BullSequana S series

Technical specifications

To tackle enterprise IT challenges and enable businesses to take full advantage of Artificial Intelligence (AI), Atos brings to the market a state of the art generation of x86 servers, BullSequana S, optimized for Artificial Intelligence, business critical computing applications and in-memory environments. BullSequana S reaches the highest level of quality of service, performance, availability and scalability to meet IT departments' existing and emerging demands.

Accelerating digital transformation

Powering Enterprise Artificial Intelligence

In order to utilize the extensive capabilities of AI, businesses require an infrastructure with extreme performance. BullSequana S meets the challenge with its unique combination of the most advanced Intel® Xeon® Scalable processors (CPUs) and Graphics Processing Units (GPUs). This innovative architecture, designed by Atos' R&D teams, enables to mix GPU, storage and compute modules within a single server for ready availability of all workloads.

Boosting data analytics & data lake

BullSequana S pre-integrated platform speeds up data lake environments deployments. Its ability to scale as needs arise and adjust with a vast array of internal disks, enables to finely tune the platform to the business requirements and simplify the lifecycle of new applications.

Accelerating in-memory applications

The key element to go real-time is to have all structured data staged in-memory which requires to encompassing specific features.

BullSequana S superior scalability, availability and serviceability make it the ideal scale-up platform for very large enterprise applications and in-memory computing.

Optimizing IT modernization through virtualization & cloud

BullSequana S is the most agile, scalable and open platform to grow digital business. With its dynamic reconfiguration capabilities, it combines exceptional performance with unparalleled agility and generates efficiencies at every level. It is the go-to server for the private part of a hybrid cloud.

Adapting to business needs

Exceptional scalability

To preserve investments and power the most demanding environments, the BullSequana S supports up to 48TB RAM / up to 64TB NVRAM non volatile memory (NVRAM) and up to 32 GPUs.

Modularity and flexibility

The BullSequana S can be build or reconfigure to fit exactly your business needs.

Operations and TCO benefits for all landscapes

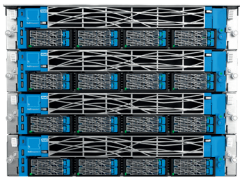
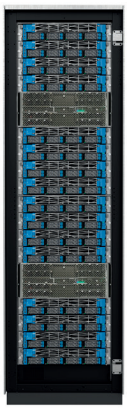
BullSequana S allows up to 20% cost reduction versus classical environments for large cluster virtualization and up to 30% price/performance gain for small and medium SAP HANA landscapes.

Atos

A powerful and scalable range

Based on a very flexible architecture, the BullSequana S range consists of 5 complementary models assembling one to sixteen 2-socket modules thanks to two types of interconnect:

- a "glueless" interconnect for 1, 2 or 4 modules, allowing to form a glueless topology up to 8 sockets with up to 3 Ultra Path Interconnect (UPI) links per CPU.
- for larger configurations, an eXternal Node Controller (XNC) technology designed and developed by Atos assumes the ultra-scalability from 8 sockets up to 32 sockets.

BullSequana S200	BullSequana S400	BullSequana S800	BullSequana S1600	BullSequana S3200
				
2 CPUs, up to 3 TB RAM, up to 2 GPUs	up to 4 CPUs, up to 6 TB RAM, up to 4 GPUs	up to 8 CPUs, up to 12 TB RAM, up to 8 GPUs	up to 16 CPUs, up to 24 TB RAM, up to 16 GPUs	up to 32 CPUs, up to 48 TB RAM, up to 32 GPUs

Thanks to a very modular design, each model can be smoothly upgraded to another one, preserving investments and applicative environments. Glue-less configurations can scale-up to 32 sockets by adding UBoxes.

The **Compute Box** is the base element of the BullSequana S server, with 3 different form factors (2U/4U/8U) hosting one 2-socket module per 2U. A Connecting Box assembles modules within a single Compute Box, on the rear side, with no apparent cabling.

Key innovative and use-case oriented components

The module is the building block of BullSequana S servers and can be easily extracted from the Compute Box for easy maintenance. The module comprises a Compute unit plus a Storage unit or a GPU unit in option to customize the system to match application requirements.

Each Compute unit imbeds:

- Two 2nd Generation Intel® Xeon® Scalable processors, with a large choice of models for the best it with your applications in terms of frequency, number of cores or power consumption
- Up to 24 memory DIMMs, ie a total of up to 3TB per compute module when using 128GB DIMMs
- NVRAM capabilities with the support of Intel® Optane™ DC Persistent Memory (DCPMM) providing near-DRAM performance at a lower-cost. Furthermore, Optane DCPMM can reduce considerably downtime with a much quicker reload of the data when the system restarts.
- Up to 8 disks and hot-plug PCIe blades.

GPU unit, for artificial intelligence

This option will be used mainly to introduce up to 32 GPUs in a single server in a very flexible way, 2 GPUs per module. Real-time algorithms and machine learning will use this huge processing power to run.

Storage unit, for data-extensive needs

This unit can hold up to: 12 SAS/SSD 2"5 disks; 4 NL-SAS high capacity 3"5 disks; 4 NVRAM for high I/O throughput. Thanks to this additional Storage unit, the capacity goes up to 20 disks in a 2U form-factor, and more than 2 raw PB in a 32-CPU server. This will be used in various use-cases from data lake to virtualization.

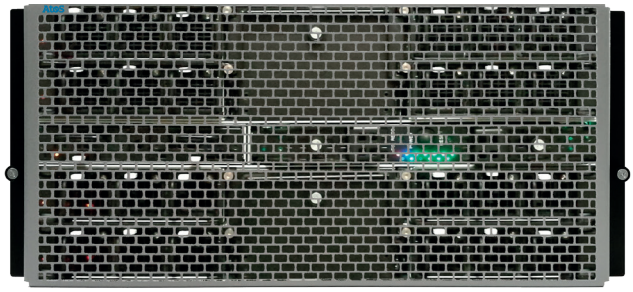
UNC and UBox for ultra-scalability up to 32 CPUs

The UBox is a 5U chassis imbedding several UPI Node Controllers (UNC). The UNC is the 6th generation of eXternal Node Controller (XNC) designed and developed by Atos for Intel processor-based servers. It is a VLSI-type (Very Large-Scale Integration) integrated circuit derived from mainframe technologies and tuned for High Performance Computing. This innovative and unique Atos technology makes it possible to interconnect up to sixteen 2-socket modules allowing to go up to 32-socket SMP systems in a Cache Coherent Non-Uniform Memory Access (CC-NUMA) architecture.

To meet customer application requirements, 2 types of UBox models can be proposed:

- **Enterprise:** this is the standard configuration providing all-to-all topology between CPUs. It provides both the performance and the high availability needed for high memory demanding applications like SAP HANA.
- **High Performance:** well suited for High Performance Computing, doubling the bandwidth in the all-to-all topology between CPUs. It provides exceptional performance for intensive CPU workload.

The UBox is autonomous in term of power, cooling and local management.



UBox technical specifications

	UBox Enterprise	UBox High-performance
Design		
Form Factor	5U	5U
Processors		
Node Controller Module*	2(1)	4(2)
Node Controller (UNC)	8(1)	16(2)
Power Supply Unit (PSU)	2 for datacenter with 220/240V 3 (N+1 redundancy) or 4 (2N redundancy) for datacenter under 220V/240V	3 (N+1 redundancy) or 4 (2N redundancy) for datacenter with 220/240V
Local Management board	1	1
Cooling		
Fans	12 hot-plug, N+1 redundancy (1)	24 hot-plug, N+1 redundant (2)
Physical specifications		
Dimensions (HxLxW)	220 (5U) x 446 mm x 850 mm	
Weight	Up to 99 kg	
Operating constraints	Ambient air temperature: +10°C to +35°C, gradient 20°C/hour Relative humidity (non condensing): 20% to 60%, gradient 5%/hour	

* Node controller module includes UNCs, Power Supplies, Fans, …
(1) for 8-socket configurations, UBox Enterprise includes 1 Node Controller module with 4 UNCs and 6 fans
(2) for +8-socket configurations UBox High Performance includes 2 Node Controller modules with 8 UNCs and 12 fans

S200 to S800 technical specifications

	S200	S400	S800
Design			
Form factor	2U	4U	8U
Processors			
Name	Intel® Xeon® Scalable Processors		
Numbers	2 max 56 cores / 112 threads	2 - 4 max 112 cores / 224 threads	2, 4, 6 and 8 max 224 cores / 448 threads
Type	8200, 6200, 5200, 4200 series	8200, 6200, 5200 series	8200 series
Processor cores available	4, 8, 10, 12, 16, 18, 20, 22, 24, 26 or 28	4, 8, 10, 12, 16, 18, 20, 22, 24, 26 or 28	4, 24, 26 or 28
L3 shared cache	77MB	154MB	308MB
Architecture			
Chipset	Intel® C627 Chipset		
Ultra-Path Interconnect (UPI)	Intel® UPI: 2-3 links per socket – up to 10.4 GT/s		
Scalability	2 processors	2 and 4 processors	2, 4, 6 and 8 processors
Hardware partitioning	No	Yes	Yes
Memory			
Memory slots	24	48	96
Min / max DRAM	64 GB – up to 3 TB	128 GB – up to 6 TB	256 GB – up to 12 TB
DRAM type	DDR4 RDIMM, LR-DIMM		
Persistent memory (DCPMM)*	up to 6 TB (12 x 512 GB)	up to 12 TB (24 x 512 GB)	up to 24T B (48 x 512 GB)
Embedded I/O ports			
Network Interface Controller (NIC)	• 4 x 10Gb/s Base-T Ethernet ports or • 2 x 10Gb/s Optical Ethernet ports (DAC or SFP+) + 2 x 1Gb/s Base-T Ethernet ports	• 8 x 10Gb/s Base-T Ethernet ports or • 24x 10Gb/s Optical Ethernet ports (DAC or SFP+) + 2 x 1Gb/s Base-T Ethernet ports	• 16 x 10Gb/s Base-T Ethernet ports or • 8x 10Gb/s Optical Ethernet ports (DAC or SFP+) + 2 x 1Gb/s Base-T Ethernet ports
Management ports	Management interface shared with 1GbE port (plus 100 Mb/s with Private Ethernet management switch for 4S & 8S)		
USB ports	4 x USB 3.0 (3 x front + 1 x internal) + 1 x USB 2.0	4 x USB 3.0 (3 x front + 1 x internal) + 1 x USB 2.0	4 x USB 3.0 (3 x front + 1 x internal) + 1 x USB 2.0
I/O			
I/O slots	Up to 5 Gen3 PCIe x 8 hot pluggable slots (or 2 x 16 + 1 x 8) per Compute Unit		
NIC PCIe blade	1GbE, 10GbE, 25GbE, 100GbE/IB (1,2 or 4 ports per PCI blade according to model)		
HBA PCIe blade	8Gb/s: 2ports per PCIe blade - 16Gb/s: 2 or 4 ports per PCIe blade - 32Gb/s: 2 ports per PCIe blade		
SAS/SATA PCIe blade	12Gb/s: 2 ext. ports per PCIe blade		
Storage			
Compute unit	Hot-pluggable Front Disk Blades		
	Up to 8 x 2.5" SSD/HDDs.	Up to 16 x 2.5" SSD/HDDs.	Up to 32 x 2.5" SSD/HDDs.
Storage unit**	Up to 12 x 2.5" SSDs/HDDs or Up to 4 x 3.5" HDDs or Up to 4 x 2.5'' NVMe U.2 drives	Up to 24 x 2.5" SSDs/HDDs or Up to 8 x 3.5" HDDs or Up to 8 x 2.5'' NVMe U.2 drives	Up to 48 x 2.5" SSDs/HDDs or Up to 16 x 3.5" HDDs or Up to 16 x 2.5' NVMe U.2 drives
Storage controller	RAID controllers: • on board SATA 6Gb/s RAID1 controller, up to 2 disks (Compute Unit) • SAS 12Gb/s and SATA 6Gb/s, up to 8 disks (Compute Unit) and 12 disks (Storage Unit) Host Bus Adapter: • SAS 12Gb/s and SATA 6Gb/s, up to 8 disks (Compute Unit) and 12 disks (Storage Unit)		
Micro SD	Dual MicroSD (RAID) on internal USB port (VMware boot only for some processors)		
SAN	Dell EMC, HitachiVantara, NetApp, ...		

* Persistent Memory (DCPMM) is only available for Platinum & Gold processors

** A 2-socket module hosts one Compute Unit and optionally either one Storage Unit or one GPU unit.

	S200	S400	S800
Video			
Video controller	1		
Memory	8 MB		
GPUs: GPU Unit*	Up to 2 GPUs	Up to 4 GPUs	Up to 8 GPUs
Security			
Security features	TPM 2.0 (check for availability), Secure boot, 2-level password		
Power supply			
Hot-swap Power Supply Unit (PSU)	1 + 1 per module		
PSU number	2, redundant	Up to 4, redundant	Up to 8, redundant
PSU type	Label 80+ Titanium & Platinum, 96% efficiency		
Max power output per PSU	2000 watts		
Auto-sensing	220V 60/50Hz		
Cooling			
Fan specifications	Up to 14 hot-plug, N+1 redundant	Up to 28 hot-plug, N+1 redundant	Up to 56 hot-plug, N+1 redundant
Physical specifications			
Dimensions (HxLxW) (max)	89 (2U) x 446 mm (19") x 850 mm	175 (4U) x 446 mm (19") x 850 mm	352 (8U) x 446 mm (19") x 850 mm
Weight	Up to 43 kg	Up to 81 kg	Up to 160 kg
Operating constraints	Ambient air temperature: +10°C to +35°C, gradient 20°C/hour Relative humidity (non condensing): 20% to 60%, gradient 5%/hour		
OS & software			
Operating system	VMware® vSphere (ESXi™), Red Hat® Enterprise Linux® ,Suse®Linux Enterprise Server, Microsoft® Windows Server, Oracle VM®, Oracle Linux®		
System management			
BMC	IPMI 2.0		
Remote management	Standard via on-board iBMC (connection through the management port)		
Management software	BMC (Server Hardware Console), IPMI 2.0, RedFish, iCare		
Availability & RAS features			
RAS features	Advanced Error Detection and Correction (AEDC), Viral Mode of error containment, PCIe "Stop and Scream", Virtual (soft) Partitioning, PCI Express ECRC, PCIe Corrupt Data Containment (Data Poisoning), PCIe Link CRC Error Check and Retry, PCIe Link Retraining and Recovery, PCI Express Live Error Recovery, DDR4 Wr Data CRC check/retry, DDR4 Command/Address Parity Check and Retry, Intel® UPI Link Level Retry, Intel® UPI Protocol Protection via 16 bit Rolling CRC, Intel® UPI Dynamic Link width reduction, Core disable for Fault Resilient Boot, Power up, Post Package Repair, Failed DIMM Isolation, PCIe Card Hot Plug (Add/Remove/Swap), PIROM for System Information Storage		
Serviceability	Hot-plug devices: PCIe blades (depending on OS), disks, fans hot-swap devices: Power Supply Unit		
Redundancy	Power supplies, fans, disks with RAID		
Warranty & services			
Standard warranty	3 Years CRU		
Warranty extension	Global Care		
Other services	IT infrastructure Advisory and energy audits Service Assurance HA, capacity and performance management Installation and integration services		
Regulator & safety			
Conformity	Safety (CE, IEC, UL, CSA + APAC certifications), Electromagnetic Compatibility (EC, FCC, ICES-03, VCCI certifications), Environment (RoHS II & WEEE directives, REACH regulation)		

S1600 technical specifications

	S1600
Design	
Form Factor	21U
Processors	
Name	Intel® Xeon® Scalable Processors
Numbers	8 - 10 - 12 - 14 -16 max 448 cores / 896 threads
Type	8200, 6200 series -
Processor cores available	4, 8, 12, 16, 18, 20, 22, 24, 26, 28
L3 shared cache	up to 616 MB
Architecture	
Chipset	Intel® C627 Chipset
Ultra-Path Interconnect	Intel® UPI between sockets and UNC: up to 11.2 GT/s SCI protocol between UNCs: up to 10.4 GT/s
Scalability	8 to 16 processors
Hardware partitioning	Yes
Memory	
Memory slots	up to 192
Min / max DRAM	512 GB - up to 24 TB
DRAM type	DDR4 RDIMM, LR-DIMM (64 & 128 GB only)
Persistent Memory (DCPMM)	up to 48 TB (96 x 512 GB)
Embedded I/O ports	
Network Interface Controller (NIC)	• 32 x 10Gb/s Base-T Ethernet ports or • 16 x 10 Gb/s optical Ethernet ports (DAC or SFP+) + 16 x 1Gb/s Base-T Ethernet ports
Management ports	Management interface shared with 1GbE port (plus 100 Mb/s with Private Ethernet management switch for 16S whatever the configuration).
USB ports	4 x USB 3.0 (3 x front + 1 internal) + 1 x Micro USB 2.0
I/O	
I/O slots	up to 40 Gen3 PCIe x 8 hot pluggable slots (or 16 x16 + 8 x8)
NIC PCIe blade	1GbE, 10GbE, 25GbE, 100GbE/IB (1,2 or 4 ports per PCI blade according to model)
HBA PCIe blade	8Gb/s: 2ports per PCIe blade - 16Gb/s: 2 or 4 ports per PCIe blade - 32Gb/s: 2 ports per PCIe blade
SAS/SATA PCIe blade	12Gb/s: 2 ext. ports per PCIe blade
Storage	
Compute unit	Hot-pluggable Front Disk Blades up to 64 x 2.5" SSD/HDDs
Storage unit**	up to 48 x 2.5" SSD/HDDs or up to 16 x 3.5" HDDs or up to 16 x 2.5" NVMe U.2 drives
Storage controller	RAID controllers: • on board SATA 6Gb/s RAID1 controller, up to 2 disks (Compute Unit) • SAS 12Gb/s and SATA 6Gb/s, up to 8 disks (Compute Unit) and 12 disks (Storage Unit) Host Bus Adapter: • SAS 12Gb/s and SATA 6Gb/s, up to 8 disks (Compute Unit) and 12 disks (Storage Unit)
Micro SD	Dual MicroSD (RAID) on internal USB port (VMware boot only for only some processors)
SAN	Dell EMC, HitachiVantara, NetApp, ...

** A 2-socket module hosts one Compute Unit and optionally either one Storage Unit or one GPU unit.

	S1600
Video	
Video controller	1
Memory	8 MB
GPU unit**	up to 16 NVIDIA GPU cards
Security	
Security features	TPM 2.0 (check for availability), Secure boot, 2-level password
Power supply	
Hot-swap Power Supply Unit (PSU)	1 + 1 per module (2 redundant PSU per module)
PSU number	up to 16, redundant
PSU type	Label 80+ Titanium & Platinum, 96% efficiency
Max power output per PSU	2000 watts
Auto-sensing	220V 60/50Hz
Cooling	
Fan specifications	up to 112 hot-plug, N+1 redundant
Physical specifications	
Dimensions (HxLxW)	930 (21U) x 446 mm x 850 mm
Weight	up to 415 kg
Operating constraints	Ambient air temperature: +10°C to +35°C, gradient 20°C/hour Relative humidity (non condensing): 20% to 60%, gradient 5%/hour
OS & software	
Operating System	Red Hat® Enterprise Linux® ,Suse®Linux Enterprise Server, Oracle Linux®, VMware vSphere (ESXiTM) on-going
System management	
Baseboard Management Controller (BMC)	IPMI 2.0
Remote management	Standard via on-board iBMC (connection through the management port)
Management software	BMC (Server Hardware Console), IPMI 2.0, RedFish, iCare
Availability & RAS features	
RAS features	Advanced Error Detection and Correction (AEDC), Viral Mode of error containment, PCIe "Stop and Scream", Virtual (soft) Partitioning, PCI Express ECRC, PCIe Corrupt Data Containment (Data Poisoning), PCIe Link CRC Error Check and Retry, PCIe Link Retraining and Recovery, PCI Express Live Error Recovery, DDR4 Wr Data CRC check/retry, DDR4 Command/Address Parity Check and Retry, Intel® UPI Link Level Retry, Intel® UPI Protocol Protection via 16 bit Rolling CRC, Intel® UPI Dynamic Link width reduction, Core disable for Fault Resilient Boot, Power up, Post Package Repair, Failed DIMM Isolation, PCIe Card Hot Plug (Add/Remove/Swap), PIROM for System Information Storage
Serviceability	Hot-plug devices: PCIe blades (depending on OS), disks, fans hot-swap devices: Power Supply Unit
Redundancy	Power supplies, fans, disks with RAID
Warranty & services	
Standard warranty	3 Years CRU
Warranty extension	Global Care
Other services	IT infrastructure Advisory and energy audits Service Assurance HA, capacity and performance management Installation and integration services
Regulator & safety	
Conformity	Safety (CE, IEC, UL, CSA + APAC certifications), Electromagnetic Compatibility (EC, FCC, ICES-03, VCCI certifications), Environment (RoHS II & WEEE directives, REACH regulation)

About Atos

Atos is a global leader in digital transformation with 107,000 employees and annual revenue of over € 11 billion. European number one in cybersecurity, cloud and high performance computing, the Group provides tailored end-to-end solutions for all industries in 71 countries. A pioneer in decarbonization services and products, Atos is committed to a secure and decarbonized digital for its clients. Atos is a SE (Societas Europaea), listed on Euronext Paris and included in the CAC 40 ESG and Next 20 Paris Stock Indexes.

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
atos.net/BullSequanaS

Let's start a discussion together