



## THE INTERNATIONAL MEETING FOR HPC, SIMULATION, BIG DATA

Tuesday 19th & Wednesday 20th of June, 2018  
Ecole Polytechnique ■ Palaiseau, France ■ 13th edition

# Teratec Forum 2018: Exhibition first previews

**TERATEC FORUM**, the meeting of international experts in High Performance Computing (HPC), Digital Simulation and Big Data will be held for its 13th edition on June 19 and 20 in Palaiseau, on the Ecole Polytechnique campus.

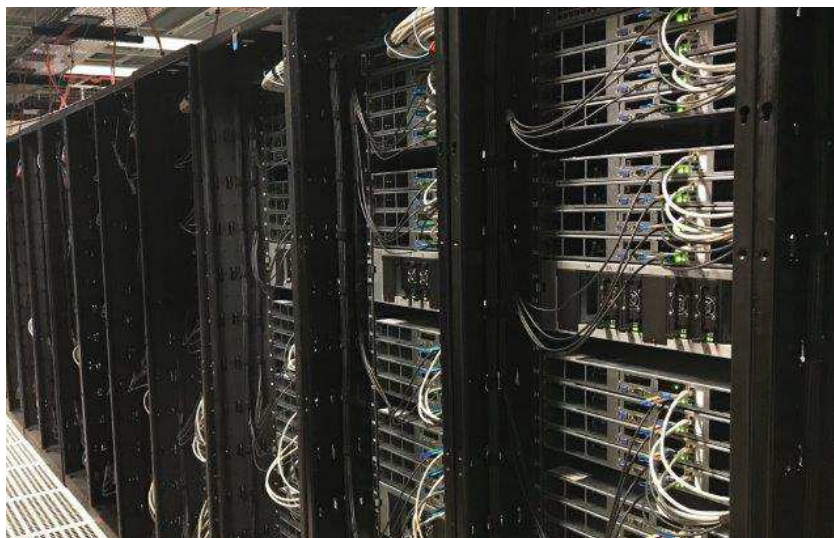
■ **Covering the hardware, software, services and R&D sections of the Teratec Forum**, walk around an exhibition of nearly **60 stands**, and **thematic areas** such as the European Research Café.

■ Here are the first information sent by the exhibitors (May 24), products and services to discover then along the stands on the FORUM, next June:

### 2CRSI

### Stand 40

Press contact: Ludovic Schell - Tél : 07 68 55 52 81- Mail : [press@2crsi.com](mailto:press@2crsi.com)



2CRSI has developed a high-performance IT infrastructure that minimizes the energy footprint of data centers, named OToPus.

Equipped with shared servers and electronic components, it achieves the highest performances for high end gaming, 3D rendering, digital simulation, Artificial Intelligence or Deep Learning.

2CRSI was inspired by the Open Compute Project (OCP) to design a unique and innovative infrastructure, combining the advantages of OCP and all the intelligence, power and flexibility of 2CRSI solutions.

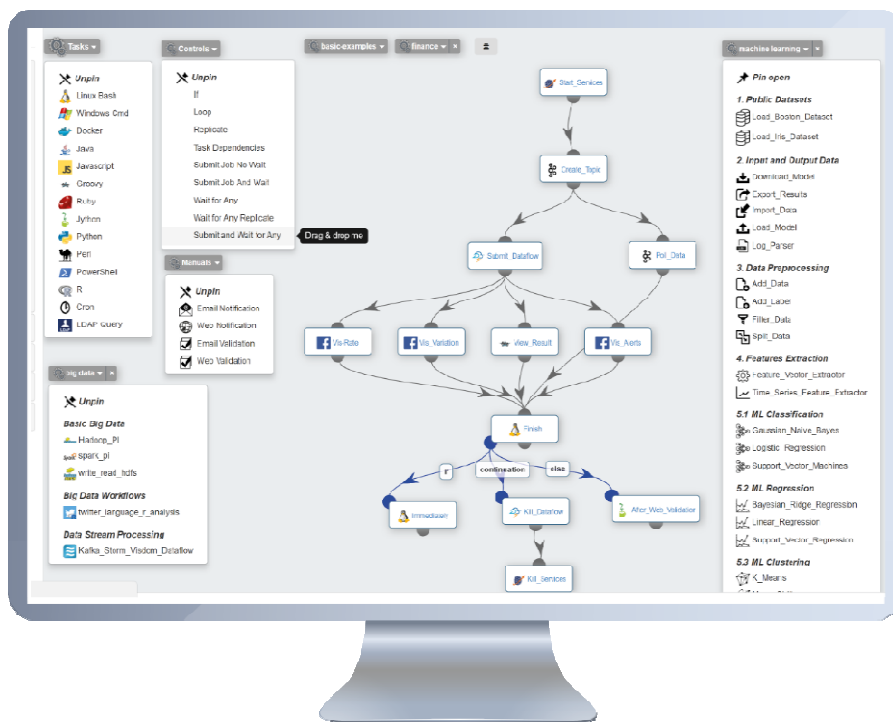
Compared to traditional systems, our eco-efficient solution improves the total operating cost of a data center with a 23.2% reduction in power consumption. This is part of a real Green IT approach combined with extreme density and therefore more power.

The accessibility of the structure has also been optimized to simplify and accelerate the maintenance and management. The time saved then allows resources to be reallocated to other more useful tasks. With shared power distribution, intelligent management of the ventilation system and easy maintenance make this product a «must have» for the latest generation of data centers.

■ **ACTIVEEON** ■ **Stand 26**

Contact: Veronika Tsiareshchanka  
Tel : 09 88 77 76 67 - Mail : veronika.tsiareshchanka@activeeon.com

Activeeon is an open source ISV offering orchestration solutions to automate and scale IT workloads and transition to the cloud. With jobs distribution and parallelization allowing acceleration of business processes and reduction of infrastructure costs, Activeeon enables digital transformation of IT, big data and Internet of Things (IoT).



*Machine learning open studio  
easily build, train & deploy machine learning models at any scale using workflows*

ActiveEon offers [ProActive](#), a software suite composed of the following products:

[Workflows & Scheduling](#): a complete workload scheduler that distributes applications to simplify their execution, featuring a workflow orchestrator and a resource manager, and supporting secured data transfer and license cost optimization;

[Big Data Automation](#) allows big data analytics and machine learning distribution and acceleration in R language, Spark, Hadoop, Matlab, Scilab and others on clusters, grids and clouds;

[Cloud Automation](#) is a platform that automates complex and multi-VM application management and deployment, handling hybrid clouds on multiple private and public accounts.

[Machine Learning Open Studio](#) is a graphical interface allowing developers and data scientists to create, train and deploy machine learning models at large scale.

## New customer success stories: CNES

At Activeeon we are happy to announce our new collaboration with the CNES (National Center of Spatial Studies) on [PEPS](#) (Platform for Sentinel products exploitation). CNES uses Activeeon solution as workflow engine for parallel execution and processing of satellite images.

ActiveEon has open a new office in Paris (Station F), but also has representatives in UK, USA, Canada, Bulgaria and Senegal. ActiveEon headquarters are in Sophia Antipolis technological park (French Riviera). ActiveEon is working with large customer accounts worldwide, such as: L'Oréal, CNES, CEA, Amadeus, La Française Asset Management, Médiametrie, Legal & General (UK), JoyGlobal (USA), Home Office (UK), and many more.

Meet ActiveEon team at the booth 26 for a custom demo of our solutions and new features, or to discuss your digital transformation, orchestration or cloud migration projects.

Attend the [plenary session](#) on June 19<sup>th</sup> to hear Denis Caromel, Activeeon CEO talk "HPC with Hybrid cloud for critical big compute workloads".

## ■ ANEO

■ Stand 41

Contact Presse : Mr Gilles TOURPE - Tel: 07 54 84 45 72 Mail: [gtourpe@aneo.fr](mailto:gtourpe@aneo.fr)

### **ANEO is a major player in numerical simulation since its creation in 2002.**

Come and meet our expert to discuss about seismic processing using FPGA, new framework to build efficient HPC complex applications (ParSec, Legion, ...), HPC with Google, Amazon or Microsoft, Autonomous vehicle simulation unique requirements and challenges, dynamic modelization and implementation of complex image processing algorithms or architecture and development of real time big data analytics systems (predictive analysis, deep learning, TPU google ...).

## ■ ASPERITAS [N]

■ Stand 65

Contact: Irene de Groot - T: +31 88 96 000 00 | M: +31 6 41 493 123  
Email : [Irene.deGroot@Asperitas.com](mailto:Irene.deGroot@Asperitas.com) | W: [www.Asperitas.com](http://www.Asperitas.com)

**With Immersed Computing® by Asperitas, HPC environments can benefit from reduced energy footprint, reduced floor space, and reduced requirements for cooling installations and other facilities.** Far less infrastructure is needed than any other liquid installation, saving energy & costs on all levels of datacenter operations. Combined with optimised IT hardware Immersed Computing would be the most sustainable and efficient solution today. Ensuring the highest possible efficiency in availability, energy reduction and reuse, while increasing capacity.

Asperitas is a Dutch cleantech company focused on enabling green datacentres for high density environments and emerging technologies with Immersed Computing®. Asperitas will announce a strategic partnership with a French manufacturer of High Performance Computing hardware 2CRSI.

You will be able to meet the Asperitas team, including the founders and management at their booth. And you will be able to experience their Immersed Computing technology in a unique containerised and modular datacentre concept developed with Modul'Data Center, just outside of the event venue. This is a unique opportunity to be able to experience this solution as it is more than a demo. This datacentre container will go to a customer to be deployed directly after TERATEC Forum.

This concept enables High Performance Computing anywhere and you have the highest energy efficiency in any climate. For a personal introduction and tour, please contact [marketing@asperitas.com](mailto:marketing@asperitas.com).

Asperitas launched Immersed Computing in March 2017. The first solution, the AIC24, is a fully integrated and modular solution for cloud, edge and HPC datacentres, enabling to be more efficient, sustainable and flexible.

The Asperitas AIC24 is a closed system and the first water-cooled oil-immersion system which relies on natural convection for circulation of a dielectric liquid. This results in a fully self-contained and Plug and Play modular system. The AIC24 needs far less infrastructure than any other liquid installation, saving energy and costs on all levels of datacentre operations. Combined with optimised IT hardware it would possibly make the AIC24 the most sustainable and efficient solution available for IT environments today. Ensuring the highest possible efficiency in availability, energy reduction and reuse, while increasing capacity.

Asperitas has been working with partners like Vienna Scientific Cluster, ClusterVision and Supermicro since the development phase of Immersed Computing. (The last HPC prototype has been installed more than one and a half year ago and still in use.)

Since the introduction of Immersed Computing Asperitas has been nominated for several awards from the datacentre, startup and cleantech industry and has received the prestigious cleantech innovation Piet de Jong Award from the Dutch TNO institute.

- **Digital Archive 4.0**, solution de sauvegarde, archivage et migration de très gros volumes de données non-structurées, avec ses capacités de transfert encore plus performantes et parfaitement adaptées à la protection de NAS stockant de plus de 100 Téraoctets de données et des milliards de fichiers.
- **Appliances de sauvegarde** : une large gamme de solutions fiables, simples et performantes pour la protection unifiée des systèmes et des données et pour des Plans de Reprise d'Activité efficaces. Dotée d'une capacité de 1To et 100 To, l'Appliance s'avère idéale pour les sites distants ou les sites sans ressource IT.

## ■ ATOS ■ Stand 59

Contact: Pascale Bernier-Bruma, HPC Communication Manager / ETP4HPC communication / Mont Blanc project dissemination.

Tel : +33 6 74 09 38 82 - Mail : pascale.bernier-bruna@atos.net

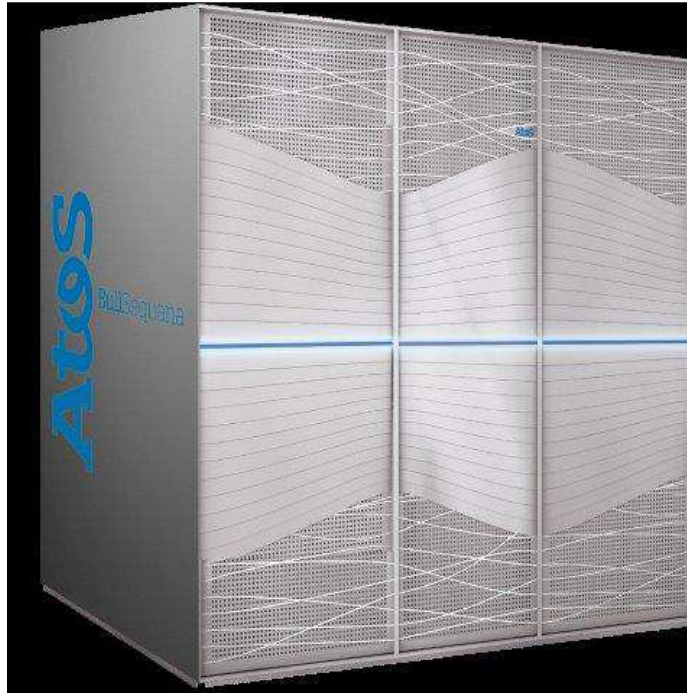
As Europe's only computer manufacturer, Atos operates in the ultra-high processing power market. With its Extreme Computing solutions – focused around its BullSequana X supercomputers – Atos implements powerful, robust systems that are easy to manage and use, and designed for round-the-clock operation. With more HPC specialists than any other European player, Atos is recognized for the technological excellence of its BullSequana X systems, its HPC applications expertise and its ability to manage large-scale projects.

Across the world, numerous organizations - from research centers to the design offices of major multinationals, or to innovative SMEs - have turned to Atos to push back the boundaries of the possible. And as conventional HPC is reaching its technological limits, Atos is committed to anticipate the future of quantum computing and to be prepared for the opportunities that come with it. For more information: [www.atos.net](http://www.atos.net)

### At the Teratec Forum, Atos will present the following solutions:

- BullSequana X1000– the open pre-exascale supercomputer that integrates a large choice of processor and accelerator technologies, as well as enhanced Bull Direct Liquid Cooling.

- The Atos Quantum Learning Machine: a complete environment dedicated to the development of quantum software, training and experimentation. It embeds a programming platform and a high-performance quantum simulator. Software developed on the Atos QLM can run on any simulated or future quantum accelerators, without changing a line.
- Bull extreme factory, Atos's HPC-as-a-Service offer: it associates an optimized HPC infrastructure, with a modern and secured web portal, and an efficient remote visualization tool, that together allow you to manage your entire HPC environment in a flexible way. Discover how our customers leverage Bull extreme factory for HPC-as-a-Service and Deep-Learning-as-a-Service.



## ■ BECHTLE DIRECT [N]

■ Stand 13

Press contact: Laure Esselin  
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### EURO/CFD choose Bechtle for its Calculating cluster

EUROCFD found in 2005, offers digital simulation's externalization to industrial companies.

#### **Problematic and Bechtle's solution**

EUROCFD needed an high-performance HPC infrastructure to support its growing business and offer new solutions for its customers.

The solution based on Linux improves resilience, stability and is easily scalable. Thereby it allows EUROCFD to focus its strategy on its calculating resources to offer « HPC On Demand » services to many customers wanting to externalize their own digital calculating.

EUROCFD emphasize is the customer services quality and the users satisfaction. Therefore one of its primary requirement was to get a simple solution, quick and easy to deploy as well as easy to manage daily.

Bechtle offers the EUROCFD's HPC solution based on :

- Hardware « SuperMicro »
- Infiniband network « Mellanox »
- Storage solution « BeeGFS »
- « Nicesoftware » solution for remote viewing
- Establishment of an applications/calculating bidding portal and « Bright cluster Manager » as an administration solution

## Results

EUROCFD has a high-performance HPC environment. With 1 500 hearts and 30 TFlops, the HPC Little BIG cluster is certainly one of the most important calculating clusters on duty on a french SME

## ■ BRIGHT COMPUTING

■ Stand 04

Press contact: Rachel Chicken, Marketing Manager, Bright Computing  
Tel: +44 7788 567 604 Mail: [rachel.chicken@brightcomputing.com](mailto:rachel.chicken@brightcomputing.com)

Bright Computing, global leader in cluster and cloud infrastructure automation software, and ThinkParQ, the company behind the leading parallel cluster file system BeeGFS, with a strong focus on performance and flexibility, will exhibit together at Teratec 2018.

At the show, Bright and ThinkParQ will demonstrate the value that the seamless integration between the two technologies, BeeGFS and Bright Cluster Manager, brings to HPC platforms. They will show how to leverage the full performance of the available hardware while ensuring all components within the HPC environment are easy to manage.

At the booth, they will demonstrate how Bright enables organisations to set up and configure BeeGFS in minutes, to quickly start monitoring the system utilization, helping system administrators to significantly improve the application runtime of their cluster users.

## ■ CARRI SYSTEMS

■ Stand 48

Press contact: Joscelyn Flores  
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Founded in 1992, CARRI Systems is the leading French computer manufacturer of high-performance on-demand solutions. The company is recognized for its know-how in the design and manufactured of TAILORED workstations and Servers.

With over 25 years of experience in the sale of workstations, servers and calculators, CARRI Systems has the hardware portfolio that meets the expectations of these customers on both classic x86-based and innovative solutions incorporating GPUs or IBM Power processors.

Our renowned expertise makes CARRI Systems a reference that has allowed it to penetrate all markets successfully. From administrations to individuals through research, industry, services in SMEs and large accounts. In total, more than 6,000 companies and industries with a need for high availability and configurability have trusted us for 25 years.

## **CARRI Systems, Expert in Artificial Intelligence and Virtual Reality Solutions**

Prestigious clients in the academic and research sectors such as the CNRS, the University of Montpellier, MINES ParisTech and the Compiègne University of Technology trust CARRI Systems to develop and develop ready-to-use solutions for ambitious and innovative projects in Artificial Intelligence and Deep Learning.

CARRI Systems is also prime contractor for the software part and services of cluster-intensive computing projects with IBM Spectrum LSF solutions, for example for MINES ParisTech. As an IBM technology partner, CARRI Systems is the only vendor to deliver Power-based and GPU-based solutions with the PowerAI stack to accelerate more powerful Deep Learning projects on a comparable basis than traditional x86 computing infrastructure solutions.

CARRI Systems is also a specialist in virtual reality. We have developed a permanent R & D center in Laval at the Laval Mayenne Technopole that has enabled us to develop, for example, a wireless VR solution that can accommodate up to six participants simultaneously - a world first.

## **CARRI Systems creates services to support its customers in their digital transformation**

Carri Systems is not only a creator of tailored computing solutions, but also supports its customers in their digital transformation. Infrastructure audits, technological support and implementation are part of the missions that the company carries out thanks to its long-standing experts and partners. Carri Systems has invented the concept of the "zero problem" package that covers hardware, software and service through a tailor-made offer adapted to the pace of growth of each client company. According to its DNA, its perfect knowledge of the infrastructure of its customers and the digital ecosystem allows it today to offer data protection services, backup in the cloud, and monitoring and securing infrastructure resting on powerful tools developed internally.

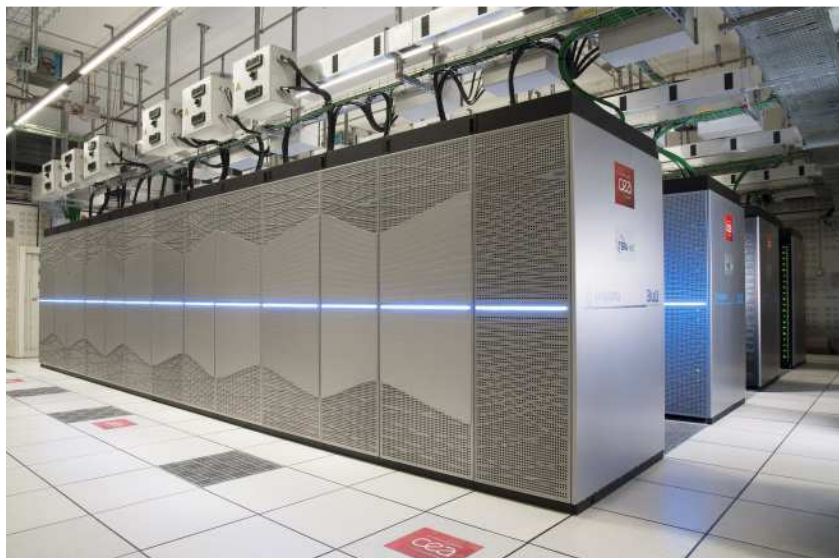
## **CEA DAM ILE-DE-FRANCE**

## **Stand 09**

Press contact: Florence POIRIER, Chargée de communication  
Tél : 01 69 26 55 54- Mail : [florence.poirier@cea.fr](mailto:florence.poirier@cea.fr)

Tera, the second phase of CEA's defense applications supercomputer, is open to users since the end of December 2017. CEA application will be able to exploit its computing power, which can reach 25 petaflops. This supercomputer is equipped with the latest Sequana modules and BXI interconnection networks developed by Bull, Atos technological brand, results of the R & D collaboration between CEA DAM and industrial Atos.

In order to fulfil the increasing needs of high performance computing power for numerical simulation, CEA and its CCRT industrial partners share a petascale supercomputer, designed by Bull. This supercomputer, Cobalt, commissioned in spring 2016, has since June 2018 a computing power of 2 petaflops. Hosted in the TGCC facility ("Très grand centre de calcul du CEA"), in Bruyères-le-Châtel, it is operated by the CEA DAM Île-de-France teams. With Cobalt, the CCRT industrial partners have access to outstanding computing resources to develop their projects.



*Le supercalculateur Tera 1000-2. © CEA*

Press contact: Céline CHICHARRO

Tel: 04 76 46 49 01 - Mail : celine.chicharro@comsol.fr - Web: www.comsol.fr - Blog: www.comsol.fr/blogs

**COMSOL NEWS 2018 : THE MULTIPHYSICS SIMULATION MAGAZINE. Multiphysics Informs Better Business & Engineering Solutions**

Grenoble (May 7, 2018) — COMSOL, Inc. published the annual edition of COMSOL News. The magazine features case studies of simulation specialists working to improve the efficiency of exchanges, both for sales and technical departments. With high-precision multiphysics simulations and the ease of use of simulation applications, engineers are pushing the limits of technology while reducing the need for physical prototypes



COMSOL News 2018 reports on how creating accurate digital prototypes and deploying simulation applications has become common practice among some industry leaders.

COMSOL News 2018 features more than a dozen articles of projects making use of multiphysics modeling and corresponding applications distributed using organizations internal portals.

The topics include biopharmaceutical processes, minimizing corrosion in multimaterial assemblies, gear lubrication, automotive product design, semiconductor manufacturing breakthroughs, enhancing water quality and developing noncontact magnetic couplings.

Join us and talk with our COMSOL experts in Digital Multiphysics Simulation on 19 and 20 June 2018 at the Teratec Forum.

Contact: Marie-Christine Sawley, PhD - ExaLab Director|E&G SW Ecosystem Engineering

Mail : marie-christine.sawley@intel.com - Mobile: +33 6 10 38 14 41 |

For the coming years, one of the major challenges to use systems with millions of cores remains optimising interactions between various software levels (particularly complex applications with many iterations) and hardware.

We need to develop sophisticated tools to analyse the behaviour of the different functional units/components within a core and also within the communication network; at the same time, we need to work at the application *Data Science* or *HPC* level to overcome poor component use, scalability limitations or loss of numerical accuracy. This cross-expertise between tools and applications knowledge to rewrite codes to optimally fit new architectures is at the heart of the collaborative work at ECR.

**During the TERATEC Forum, we will be showing the latest advances made thanks to ONE VIEW, part of the MAQAO suite tool**, to facilitate the analysis and to drive the work towards higher performance.

Significant improvements obtained on Yales2, AbInit and AVBP, among others, will be shown. We will also be presenting the recent results obtained with Verificarlo to help track numerical errors and loss of precision.

Verificarlo relies on Monte Carlo arithmetic in which random noise is added to computational operators to model rounding or cancellation errors, in a stochastic process. Code instrumentation is performed by the tool during compilation, through a specific LLVM pass, without any need to modify the program source code.



## ■ FUJITSU

■ Stand 61

Contact: **Dr. Pierre Lagier**, Chief Technology Officer  
Tel:: +33(0)562475830 - Mail: pierre.lagier@ts.fujitsu.com

### ★★★ Preview: Fujitsu Gateway showcase - Deep Learning integrated solution

Fujitsu Gateway is a platform that enables any AI framework to be integrated into a front end environment. In particular it is integrated with Fujitsu Advanced Image Recognition system, providing analysis delivered at the edge, close to the line itself. By improving defect localization and classification it delivers increased yield, lower risk, and enhanced flexibility. This wholly integrated solution helps businesses transform their production processes for more accurate and automated real-time decisions.

Fujitsu's integrated Deep learning solution brings greater insight, accuracy and speed to manufacturing quality control and non-destructive testing processes. The solution brings together an enterprise-oriented approach, innovative services, software and a set of proven hardware platforms incorporating the latest AI enabled technologies of GPU's, DLU's (Deep Learning Unit) and VPU's.

## ■ NAFEMS FRANCE

■ Stand 20

Press contact: Didier LARGE -  
Tel: 06 85 88 21 62 - Mail: didier.large@nafems.org

The 2018 NAFEMS France Regional Conference will be held on 14 and 15 November in Paris. To view the program and register: <https://www.nafems.org/2018/france/>.

It will bring together major players in the analysis and simulation of the main sectors of industry and academia in the presence of publishing partners who will exhibit.

This year will be covered the classical areas of simulation in mechanical engineering but also more emerging themes such as additive manufacturing optimization, system engineering driven by modeling-simulation, data and process management (SPDM) , optimization and lightening of structures, analysis and exploitation of mass data (big data analytics), digital twins, cloud computing and HPC.

In addition, the program will offer original sessions on biomechanics simulation and the dissemination of best practices and services for SMEs and mid-range companies with examples of pilot's feedback from the GENCI and SiMSEO programs of TERATEC.

## ■ NEWNET & QUOBYTE [N]

■ Stand 43

Press contact: NEWNET : M. Manuel MORLIER, Marketing & Communication Manager  
[mmorlier@newnet.fr](mailto:mmorlier@newnet.fr) – Phone: +33.1.64.86.20.00

Press contact: QUOBYTE : M. Sebastian Bünker, Director of Marketing EMEA  
[sebastian@quobyte.com](mailto:sebastian@quobyte.com) – Phone: +49 30 814 591 828

### QUOBYTE SOLUTION FOR HPC & LIFE SCIENCES MARKET

Storage for HPC is faced with seemingly contradicting requirements: Users want fast, parallel storage yet require long-term data availability and don't tolerate data loss or corruption. Quobyte delivers the perfect solution: its software turns standard server hardware into a reliable and highly available data center file system. Built around a high-performance parallel file system core, Quobyte supports all workloads from classical file system use cases like HPC, files and archival to high-performance block storage for virtual machines and databases. Data is kept safe and available with end-to-end checksumming, replication and erasure coding, and is accessible via local mount point for Linux, Windows, and Mac and for NFS, HDFS or S3. Admins benefit greatly from Quobyte's automation capabilities that enable lights-out operations and make excessive maintenance overhead a thing of the past.

Need more information ?

Please visit <https://www.quobyte.com/hpc> and <https://www.newnet.com/hpc-et-big-data>

## NUMSCALE

Stand 44

Contact presse : Pascale PERROT – Responsable commerciale  
Tél. : 01 69 15 64 94 – Mobile : 07 71 93 73 40 – Mail : [pascale.perrot@numscale.com](mailto:pascale.perrot@numscale.com)

NUMSCALE specializes in the porting of software to new platforms and the optimization of software performance. We offer products and services linked to our expertise in three key areas: algorithms, fine-grained knowledge of modern processors and the development of high performance software. This combination of expertise allows us to obtain maximum performance and to assist developers throughout the entire development process, be it via performance analysis, algorithm development, software optimization, porting to new platforms, or even scaling up to larger systems and/or larger volumes of data (distributed, grid, or cloud computation).

NUMSCALE is a young innovative company but it already has many large clients such as Natixis, Syngenta, Zodiac Aerospace, Thalès, Michelin, SNCF, Safran, Euronext, Faurecia, Total, GTT, GE Healthcare, and HUAWEI.

NUMSCALE, constantly evolving solutions : <https://developer.numscale.com>

## OPENIO [N]

Stand 04

Press contact: Marie Ponseel  
Tél : +33 6 19 36 01 62 - mail : [marie@openio.io](mailto:marie@openio.io)

OpenIO is a French company that is developing a next-generation open source object storage system and a serverless computing framework. This is an end-to-end solution with innovative characteristics that overcome some of the limits of traditional object storage solutions.

Because of its unique design and efficiency, OpenIO SDS has higher and more consistent performance when compared to other object stores. This allows it to take advantage of hybrid and all-flash nodes mixed with traditional high capacity servers. Dynamic cluster load balancing techniques ensure that the cluster always responds optimally, making it possible to combine different types of hardware, and avoiding the slowdowns that occur with data rebalancing in other solutions.

OpenIO also offers Grid for Apps, an embedded serverless framework for integrated data processing, that allows users to offload some operations directly to the storage platform. This functionality is helpful when developers need a scalable backend for intensive data processing applications, and is also useful to improve overall infrastructure efficiency or add custom features to the storage platform.

OpenIO SDS and Grid for Apps are the perfect match for big data and HPC environments because all the data sent to the object store can be pre-processed, validated, or enriched automatically without external resources or user intervention, improving the overall flexibility and efficiency of the entire infrastructure.

## REFLEX CES

Stand 42

Press contact: Clémence LAVAINÉ  
Tel: 01 69 87 02 55 ext215 - Mail: [clavaine@reflexces.com](mailto:clavaine@reflexces.com)

### **REFLEX CES designs and produces custom embedded systems and boards, since 2000.**

The company, which now counts 100+ people, is recognized for its expertise in high-speed applications, analog and hardened systems. REFLEX CES thus has become a leading partner with major industrial companies.

REFLEX CES facilitate the adoption of the FPGA technology with its leading edge FPGA-based custom embedded and complex systems. REFLEX CES FPGA network platforms enables indeed a better flexibility and ease of programming. That offers a faster and most powerful board, and reduces the customers' technology risks.

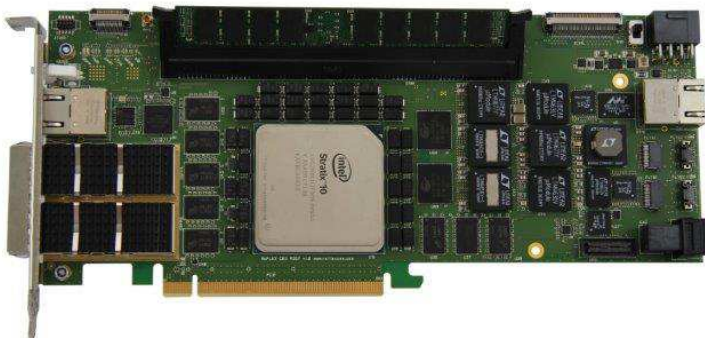
In 2017, REFLEX CES has recorded a steady growth of 35%, along with the opening of a new subsidiary company in Germany and a reinforcement in USA

★★★ In first preview, at Forum Teratec, REFLEX CES will present its newest products, the new Stratix 10 FPGA boards :

- **NEW ! XpressGX S10-FH800G**, a full-height profile PCIe Network Processing FPGA Board, with an Intel PSG Stratix 10 FPGA, featuring 800G Ethernet



- **XpressGX/SX S10-FH200G**, a full-height profile PCIe Network Processing FPGA Board, with an Intel PSG Stratix 10 FPGA, featuring 200G Ethernet



They both are designed for HPC, Data Center and Cloud Computing, and Finance.

Do not hesitate to often check the website [www.reflexces.com](http://www.reflexces.com) or contact the sales team [sales@reflexces.com](mailto:sales@reflexces.com) for more information

Visit booth 42 !

## SCALIAN [N] Stand 39

Contact: Julie Hoareau, Ingénieure d'affaires  
Tél : 07 76 11 71 39 - Mail : [julie.hoareau@scalian.com](mailto:julie.hoareau@scalian.com)

Scalian Group establishes and grows its expert proficiency within Center of Excellence (CoE) which develop their skills by providing engineering services (office or on customer site) and by developing and distributing scientific-based software.

### Multi-physics Simulation CoE

As a recognized specialist in numerical simulation, its activities of modeling and simulation of structures developed in all industry sectors is based on over 25 years of expertise, strong partnerships with software developers, a high level training center and proven customer support. It offers a wide range of services: design office, simulation projects, virtual testing and prototyping, distribution of Finite Element software (SIMULIA, MOLDEX3D ...), training and customizes coaching, technical support, specific developments...

### CEN Simulation, Virtual Reality, Augmented Reality & HPC

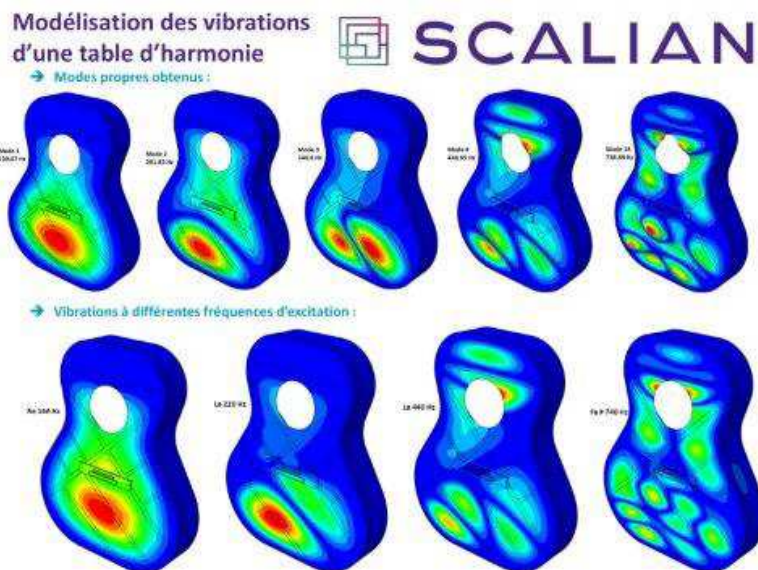
Recognized specialist, its activities include the realization of scientific software and simulation of synthetic environments, solutions in Virtual Reality or Augmented Reality and products for the database generation of simulated images for the implementation of Deep learning classifiers.

This work carried out jointly by scientific experts and software architects in particular the development of innovative products, such as:

- SEAMOTION: Platform for simulation in real time of maritime environment,
- MOCEM: radar signature simulator,
- SIMSON: sonar simulator of underwater scenes,

- METANE: simulator of accidental underwater oil leaks,
- SIMUFLUVIAL: Simulator for training in river navigation.

These two CoEs share a common goal: simulation for tomorrow's innovations.



## TOTALINUX

Stand 60

Press contact: Céline DESANGLOIS

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### ★★★ Preview: TotalinuX presents you its new offers :

- Our IMMERSION solution - save 95% of electrical energy in Data Centers: it allows us to recover the digital energy produced by our population and convert it into stable and renewable energy. Computer servers are immersed in a dielectric fluid called ICE COOLANT that captures the digital heat produced and transports it to a single point of transformation.
- Our new data compression algorithm (TLT) in partnership with the CEA: the objective is to improve transfer speeds (inter-node communication (MPI), Bluetooth, satellite communication, etc.) and data writing speeds (writing to hard disk, SD card, SSD, any storage). It is an extremely fast Lossless compression algorithm (lossless: after compression/decompression, the signal is exactly the same as the original, so it is perfectly transparent). It is also very simple to set up, and light. Since it compresses/decompresses very quickly, it scales to 100% (on a compute node, it will compress exactly as fast as there is no compute core). Memory level, it is also very light since it only requires very small buffers. Therefore, it becomes interesting to use it as soon as you do disk writing, data transfer and/or communication.
- Our virtual reality (VR) solution - HP Backpack: in order to create a virtual environment using calculation software, it stimulates touch, hearing and sight in an artificial way. Ergonomic 3D simulation requires high performance equipment. This technology can be used in several fields: games, engineering, medicine, combat, design or education.

TotalinuX strategic developments:

To support its very fast growth, TotalinuX is building a new 3500m<sup>2</sup> Data Center combined with office space. These new premises will enable TotalinuX to develop more effectively its business and to forge closer partnerships with all manufacturers and customers.

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## ■ THE EUROPEAN RESEARCH CAFÉ ■

Sponsored by **INRIA**, this area presents 10 European research projects in the fields of computer simulation, HPC and Big Data.

### ■ ANTAREX

■ Stand 24

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#### AutoTuning and Adaptivity approach for Energy efficient eXascale HPC systems Main

ANTAREX aims to provide a breakthrough approach to map, runtime manage and autotune applications for green and heterogeneous High Performance Computing systems up to the Exascale level.

One key innovation of the proposed approach consists of introducing a separation of concerns (where self-adaptivity and energy efficient strategies are specified aside to application functionalities) promoted by the definition of a Domain Specific Language (DSL) inspired by aspect-oriented programming concepts for heterogeneous systems.

The new DSL will be introduced for expressing the adaptivity/energy/performance strategies and to enforce at runtime application autotuning and resource and power management. The goal is to support the parallelism, scalability and adaptability of a dynamic workload by exploiting the full system capabilities (including energy management) for emerging large-scale and extreme-scale systems, while reducing the Total Cost of Ownership (TCO) for companies and public organizations.

ANTAREX is driven by two relevant use cases: a biopharmaceutical application for drug discovery and a self-adaptive navigation system for smart cities.

### ■ CLOUDBAPPLIANCE (N)

■ Stand 24

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#### European Cloud In-Memory Database Appliance with Predictable Performance for Critical Applications

CloudDBAppliance will deliver a European appliance with a leading-edge hardware platform, the new Bullion generation, equipped with an ultra-scalable operational database, LeanXcale, boosted with its ultra-efficient storage engine able to scale up linearly to 1,000+ cores and integrated with ActivePivot, that will provide real-time analytics, as well as an ultra-scalable in-memory streaming engine, with a set of parallel analytics algorithms for data mining and machine learning, both over the operational data.

The CloudBDAppliance outcomes will be validated through five real industrial use case scenarios in three verticals:

- Bank sector – Real-time risk monitoring in banking & ATM optimization,
- Telecommunication sector – Mobile number portability,
- Retail sector – Proximity marketing & Real-time pricing

CloudDBAppliance aims at creating an appliance with an ultra-scalable operational database with analytical capabilities leveraging a new ultra-efficient storage engine able to scale to up to the next Bullion generation with 800 cores.

The CloudBDAppliance outcomes will be validated through five real industrial use case scenarios in three verticals: Bank Telecommunications & Retail

### ■ COMPBIOMED PROJET (N)

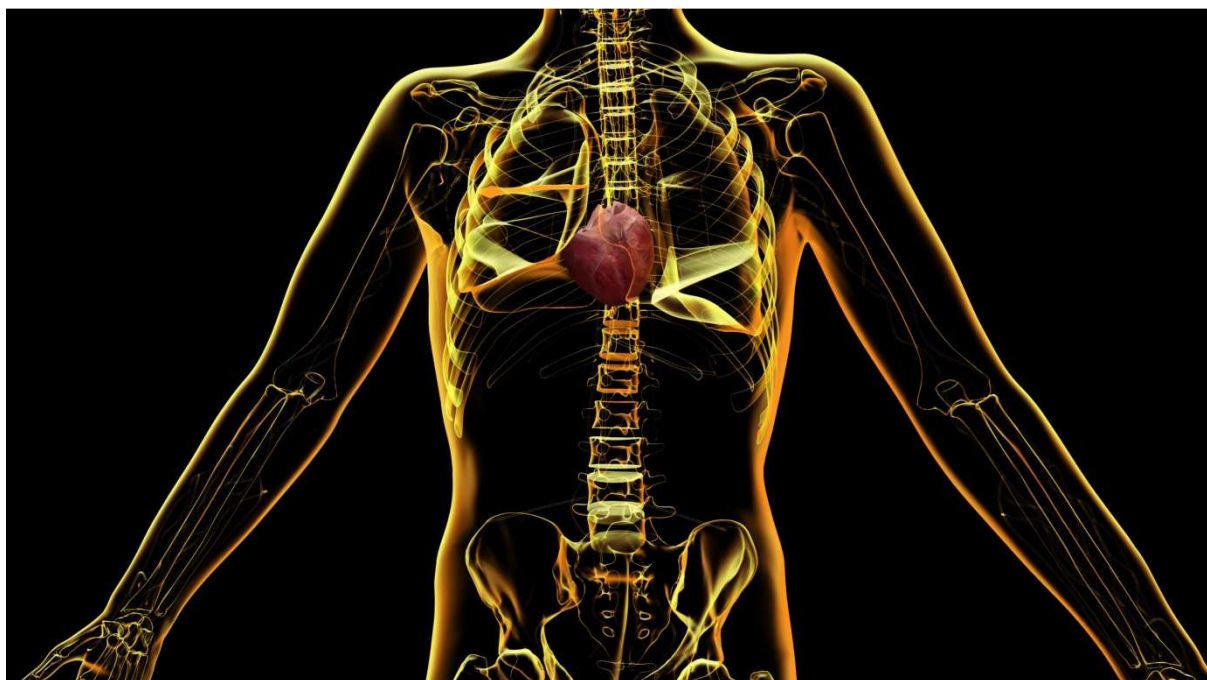
■ Stand 24

Press contact: Professor Peter V. Coveney  
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Computational methods, based on human biology and physiology, are now reaching maturity in the biomedical domain. These methods are rendering predictive models of health and disease increasingly

relevant to clinical practice by providing a personalized aspect to treatment, and supporting the reduction of animal and human experimentation.

Computer based modeling and simulation is well established in the physical sciences and engineering, where the use of both high performance computing (HPC) and high throughput computing (HTC) is now routine. CompBioMed is a user-driven Centre of Excellence (CoE) in Computational Biomedicine, designed to nurture and promote the uptake and exploitation of HPC and HTC within the biomedical modelling community. Our user communities come from academia, industry and clinical practice.



Project partners: University College London, University of Amsterdam, University of Edinburgh, Barcelona Supercomputing Centre, SURFsara BV, University of Oxford, University of Geneva, University of Sheffield, CBK Sci Con Ltd, Universitat Pompeu Fabra, LifeTec Group BV, Acellera Labs SL, Evotec AG, Bull, Janssen Pharmaceutica.

## ■ ESCAPE

## ■ Stand 24

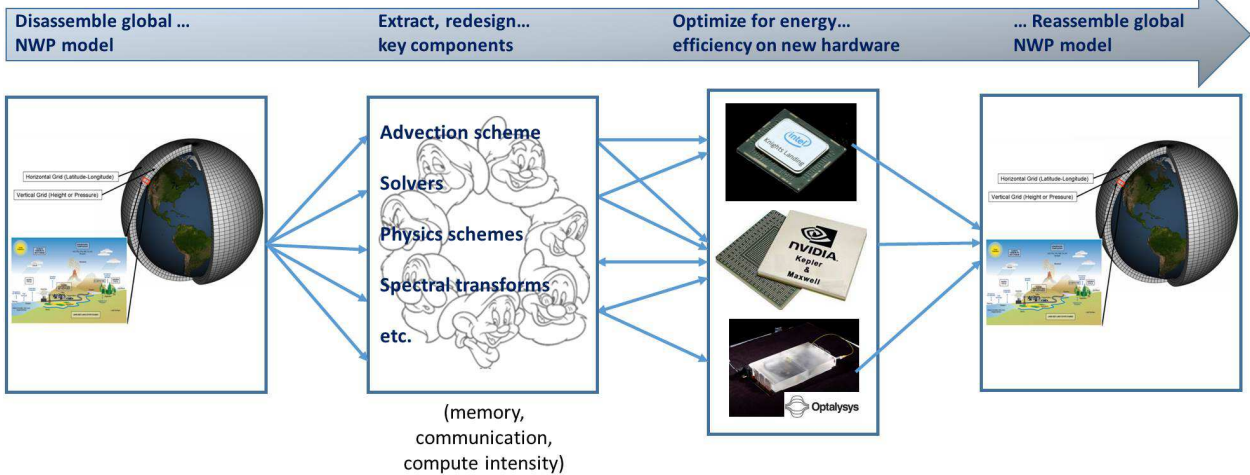
Press contact: Daniel Thiemert (ECMWF)  
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ESCAPE stands for Energy-efficient Scalable Algorithms for Weather Prediction at Exascale. The project will develop world-class, extreme-scale computing capabilities for European operational numerical weather prediction (NWP) and future climate models.

The biggest challenge for state-of-the-art NWP arises from the need to simulate complex physical phenomena within tight production schedules. Existing extreme-scale application software of weather and climate services is ill-equipped to adapt to the rapidly evolving hardware. This is exacerbated by other drivers for hardware development, with processor arrangements not necessarily optimal for weather and climate simulations. ESCAPE will redress this imbalance through innovation actions that fundamentally reform Earth system modelling. The project will provide the necessary means to take a huge step forward in weather and climate modelling as well as interdisciplinary research on energy-efficient high-performance computing.

# ESCAPE

Energy efficient **SC**alable **A**lgorithms for weather **P**rediction at **E**xascale



Project partners: ECMWF, DMI, RMI, MeteoSwiss, DWD, Meteo-France, ICHEC, PSNC, U Loughborough, Bull, NVIDIA, Optalysy.

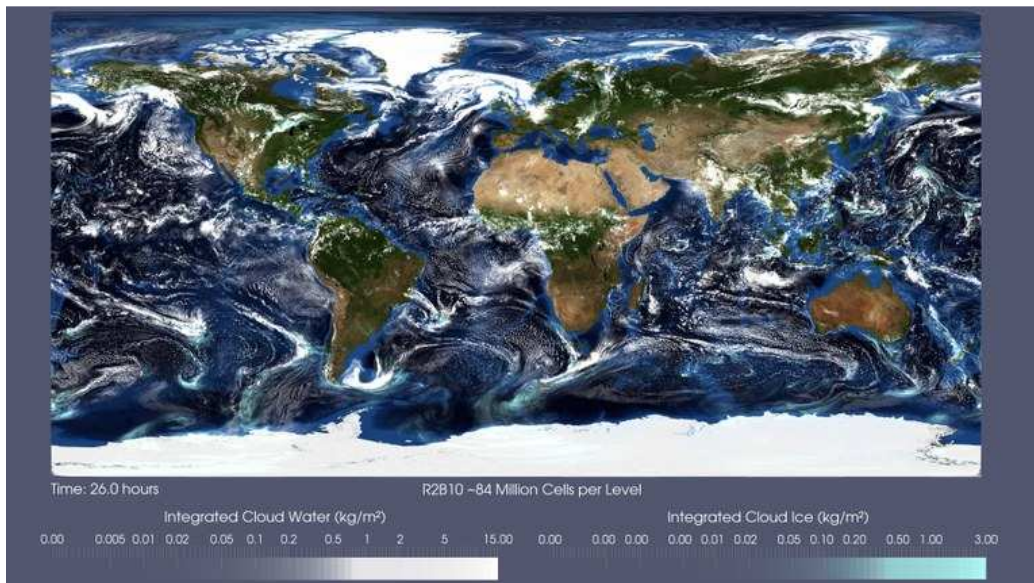
## ESIWACE PROJECT Stand 24

Press contact: Chiara Bearzotti (DKRZ)  
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### Qu'est-ce qu'ESIWACE ?

ESIWACE signifie « Centre d'Excellence dans la Simulation Météorologique et Climatique en Europe » (en anglais « Centre of Excellence in Simulation of Weather and Climate in Europe »).

Nous sommes une nouvelle initiative issue de l'écosystème HPC en Europe, financée par le Programme Horizon 2020 de la Commission Européenne, et tirons avantage de deux réseaux européens établis : « le réseau européen pour la modélisation du Système Terre » (European Network for Earth System modelling - ENES) <http://enes.org> représentant la communauté européenne de modélisation du climat et « le Centre Européen pour les Prévisions Météorologiques à Moyen Terme » (CEPMMT) (European Centre for Medium-Range Weather Forecasts - ECMWF) <http://www.ecmwf.int> leader mondial dans ce domaine.



Un des principaux objectifs d'ESIWACE est d'améliorer substantiellement l'efficacité et la productivité de la simulation météorologique et climatique sur des plateformes de calcul haute performance en supportant de bout en bout la chaîne de calcul de modélisation global du système à l'échelle de la Terre, et cela dans un environnement HPC.

Par ailleurs, dans le contexte de l'ère exascale à venir, ESIWACE établira des démonstrateurs de simulations qui seront exécutées à la plus haute résolution accessible (cible de 1km). Cela donnera un aperçu des capacités HPC permettant de calculer des configurations qui permettront d'adresser les challenges scientifiques clés dans le domaine de la prédiction météorologique et climatique.

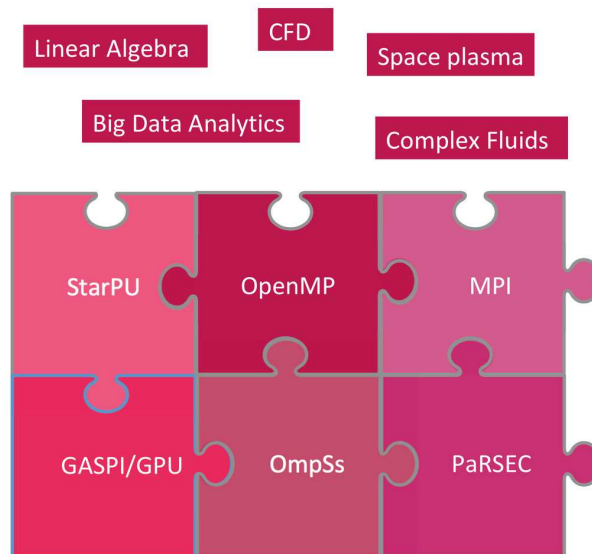
## ■ INTERTWinE Project ■ Stand 24

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### Coordinated by University of Edinburgh, EPCC

Le projet INTERTWinE s'intéresse à la conception et à l'implémentation de modèles de programmation pour le calcul scientifique à l'Exascale.

Les premières machines exascales vont apparaître au cours de la première moitié de la décennie 2020, et seront des systèmes très massivement parallèles, consistant en une hiérarchie de niveaux architecturaux tels que les sockets de processeurs, les cœurs de processeurs et les unités vectorielles.



Pour programmer ces systèmes de façon effective et portable, nous devons instamment proposer des interfaces de programmation applicatives robustes et efficaces. L'interface de programmation ultime capable de cibler l'ensemble de ces niveaux architecturaux n'existe pas encore, et il est peu vraisemblable qu'elle apparaisse dans un futur proche.

Nous devons donc envisager que l'utilisation combinée de plusieurs interfaces de programmation différentes sera l'unique solution viable, à court et à moyen terme. Bien qu'il y ait une marge de progression individuelle pour chaque interface de programmation, les principaux défis portent sur l'interopérabilité entre ces interfaces.

INTERTWinE s'efforce de relever ces défis et fait progresser l'état de l'art de l'interopérabilité des modèles de programmation, au niveau de la spécification et au niveau de l'implémentation, en se concentrant sur des interfaces de programmation majeures telles que MPI et OpenMP, et en étant guidé par des applications réelles d'ingénierie, de cosmologie et de mathématiques appliquées.

## ■ LEGATO Projects ■ Stand 24

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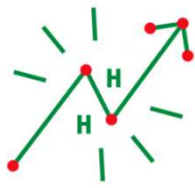
### Low Energy Toolset for Heterogeneous Computing

Due to fundamental limitations of scaling at the atomic scale, Moore's Law has slowed down. Heterogeneity aims to solve the problems associated with the end of Moore's Law by incorporating more specialized compute units in the system hardware and by utilizing the most efficient compute unit for each computation.

The overall objective of the LEGaTO project is to produce this software stack to support energy-efficient heterogeneous computing. The project will strive to achieve this objective by employing a naturally



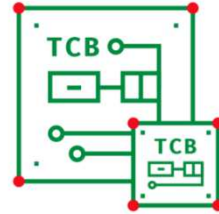
energy-efficient task-based programming model, coupled to a dataflow runtime while simultaneously ensuring security, resilience, and programmability.



One order of magnitude improvement in energy-efficiency for heterogeneous hardware through the use of the energy-optimized programming model and runtime.



5× decrease in Mean Time to Failure through energy-efficient software-based fault tolerance.



Size reduction of the trusted computing base by at least an order of magnitude.



5× increase in FPGA designer productivity through the design of novel features for hardware design using dataflow languages.

Using heterogeneous hardware composed of CPUs, GPUs, FPGAs, the project aims at energy savings in the order of one magnitude from the edge to the converged cloud/HPC. The energy-efficient software toolset for heterogeneous hardware developed within the LEGaTO project will be applied to three use cases:

Healthcare: A decrease in energy consumption in the healthcare sector and an increase in healthcare application resilience and security – both critical requirements in this area.

Smart cities: Ease of programming and energy savings through the use of the project's software-hardware framework for the Internet of Things (IoT), smart homes and smart cities application.

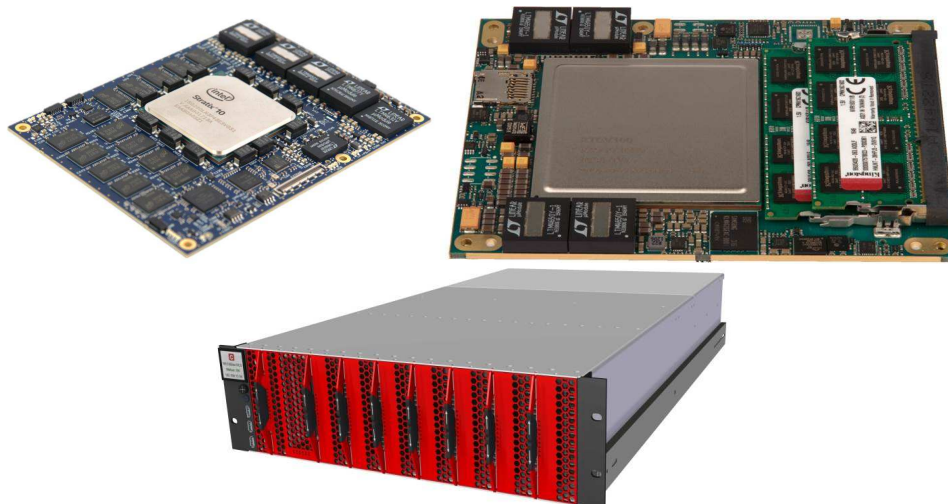
Machine learning (ML): Improve energy efficiency by employing accelerators and tuning the accuracy of computations at runtime.

The overall objective of the LEGaTO project is to produce a software stack to support energy-efficient heterogeneous computing. The project will strive to achieve this objective by employing a naturally energy-efficient task-based programming model, coupled to a dataflow runtime while ensuring security, resilience, and programmability. Using heterogeneous hardware composed of CPUs, GPUs, FPGAs, our aim is one order of magnitude energy savings from the edge to the converged cloud/HPC.

**M2DC** **Stand 24**

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 Email: ariel@man.poznan.pl - Phone number: +48 61 858 21 69 - Website : www.m2dc.eu

**Modular Microserver Data Centre**



The Modular Microserver DataCentre (M2DC) project investigates, develops and demonstrates a modular, highly-efficient, cost-optimized server architecture composed of heterogeneous microserver computing resources. The resulting server architecture can be tailored to meet requirements from a wide range of application domains such as image processing, IoT, cloud computing and HPC. M2DC is building on three main pillars:

A flexible server architecture that can be easily customized, maintained and updated: Due to its modular and scalable architecture, the system can combine arbitrary mixtures of high-performance ARM server processors, low-power ARM embedded/mobile SoCs, traditional x86 processors, GPUs and FPGAs in a heterogeneous, densely integrated server environment.

Advanced management strategies and system efficiency enhancements (SEEs): In comparison to current FPGA or GPGPU-based hardware accelerators that are specifically targeting performance enhancements of applications, the M2DC hardware accelerators are seamlessly integrated into the system architecture. Depending on the actual requirements, the accelerators can dynamically adapt their behavior, e.g., towards performance improvements, power reduction, and dependability.

Well-defined interfaces to surrounding software data center ecosystem: This will include required interfaces for smooth integration with DCIM and HPC management software allowing fine-grained monitoring and comprehensive set of power management functions.

## ■ MONT BLANC ■ Stand 24

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Since 2011, project Mont-Blanc has been investigating a new type of energy efficient computer architecture for HPC, leveraging Arm processors. Now in its third phase and coordinated by Bull (Atos Group), Mont-Blanc is funded by the EC under the Horizon 2020 program. Its aim is to define the architecture of an Exascale-class compute node capable of being manufactured at industrial scale, while developing the matching software ecosystem.

At Teratec Forum 2018 Mont-Blanc will show its prototype based on Cavium Arm processors (ThunderX2), now commercialized by Atos as part of its BullSequana X1000 range. We will also present our latest developments concerning compute efficiency, simulation, software & applications – a lot of which are leveraged by the first HPC Arm-systems recently deployed.

Project Mont-Blanc 2020, that started in December 2017, will also be present. The Mont-Blanc 2020 project intends to pave the way to the future low-power European processor for Exascale. It is at the heart of the European exascale supercomputer effort, since most of the IP developed within Mont-Blanc 2020 will be reused and productized in the European Processor Initiative (EPI). To improve the economic sustainability of the processor generations that will result from the Mont-Blanc 2020 effort, the project includes the analysis of the requirements of other markets, such as “embedded HPC” for autonomous driving.

## ■ TANGO Project [N] ■ Stand 24

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### **Transparent heterogeneous hardware Architecture deployment for eEnergy Gain in Operation.**

The objective of the TANGO project is to provide technologies and tools made to facilitate the adoption of new heterogeneous hardware. We plan to create a number of technologies and tools base on our research objectives: Propose an implement a self-adaptive reference architecture, extend existing software development models and methodologies for heterogeneous parallel architectures, develop and energy aware hardware agnostic programming environment, develop and evaluate a self-adaptive model with identified low power parameters and QoS metrics, develop hardware power consumption and software energy models.

The objective of the TANGO project is to simplify and Optimize the Heterogeneity by simplifying the way developers approach the development of next generation applications based on heterogeneous hardware architectures, configurations and software systems including heterogeneous clusters, chips and programmable logic devices.

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■ **To conclude on a distinctive note, make sure to attend the 4th edition of the Digital Simulation Trophies** organized with **L'Usine Digitale**, in partnership with **CEA, Cray Computer, Dell EMC, HPE** and **Inria**. At this occasion, a jury of leading professionals will award 5 trophies **rewarding the Champions** of digital simulation, HPC and Big Data.

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