

Advanced computing

Atos

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Quantum Learning Machine



Trusted partner for your Digital Journey

Atos

Get Ready for the Quantum Revolution

To tackle increasingly demanding industry challenges, we need to find alternatives to existing computing solutions. In this context, Quantum Computing is one of the most promising technologies.

Leveraging quantum properties

The first quantum revolution has taken place at a microscopic level and brought some major innovations of the 20th century such as the transistor, the laser, superconducting devices and optical fibers. Many experts are convinced that the second quantum revolution, which will see quantum information emerging, is already upon us. A binary digit is always in one of two definite states (0 or 1) however quantum computing uses qubits which can be in a superposition of states (1 and 0 superposed), enabling massively parallel computation. This multiplies capacity, so that quantum computers with a modest number of qubits, as little as 60, could solve problems that today's most powerful supercomputers cannot address with years of computing time! Advances in quantum science are extensive and demonstrate the reality of the tremendous opportunities to accelerate calculations, which together allow quantum superposition and quantum entanglement.

Atos Quantum R&D Program

Atos Quantum' is the first quantum computing industry program in Europe. This global program aims to develop quantum computing solutions but also to learn how to enhance cyber security products to anticipate quantum advantage and its impact on cryptography.

Atos' ambition is to be a quantum player in three domains: quantum programming and simulation platforms and, later, next-generation quantum-powered supercomputers, as well as quantum-safe cybersecurity. It is piloted by a Scientific Council with world-renowned members. The 'Atos Quantum' Scientific Council is enriched with the immense knowledge and visionary power of its members, all highly renowned researchers. The Council is chaired by the Chairman and CEO of Atos and is made up of universally recognized quantum physicists and mathematicians.

The first products of the Atos Quantum Program have been the Atos Quantum Learning Machine - Atos' world-class quantum simulation appliance - and the Atos Quantum consulting practice.

Go beyond HPC

Quantum Computing is a new computing paradigm that will solve critical problems in all industries more efficiently than current high performance computing (HPC) systems.



Manufacturing

- Autonomus vehicle
- Logiastic
- Supply chain
- Software validation
- Batteries
- Polymer



Public Sector & Defence

- Neural networks
- Process optimization
- Cryptanalysis
- Material science
- Nanotechnologies



Financial Services & Insurance

- Fraud detection
- Trading strategies
- Market simulation
- Portfolio optimization
- Risk assessment
- Cryptocurrency



Telecom, Media & Technology

- Personalized content
- 5G antenna location
- Chip layout optimization
- Post-quantum cryptography



Resources & Services

- Smart grids
- Flight scheduling
- Oil well optimization
- Yelid management
- Cybersecurity
- Carbon dioxide capture



Healthcare & Life Sciences

- Genomics
- Virtual Screening
- Protein folding
- Drug discovery
- Personalized medicine

Atos QLM benefits

- Bootstrap in Quantum Computing
- Ease end-user quantum programming language, a set of provided Quantum Libraries and a Jupyter
- Notebook environment
- Program and execute hybrid quantum-classical algorithms
- Integrate with existing frameworks to leverage algorithms developed via other frameworks
- Support real noise simulation models on different hardware
- Simulate different technologies through its hardware agnostic environment with unprecedented performances.
- Explore both digital and analog quantum computing technological approaches

Develop quantum applications today

The Atos Quantum Learning Machine (Atos QLM) is a complete on-premise environment designed for quantum software developers. It is dedicated to the development of quantum software, training and experimentation.



Programming



Optimization



Simulation

The Atos Quantum Learning Machine provides 3 environments

It embeds a programming platform and a high-performance quantum simulator. Its capabilities and performances are unmatched on the market. The Atos Quantum Learning Machine allows researchers, engineers and students to develop and experiment with quantum software. Powered by a powerful dedicated hardware infrastructure, the Atos QLM will emulate execution as a genuine quantum computer would.

Software developed on the Atos QLM can run on simulated, as well as on future quantum accelerators, without changing a line. The Atos Quantum Learning Machine computes the exact execution of a quantum program, with double digit precision. It simulates the laws of physics, which are at the very heart of quantum computing.

This is very different from existing quantum processors, which suffer from quantum noise, quantum decoherence, and manufacturing biases, as well as performance bottlenecks. Simulation on the Atos Quantum Learning Machine enables developers to focus on their applications and algorithms, without having to wait for quantum machines to be available.

The Atos Quantum Learning Machine is a complete appliance

Thanks to the bespoke software and hardware developed by Atos, the Atos QLM has superior simulation capabilities, much more than any other affordable appliance. In its maximum configuration, it can simulate up to 41 Qbits, which was until now, only possible on large supercomputers, despite the fact that the Atos QLM has the physical dimensions of a simple business server.

The appliance is composed, non-exhaustively of:

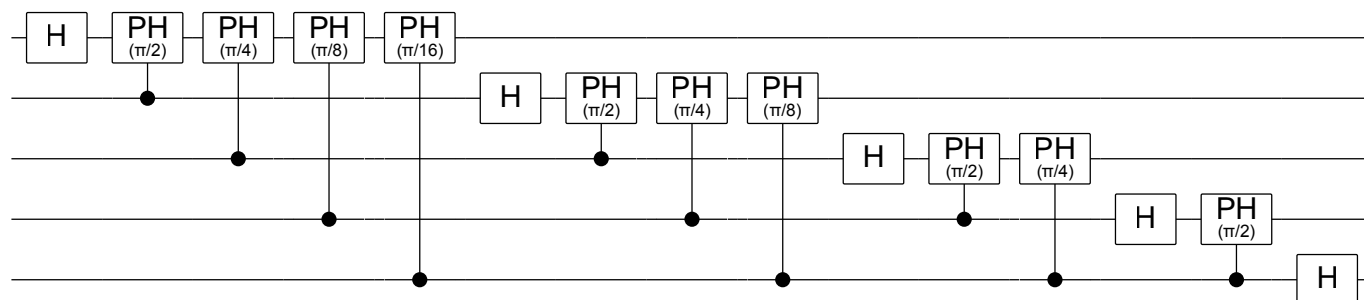
- A specific hardware infrastructure, with large in-memory capacity and - available soon - a dedicated hardware accelerator
- An extensible quantum circuit model (data representation model)
- A universal quantum assembly programming language (AQASM, Atos Quantum Assembly Language)

- A high-level quantum hybrid language, built on top of the popular Python language
- A set of mathematic libraries and algorithms - ready to use

Thanks to Atos' large in-memory infrastructure, it is simple and seamless to upgrade the simulation capabilities from 30 to 41 qubits. Grow as your business needs it while leveraging existing investments.

The Atos Quantum Assembler (AQASM)

The Atos Quantum Assembler is an important component of the Atos QLM appliance. AQASM is designed in the Atos R&D labs. AQASM is Atos' implementation of the universal quantum software development language: QASM. Programs using AQASM can be used on the quantum simulator today, as well as on the physical quantum computers of tomorrow. AQASM is configurable; it has the ability to program new quantum gates or to mix existing gates. AQASM offers high-level wrappers for developers and accepts quantum programs from other frameworks thanks to a versatile software development kit.



Atos Quantum Learning Machine functional scope

Programming

AQASM

Assembly language to build quantum circuits

pyAQASM

Python extension to AQASM

CIRC

Binary format of quantum circuits

QLIB

Quantum arithmetic libraries

Quantum algorithms

Variational Algorithms, such as QAOA and VQE

QPU

QPU

Quantum processing unit emulation

Optimization

Gate set rewriter

Abstract gates

Plugins

Expressive and concise programming

Circuit optimizers

Generic circuit optimizer
Topology constraint solver

Simulation

Simulators

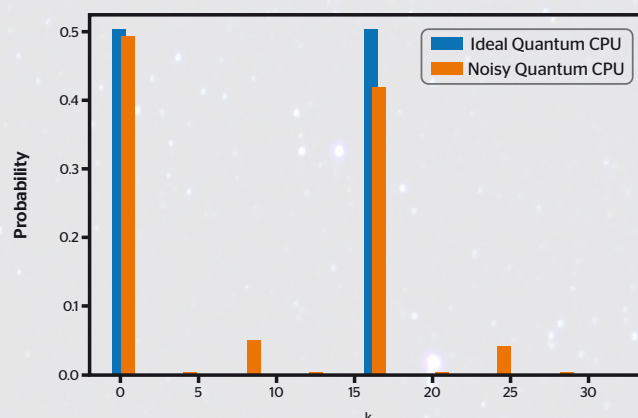
Different simulation modules for Circuit models
Simulated Quantum Annealing

Physics

Physical noise models
Gateset tomography

Quantum Noise Simulation

The simulation of physics includes different models for quantum noise. Should the underlying technology be trapped ions, superconducting circuits or semiconducting silicon, the noise models can be chosen and used to be as close as possible to reality.



A broad range of services based on the Atos QLM

1	Quantum Computing Basis	Beginner 1/2 day	A comprehensive approach to quantum computing
2	Atos QLM Fast Start	Intermediate 2 days	Quick knowledge ramp-up on the Atos QLM appliance
3	Decoding of quantum algorithm	Advanced 2 days	Principles and building steps of a specific quantum algorithm
4	Proof of Concept	Business + experts 5 days → 6 months	Study the feasibility of quantum implementation relative to the customer's use cases

Join the Quantum revolution with Atos experts

Atos provides a broad range of services based on the Atos QLM. Our mission, with our Quantum experts, is to accompany you in every aspects.

From the discovery of the Atos QLM appliance, to the development and simulation of your first Quantum codes, our experts' outstanding teaching skills and the QLM intuitive programming environment gives you the knowledges to join the Quantum revolution

Atos QLM E - accelerating research in the NISQ era

NISQ - Noisy Intermediate-Scale Quantum - devices will be the first quantum accelerators to be commercialized in the next few years. Herein lies a double challenge for the industry: developing NISQ algorithms is as important as building the machines, since both are required to identify concrete applications. Atos QLM E has been optimized to drastically reduce the compilation time of hybrid quantum-classical algorithms simulations, leading to quicker advancement in application research.

Get your quantum simulations results up to 12x faster

Optimized for variational algorithms best suited for the NISQ era (up to 30 qubits)

Upgrade your QLM to a QLM E very easily to benefit from these enhanced features

Accelerate research on variational algorithms using Atos QLM E



Quantum Approximate Optimization Algorithm



Variational Quantum Eigensolver



Variational Quantum Factoring



Variational Quantum Classifier

... among other application fields!

Explore both analog and digital quantum simulation paths to solve optimization use cases using the Atos QLM

NP-hard optimization problems have critical applications in all industries, such as portfolio management, logistics, antenna location, chip design or clinical trial database search. Classical tools like solvers and heuristics provide either exact solutions for a small number of variables or approximate ones for larger problems, but their use is problem-dependent, and they do not all have provable behaviors. In this field, quantum computing holds major promises:

- Address larger problems
- Improve accuracy level
- Reduce time to solution
- And thus, reduce energy consumption

Using the Atos QLM, you can explore now two quantum-related technological paths to solve such problems in the future:

Describe your use case as a high-level NP-hard problem

- Max cut
- Graph partitioning
- Graph colouring
- K-Clique
- Vertex Cover
- Number Partitioning
- Binary Integer Linear Programming

Key benefits of using both approaches in the Atos QLM

- Better understand the specificities of digital and analog quantum computing
- Compare the benefits and constraints of two quantum computing technological paths applied to combinatorial optimization problems
- Prepare code to then run on NISQ accelerators or Quantum Annealing machines using the same programming environment

Encode it in a mathematical formulation

- QUBO (Quadratic Unconstrained Binary Optimization) formulation
- Ising model

Simulate it

- Digital Quantum Computing: Variational Algorithms such as QAOA (Quantum Approximate Optimization Algorithm)
- Analog Quantum Computing: SQA (Simulated Quantum Annealing) or SBA (Simulated Bifurcation Algorithm)



Explore the capabilities of quantum programming on your laptop using the world's most powerful quantum simulator's programming framework.

Start building quantum programs on your laptop with myQLM

myQLM is a python package that is provided with open source interoperability connectors with frameworks such as Qiskit, Cirq, ProjectQ or Forest™. It was designed to democratize quantum computing by allowing researchers, students and developers to create and simulate quantum circuits on their laptops.

It is fully compatible with the Atos Quantum Learning Machine: users will be able to launch their myQLM programs on their organization's Atos QLM to benefit from larger simulation capabilities and advanced features like quantum circuit optimizers and noisy simulators.

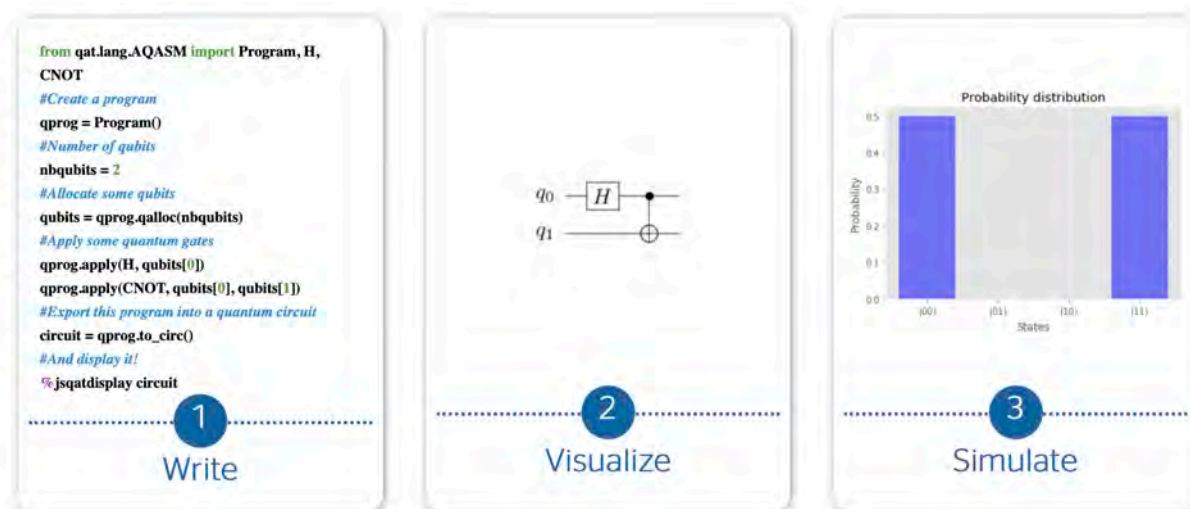
Expand your quantum programming community with myQLM

- myQLM is the best framework to help students, scientists and developers get acquainted with quantum computing and quantum programming.
- It's a tool to brainstorm, test and share ideas without being bothered by quantum noise.
- Users will have access to a broad user community as Atos also provides open source translators from myQLM to other main quantum programming environments.
- Everyone's myQLM ideas can be shared via a community GitHub repository.
- All research done using myQLM will remain the property of the entity who produced it.

Join the myQLM community

To download myQLM and stay informed on the latest developments of our community, please visit: www.atos.net/myqlm

Start building quantum programs on your laptop with myQLM



Inspired by the Atos Quantum Learning Machine

Programming

AQASM

Assembly language to build quantum circuits

CIRC

Binary format of quantum circuits

pyAQASM

Python extension to AQASM

INTEROP

Connectors' source codes: build your own!

QLIB

Quantum arithmetic libraries

Quantum algorithms

Variational Algorithms, such as QAOA and VQE

Open Source

Optimization

SIMULATOR pyLinalg

Source code of this simulator: build your own!

Open Source

Discover Atos' broad quantum simulation ecosystem

Features	myQLM freeware	Atos QLM appliance	Atos QLM E appliance
Programming			
pyAQASM/AQASM/CIRC formats	✓	✓	✓
Custom gates	✓	✓	✓
QLIB libraries	✓	✓	✓
Interoperability kit - open source translators	✓	✓	✓
Pre-/Post-Processing			
Custom plugins	✓	✓	✓
Gate set rewriter	✗	✓	✓
Topology constraints solver	✗	✓	✓
Circuit Optimizer	✗	✓	✓
Digital QC Simulation			
Simulation capabilities	Up to 20 qubits	Up to 41 qubits	Up to 41 qubits
Simulation performances	★	★★★★	★★★★★
PyLinalg - open source noiseless simulator	✓	✗	✗
Advanced noiseless simulators <ul style="list-style-type: none"> • Linalg • Feynman • Stabilizers (stabs) • Matrix Product State (mps) • Binary Decision Diagram (bdd) 	✗	✓	✓
Noisy simulators <ul style="list-style-type: none"> • Deterministic • Stochastic 	✗	✓	✓
Acceleration up to 12x - best suited for variational algorithms	✗	✗	✓
QLM for Combinatorial Optimization			
<ul style="list-style-type: none"> • Simulated Quantum Annealing • [SOON] Simulated Bifurcation Algorithm 	✗	✓ <ul style="list-style-type: none"> • (default) up to 500 variables • (optional) up to 2,000 variables • (optional) up to 5,000 variables 	
<ul style="list-style-type: none"> • [SOON] Acceleration for Simulated Bifurcation Algorithm 	✗	✗	✓
Services			
Training	Self training	Instructor-led training	Instructor-led training
Support	Community	Subscription	Subscription
Consulting	On demand	On demand	On demand

About Atos

Atos is a global leader in digital transformation with 110,000 employees in 73 countries and annual revenue of € 12 billion. European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos|Syntel, and Unify. Atos is a SE (Societas Europaea), listed on the CAC40 Paris stock index.

The purpose of Atos is to help design the future of the information space. Its expertise and services support the development of knowledge, education and research in a multicultural approach and contribute to the development of scientific and technological excellence. Across the world, the Group enables its customers and employees, and members of societies at large to live, work and develop sustainably, in a safe and secure information space.

Find out more about us

atos.net

atos.net/career

Let's start a discussion together



For more information: atos.net/qim

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Powering Enterprise Artificial Intelligence



Every enterprise faces digital transformation

- Customer contact is increasingly managed by intelligent automated routines.
- The Internet-of-Things impacts everything from building control to transport management.
- Mobile becomes the norm, with access to services and information demanding the highest standards of both performance and security.

In this new data-driven environment, every click and every transaction must feed back into increased insight and efficiency. Analytics and cognitive computing become ubiquitous, as does the sophistication of customer engagement, with nearhuman avatars already close to reality.

These new data-driven business and social practices need unprecedented levels of computing power. Financial services companies, retail chains, healthcare providers and manufacturing companies routinely demand computing power that, until recently, existed only within highly specialized scientific domains.

With the **BullSequana S** series, Atos introduces a new kind of enterprise server - ready to meet the accelerating demand for computing power experienced across every public and private sector enterprise.

Affordable, expandable and intelligent, the **BullSequana S** series delivers the computing power demanded by every forward-thinking enterprise.

Welcome to the family

The **BullSequana S** series is the latest addition to the **BullSequana** range of computers. With the S series, we have taken the exceptional computing power of the high-performance X series and applied it to the enterprise environment.

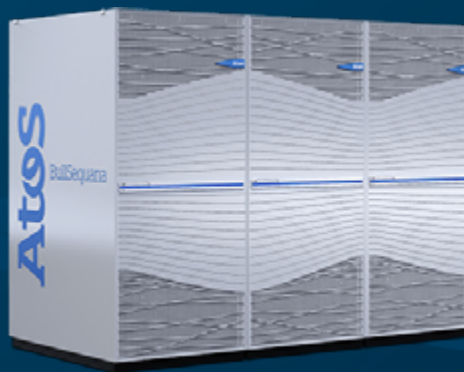
This gives your business access to the computing power and resilience that combines the best of supercomputers and mainframes. The X series, for example, has become the computing platform of choice in meteorology, genomics and aerospace.

The **BullSequana** family



S Series

Enterprise servers for data-driven organizations.



X Series

High performance computing for data-intensive scientific and academic environments.



M Series

Mainframe class servers to support legacy application processing.

BullSequana S series: impeccable logic

When analytics and cognitive are integral to business process, it makes sense for the enterprise server to combine business computing and analytics in a single server architecture. In designing the **BullSequana S** series, Atos computer scientists looked beyond the straight “faster and smarter” progression. They asked what kind of computer power an enterprise needs to actively support and encourage data-driven business.

By combining high-performance GPU (Graphic Processing Units) and industry-standard X86 CPUs in the same server, the **BullSequana S** series deliver unprecedented levels of computing power for both traditional and new Artificial Intelligence applications.

- The GPUs do the heavy lifting, crunching through the most demanding cognitive workloads.
- The CPUs handle the traditional business processing, managing, for example, ERP, payments or HR processes.

The **BullSequana S** series is currently the only enterprise server with an easy 2-32 CPUs and up to 32 GPUs expansion to do this.

The innovative **BullSequana S** design delivers clear and critically important benefits:

Power and scalability

As enterprises invest in AI, in analytics and cognitive, access to powerful computing capacity is a prerequisite for success.

Enterprise computing requirements resulting from AI can change rapidly. Demand for capacity grows continually, but is not constant. Events, such as new product launches, can result in massive spikes in requirement.

The **BullSequana S** series delivers both power and scalability. It allows, for example, easy expansion from 2 - 32 CPUs.

Reduced TCO

Enterprises that continue to invest in separate servers for separate business functions carry the increased costs of managing multiple platforms. Through unification, the **BullSequana S** radically simplifies management, reducing costs accordingly.

This is not just about optimizing IT budgets. It is about ensuring that all IT resources are used to maximum effect.

You will also reduce collateral IT expenditure by adopting **BullSequana S** series enterprise servers. You will, for example reduce costs associated with areas as diverse as energy consumption, on the one hand, and security management, on the other.

Future-ready

As data-driven business becomes the norm, analytics and cognitive will be embedded in all process and practice.

Combining Artificial Intelligence and business process functions in a single server architecture establishes the foundation for a data-driven IT and business culture.

In purely practical terms, this means the **BullSequana S** series of enterprise servers actively supports and accelerates the development and implementation of new data-driven business and customer-engagement applications.

Off the scale scalability

All forward-thinking enterprises understand the importance of developing as data driven enterprises.

The **BullSequana S** series offers the degree of scalability making it an ideal server platform for enterprise use. The five models that make up the series can all be customized and configured to offer servers tailored to your exact enterprise requirements.

The S series scales:

- from 2 to 32 Intel® Xeon® Scalable processors
- up to 32 GPUs
- Up to 48TB RAM (up to 64TB NV RAM)
- Up to 2PB internal storage

Each enterprise server can be split into smaller units. This makes it possible to optimize resource allocation, running analytics and cognitive processing alongside more traditional business applications.

Scalability is not just about the ability to add processing power and storage easily according to current and future need.

It's also about being able to balance the combination of CPUs and GPUs according to changing requirements.

In an engineering enterprise, for example, exponential growth in the distribution of

data sensors may require a corresponding increase in GPU capacity, while CPU power remains more stable.

Whatever combination and configuration you choose, all **BullSequana** computers are engineered to the highest standards and all are exceptionally energy efficient.

Note also, that your server can also be configured using software-defined hardware functions. This gives a nearinstant response, for example, in the event of an unscheduled surge in data requiring immediate analysis.

A powerful family of servers



Each model in the **BullSequana S** series uses the same modular construction, built on three key components:

Module	It comprises 1 Compute Unit plus in option a Storage Unit or a GPU Unit
Compute Unit	It comprises 2 CPUs, up to 3TB RAM, up to 8 disks (2.5") and hot plug/swap I/O cards
Storage Unit (optional)	It comprises 12 SAS/SSD, 4 NL-SAS disks, 4 NV-Mem for high I/O throughput
GPU Unit (optional)	It comprises 1 to 2 GPUs

Putting your BullSequana S series enterprise server to work ...

The S series enterprise servers are designed specifically to meet the demands of agile and innovative data-driven enterprises. Four specific and closely related functional areas stand out: artificial intelligence; analytics; real-time computing; and cloud delivery.

Artificial intelligence

Machine learning now becomes key to improved efficiency, decreased costs and smarter decision-making. By combining CPU and GPU processing power, the S series provides an integrated platform from which to launch AI-enabled business practices.

Highly scalable and completely modular, the S series enterprise servers give you the means to support AI initiatives effectively at both enterprise and departmental level.

As deep learning and AI grow in intensity across your enterprise, so the S series gives you the opportunity to increase capacity without system change.

Data analytics

In the data-driven enterprise, the demands made by analytics increase exponentially as millions of new data sources take shape. Whether focused on customer behavior in telecommunications and media, or the need to balance renewable energy across smart grids, analytics now takes on strategic business value for every enterprise.

The high storage capacity of the S series ensures that you are ready for any change in data volumes – and ready to process the most demanding algorithms for actionable business with scalable GPU capacity.

Analytics will continue to combine historic and real-time data from an increasingly wide array of proprietary and third-party sources. Whatever the mix, the S series is ready for the load, making easy work of new data lake, multi-format scenarios.

In-memory applications

In-memory computing is a prerequisite for the effective management of real-time analytics. In every sector of business and commerce, there are new instances in which real-time computing becomes an essential enabler. Examples include Network Function Virtualization in telecommunications; smart urban traffic control; and contextual personal avatars in financial services.

In-memory is a prerequisite for the effective adoption of the technologies which support the real-time analytics behind these business applications. SAP HANA dominates here, but other technologies are fast-emerging: Siemens MindSphere, for example, looks set to become the standard for industrial IoT.

The S series delivers the exceptional depth of memory needed to give full performance and security of operation for critical real-time analytics.

Cloud enablers

Hybrid cloud models are rapidly becoming the standard enterprise architecture. Organizations are coming to recognize that only cloud models can deliver the required agility in a world in which mobility becomes the norm.

In a hybrid cloud model, the private cloud components must match public cloud services in performance and flexibility, while ensuring the highest standards of data security.

The S series enterprise servers give you everything you need as a motor for high-performance private cloud implementation.

Inherent scalability is particularly important here. During mergers and acquisitions, for example, when newly extended enterprises need to accelerate access to shared business resources, the S series makes it possible to establish a secured collaboration environment in minutes rather than months.

Business technology focus

Four business technology areas in particular are deeply relevant to your **BullSequana S** server choices. Atos has the specialist expertise needed to help you make the right decisions.

AI and Machine Learning

Solutions for advanced analytics, the Internet-of-Things, and cognitive computing are combined in Atos Codex. Our data scientists help enterprise customers craft visionary and effective AI strategies.

Built firmly on use cases, Atos Codex delivers accelerated access to data-driven innovation.

SAP and SAP HANA

Atos is an end-to-end service provider for SAP, with a special focus on the challenges and opportunities associated with SAP HANA.

With some 13,000 technical experts and 6,200 successful SAP implementations to date, there are few companies better qualified to ensure your enterprise servers are ready to deliver maximum value from SAP.

Hybrid Cloud

Atos delivers a rigorous and comprehensive suite of orchestrated hybrid cloud services.

Recognized as a leader in next generation infrastructure, Atos will ensure that the server choices you make for private cloud are effectively integrated across the wider hybrid cloud landscape.

Cybersecurity

Brand reputation and data are fast becoming your most valuable assets. As a leader in cyber-security, Atos offers practical and intelligent approaches to assured operation.

Our experts offer insight and guidance to all security and compliance-related issues associated with your enterprise server strategy.



Extending the horizon

The **BullSequana S** series of enterprise servers is available for immediate configuration and delivery. The experts behind this innovative server family work in close collaboration with business technology specialists from across Atos – and this extended expertise is readily available to help ensure you get the very best from your investment.

The server family is designed as the motor for forward-thinking, datadriven enterprises. Our wider circle of expertise helps ensure that the choices you make are the best for your enterprise.

With over 100,000 Business Technologists worldwide, Atos combines a deep knowledge of the specific markets it serves with technical expertise in the domains which underpin digital transformation.

With a practical and industrialized approach to effective innovation, we offer the Atos Digital Transformation Factory.

Artificial Intelligence features prominently:

- Our leadership in high-performance, quantum computing combines with expertise in deep and machine learning. You gain direct benefit from our numerous R&D programs with partners including Siemens, Microsoft, SAP and Salesforce.
- We take a holistic approach to enterprise computational knowledge. We are especially focused on creating robust machinelearning models; applying business rules; and on clear visualization for actionable business insight.
- We offer both industry-specific and cross-industry use cases as a means to accelerate AI adoption. Examples include: fraud and risk management; prescriptive security operations; and contextual customer engagement.



What now?

The Atos experts are ready for engagement.

Whether you are a professional member of an enterprise IT team, or an infrastructure specialist serving enterprise clients, we are ready to give you our full support.

Atos always believes in the value of practical action.

The BullSequana S series is available for detailed study across the global network of Atos Business Technology Innovation Centers. We invite you to explore the enterprise servers, and indeed, to put them to the test. With just a little forward planning, we can preload your own selected data for practical performance trials - giving you the chance to monitor and configure potential options.

We can take this further.

Combine your discovery of the BullSequana S series with an initial exploration of the Atos Digital Transformation factory, putting server acquisition in the wider context of the data-driven enterprise.



About Atos

Atos is a global leader in digital transformation with 110,000 employees in 73 countries and annual revenue of € 12 billion.

European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos|Syntel, and Unify. Atos is a SE (Societas Europaea), listed on the CAC40 Paris stock index.

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Find out more about us
[**atos.net/BullSequanaS**](https://atos.net/BullSequanaS)

Let's start a discussion together



Unlock new insights in real-time with SAP HANA



SAP® Certified
Hardware for SAP HANA®

Atos

HANA is a go-to element when it comes to evolving SAP landscapes and, more widely, for all Big Data environments where very high speeds are essential. Its potential and benefits provide both performance and innovation for the entire IT landscape.

The BullSequana S for SAP HANA platform delivers unique flexibility, unmatched scalability and best-in-class quality of service in the x86 world, essential criteria for in-memory databases and real-time computing. Combined with expertises and value-added services from Atos, this forms an end-to-end solution for successful SAP HANA deployments in even the most critical environments.

Designed to boost SAP HANA applications

Perfect scalability

As the path to HANA often begins with small deployments that become progressively bigger, choosing a scalable solution is key. The same BullSequana S technology can be used for any SAP HANA deployment - from 384GB to 24TB of RAM. This protects investments, by providing a migration path for any SAP HANA architecture, at any scale.

Maximum flexibility

The option of re-using existing environments (e.g. storage) and partitioning the system for cohabitation of existing and new environments creates the flexibility needed to reduce TCO. BullSequana S is certified for SAP HANA, whether in appliance (pre-integrated hardware, storage and software) for fast deployment, backed by central support and agreed performance levels; or also in Tailored Datacenter Integration (TDI) mode.

Mainframe-class reliability

Reliability and resilience are essential where in-memory is concerned. Memory failure protection features make a real difference. PCIe components can be hot-plugged or hot-swapped to facilitate maintenance activities while providing best-in-class high availability.

Future ready

BullSequana S provides the possibility to side classical CPUs with GPUs for later developments, like SAP Leonardo.

Supported by a worldwide network of skills

Atos is strongly committed to delivering advice and integration/migration expertise to ensure successful HANA implementations.

Building on a long and close relationship with SAP, serving leading SAP customers, Atos has developed a unique approach helping enterprises fully benefit from the value of HANA.

Atos leverages its expertise to design, optimize and deploy complex SAP projects, and provides end-to-end solutions from infrastructure design and architecture optimization to tailored deliverables.

Impressive SAP expertise across industries

13,500 SAP experts in 73 countries

6,200 + implementations

Over 3,000,000 end-users supported in over 90 countries

Mission - critical SAP workloads on Microsoft Azure

The joint Atos and Microsoft initiative enables the deployment of SAP HANA Very Large Instances (VLI) in Azure bare-metal or virtualized environments

The largest SAP HANA implementation in the world

Atos is supporting organizations of various sectors all over the world in their SAP HANA deployments. The most representative example is Atos helping Siemens to deploy the largest SAP HANA implementation in the world, which supports over 100,000 Siemens personnel and impacts every business unit within the Group.

The benefits of BullSequana S for SAP HANA

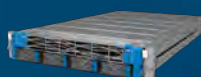
Adapt to change quickly - "highly scalable and open solution"

Reduce cost and save implementation time - One-fits-all solution: from small configurations to very large.

Increase efficiency - Designed to deliver high performance 7 days a week, 365 days a year.

Find the configuration that fits your need

BullSequana S200



BullSequana S400



BullSequana S800



BullSequana S1600



MAX SERVER MEMORY SIZE	Up to 3 TB RAM	Up to 6 TB RAM	Up to 12 TB RAM	Up to 24 TB RAM
HANA CERTIFICATION				
BWoH/BW4H/DM/SoH/S4H	384 GiB, 768 GiB, 1125 TiB & 1.5 TiB*	2.25 & 3 TiB*	+ 6TiB & 4.5TB (6 CPUs), 6TB (8 CPUs)	12 TiB (16 CPUs) by 2-socket/ 15 TiB
SoH/S4H	2.25 & 3TB*	+ 4.5 & 6TB*	4.5, 6.75 & 9 TiB (6 CPUs), 12 TiB (8 CPUs)	24 TiB (16 CPUs) by 2-socket/3 TiB

*max RAM size in single-node

SoH (Suite on HANA) is the name for SAP business suite using HANA as a database

S4 HANA is the new SAP Business Suite with highly optimized data structures taking full advantage of the SAP HANA platform

Scale out: - up to sixteen 4/8-CPU nodes for BWoH/BW4H/DM

up to four 8-CPU nodes for S4H

SUMMARY OF ARCHITECTURE AND CHARACTERISTICS	
Processors	Intel® Xeon® 2nd generation Intel® Xeon® Scalable processors (up to 28 cores/38.5MB L3) with 8280 and 8276 models including L versions
Number of BullSequana S modules	1 BullSequana S server with 1, 2, or 4 or 8 modules with 2 x CPUs (model name are respectively S200, S400 and S800 and S1600)
Memory	32, 64 or 128GB DIMM units; from 384GB to 24TB in total depending on the model
Disks / internal and external storage	Appliance with internal storage (only with 8276 or 8276L): <ul style="list-style-type: none"> • Boot : 2 x 400GB SATA SSD 2.5" (RAID 1) with embedded controller • SAP HANA pool : 3.2TB SAS SDD 2.5" from 2 to 34 based on minimal capacity requirements Appliance with external storage: <ul style="list-style-type: none"> • Boot: Boot on SAN • SAP HANA pool : 1 Dell EMC Unity® or 1 NetApp AFF A-Series (All-Flash) TDL mode: <ul style="list-style-type: none"> • Boot : choice between Boot on SAN or boot on 2 x 400GB SATA SSD 2.5" (RAID 1) with embedded controller • SAP HANA pool : on any storage in SAP TDL certified list - provided apart
Network interfaces	Ethernet 1Gb/s (base-T) and 10/25/50 Gb/s (Base-T, Twinax, optical), 16/32 Gb/s (for external storage)
OS / Virtualization	SLES for SAP 12 & 15, RHEL 7 & 8 for SAP solutions S200, S400 & S800 are certified by VMware for ESXi 6.7 and 7.0 which can be used for SAP Solutions / HANA TDI virtualized environments according to SAP rules
Rack space required	2U (S200), 4U (S400), 21U (S1600) + optional external storage

The Physical Partitioning is supported by SAP.

The BullSequana S for SAP HANA appliance is delivered with pre-integrated server and storage, with Suse or Red Hat for SAP HANA and SAP HANA software pre-installed in their current versions. For more information on BullSequana S, SAP HANA, EMC Unity NetApp AFF A-Series and SAP certified hardware, please refer to the relevant documents.

About Atos

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For more information: atos.net/BullSequanaS4Hana

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Powering agility for Hybrid Cloud

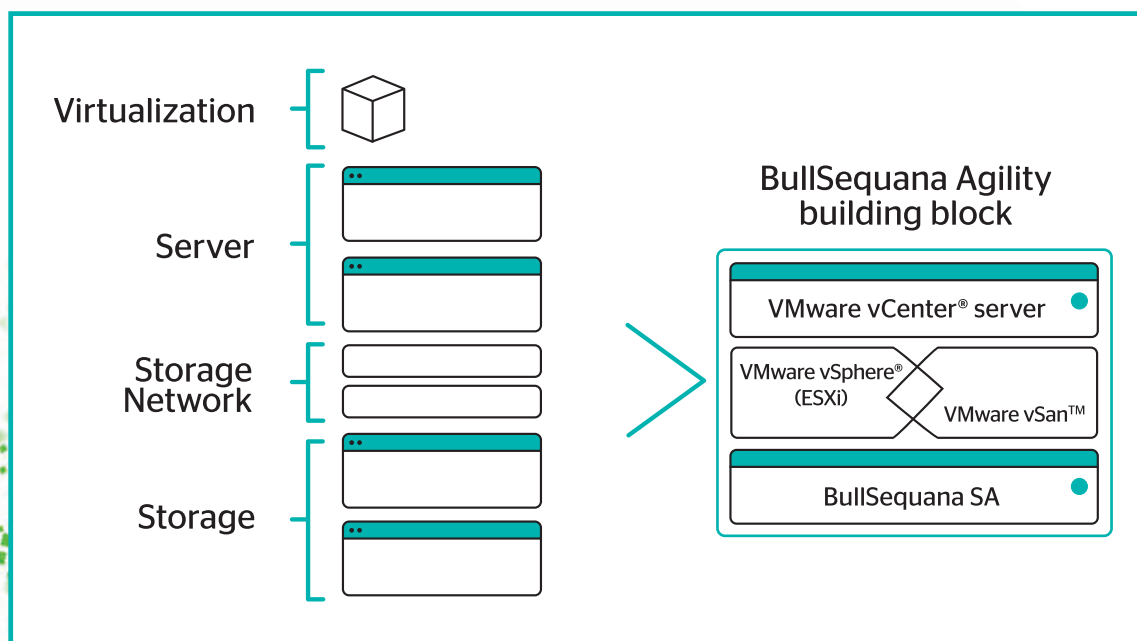
Bringing agility at scale

To boost competitiveness, enterprise IT departments are continuously challenged with making the business more efficient and with adopting innovation initiatives, especially to accommodate easier growth capability.

BullSequana S series from Atos offers a new kind of enterprise servers, ready to meet the accelerating demand for extreme computing power. BullSequana S servers distinguishes with their exceptional scalability - from 2 to 32 processors and up to 48 TB RAM and 64 TB NV-RAM in a single system - enabling consolidation of high-demanding business applications while preserving and optimizing investments.

With BullSequana Agility, Atos continues to enrich the BullSequana S portfolio to provide storage-optimized solutions for specific use cases where virtualization and scaling horizontally (scale-out) is required to meet the high demand for extreme agility at the speed and operational efficiency of Cloud services, while lowering IT costs.

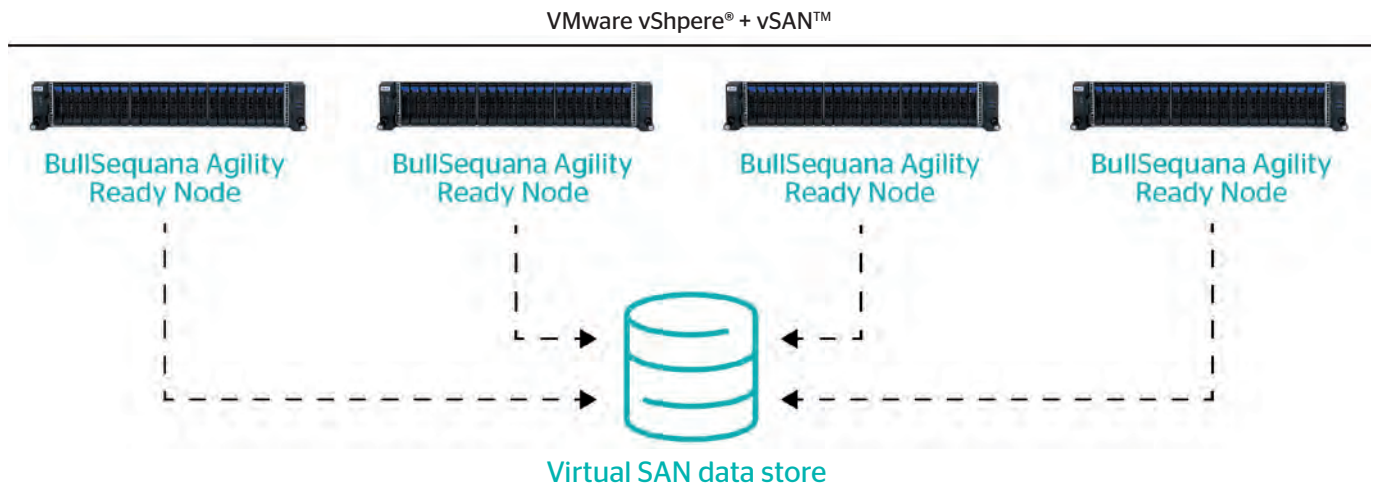
BullSequana Agility provides, in one highly dense 2U rack-mounted building block, a balanced hyperconverged infrastructure (HCI) optimized for VMware vSphere® for server virtualization and VMware vSAN™ for software-defined storage. It combines new entry-level BullSequana SA servers based on the 2nd generation AMD EPYC™ processors, Hybrid or all-flash storage and optional graphics processing units (GPUs) - and virtualizes all, consolidating them into a single manageable portal. BullSequana Agility thus enables all resources to scale simultaneously as building blocks, while simplifying infrastructure deployment and reducing operational complexity.



VMware vSAN™, the leading Software Defined Solution (SDS) for open agility

Contrary to HCI solutions that combined hardware and virtualization software from a single vendor, BullSequana Agility has been fully integrated with the market-leading VMware software stack (VMware vSphere® and vSAN™). Supported on various certified x86 servers, among them BullSequana SA servers, VMware Hyper-converged software gives enterprises the agility deploy their infrastructure in a variety of ways, avoiding "vendor lock-in" which is a big concern for most of companies.

VMware vSAN™ provides seamless integration with VMware vSphere® making BullSequana Agility a simple and balanced platform for virtual machines and maximizing BullSequana SA all-flash or hybrid storage. BullSequana Agility can scale easily and linearly without disruption from 2 to 64 nodes, according to your business needs, with vSAN™ allowing to simply create a distributed shared data store within the cluster.



The benefits

BullSequana Agility brings Cloud-like flexibility to on-premise datacenters, fully offering a path to the Hybrid Cloud:



A turnkey and fully integrated solution that combines compute, storage, networking and virtualization in a single system which is managed through a single management interface. BullSequana Agility uses a modular building-block approach with a single pool of virtualized resources.



Easy to manage, deploy and scale, compared to traditional SAN-based infrastructures. Each node supports many fully protected VMs, with all the nodes managed as a single entity from a unique management interface, vCenter®, removing the need to log on to multiple interfaces.



Ready for Hybrid Cloud: combined with additional Cloud management, automation and orchestration software, BullSequana Agility can simplify the path to Hybrid Cloud by delivering a common platform to private and public Clouds.



Predictable performance with high performance storage with reduced latencies. Inline deduplication, compression and optimization enable to minimize I/O and network traffic.



Optimized costs with lower CAPEX, no over-provisioning, lower operational expenses and the ability to have a pay-as-you-grow approach.



Easy procurement with a single point of contact.

Main use cases of BullSequana Agility

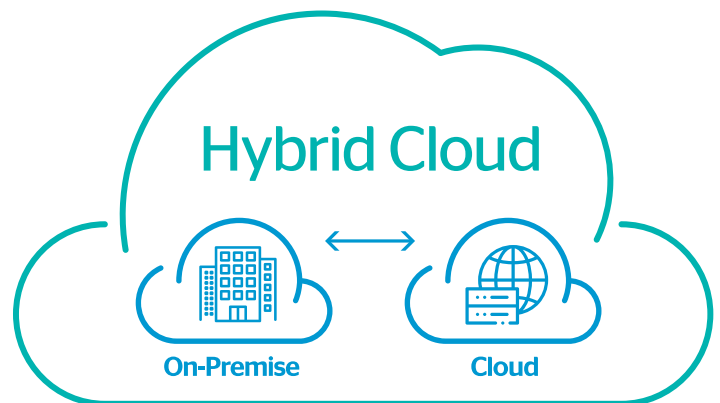
A natural choice for Hybrid Cloud

Moving business applications to the Cloud is attracting more and more companies, as it offers a high level of flexibility with a service-delivery model that users can control and pay for as they need. But moving the entire IT infrastructure to the Cloud is not a simple operation lasting a few weeks or months. It can take several years.

Cloud computing is a game-changing technology. For a successful migration to the Cloud, most organizations need to prioritize their applications according to their simplicity to migrate. Unsurprisingly, legacy applications are the most challenging as they are not designed for the Cloud. Although it may seem contradictory, their Cloud transformation will involve a refresh of the on-premises infrastructure, with virtualization and the need for normalization between the public Cloud and the on-premise data center. This is called the Hybrid Cloud.

Thanks to BullSequana Agility, and its virtualization capabilities, you can modernize your legacy on-premise environment and be prepared for a future Cloud migration without redeveloping applications. BullSequana Agility brings Cloud-like flexibility to on-premise applications with the support of a common management platform and set of tools, enabling to deploy services the same way on every Cloud – private, Hybrid or public.

In addition, for cost reasons, some applications are not well adapted with the Cloud providers' metering and billing, e.g for data-intensive applications with invoicing per outgoing data transfer. The BullSequana Agility can be used to host these applications on a long-term period until the end of their lifecycle or their migration to a suitable Cloud service.



Different levels of Cloud Hybridization

- Support in the operating system of SDKs (Software Development Kits) and APIs (Application Program Interfaces) for Cloud providers, including Microsoft Azure, Google and Amazon Web Service, enabling the development of new applications wherever on public or private Clouds.
- Integration of VMware vSphere® and vSAN™ with BullSequana Agility Ready Nodes allowing customers to take advantage of the same operating environment in their own datacenters and on the public Clouds.
- Cloud management and orchestration on top of BullSequana Agility can be provided by VMware vCloud Foundation.
- Finally, BullSequana Agility offers a convenient and secure cloud-like platform for companies that need to stay on-premise to be compliant with their data governance policies.

A flexible solution for Virtual Desktop Infrastructure (VDI)

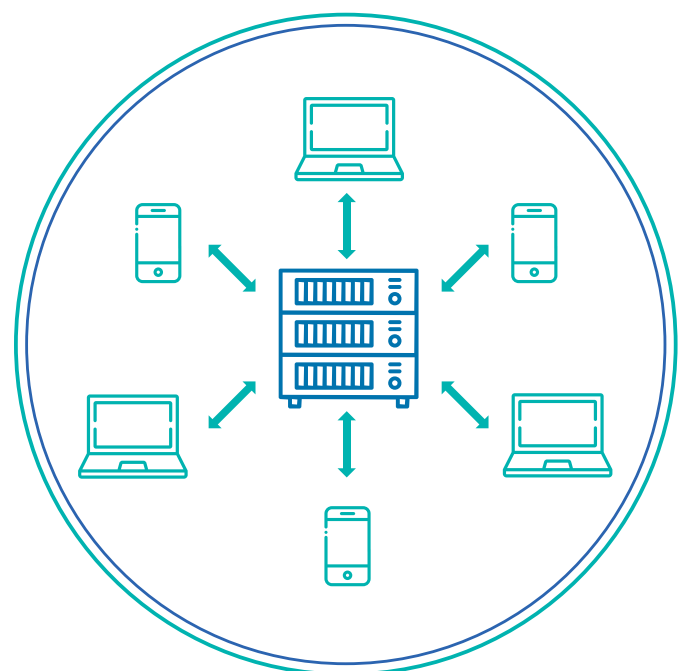
Virtual Desktop Infrastructure (VDI) was probably one of the original primary use cases that has favored the introduction of hyper-converged infrastructure into companies, in order to simplify the deployment and management of desktops while reducing costs. Each end-user accesses his own working environment hosted in a virtual machine (VM) that lives within a remote centralized server, as if it were running locally.

To get the full benefits of VDI, it is important to choose the right infrastructure. Performance is probably one of the main challenges of VDI, as applications and data storage reside on the remote server to which a high number of users are connected, resulting in I/O intensive workloads.

BullSequana Agility provides a flexible solution for better business agility and worker mobility while driving down costs without sacrificing performance. BullSequana Agility leads on a balanced and storage-optimized architecture embedding low latency flash storage enabling enterprises of any size to harmonize everything across employees and give them access to their applications and online services with very fast processing and response times from anywhere and anytime.

In addition, BullSequana Agility allows to add users and virtual desktops easily and to expand or shrink configurations by adding or removing nodes according to your needs.

Finally, with the support of NVIDIA GPUs, BullSequana Agility is well-suited for graphic-intensive VDI environments.



A general-purpose virtualization solution

When discussing digital transformation and moving to the Cloud, agility is one of the primary justifications. Agility is also a primary reason why IT managers are introducing HCI solutions in their datacenters. And when we talk about HCI, we imply virtualization for both compute and storage.

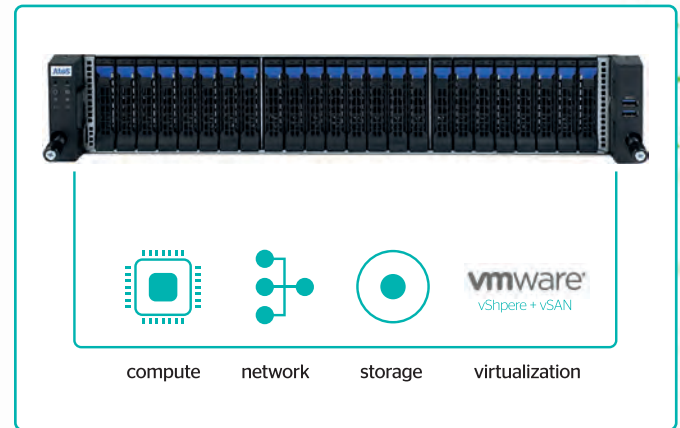
BullSequana Agility easily consolidates compute, storage, network and virtualization into one infrastructure stack that operates as an elastic pool of resources. In a way, combining storage with compute is a return to the past, but in the same time it eliminates the need for a highly skilled administrator or a team to manage the traditional SAN environment.

BullSequana Agility is ideally suited for small to large scale-out workloads, as it can very quickly accommodate unanticipated resources demands, especially for storage capacity. Indeed, with the increasing volume of data, predictability is becoming a big challenge for most customers and the way the solution will manage unpredictability after purchase is an important factor in their decision.

Key BullSequana Agility functions are managed by VMware vSphere® and vSAN™. Implementing vSAN™ gives access to key technologies, such as data reduction, deduplication and compression that easily enable the reduction of storage capacity with minimal impact on performance. This is managed through vCenter® Server and supports vSphere® cluster

features such as vMotion®, HA, Distributed Resource Scheduler™ (DRS) and Fault Tolerance (FT).

Furthermore, VMware vSAN™ offers built-in-security features guaranteeing data protection and compliance with security policies requirements.



Find the platform that fits your business need

With longstanding experience in system integration and service delivery across a range of industries, Atos ensures that technology delivers on its promise for business. As a VMware Principal Partner, Atos, with more than 1200 certified experts, demonstrates architectural and deployment mastery of data center virtualization and hyperconverged infrastructures.

With BullSequana S customers can take advantage of modern platforms with the ability to choose the infrastructure of their choice according to their business needs.

Scale-out deployments 1 & 2 CPUs nodes




 BullSequana SA10
1 socket
2U



 BullSequana SA20
2 sockets
2U

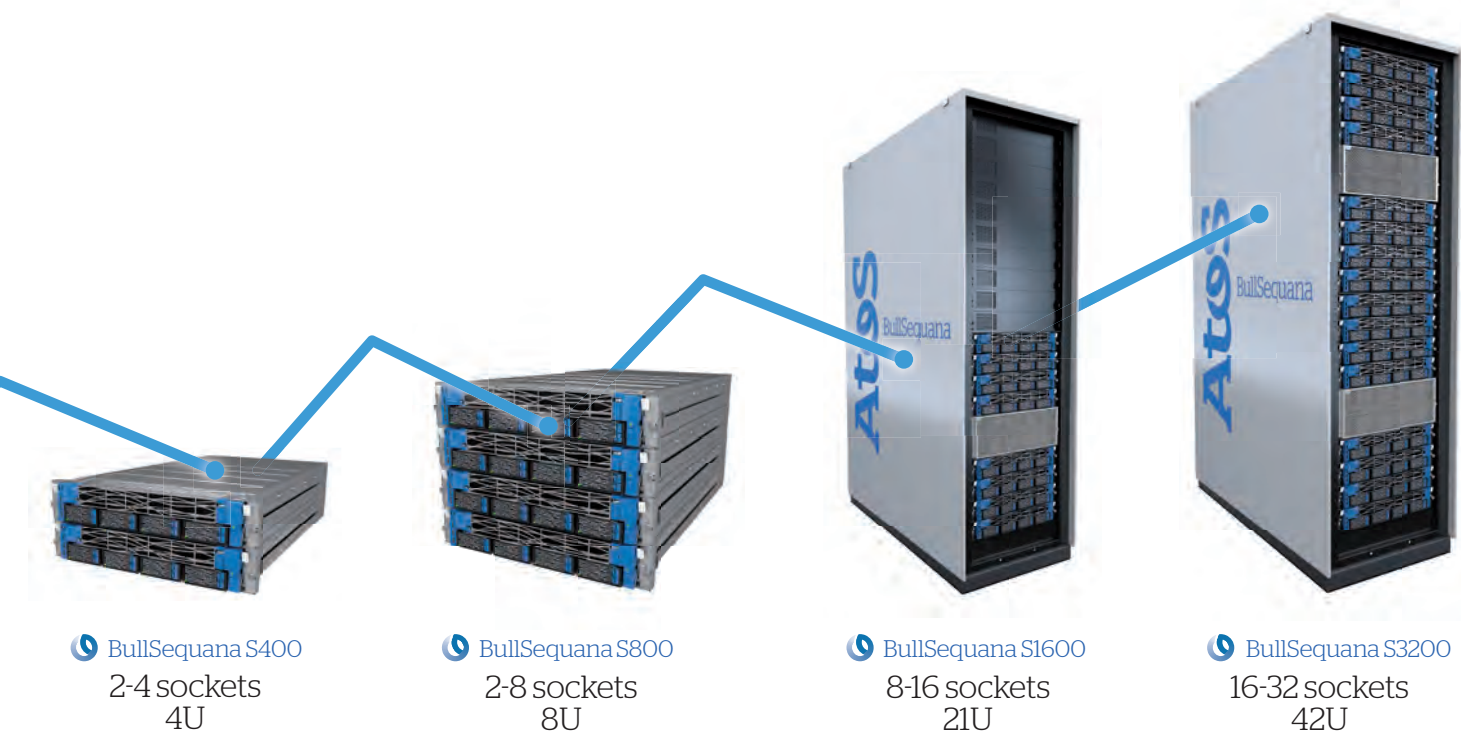


 BullSequana SA20G
2 sockets
2U
with up to 3 GPUs



 BullSequana S200
2 sockets
2U

Storage optimized: price/TB, disk density
Balanced infrastructure
Agility



Performance optimized
Outstanding scalability; Investment protection
Optimized TCO through consolidation

About Atos

Atos is a global leader in digital transformation with 110,000 employees in 73 countries and annual revenue of € 12 billion. European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos|Syntel, and Unify. Atos is a SE (Societas Europaea), listed on the CAC40 Paris stock index.

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 Codex Datalake Engine

Delivering business insights across the data lifecycle

Codex Datalake Engine is Cloudera CDP certified

CLOUDERA

Atos

Context and challenges of customer

As data volume grows exponentially both in volume and formats across multiple infrastructures from cloud to on-premise, getting value from data becomes more challenging. There are several core challenges that an organization must address to get maximum business value from their data.

Challenge #1 Harmonize data governance, security, management and control

Security and management policies are difficult to implement across your different data stores and moving data is often not possible: for practical reasons, like too large in volume, too costly to move or impossible to ensure the latest version across multiple locations; and often for principle reasons such as compliance restraints.

Challenge #2 Standardize the processes used for analytics across the organization

The processes for analyzing the data are difficult to harmonize consistently across the organization, no matter the whereabouts or type. Without a consistent view, data science modelling capabilities are restricted in interrogation approaches in their effectiveness and ability to re-use across the organization.

Challenge #3 Leverage data stored in silos across the business

To industrialize the use of data and insights out across the organization at scale can be impossible to achieve with silos commonly built up from different data stores.

Organizations overcoming these challenges will be able to glean insights from complex and intense data. A hybrid datalake infrastructure is highly scalable in modular environments, capable of supporting extremely large data volumes and formats. It provides consistent and reliable security, governance, lineage, management and automation across these stages irrespective of the data type or data state.



Overview of Codex Datalake Engine & Cloudera CDP

Codex Datalake Engine is a turnkey solution (preconfigured, scalable, easy-to-use and fully virtualized solution). It helps customers focus on solving business problems. It is cost & energy effective with minimal administration. As a result, organizations spend less time installing, tuning, operating, troubleshooting, patching, upgrading, and dealing with integration, adoption of technologies and scale-related issues.

Codex Datalake Engine is delivered as a turnkey solution that features BullSequana S and SA20, two of the most agile, scalable and open servers. With their dynamic reconfiguration capabilities, BullSequana S and SA20 server, powered by AMD processors, combine exceptional performance with unprecedented levels of agility and efficiency.

Codex Datalake Engine is Cloudera certified and uses Cloudera CDP for data life cycle management.

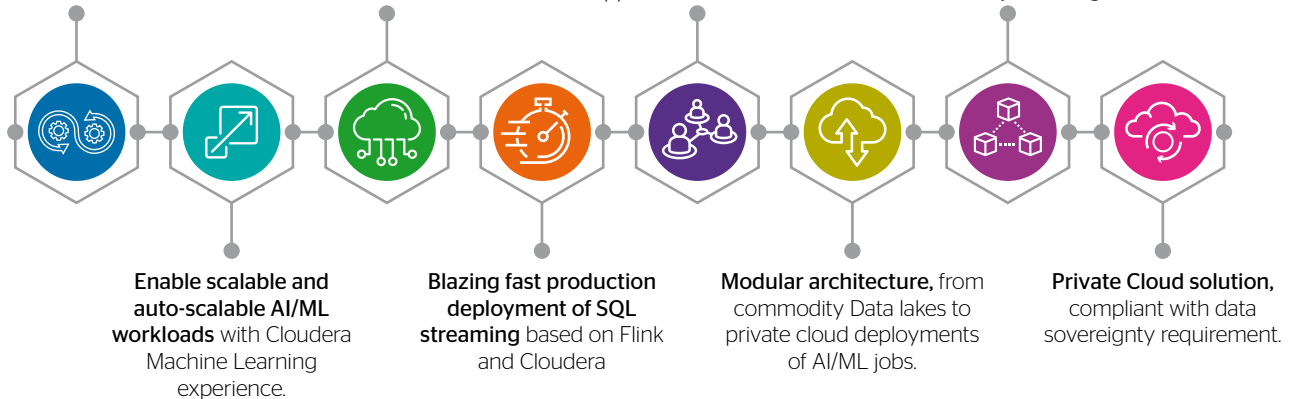
Focus on Codex Datalake Engine

End to end offering: from consulting, architecture, configuration, migration service up to deployment of the hybrid data platform including BullSequana S series high performing servers.

Cloud workload elasticity brought on private infrastructure with Cloudera CDP Private Cloud Experiences based on Kubernetes.

Diversity & versatility of hardware components (up to 128 hyperthreaded cores per server, 10 to 100Gbps networking, wide range of supported Nvidia GPUs).

Support multiple scalable storage backends (classic HDFS to object storage).



Cloudera CDP

With the Cloudera Data Platform – the industry's first Enterprise Data Cloud, the field of possibilities of analytics on any Cloud is widened - enabling the speed and agility the business wants with the security and governance the enterprise demands. CDP is an integrated data platform that is easy to deploy, manage, and use. It delivers powerful, self-service analytics across hybrid and multi-cloud environments with the granular security and governance policies that IT leaders demand. CDP is a new approach to enterprise data that delivers a full range of analytic capabilities from the Edge to AI.

Benefits of Codex Datalake Engine & Cloudera CDP is different from other data platforms and analytics services in four important ways:



TTM - lightspeed Time-To-Market, from procurement to production use-cases. Reduce cost for architecture, automation, and resources management.



Open – is 100% open source, open compute, open storage and open for integration - enabling rapid innovation and protecting organizations from vendor lock-in.



Multi-function – Reduces the time and effort to deploy common application types with five new self-service experiences: flow & streaming, data engineering, data warehouse, operational database, and machine learning. No matter Data Engineers, Data Analysts, Data Scientists, Data Stewards, ...



Secure and Governed – Simplifies security, privacy, and compliance for diverse enterprise data on any cloud through shared data experience (SDX) technologies. SDX makes it easy to create a secure data lake in hours instead of weeks and replaces tedious scripting with "set it and forget it" convenience.

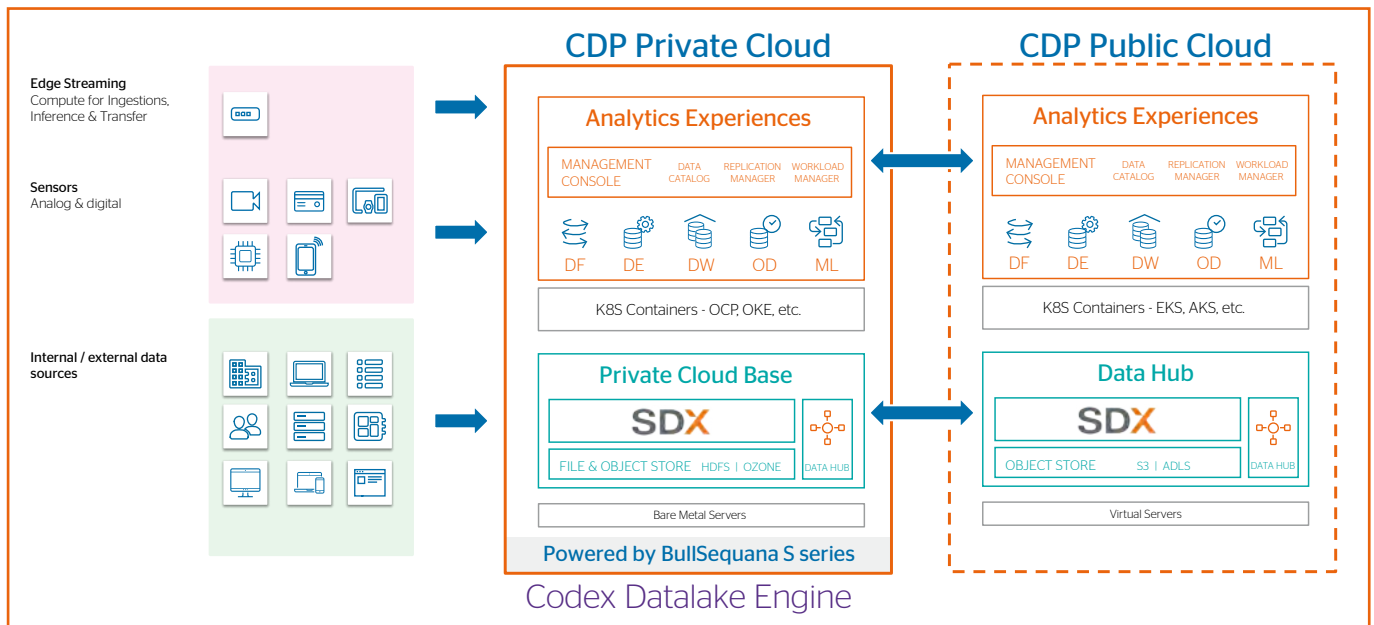


Any cloud – Provides maximum choice and flexibility with the option to manage, analyze, and experiment with data on-premises, in hybrid, private cloud, and multiple public cloud environments.



Together, Atos and Cloudera are committed to bringing world-class hybrid solutions to market.

Architectural Diagram



Why Atos and Cloudera Partnership

Cloudera provides a scalable, flexible, integrated platform that makes it easy to manage rapidly increasing volumes and varieties of data. Codex Datalake Engine is Cloudera certified. It is the result of a joint effort between Atos and Cloudera to achieve a solid and trustworthy data architecture and deliver the most complete, secure, industrial and qualified data lake solution on the market.

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Contact us

To start your journey your private or hybrid cloud journey with Atos and Cloudera please contact:

clement.yunes@atos.net Head of Business Development, Codex Datalake Engine, Atos

Additional resources

E&U



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Health



[Web page](#)

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Gaining the digital edge

Foreword

By 2022 Gartner predicts that 80% of enterprise-generated data will be created and processed outside of the data center and cloud infrastructures compared with 10% today*. Edge computing will pick up this job; extending cloud computing capabilities and allowing us to deal with the data tsunami being created by the Internet of Things (IoT) revolution.

Edge will allow us to move away from a reliance on centralized data centers and remove the issue of networks having to transmit ever-increasing volumes of data. It will help us make optimal use of the growing reservoir of unstructured data produced by IoT devices and of rapidly maturing analytics technologies and will enable IoT devices to make full use of artificial intelligence and offer ever more opportunities for innovation.

It means real-time information processing at the source enabling faster reaction times. It will change the factories of the future, create smart cities and has the potential to completely change the way we travel through autonomous vehicles.

Over the last five years, Atos has made a continuous and significant investment in the competencies, technologies and resources needed to help you embrace the edge computing revolution.

These investments now come together in Atos Codex Datalake Engine and BullSequana Edge – solutions we have specifically designed to enable the rapid adoption of edge computing, so you can take full advantage of the IoT and AI revolution.

* Source: Smarter with Gartner, What Edge Computing Means for Infrastructure and Operations, October 3, 2018

The evolving cloud

Cloud computing is now the predominant mechanism for IT service delivery. Enterprises appreciate the benefits it brings – the agility, scalability, cost efficiency and more. The current approach, however, needs to evolve in the long run.

The rapid advance in technologies such as the Internet of Things (IoT), big data analytics, machine learning and artificial intelligence (AI) requires an alternative.

Why? Because ingesting massive data sets from geographically distributed edge devices and processing it in the cloud generates critical issues. Today's networks are not yet ready for the incredible growth expected in data to be transferred. Potential risks include low latency, bandwidth congestion, poor scalability, not to mention privacy, sovereignty and security issues.

With crucial production environments needing real-time (or near real-time) reactions in closed-loop environments, there is a pressing need to transfer real-time data processing and analysis nearer to the source of data. Compute capability needs to be provided inside an environment where connectivity and response times can be tightly controlled.

Edge computing provides a perfect response to these high-stakes challenges.

A huge data explosion

The IoT is fast becoming an essential source of data; its volumes limitless. Unlimited AI, social networks, applications, sensors and captors, among other things, are only adding to the soaring data and content. By 2030, the total volume produced could reach 1 yottabyte – that's a trillion terabytes or a million trillion megabytes.

Data shifts to the edge

Around 75% of data is expected to be produced at the edge by 2020, with only 25% still produced within the data center.

A growing complexity of the data

More and more complex and unstructured data is produced at the edge. Data is produced from many various sources in different formats including text, voices, images, video streams, sounds and sensors.

Exactly what is edge computing?

Edge computing is an important element of the post-cloud era, extending rather than replacing the cloud. It allows data to be processed rapidly at the edge, close to where devices are generating it.

The decentralized and distributed nature of edge computing avoids unnecessary network transmission to the cloud and enables the near real-time actuation of connected things.

Simply put, edge computing makes large-scale AI at the edge not only possible but also cost-effective. In doing so, it opens the door to unprecedented innovation.

The Atos edge vision

The exponential growth of intelligent sensors and devices is generating an unprecedented amount of data. This is reshaping IT architectures, as increasingly powerful processing and machine learning inference capabilities are required at the edge of the networks to enable next generation, transformative AI and IoT applications.

BullSequana Edge has been designed to meet these challenges, delivering powerful AI inference and streaming analytics capabilities while ensuring that the data at the edge remains safe and secure.

5 edge computing core strengths



Real-time

Addresses IoT latency issues, enabling a near real-time response by bringing computation close to data sources.



Video analytics

Capacity to analyze massive (1GIGA bits data per second) and complex video data in real time.



Security and privacy

Data in motion and data at rest as well as the physical server are protected by an advanced chain of security measures.



Cost reduction

Massive and complex data induct high satellite and cloud provider costs. BullSequana Edge can be completely used independently.



Local autonomy

It can communicate through radio, private LTE or Wi-Fi networks. Can be mounted in a 2U form factor rack. Reduced dependence on cloud and data center availability and connectivity.



BullSequana Edge offer

2 core solutions

Atos Edge Computer Vision

It enables a large set of intelligent cameras to collaborate holistically in real-time, permitting tracking of operations without interruption.

Features:

- Advanced feature extraction (person, faces, emotion, behavior), or privacy by design
- Digital signature used for personalized operations
- Feature sharing and classification
- Automatic actions based on feature analytics
- Real-time and post-event actions or post event analytics
- A powerful search function accelerates the search of a specific person from multiple criteria

Product design:

- Exceptional hardware acceleration for machine learning applications
- Can be equipped with two powerful NVIDIA GPUs, or optional FPGAs/ASIC accelerators to deliver high-performance machine learning inferences
- The architecture is based on micro-services and guarantees the scalability of the solution as well as the operational efficiency
- The Web interface offers a graphical application view to track and search

Atos Edge Data Analytics

Tenfold potential of sensor analysis with real-time ingestion and monitoring without interruption.

Features:

- Enables organizations to improve their business models with predictive and prescriptive solutions
- Make data trustworthy and useable - with strong data governance within a robust data architecture to ensure data quality, security and privacy
- Manage the complete data life-cycle - from data ingestion, data cleansing, data blending, data discovery, audit, data lineage and policy enforcement
- Enable compatibility and minimizing risk - by providing on-site data storage to give full control of the data and its lifecycle, as well as full control over the infrastructure, the applications and the operations.
- Is designed to enable open source based hyperconverged infrastructure solutions which enable flexible resource sharing between nodes, with centralized management and security hardening.

2 core solutions enhanced by Edge Data Container for your specific needs

• High storage capacities

Ranges from a small rack up to complete secured, air-conditioned containerized data centers

• Extreme Environments

High performance in dust, heat, humidity

• Isolated areas

Delivers an all-in-one solution, serving as a decentralized IT system

Autonomy

Can run autonomously in non-data center environments; no need for a white room or local IT teams to operate

• Security

Highly sensitive data is a secure, highly standardized, industrial solution

• Applications

Edge Computer Vision, Edge Data Analytics and other applications can run on Edge Data Container



Putting Edge use cases

Manufacturing

Becoming agile is one of the biggest stakes for factories. Industrials manage short product production cycles with a high degree of product variation. To facilitate processes, production line data needs to be analyzed in real time although limited connectivity.

BullSequana Edge's solutions: Edge data analytics and Edge computer vision facilitate reaching industrial goals. • Atos Edge Data analytics enhances predictive maintenance, inventory management, intelligent logistics, fleet tracking and connected workers. Its machine learning algorithms create local inference for massive and complex data analysis. You take decisions in real-time at the right time, locally. • Manufactures have complex camera networks for security and quality purposes. Edge Computer Vision analyzes multi-camera quality control inspection. It is designed for high massive video data analysis in real-time and in complex environments (dust, heat, humidity)

Energy & Utilities

All energy infrastructure components are undergoing major changes on distributed generation (solar, wind), electric grid bidirectionality, effective energy storage, water conservation and on distribution infrastructure worldwide. Edge computing is game-changing in intelligent operation/ automation & predictive maintenance. Edge Data Analytics identifies malfunctions and optimize maintenance from the data provided by sensors. Upfront scheduling of maintenance services and asset optimization are improved.

Retail

Retailers are facing new challenges to strengthen revenues despite e-commerce competition. Thus, loss prevention and margin increase are critical. Today, most of losses are due to shortage in shelves and theft (Around 2% of loss per year and increasing with automatic pay stations). Edge computer vision analyzes movements on shelves to improve restocking process. The multi-camera data analysis captures theft trials and alerts security before theft is committed. To drive higher revenues, retailers take advantage of in-store data: product shortage on shelves, heat mapping, shopper tracking and price matching. Edge Data Analytics improves processes, customer experience and revenue by providing real-time data analysis.

Smart Cities

Smart Cities are complex environments in which massive complex data improves situational awareness to ensure safety and security. Edge computing in combination with AI (Artificial Intelligence) improves emergency and security operations. Edge computer vision enables real-time search and tracking of people of interest based on criteria to accelerate post event investigation. In addition, it detects automatically and in real-time abnormal situation/behavior identification. You have the right information on-time to ensure safety, even in low connectivity conditions.

Transports

Edge computing transforms transports in terms of connectivity (connected car/plane/rail), telematics (fleet trucking route optimization, condition-based maintenance), and autonomy (advanced driver-assistance systems, autonomous vehicles). Connected cars, trucks, buses, ships, trains and other vehicles can continuously and bi-directionally communicate with ecosystems and environments. Edge computer vision and Edge Data analytics empower smart services like traffic management, predictive maintenance, convenience services, after-sales solutions with massive complex and video data analysis in real time. BullSequana Edge enables smart transport different modes of transport & traffic management, and enable various users to be better informed as well as to make safer, more coordinated and "smarter" use of transport.

Why Atos?

Atos is uniquely positioned to support organizations in the post-cloud era, helping them understand, deploy and fully leverage edge computing.

Our clients have tremendous knowledge of their industries and challenges. To fully benefit from edge computing, they need a partner who understands their business as well as they do, a partner with hands-on experience and a partner who can provide them with best-in-class people, technologies, computing capabilities and alliances. These are all essential elements to make edge computing a reality today.

Atos delivers a complete edge computing solution, including hardware, software, professional services and ready-to-go use cases. This environment is a prerequisite to consolidate data in a data lake engine while training new analytical models, developing inference models and analyzing real-time data streams - using an edge server in a micro data center at the edge.



BullSequana Edge

Powering Intelligence in your IoT

About Atos

Atos is a global leader in digital transformation with over 110,000 employees in 73 countries and annual revenue of over € 11 billion.

European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions.

The group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Syntel, and Unify. Atos is a SE (Societas Europaea), listed on the CAC40 Paris stock index.

The purpose of Atos is to help design the future of the information technology space. Its expertise and services support the development of knowledge, education as well as multicultural and pluralistic approaches to research that contribute to scientific and technological excellence. Across the world, the group enables its customers, employees and collaborators, and members of societies at large to live, work and develop sustainably and confidently in the information technology space.

Find out more about us

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Let's start a discussion together



Find out more about us: **atos.net/BullSequanaEdge**

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Angers Industrial site & supply chain



Trusted partner for your Digital Journey

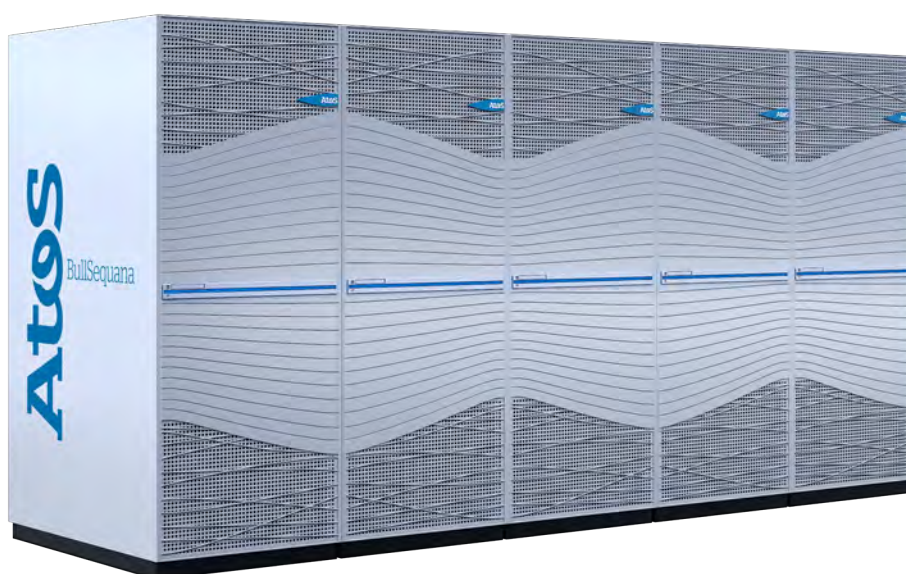
Atos

A high added value industrial & logistics facility

Located in Angers, Atos' industrial and logistics site is responsible for the management of the supply chain, industrialization, manufacturing, integration and tests of high technology IT products, as well as the validation of customer solutions.

As part of the Big Data & Security division, the Supply Chain & Manufacturing entity is responsible for validation and industrialization, in close collaboration with the Group's Research and Development teams, including:

- coordination and overall control of the supply chain, from sourcing to delivery,
- assembly, test and personalization of servers and supercomputers,
- customers configuration validation before delivery,
- collection and processing of end-of-life products,
- procurement and distribution of spare parts, ensuring stock optimization and cost reductions.



Key figures



250
Employees



25000m²
Plant surface



M€ 250
Activity output

Certifications



Quality
ISO 9001



Health & Safety
ISO 45001



Environmental protection
ISO 14001

Lean, competitive, agile, ethical, and customer-focused

Industrialization expertise in technology

A strong partnership with Research & Development teams enables us to define the resources we need to put in place in order to implement the manufacturing and logistics processes from the earliest stages in the design of a new server. This involves piloting the introduction of new offerings with a view to their future commercialization, moving from a logical concept designed by researchers to physical fabrication by a technician, so as to guarantee that the product will be successful.

A competitive Supply Chain

The operation of the supply chain guarantees the optimization of all production flows from purchasing right through to delivery at the end customer's site, end to end, with no disruption to any of the processes involved. The ultimate aim of the supply chain is to deliver high quality products to customers, at requested date, at the best price, and environmentally friendly.

Configuration to customers' requirements

The entire solution ordered by the customer is the responsibility of individual integration and testing units: every customer need is different, every order is unique. Once a customer order is received, the processors, memory, cards, disks and other peripherals are assembled in the servers. System and drive trays, as well as other elements that have been ordered are mounted and cabled in the rack.



Global HPC Test Lab

To build increasingly efficient digital infrastructures, it is essential to provide industrial and logistics services which are specifically adapted to each customer's requirements. The Test Lab allows customers to test and validate their solution before delivery thanks to our secure and favorable environment (personalized reception, control rooms, adapted tools, collaborative space).

Citizenship approach

Our desire to contribute to environmental protection and sustainable development is reflected in its total commitment to a citizenship approach. This has already been materialized by having our industrial system certified and ensuring conformance with the AFAQ reference system. The industrial and logistics site is one of the first 100 companies to have developed an integrated HSQE (Health, Safety, Quality, Environment) management system.



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