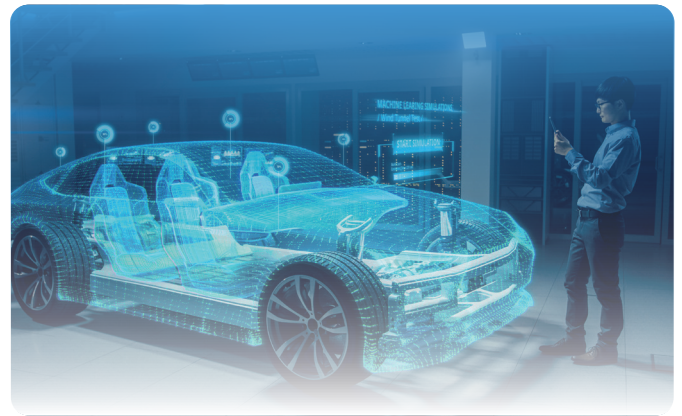


IT Consulting & Services for CAE / HPC Simulation

Utilizing Computer Aided Engineering (CAE) simulation is key to creating innovative products and bringing them to the market fast while assuring highest product quality and safety. With bespoke IT services Atos science + computing assures that the complex and fast-moving IT environment used for engineering / R&D utilizes expensive technologies like HPC to the maximum and manages the complexity to create an engineer focused product innovation platform.

Performing 1 million virtual car crash tests a year, developing more fuel-efficient wing-profiles for planes, boosting the creation of a COVID vaccine or reducing the number of failed silicon wafers during the production process – all these and many more use-cases benefit from advanced CAE simulations and HPC clusters.

Designing and running these highly specialized high-end IT environments implies making use of new technologies fast and integrating dozens of specialist software tools while providing a Linux based workplace, which empowers engineers to use these tools without becoming an IT expert on their own.



Accelerated Product Development

Customers Challenge

While CAE simulation is a proven and established discipline in product development, the overall success depends on the capabilities of the dedicated IT environment and their most efficient use:

- Efficient use of expensive HPC clusters require performance tuning of low-latency networks and batch schedulers
- Vast amounts of data have to be managed in the fastest way possible while assuring data security and data continuity
- Hybrid Cloud resources need to be customized to provide a flexible cost-effective global compute platform
- Highly specialized applications need to be integrated and technical workflows automated

Atos science-computing Solution

Working closely with the customer, Atos science + computing helps to architect and streamline CAE IT environments.

Starting from an in-depth analysis of the engineers' demand we create use-case optimized end-to-end solutions which build on our extensive expertise of running production critical CAE IT environments in the industry.

Our experts tune HPC and storage systems to maximum utilization, bring insight to CAE software licenses usage and implement standardized HPC solutions.

Experienced CAE Workflow Consultants create tailor made tools for web portals, submit frameworks or Simulation Data Management Software integration or automation of the engineers' recurring tasks.

Business Benefits

An optimized and agile CAE IT environment which uses on-Premise and/or Cloud resources more efficiently – run by experienced CAE IT experts.

- Clear insight to systems utilization and license usage for just-in-time capacity management
- Engineers and suppliers which can use HPC at ease
- Fast implementation of service requests by a CAE expert level Service Desk team which understands and speaks the language of the engineers
- Reduction of cost for local workstations by leveraging powerful Linux 3D remote visualization
- Accelerated product development and faster capitalization of R&D investments

Solution Overview & Service Models

Driven by use-case specific demands for disciplines like FEM, CFD or NVH Atos science + computing designs and runs each CAE IT environment based on standardized CAE components and orchestrates them for the bespoke workload.

Customer Engagement

Our solutions cover consulting and out-tasking services up to full end-to-end as-a-Service models:

- IT Consulting for optimizing a partial aspect of the full CAE environment e. g. reducing ISV software licenses or tuning the HPC batch system for higher utilization. Our experts will perform an in-depth analysis and document clear recommendations for savings and improved IT architectures.
- T&M or fixed price-based IT Operations for selected critical layers like HPC cluster & CAE workflows or Container based application management.
- Full end-to-end responsibility for the complete CAE IT stack including an optional as-a-Service model where the customer can reduce its IT coordination effort to the minimum.

Delivery Model

Having detailed knowledge about the customer engineering processes, HPC workloads as well as CAE applications is key for being a trusted advisor and innovation partner.

- Atos science + computing uses a customer specific team to assure customer intimacy.
- Our experts are close to or on the customer site for export workshops, design meetings, etc. This model can be extended to a full on-site operation or to a cost optimized model with near-shore resources.
- Close cooperation of the customer specific expert Service Desk and IT operations team assures an end-user centric service mentality with fixed personal contacts.

Reference End-to-End CAE IT Services

For a leading German car manufacturer Atos science + computing provides design / plan / build / run CAE services covering the full CAE stack --- from data center services up to tailor made software development for CAE workflows: > 6.000 servers, about 1.000 engineers, dozens of PBytes of storage, hundreds of ISC / in-house applications.

The delivery is fulfilled by a mixed-shore team with local experts on-site as well as on-shore and near-shore system engineers and consultants.

Orchestrated Global HPC Grid

Atos science + computing empowers customers to create dynamic hybrid HPC grids as an internal shared resource for CAE workloads as well as AI and Data Analytics based HPC use-cases.

This platform includes

- globally distributed on-Premise as well as Cloud HPC resources,
- an easy-to-use entry point for the engineer or engineering suppliers,
- an orchestration layer which assures data security, auditing and reporting,
- an interface for integration of e. g. Simulation Data Management Software or Digital Twin infrastructures.

Technologies

Typical technologies and tasks mastered by our CAE IT experts are

- Performance-tuning of HPC clusters, batch schedulers and Infiniband networks
- Tiered parallel Scale-Out filesystems (Lustre, GPFS, etc.)
- Scripting up to full-scale software development for workflow automation
- System engineering according to the Infrastructure as Code paradigm
- Cloud & Cloud Native technologies like HPC containers
- Linux 3D remote desktop virtualisation

Reference Hybrid HPC as-a-Service

For a leading German car manufacturer Atos science + computing provides a hybrid HPC as-a-Service environment. The hardware is owned by Atos and located in multiple redundant Green-Energy regions. Bursting to a public cloud provider allows to run the platform in the most cost-efficient way while still providing always sufficient resources to the engineers.

In addition to the HPC platform Atos is also responsible for running, integrating and customizing of the Simulation Data Management environment, which is automated with the standardized FlowGuide software.

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