



# CloudFlow – The Portal

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# INTRO: ABOUT CLOUDFLOW

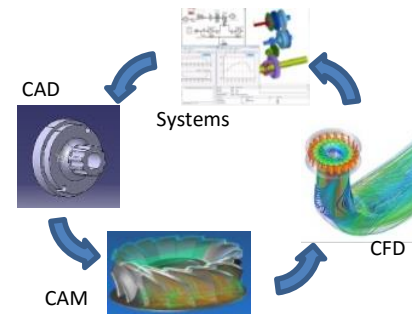
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- EU FP7 project
- duration 42 months, started in July 2013
- 2 open calls: 11- 36 - 46 partners
- The idea:  
Make Cloud infrastructures a practical solution for manufacturing SMEs!
- The Goal:
  - enable the remote use of computational services on the cloud,
  - (seamlessly) integrating within established engineering design workflows
  - empower the different engineering disciplines with on-demand access to scalable computational services
  - engineer will not need multiple computers for different tasks

# CLOUDFLOW

## Motivation:

- Manufacturing industry requires ICT for competitiveness
- Engineering workflows are complex
- Different types of software involved
- Compute intense
- Open up the power of Cloud and HPC computing to SMEs

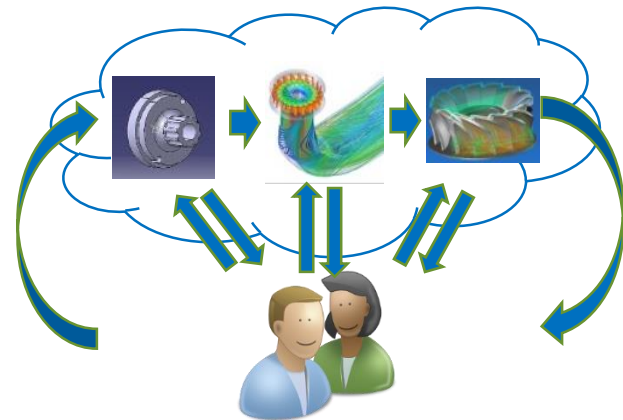


# CLOUDFLOW: THE IDEA

Existing solutions provide single access of Cloud or HPC resources

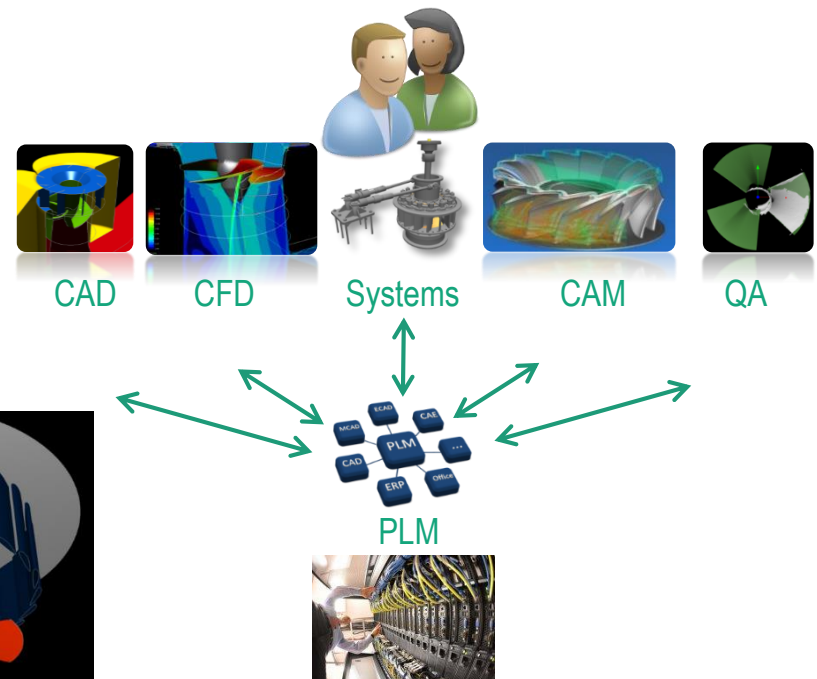
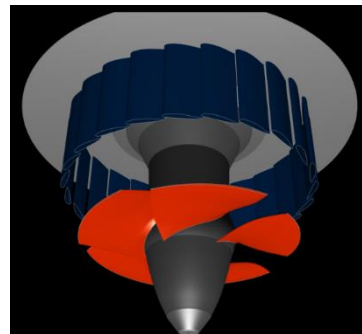
## Idea:

- Go beyond isolated use of a Cloud or HPC resources
- Conduct seamless engineering workflows in the Cloud
- Supported by the use of Cloud and HPC resources
- Combine **Cloud** Computing and Work**Flows: CloudFlow**



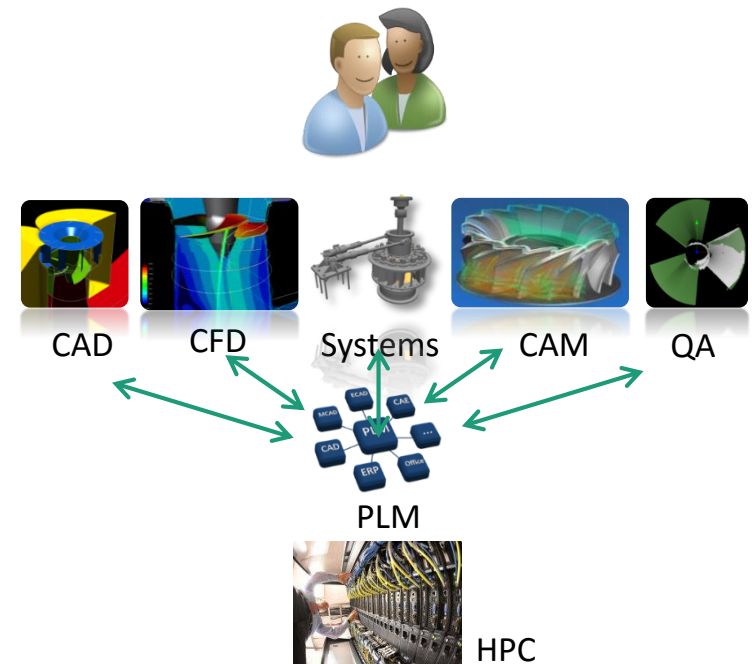
# COMPUTATIONAL CLOUD SERVICES AND WORKFLOWS FOR AGILE ENGINEERING

- 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 (QA)



# AMBITION

- support engineering workflows
- support design, engineering and manufacturing stages of development processes of complex products
- develop CloudFlow Infra-structure based on standards
- provide evidence for benefits through 3 waves of experiments
- exploit via CloudFlow Portal and CloudFlow Competence Centre

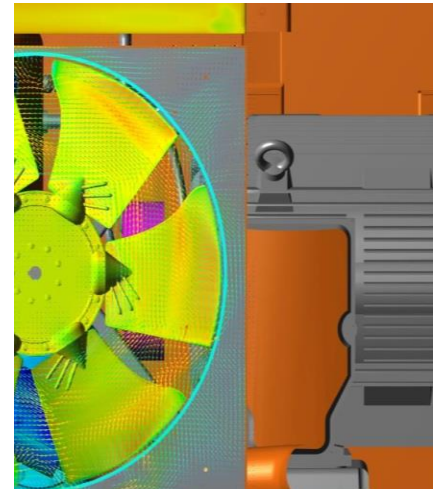


# SUCCESS STORY: EXAMPLE

## Optimizing Energy Consumption and Noise Emission of the Cooling Airflow for Compressors

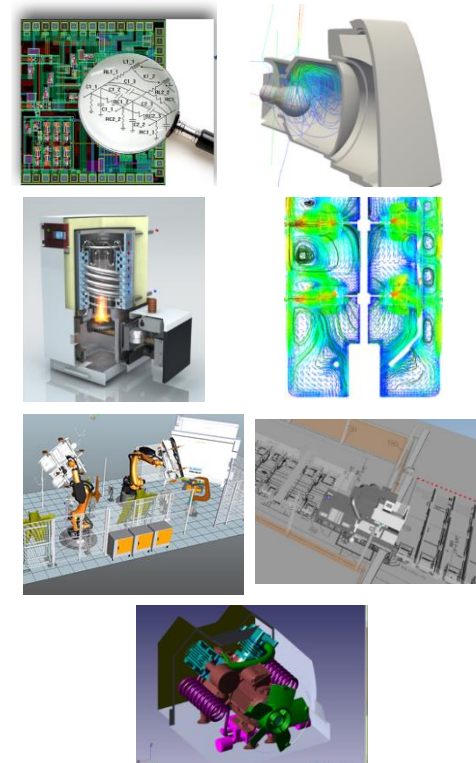


- reduced fan power consumption from 4 kWel to 2,75 kWel (> 30 %)
- reduced fan noise from 82,1 dB(A) to 75 dB(A)
- reduced noise of the whole compressor by 0,9 dB(A) (15 % reduction of noise energy)
- save electricity cost that amounts to about 350.000€ per year
- new cloud-based business opportunities for CapVidia the CFD software provider



# CLOUDFLOW

- Electronic Design Automation (EDA)
- Lighting Systems (Automotive)
- Biomass Boilers (Energy)
- Bio-reactors (chemical / pharma industries)
- Plant simulation
  - Steel structures (AEC)
  - Welding (automotive)
- Compressor design (mechanical engineering)
- Rubber molding
- Fire safety
- Gearboxes
- Suspension systems
- etc.



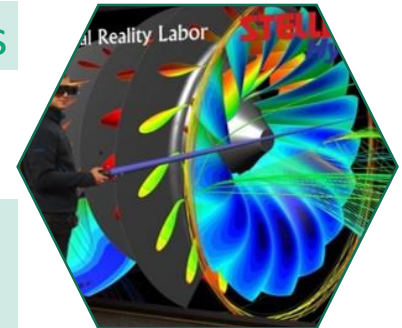
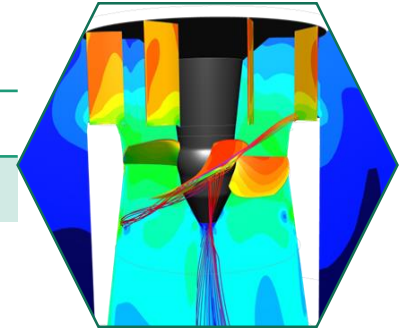


# PARTNERS:



# WHAT WE ACHIEVED

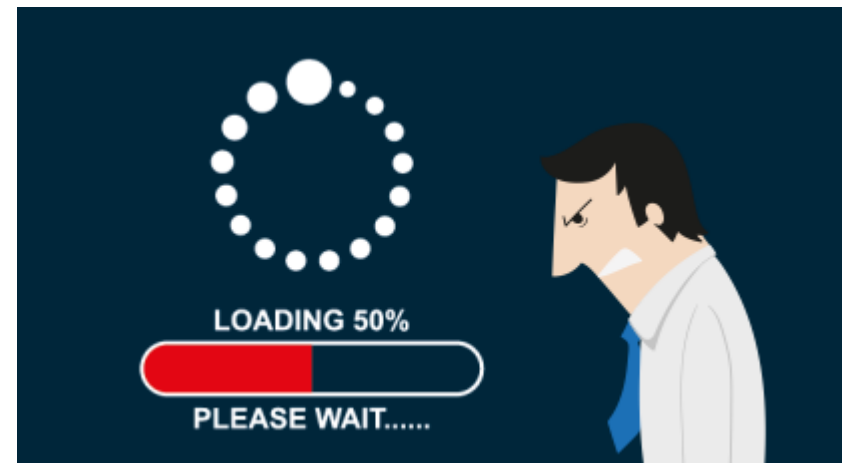
Process	SME User Impact	SME Partner Impact
Design	From 8 hours to 20 min.	New "Plug-in" software
PLM	25% improvements	Growth in software sales
Efficiency optimization	Factor of 30 times	New CFD software
Machine Simulation	Almost 70% reduction	New employments
Safety Analysis	Reduce 10k€ per project	New Workflow software
QA 3D Scanning	Factor of 5 times	New employments



# CLOUDFLOW: THE PORTAL

An advanced HPC Cloud computing platform:

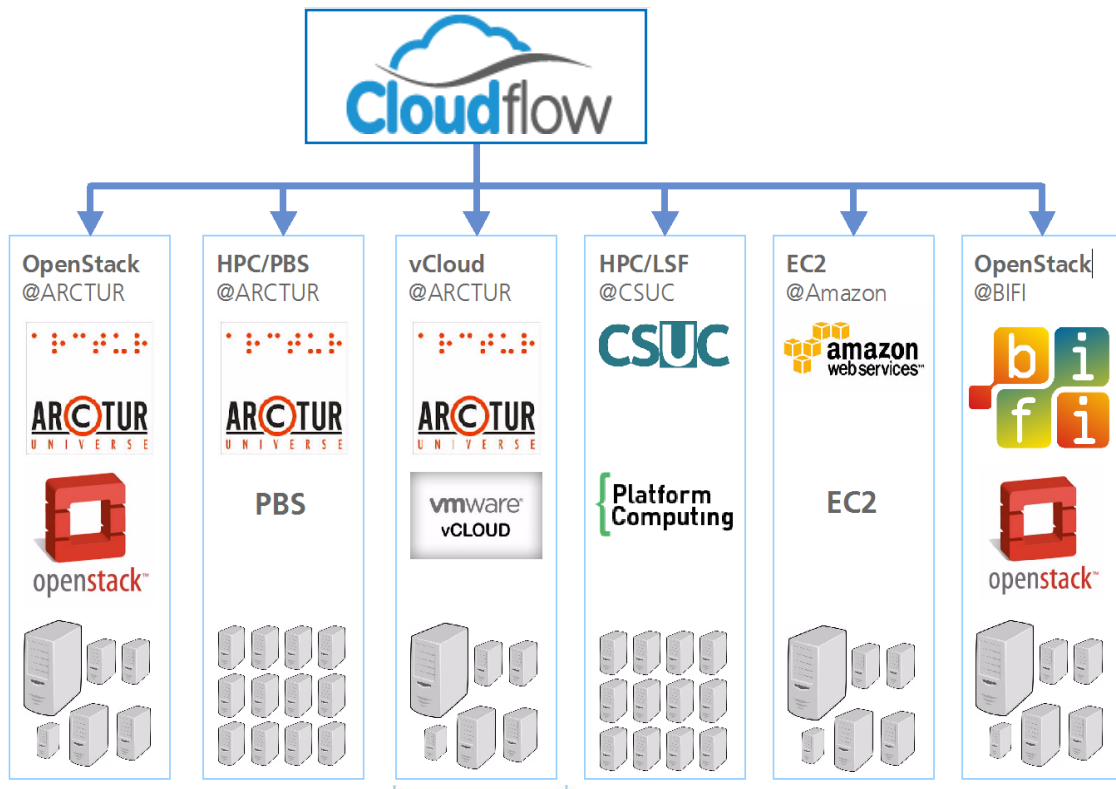
- Desktop solutions „cloudified“
- Familiar interfaces and workflows no need for extra knowledge
- Whole solution available though the web browser
- Extended licenses or pay-as-you-go
- Scalable infrastructure depending on current needs
- Clear pricing
- Shift form CAPEX to OPEX



# CLOUDFLOW: THE INFRASTRUCTURE

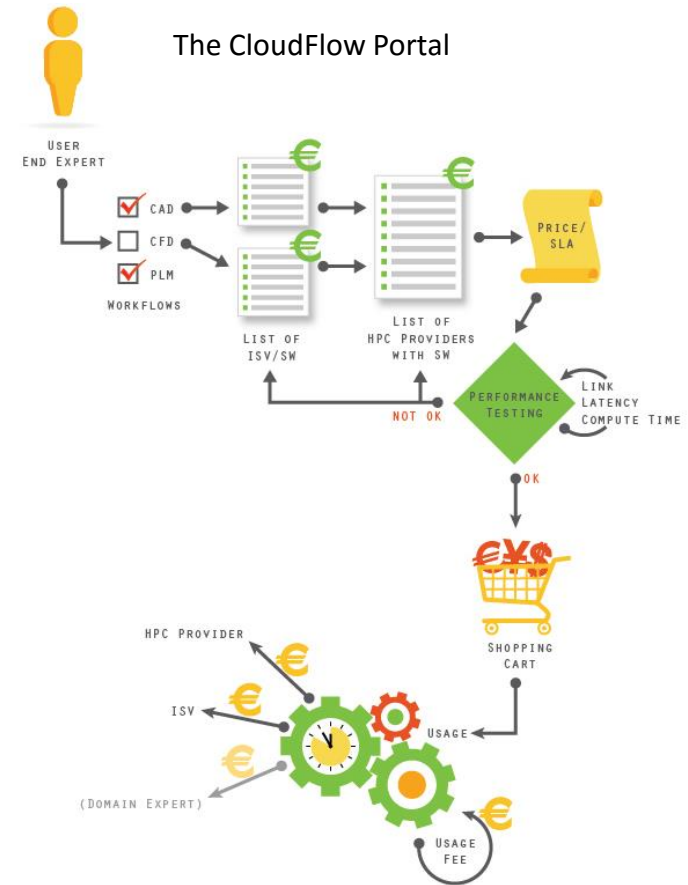
## HPC center integration:

- Project started with one HPC center
- Currently extended to four HPC providers
- Cloud components are based on VMware and OpenStack
- Integration of HPC resources (for demanding MPI codes) requires special handling – special component has been specially developed



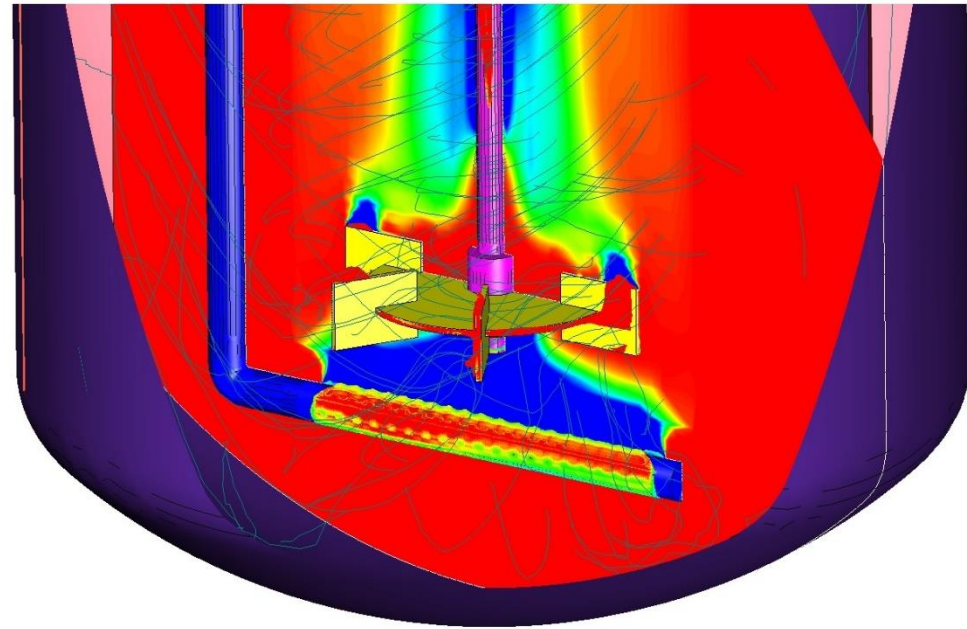
# EUROPEAN CAE SOFTWARE ON THE SAME CLOUD PLATFORM TAILORED TO SME NEEDS

- New Software solutions from recognized EU ISVs on distributed infrastructure
- Amongst first on the market to offer **pay-as-you-go** business model in licensing specific SW
- Enabling a user-centric scalable and adaptive environment
- I4MS helps to build the demand among European manufacturing SMEs
- Most of the end-users approached during the Open Calls became our customers and business partners



# WHERE ARE WE NOW?

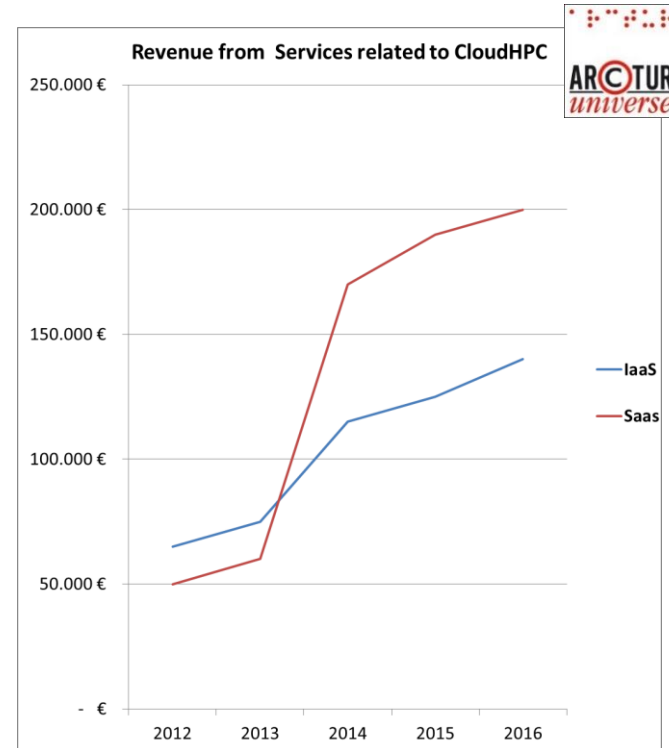
- Advanced beta stage
- Many workflows are under heavy development
- Currently cca. 40 software solutions available
- Current focus on easy of use and intuitive use
- Public release planned for Q4 of 2016



# HOW WE WILL TAKE IT FORWARD

## Sustainability, exploitation and expansion

- evolution from **IaaS** to **SaaS**
- new clients all over EU with **long term** prospects
- the CloudFlow Competence Center (CF CC)
- new software tools and solutions
- new expertise



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# THANK YOU!

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