

HPC in Cloud

Delivering services to Manufacturing SMEs

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About Arctur (since 1992)

- 25 employees (as 1st January 2016)
- Income from services >1,5 M €
- **High Performance & Cloud Computing**
- R&D Department (9 researchers & 3 PhD students, innovations, patents)
- 4PM (Project Management Software – 15.000 users, 5 languages, awards)
- Mobile & web apps



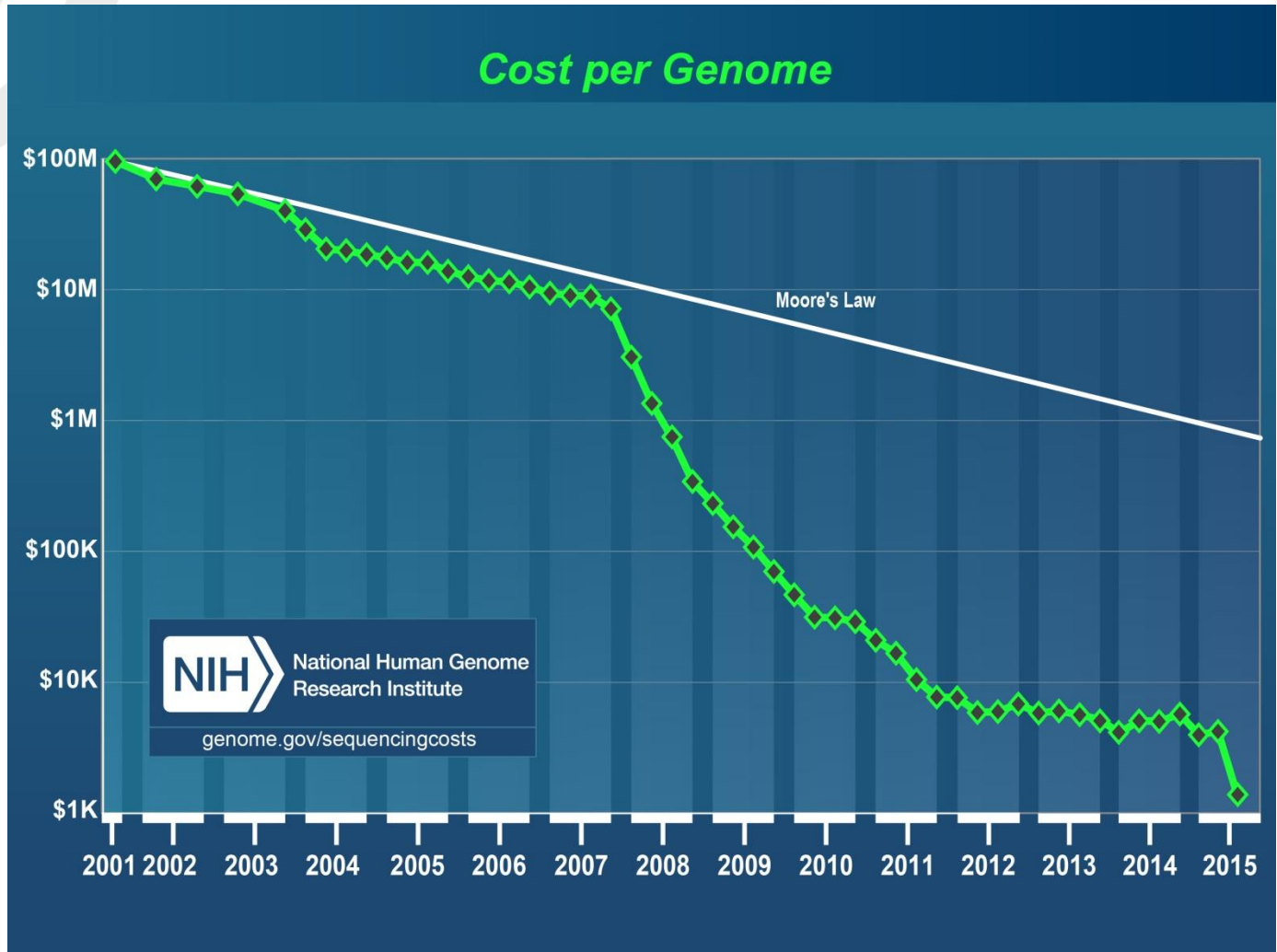
The Internet Era

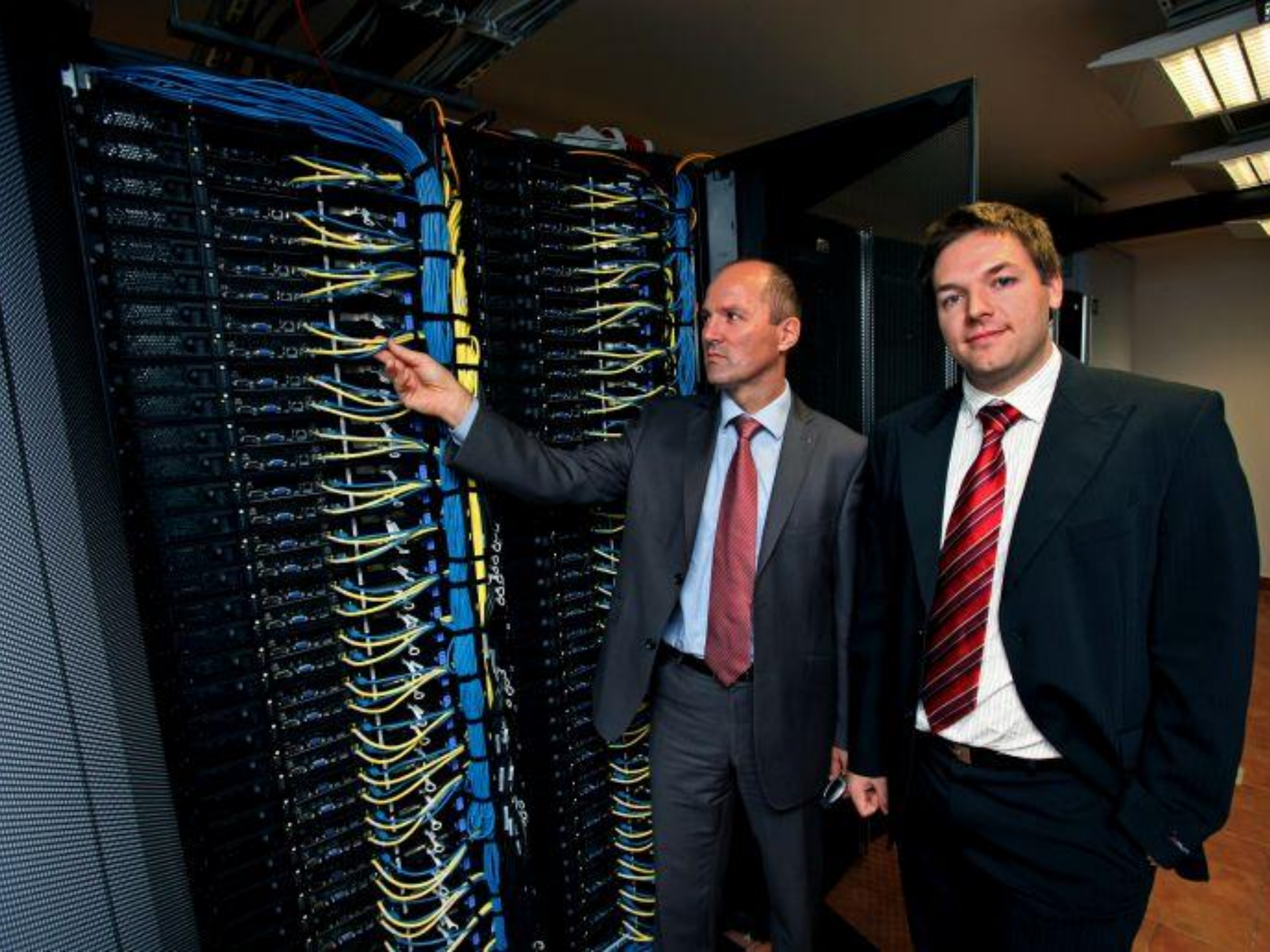
1. Military and Government
2. Universities and research org.
3. Large enterprises
4. SME's
5. Citizens

The HPC Era

1. Military and Government
2. Universities and research org.
3. Large enterprises
4. SME's
5. Citizens

The 1.000\$ genome





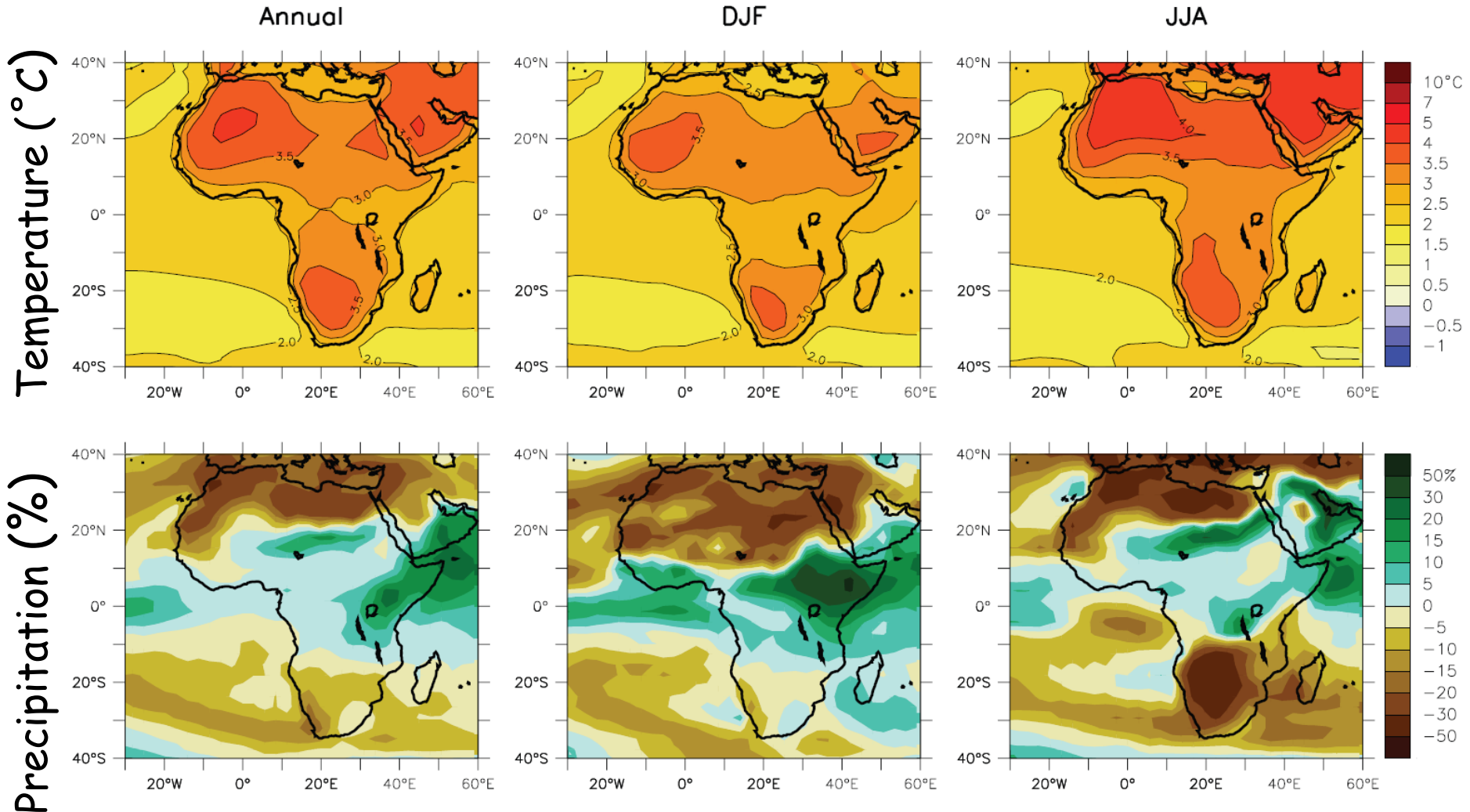
HPC 4 researchers

1. Price and performance negotiations
2. Deployment of user SW
3. Computation
4. End

Projected climate change in Africa

Climate change (2080-2099 vs 1980-1999)

A1B emissions scenario, average of 21 GCMs



HPC 4 SMEs

- 4. Searching for an appropriate SME
- 3. Building the demand (ideas)
- 2. Searching for the right Academia partner
- 1. Searching for the proper SW (OS?)
- 0. Optimize SW and prepare it for remote usage
- 1. Price and performance negotiations
- 2. First computation for FREE
- 3. High priority Computation (for charge)
- 4. Long term storage of user data and results
- 5. Hope they will come again

HPC in Cloud as an Innovative ICT for Manufacturing SMEs

Automotive

Aerospace

Nautical engineering

Clean and Sustainable Energy

Advanced Materials

Civil Engineering

Geodesy

Many other industry sectors...

Competences

Domain experts

Software experts

HPC experts

Software

CAD

CAM

CFD

PLM...

Infrastructure

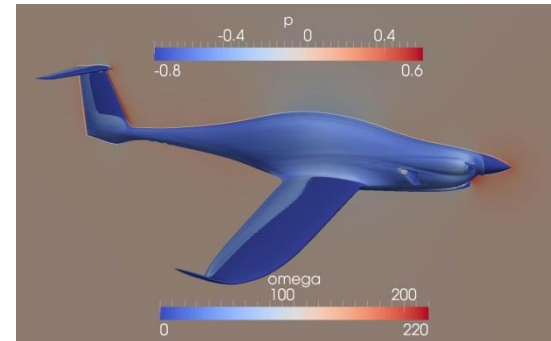
HPC & Cloud HW

Middleware

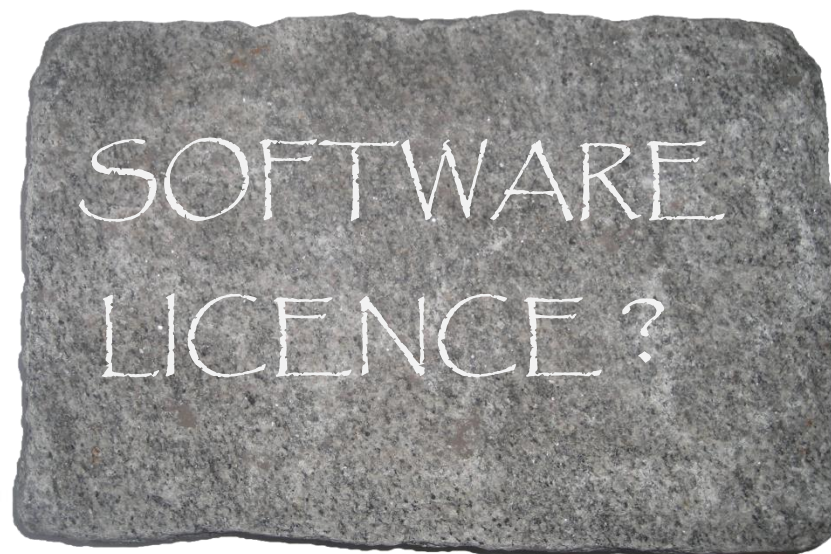
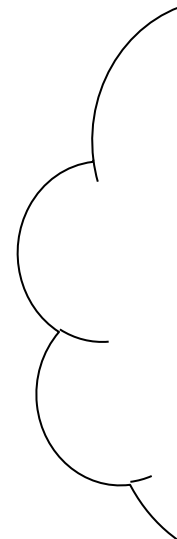
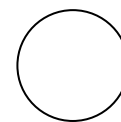
Data Center

Connectivity
Fiber-Optic Network

Barriers for SMEs



Barriers for SMEs



Barriers for SMEs



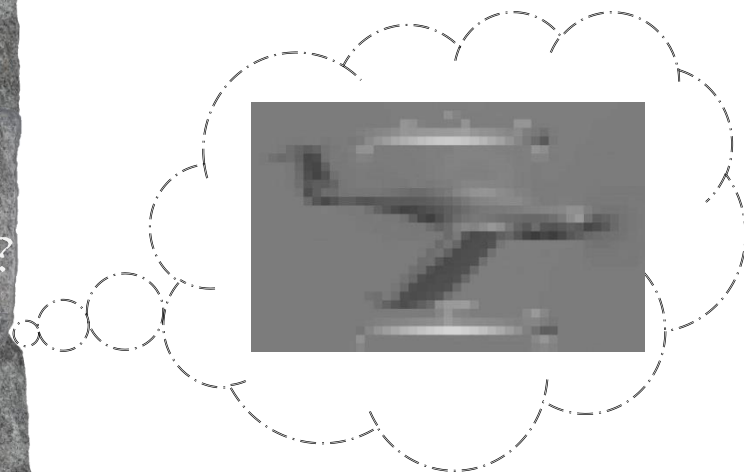
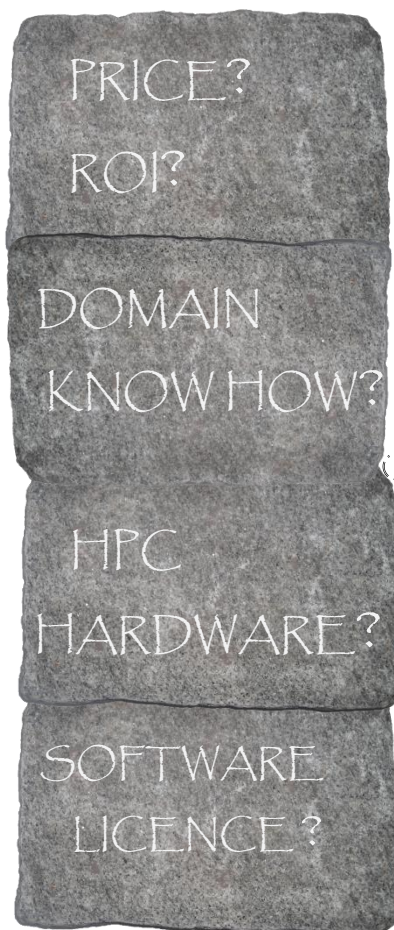
HPC

HARDWARE?

SOFTWARE

LICENCE?

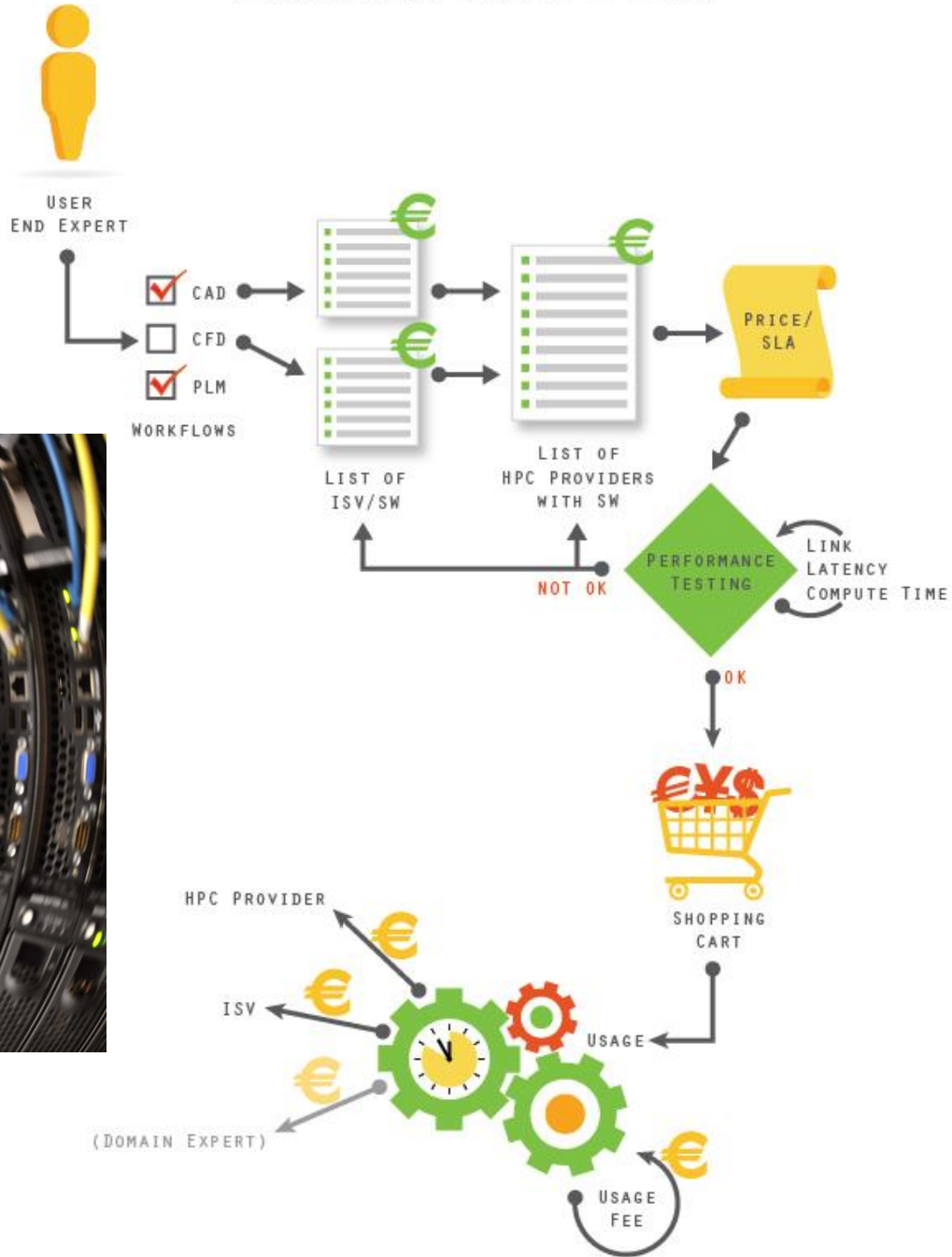
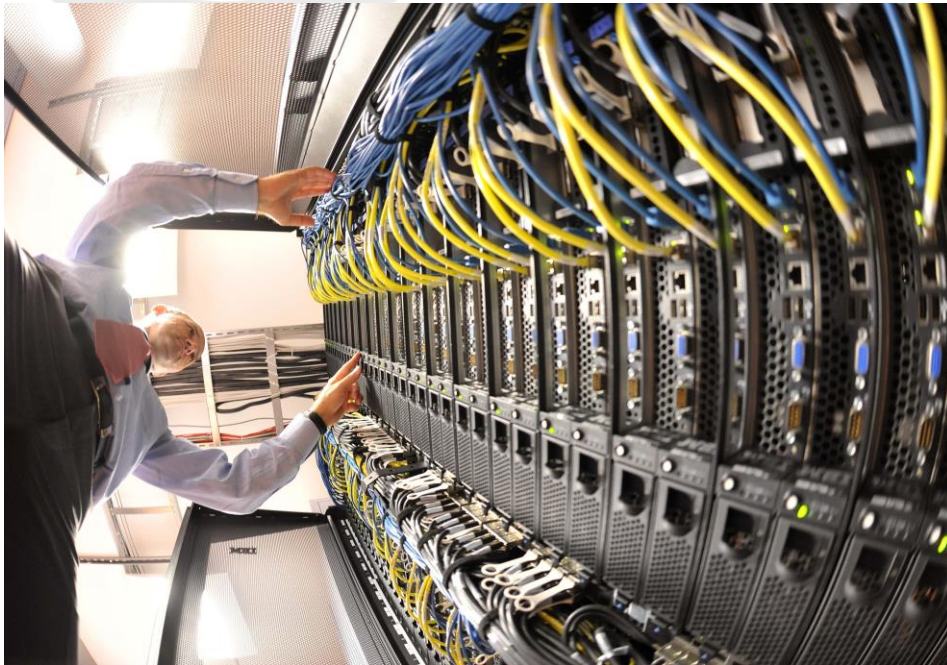
Barriers for SMEs



1. Fortissimo (16MIO€, FP7 program)
2. CloudFlow (6MIO€, FP7 Program)
3. IoStack (8MIO€, H2020)
4. Sesame Net (3MIO€, H2020)
5. Fortissimo 2 (10MIO€, H2020)
6. CAXMan (8MIO€, H2020)
7. NextGenIO (3MIO€, H2020)

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CLOUDFLOW MARKETPLACE



Fortissimo – delivering for manufacturing SMEs

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- Strong demand evident
- Many SMEs new to HPC but seeing real benefits
- Direct impact on
 - Manufacturing costs
 - Product quality
 - Jobs and growth
- Next steps - delivering open sustainable marketplace



Ergolines success story

Experiment Partners:

Ergolines

Arctur

ARCTUR

- SME based in Italy
- Speciality steels technology
- Simulation of slag carry-over from ladle to tundish
 - New monitoring system developed
 - Better overall steel quality
 - Reduced re-melting
- On average 6,000 tonnes of lost steel per year saved
- Saving between €420,000 - €600,000 per year



Flange Tightening – Texas Controls



- A Spanish SME offering tightening and sealing solutions to large industrial facilities in the industrial, power generation and oil & gas sectors.
- HPC Simulation based design of flange tightening operations leads to:
 - 33% time-saving
 - Reduced manpower costs & reduced “down time” of the equipment
 - End-user savings of 180 K€ per tightening
 - Estimated annual savings of 5,4 M€ for Texas customers



Experiment Partners:
Texas Controls
AIMEN
CESGA

HPC-Cloud based Urban Planning - IES

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IES is a Scottish SME (with offices world-wide).

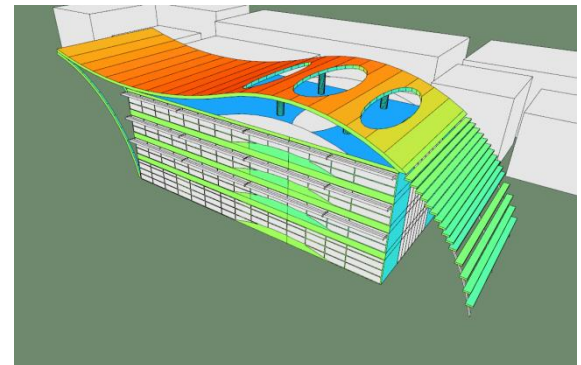
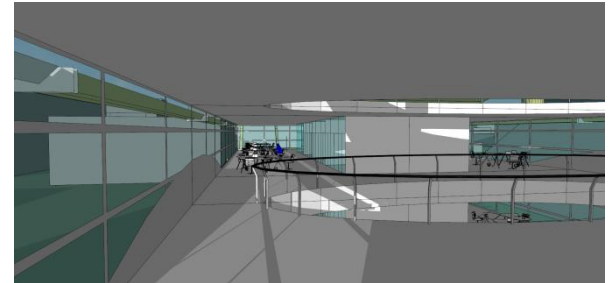
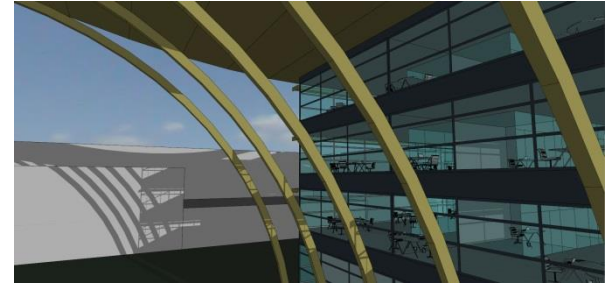
HPC-Cloud approach enables pay-as-you go customer options reducing large model simulations from days/weeks to hours/days.

Comparison with in-house costs: 50% reduction

Experiment Partners:

IES

U. Edinburgh (epcc)



Sports-car aerodynamics - Koenigsegg

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The SME Koenigsegg designs & manufactures high-performance sports-cars.

Aerodynamics development for the Koenigsegg One:1 - HPC-based CFD:

250km/h → 250% higher down-force

440 km/h → 50% higher down-force

Savings in design & development, wind-tunnel use; 30% shortening of time to market

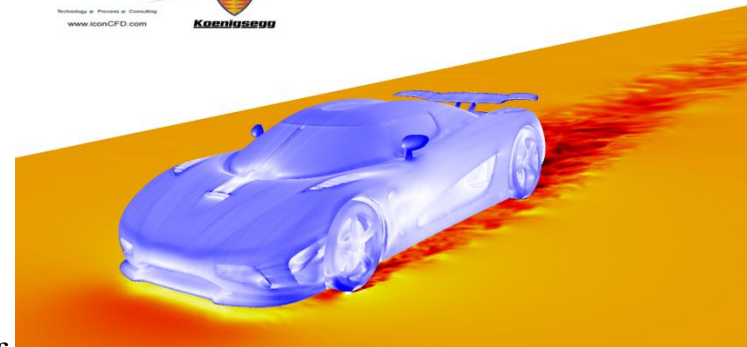
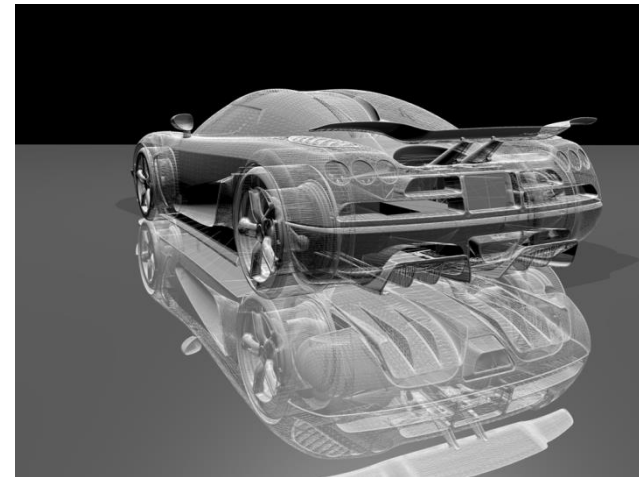
Experiment Partners:

Koenigsesgg

ICON

NTUA

CINECA

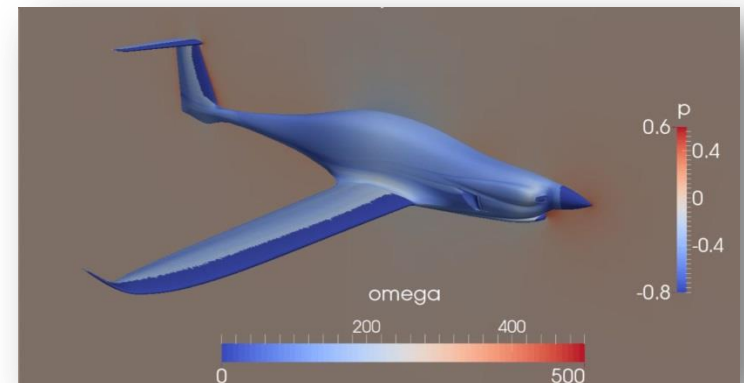


Pipistrel success story

Experiment Partners:
Pipistrel
XLAB; Arctur

ARCTUR

- SME based in Slovenia
- Light aircraft manufacturer
- New aircraft design
 - Wind tunnel too expensive
 - CFD on HPC Cloud solution
- Large detailed models
 - 20-30 days in-house
 - 2-3 days in HPC Cloud
- **Design cycle transformed**
- 10x cheaper and 10x faster



ARCTUR

Welcome to our new HPC center!



ARCTUR



*They want us to analyse
their Genome and want
to pay in Bitcoins...*

**THANK YOU
FOR YOUR
ATTENTION!**

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