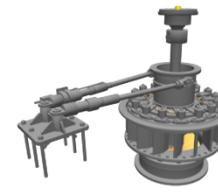
- Design
- Simulate
 - Flow
 - System
- Machining
- Assure quality
- Manage data



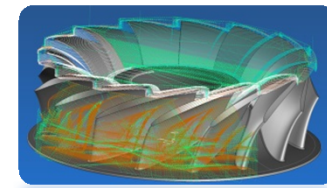
CAD



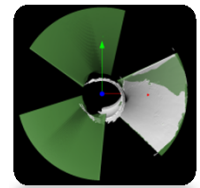
CFD



Systems



CAM



QA

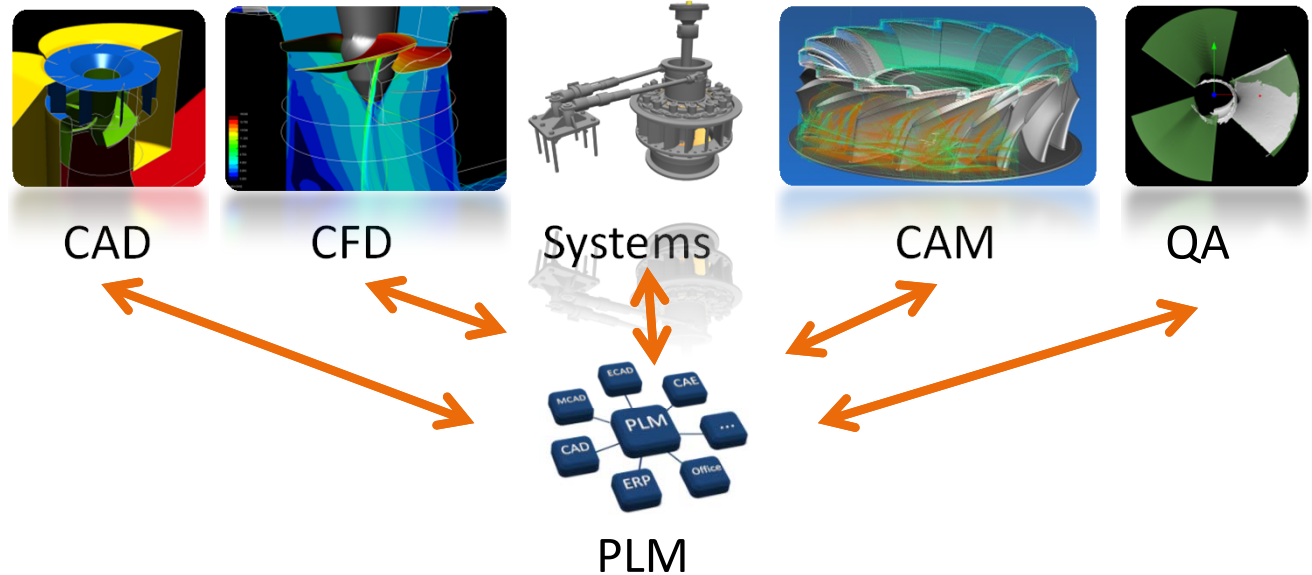


PLM

DRIVEN BY END USER **stellba** Hydro

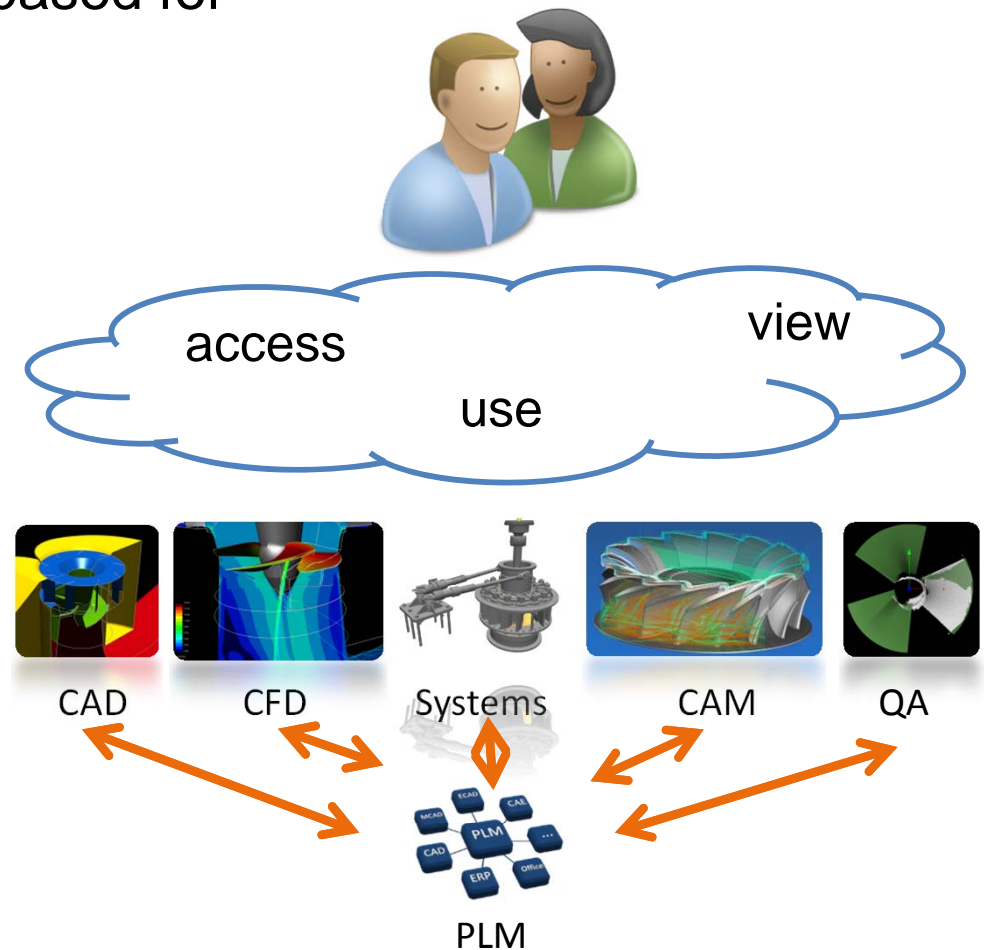
■ Water turbine maintenance, repair and overhaul (MRO)

- Design
- Simulate
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DRIVEN BY END USER **stellba** Hydro

- Wish to use these functionality Cloud-based for
 - Faster time-to-market
 - Better products
 - More cost-efficient development

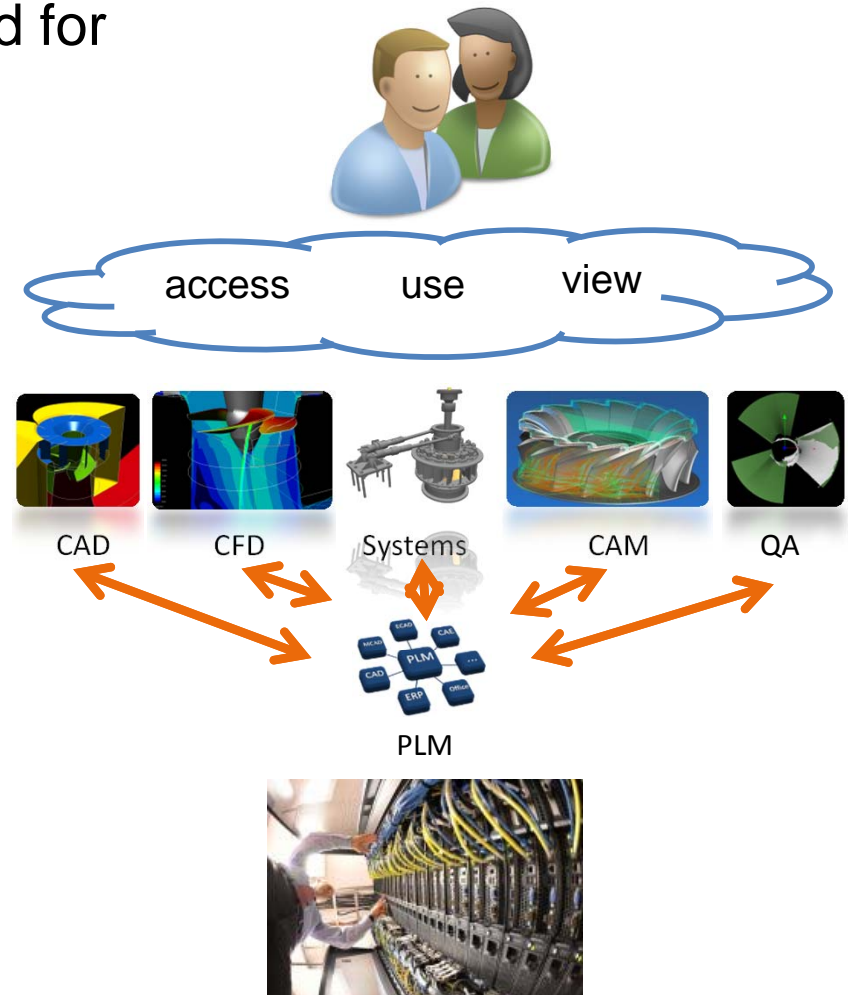


DRIVEN BY END USER **stellba** Hydro

■ Wish to use these functionality Cloud-based for

- Faster time-to-market
- Better products
- More cost-efficient development

- Leveraging HPC resources for
 - More complex physical-based simulation
 - Higher spatio-temporal resolution
 - Transient simulations, etc.

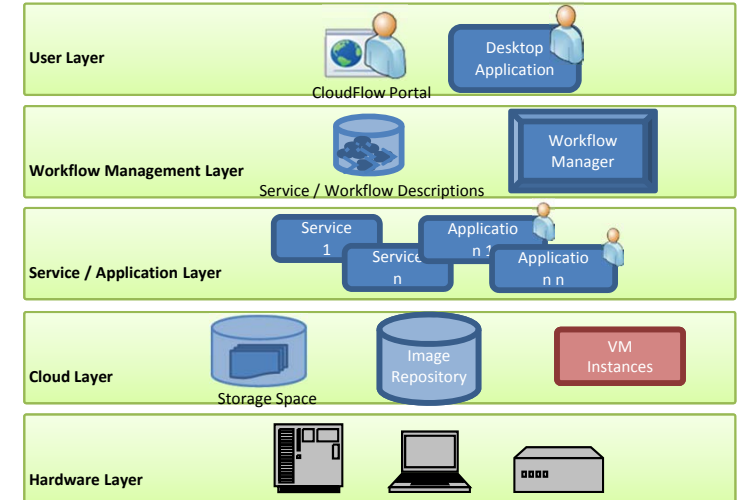


AIM OF CLOUDFLOW

- Developing an infrastructure open for new Cloud-based engineering services supporting engineering workflows in manufacturing and engineering companies (SMEs)
- Ease accessibility to HPC-based simulation services
- Increase affordability by new business models

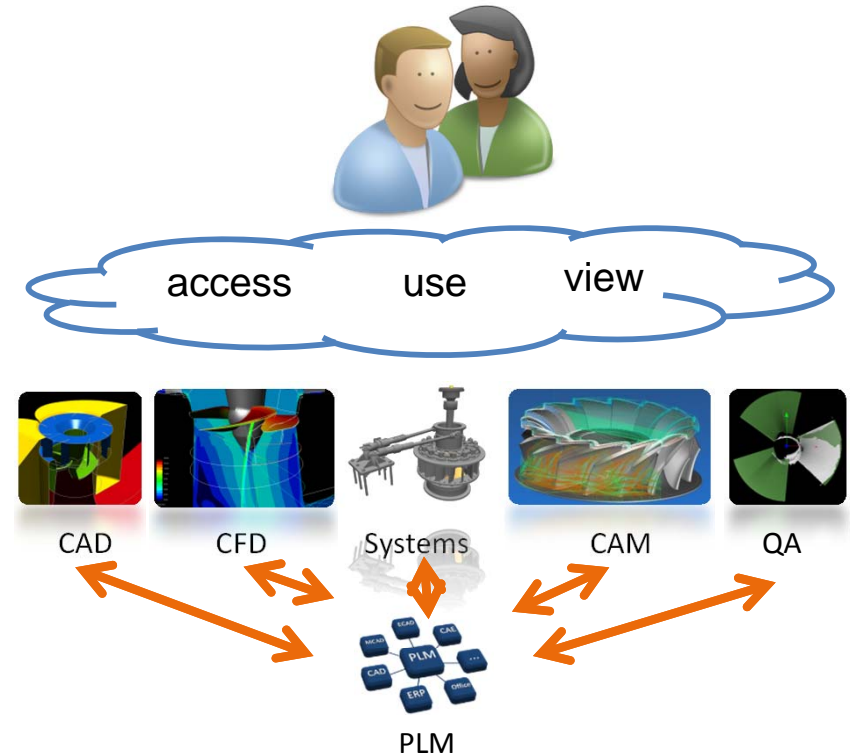
- Running

- 6 'internal' experiments
- 2 Open Calls, with 7 new experiments each



CURRENT 6 EXPERIMENTS

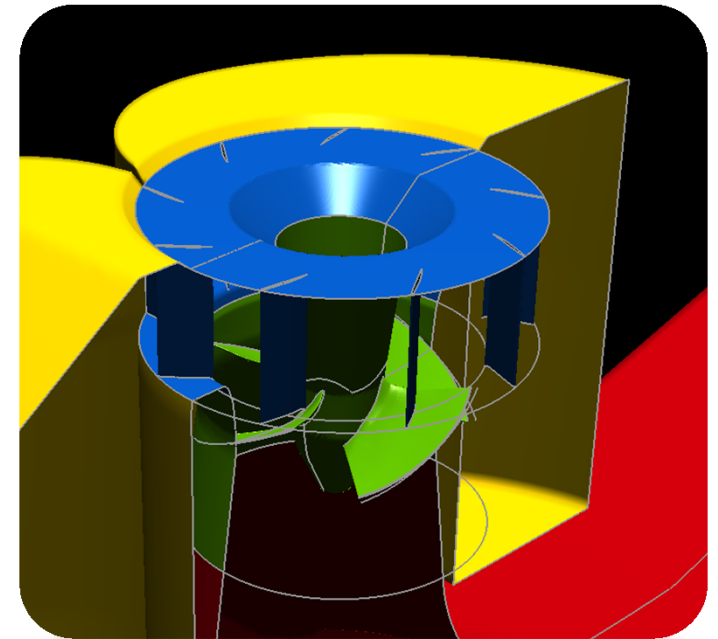
- CAD on the Cloud
- CAM on the Cloud
- CFD on the Cloud
- PLM on the Cloud
- Systems simulation on the Cloud
- Point clouds vs CAD comparison on the Cloud



CURRENT EXPERIMENTS (1/6)



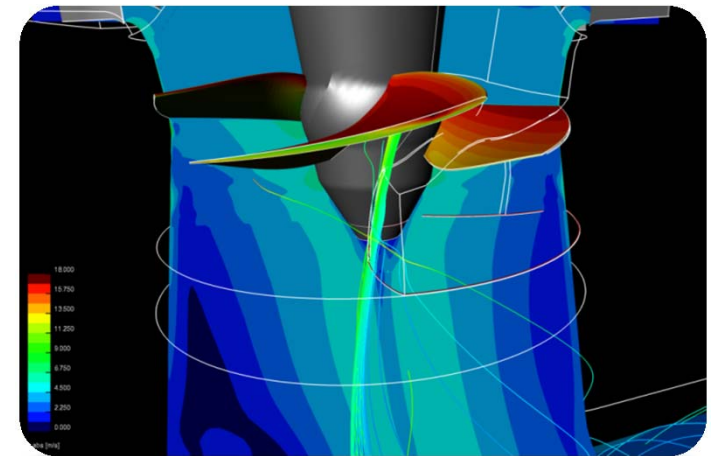
- CAD on the Cloud
 - Using a specific and expensive application on a local CAD Software can be replaced by a Cloud service
 - Service can work for a full process from the definition of the needs down to the manufacturing
 - User can initiate the development of special services



CURRENT EXPERIMENTS (3/6)



- CFD on the Cloud
 - CFD cloud simulation enables the access to computational resources that can otherwise not be made available in the company
 - Allows casual CFD users to have timely access to CFD capabilities as well as externalized computer resources
 - Accessing appropriate large resources on-demand

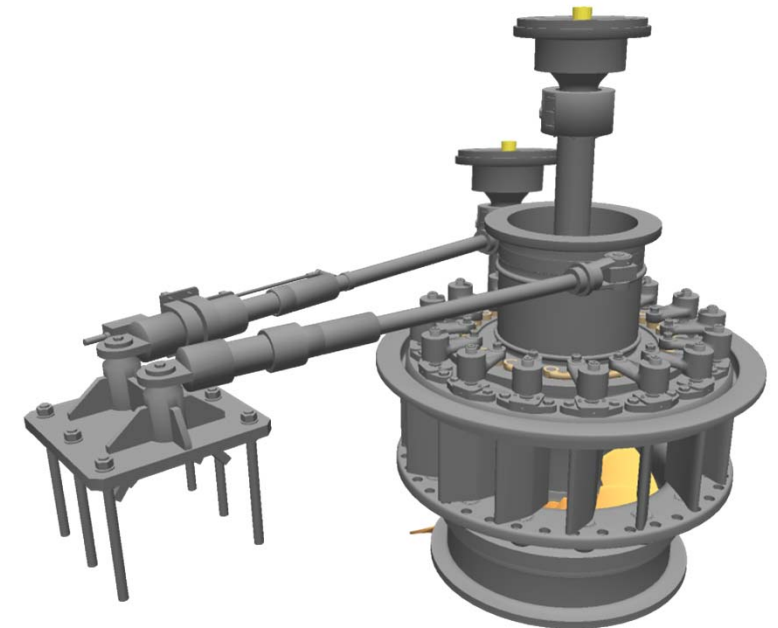
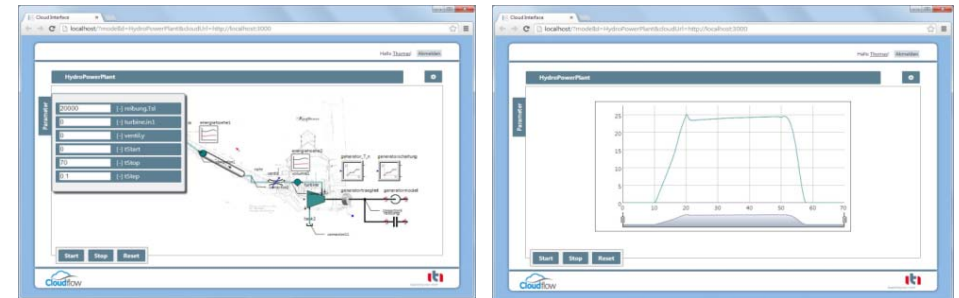


CURRENT EXPERIMENTS (5/6)



Supporting your vision

- Systems simulation on the Cloud
 - Typically 1D, multi-physics
 - Based on Modelica
 - Run
 - batch jobs,
 - parameter studies, and
 - optimizations
 - on an HPC infrastructure



CURRENT 6 EXPERIMENTS

- CAD on the Cloud
- CAM on the Cloud
- CFD on the Cloud
- PLM on the Cloud
- Systems simulation on the Cloud
- Point clouds vs CAD comparison on the Cloud



CLOUDFLOW PORTAL

Access the portal in the web-browser.

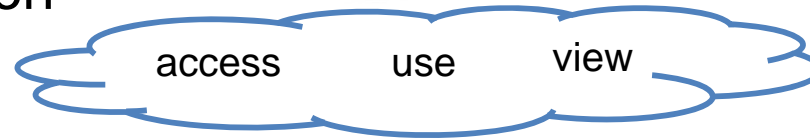
Example Experiment 6.

Video.

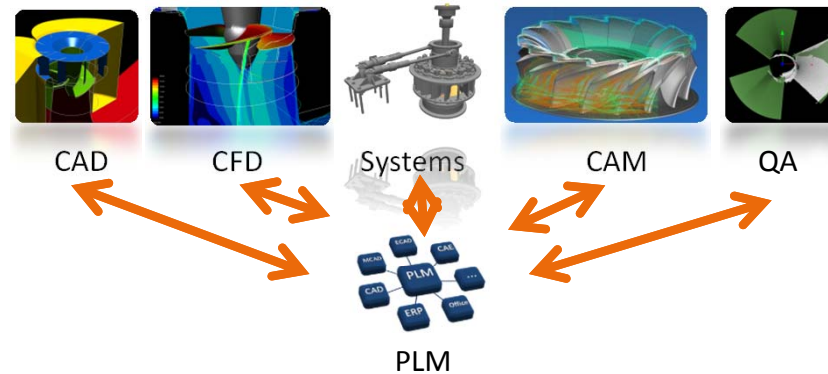
OTHER CONSORTIUM PARTNERS



- Experiment evaluation



- Business models



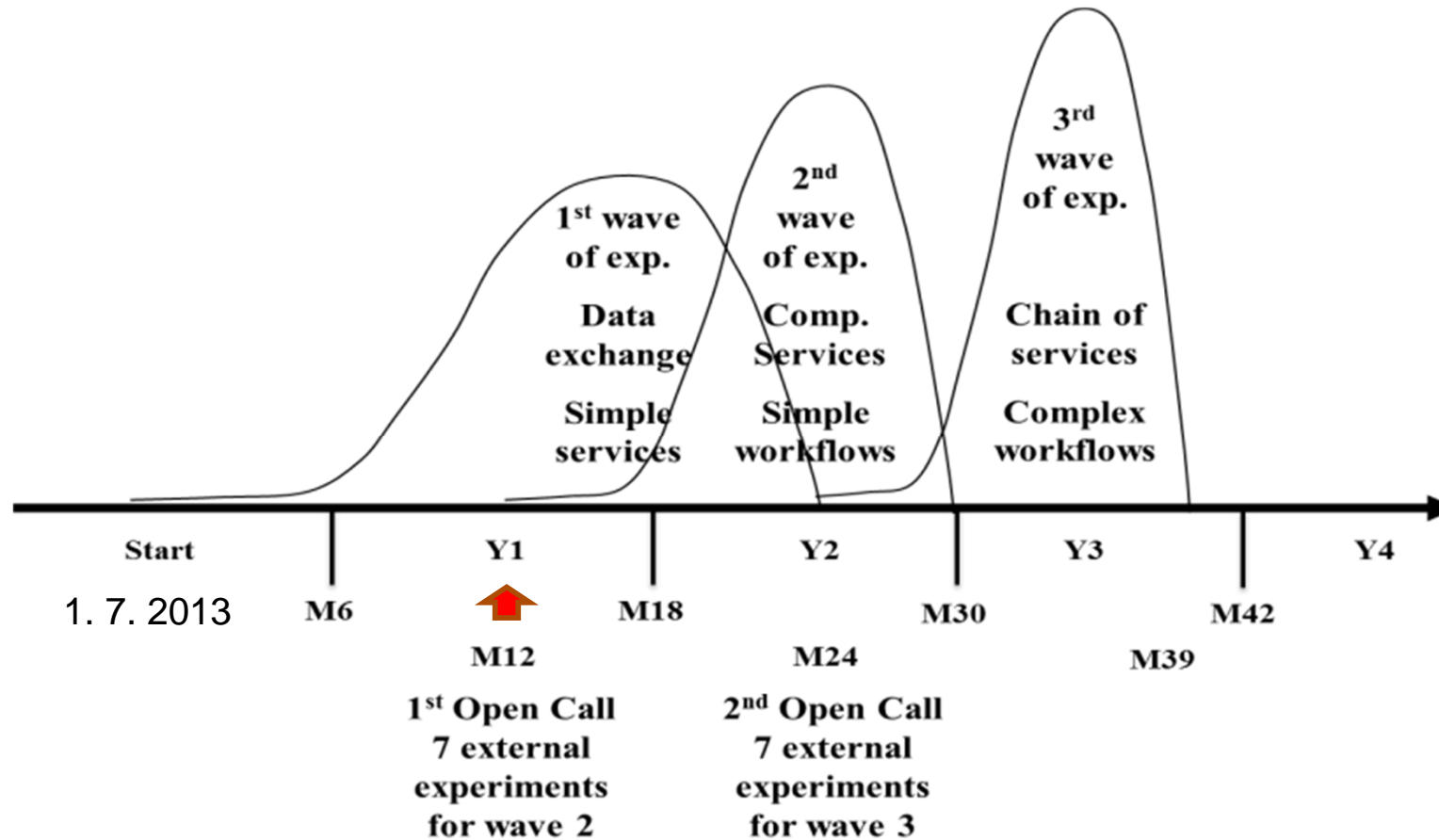
- CloudFlow infrastructure



- HPC provider



1ST OPEN CALL



30. 6. 2014

1ST OPEN CALL

- looking for 7 new Application Experiments
 - rooted in computational technology for manufacturing and engineering industries (SMEs)
 - address workflows along value chains in and across companies
 - priority on innovative product development and products, such as mechatronic and cyber-physical systems

1ST OPEN CALL

- consortia: 1-4 partners:
 - end users,
 - software vendors,
 - HPC provider and/or
 - research institutions
 - complemented by existing CloudFlow partners

1ST OPEN CALL

- Call publication date: 30. 6. 2014
- Call closing date: 30. 9. 2014

- Start date of experiment: 1. 1. 2015
- Duration: 1 year

- each application experiment to receive 100 K€ EC contribution on average

1ST OPEN CALL

- More info: www.eu-cloudflow.eu/open-calls including 4 documents
 - Short form (1-pager)
 - Guide for Applicants
 - Detailed explanations/hints w.r.t. consortia, experiments, funding scheme, ...
 - Proposal template incl. evaluation criteria
 - Proposals have approx. 12 pages
 - Short technical description of the infrastructure, incl. partner description
- Questions: info@eu-cloudflow.eu

MISSION



**Make Cloud infrastructures
a practical solution for manufacturing SMEs!**



THANK YOU!



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www.eu-cloudflow.eu/open-calls

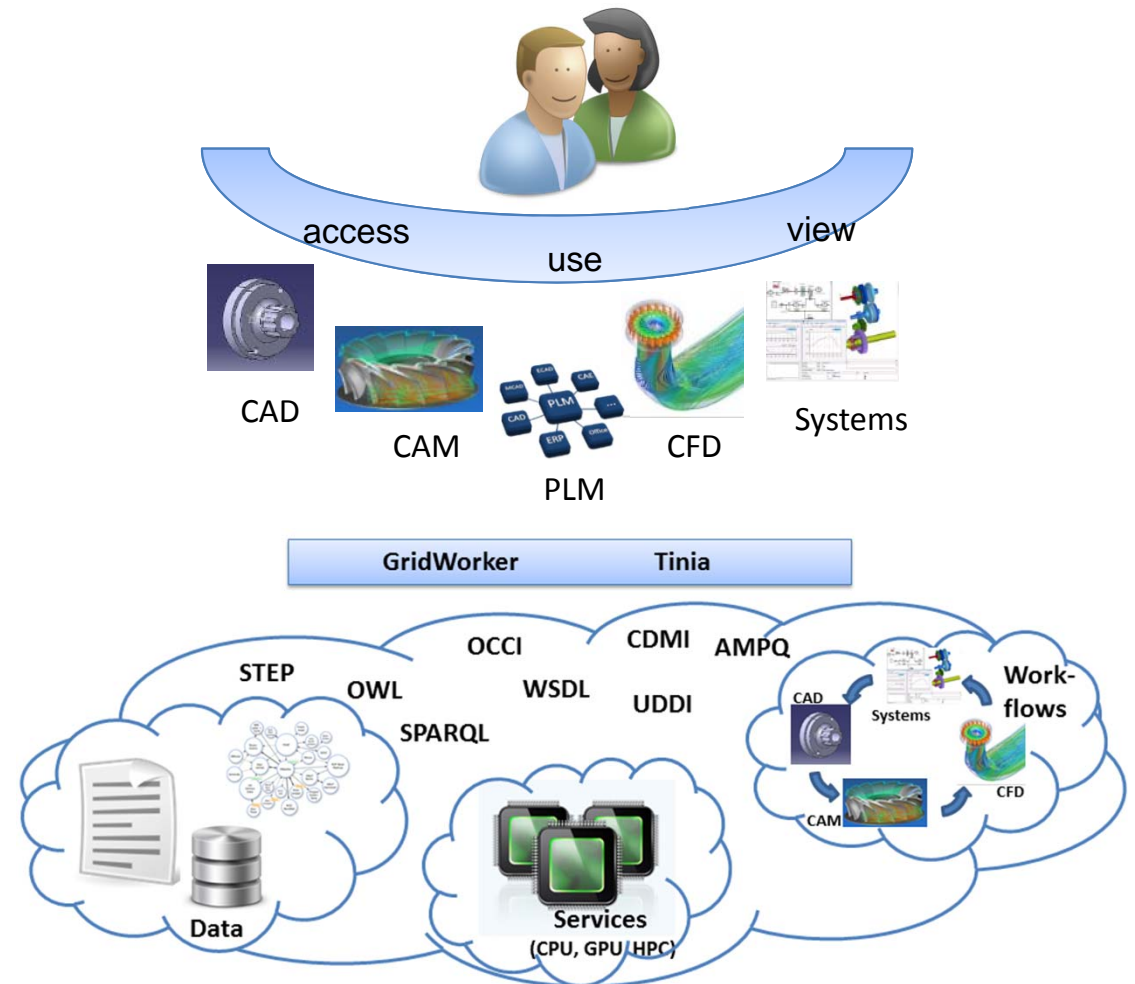
[e-mail: info@eu-cloudflow.eu](mailto:info@eu-cloudflow.eu)

S&T OBJECTIVES

- **Data:** cloud-based management of heterogeneous data and extended data interoperability
- **Services:** cloud-based computing services based on standard technologies and extended interoperability through semantic technologies
- **Workflows:** linking heterogeneous services along the engineering chain to integrated workflows to support multi-domain / multi-physics decision making in product and production design
- **Users:** flexible definition of workflows / single point of access
- **Business Models:** confirm and further analyse the value proposition, value chain, business models and deployment models for the optimal final exploitation of results
- **Security:** establish a security certification programme

TECHNICAL APPROACH

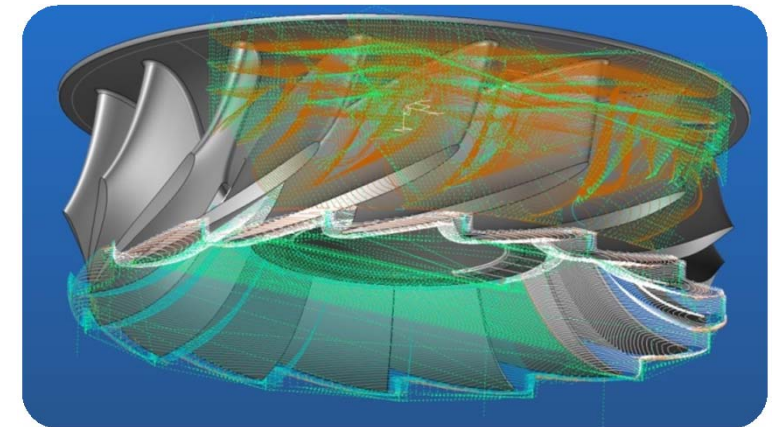
- Standards-based
 - Standardized data exchange, integration and archival based on STEP AP 209
 - Open standards
 - e.g. OCCI for management, CDMI for storage and AMQP will be adopted of CloudFlow components and services



CURRENT EXPERIMENTS (2/6)



- CAM on the Cloud
 - Using an external specific CAM module based on the Cloud allow users to define complex parts according to their needs
 - The Cloud allows services to be offered on the global market targeting niche CAM needs
 - Using a specific and expensive in-house CAM software can be replaced by a Cloud service



CURRENT EXPERIMENTS (4/6)



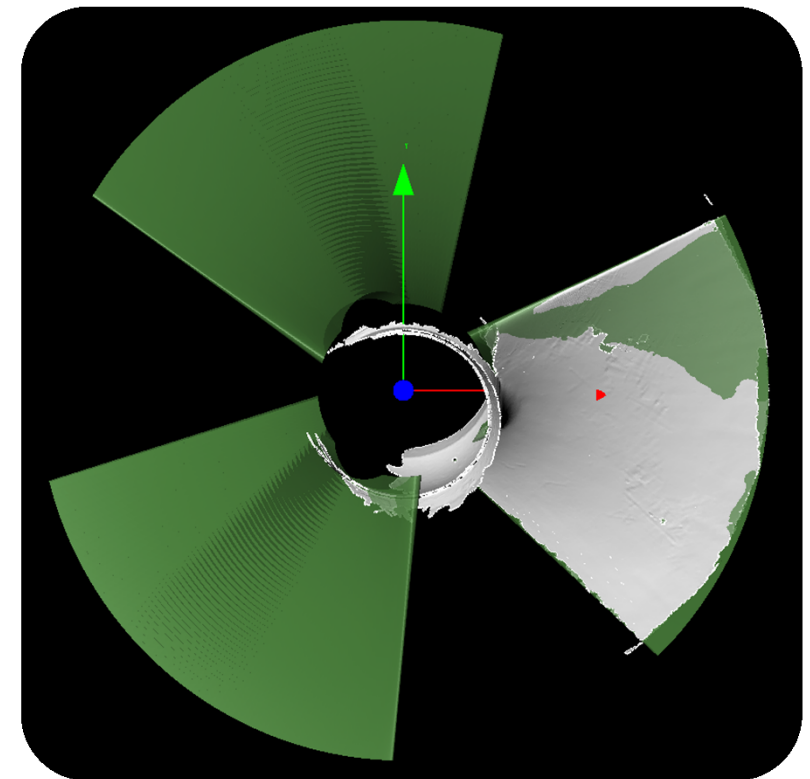
- PLM on the Cloud
 - Availability of visual inspection removes the need to acquire, install and maintain sophisticated PLM and post-processing/ visualization software
 - PLM environment on the cloud provides a unified way of documenting the engineering process



CURRENT EXPERIMENTS (6/6)



- Point clouds vs CAD comparison on the Cloud
 - Demonstrates how manufacturing industry can tailor CAD/CAM and metrology solution by combining Cloud services
 - Tailoring niche services in the Cloud addressing specific product classes allows simple workflows that cross the barriers between disciplines (CAD, CAM, FEA,...)
 - Functionality can be reduced to a necessary minimum avoiding comprehensive and often complicated user interfaces



WHY WORKFLOWS?

- Complex products require ...
 - development and simulation of mechanics, software and electronics all together
 - interactive simulation, simulation-in-the-loop and synchronized workflows based on interoperability of data, services and workflows

