BullSequana SH series

Technical specifications

Get ready for secure, carbon-efficient hybrid computing

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AtoS

With the accelerating shift to hybrid cloud models and growing awareness of sustainability and carbon footprint considerations, Atos has launched BullSequana SH, a state-of-the-art generation of x86 servers based on the 4th Gen Intel® Xeon® Scalable processors with innovative capabilities to address these new business needs. BullSequana SH meets the demands of enterprises, cloud providers and hyperscalers in terms of security, scalability, reliability, performance and energy efficiency.

Accelerating the shift to hybrid cloud

Greater business agility

BullSequana SH servers are designed for agility while providing best-in-class reliability, scalability, security, performance and energy efficiency to help clients modernize their IT landscape, meet dynamic business needs and deploy their enterprise applications wherever they want – on-premises or in public cloud.

Picking the right model to scale

Although virtualization and cloud adoption have favored scale-out deployments, they are not well suited to real-time business processing, big data and analytics (e.g., SAP HANA®), which require maximum computational resources to process vast amounts of data.

These applications can take advantage of both the large number of processors that are close together and the large memory capacities of the BullSequana SH, therefore allowing large amounts of data to be kept near the processor, thereby minimizing the latency to fetch those data.

Protecting your most valuable assets

With increasing cyberattacks, security is no longer an option. BullSequana SH helps organizations to protect their data from the core to the cloud by creating a chain of trust without compromising performance. This ensures a secure boot and prevents unauthorized firmware updates before execution.

In addition to Intel® processor native hardware security features, BullSequana SH embeds a Trusted Execution Architecture (TEA) designed by Atos with public cryptographic root-of-trust keys anchored in silicon and a hardened operating system, TeaCore, developed by ProvenRun on Atos specifications based on their formally proven and EAL7 certified ProvenCore operating system.

Lower total cost of ownership (TCO)

Thanks to the increased performance of BullSequana SH, you can lower costs through server consolidation, reduce energy consumption, lower operational costs and potentially even reduce software licensing costs by replacing older x86 servers.

Reducing carbon footprint

Tackling climate changes

Atos has long prioritized decarbonization in all its business activities, from operations to product design, compliance with environmental directives and supplier selection. Thus, BullSequana SH enables businesses for all industries to achieve their sustainability goals by providing best-of-breed technologies that efficiently utilize CPU core resources, built-in accelerators and a broad range of power management features that help you to control server power usage (power capping, eco-mode, …).

In addition, to accelerate decarbonization, Atos has invested in infrastructure industrialization services, highly standardized and automated, producing and shipping products in a sustainable way, to boost efficiency and productivity namely for hyperscalers, cloud providers and large organizations projects. With its HPC experience, Atos can also propose a decarbonization level agreement (DLA) to help clients capture, measure, report and reduce the overall carbon footprint of the BullSequana SH platform, including an option for 100% carbon neutral compute, where the incompressible part of the carbon footprint is completely offset.

Efficient on-demand scalability

To preserve investments and power the most demanding environments, the BullSequana SH supports up to 128 TB memory and up to 32 CPUs while enabling the configuration that exactly fits your business needs.

With the ability to scale up by 2 CPU increments, you can avoid over-allocation of resources for future demand and reduce your carbon footprint. Moreover, through the optional Intel® On Demand Activation Model, additional accelerators can be turned on, beyond the base configuration, when needed.

Operational performance leap

Ensuring optimal performance with the smallest number of physical systems is key to minimizing environmental impact. Thanks to the increased memory, I/O and multi-socket bandwidths, along with DDR5, PCIe 5.0 and UPI 2.0, the overall throughput of the new BullSequana SH servers is greatly improved compared to previous generations, reducing the required computing hardware by up to 50% for large scale in-memory computing applications (e.g., SAP HANA®).

BullSequana SH also benefits from built-in accelerators on its 4th Gen Intel® Xeon® Scalable processors that increase efficiency and performance across AI, data analytics and networking.
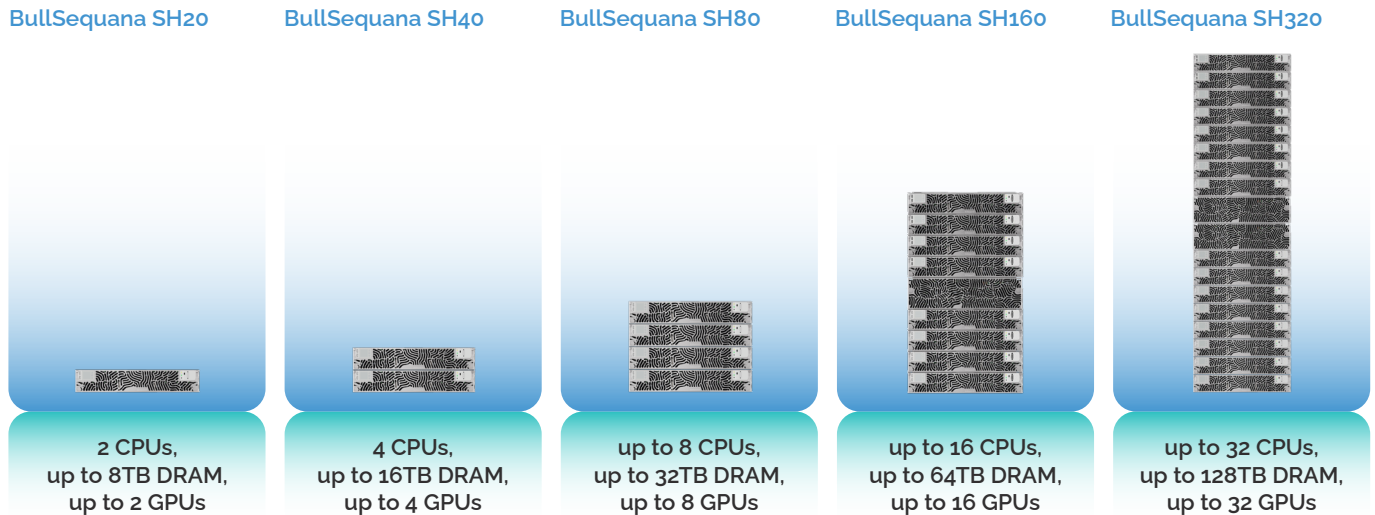
A powerful and scalable range

Based on a very flexible architecture, BullSequana SH's range includes 5 complementary models assembling one to sixteen 2-socket server modules, thanks to the two types of interconnections:

- A "glueless" interconnect for up to 4 modules, allowing glueless topology that supports up to 8 sockets with up to 4 Ultra Path Interconnect (UPI) links per CPU.

- An eXternal Node Controller (XNC) technology from Atos for larger configurations with ultra-scalability from 8 sockets up to 32 sockets.

BullSequana SH20	BullSequana SH40	BullSequana SH80	BullSequana SH160	BullSequana SH320
2 CPUs, up to 8TB DRAM, up to 2 GPUs	4 CPUs, up to 16TB DRAM, up to 4 GPUs	up to 8 CPUs, up to 32TB DRAM, up to 8 GPUs	up to 16 CPUs, up to 64TB DRAM, up to 16 GPUs	up to 32 CPUs, up to 128TB DRAM, up to 32 GPUs

Thanks to a very modular design, each model can be smoothly upgraded to another, preserving investments and application environments. Glueless configurations (from 2 to 8 sockets) can scale-up to 32 sockets by adding one (up to 16 sockets) or two UBoxes embedding the necessary Node Controllers.

The 2-socket server module is the base element of the BullSequana SH server with a dense 2U form factor. The processor interconnections between server modules is realized through the front and rear connecting boxes, and with the UBox(es) above 8 sockets, without any apparent cabling.

Key innovative and use-case oriented components

The 2-socket server module is the basic building block of the BullSequana SH servers and can be easily extracted from the 2U Compute box for easy maintenance. The full rack houses up to 16 server modules, which act as a single server or several servers when using the hardware partitioning feature. All processors within a single server must be of the same processor type.
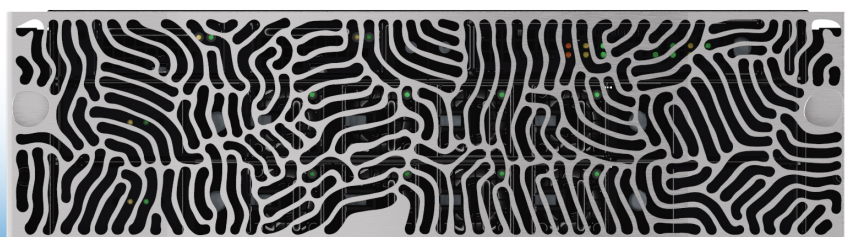
Each 2-socket server module embeds:

- A 2-socket compute drawer that includes:

  - Two 4th Gen Intel® Xeon® Scalable processors, with a large choice of models that are best fit for your applications in terms of frequency, number of cores or power consumption
  - Up to 32 DRAM DDR5 DIMMs
  - 12 hot swappable fan modules
  - 2U heatsink trays for better thermal dissipation, lower power consumption and lower sound level

- 2 hot swappable redundant Power Supply Units (PSUs) either of 2200 W or 3000 W. They are compliant with European ECO design with 80 PLUS Titanium certification to offer the highest efficiency
- 2 M.2 modules for optional NVMe SSDs operating system boot
- Optional NVMe SSD box, GPUs and hot swappable PCIe blades

Optional GPU tray for artificial intelligence

You can introduce up to 32 GPUs in a single server in a very flexible way (2 GPUs per module). They are installed on a specific tray on top of the motherboard. Real-time algorithms and Machine Learning will use this huge processing power.

UNC and UBox for ultra-scalability up to 32 CPUs

The UBox is a 3U-height chassis embedding two Intel® Ultra Path Interconnect (Intel® UPI) Node Controllers (UNCs). This UNC generation is the 6th of the eXternal Node Controller (XNC) designed and developed by Atos for Intel processor-based servers. The UNC is an Application-Specific Integrated Circuit (ASIC) derived from mainframe technologies and tuned for workloads requiring high performance and large memory footprints. 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.

UBox technical specifications

	UBox
Design	
Form factor	3U
Node Controller modules*	2
Node Controllers (UNCs)	2
Power Supply Unit (PSU)	80 PLUS Titanium, up to 96% efficiency
PSU slots (hot swap)	2 with 1 + 1 redundancy
Max power output per PSU	2200 W
PSU voltage and frequency range	100-120 V / 200-240 V @ 50-60 Hz
Management module	1
Cooling fans (hot swap)	8, N+1 redundancy

Physical specifications

Dimensions (H x L x D)	132 mm (3U) x 447 mm (19'') x 801 mm
Weight	35.5 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 Elevation: above sea level and below 2500 m

* Each node controller module includes one UNC, Power Supply Units and fans

Technical specifications of BullSequana SH20, SH40 and SH80

	BullSequana SH20	BullSequana SH40	BullSequana SH80

Design

Form factor	2U	4U	8U

Processors

Name	4th Gen Intel® Xeon® Scalable processors		
Numbers	2 (max 120 cores/ 240 threads)	4 (max 240 cores/ 480 threads)	6, 8 (max 480 cores/ 960 threads)
Type	8400, 6400, 5400, 4400 series	8400, 6400 series	
Cores available per processor	8 to 60		
Base Frequency	1.7 to 3.7 GHz	1.9 to 3.7 GHz	
Max Turbo Frequency	3.2 to 4.2 GHz	3.4 to 4.2 GHz	
L3 shared cache per processor	22.5 to 112.5 MB		

Architecture

Chipset	Intel® C741 chipset (Emmitsburg)		
Ultra Path Interconnect (UPI)	Intel® UPI 2.0: 2-4 usable links per socket, up to 16GT/s	Intel® UPI 2.0: 2-3 usable links per socket, up to 16GT/s	Intel® UPI 2.0: 4 usable links per socket (3 links only for 6-sockets), up to 16GT/s
Scalability	From 2 to 8 sockets by 2-socket increment		
Hardware partitioning	No	Yes	Yes

Memory

DIMM slots	32	64	Up to 128
Min/max DRAM	128 GB up to 8 TB (32 x 256 GB[1])	256 GB up to 16 TB (64 x 256 GB[1])	512 GB up to 32 TB (128 x 256 GB[1])
DRAM type	• 16 GB, 32 GB, 64 GB, 96 GB DDR5 RDIMM • 128GB, 256GB[1] DDR5 RDIMM-3DS		
Maximum memory capacity	8 TB (16 x 256 GB)	16 TB (32 x 256 GB)	32 TB (64 x 256 GB)

[1]256 GB: check availability with your sales representative

	BullSequana SH20	BullSequana SH40	BullSequana SH80

Embedded I/O ports

Management ports	Management interface 1 x 1GbE (RJ45) per hardware partition		
USB ports	2 x USB 3.1	4 x USB 3.1	8 x USB 3.1
Video port	1 VGA port per hardware partition		
Serial port	1 serial port per hardware partition		

I/O options

PCIe slots (hot swap)	Up to 4 PCIe Gen5 x8 and 3 PCIe Gen5 x16 or up to 5 PCIe Gen5 x16	Up to 8 PCIe Gen5 x8 and 6 PCIe Gen5 x16 or up to 10 PCIe Gen5 x16	Up to 16 PCIe Gen5 x8 and 10 PCIe Gen5 x16 or up to 20 PCIe Gen5 x16
NIC adapters	1GbE, 10GbE, 25GbE, 100GbE, 200GbE (2 or 4 ports per NIC according to model)		
FC Host Bus adapters	32, 64Gbps: 2 ports per HBA*		
RAID M.2 adapters	RAID 0/1 card hosting 2 x M.2 NVMe SSDs		

Storage

M.2 slots (hot swap)	2 x M.2 NVMe SSDs	4 x M.2 NVMe SSDs	8 x M.2 NVMe SSDs
Optional E1.S SSD box	Up to 8 x E1.S 5.9 mm NVMe SSDs (hot swap)	Up to 16 x E1.S 5.9 mm NVMe SSDs (hot swap)	Up to 32 x E1.S 5.9 mm NVMe SSDs (hot swap)
	– Optional RAID card (RAID 0, 1, 5, 6, 00, 10, 50 and 60) 8 GB cache, - JBOD capable		
SAN	Any Ethernet and FC compliant external array (Dell EMC, Hitachi Vantara, NetApp, PureStorage…)		

Graphical Processor Units

Quantity	Up to 2 GPUs	Up to 4 GPUs	Up to 8 GPUs

Security

Security features	TPM 2.0 (check for availability), Secure boot, Root-of-Trust, Trusted Execution Architecture		

* 8/16 Gbps supported according to model

	BullSequana SH20	BullSequana SH40	BullSequana SH80

Power supply

Power Supply Unit (PSU)	80 PLUS Titanium, up to 96% efficiency
PSU slots (hot swap)	2 per 2-socket server module (1+1 redundancy)
PSU cable types	C19-C20, 20 A
Max power output per PSU	2200 W or 3000 W, according to configuration
Rated voltage and frequency ranges	100-120 V / 200-240 V @ 50-60 Hz

Cooling

Fans (hot swap)	12 fans per 2-socket server module (N+1 redundancy)

Physical specifications

Dimensions (H x W x D) (max)	89 mm (2U) x 447 mm (19") x 855 mm	177 mm (4U) x 447 mm (19") x 855 mm	355 mm (8U) x 447 mm (19") x 855 mm
Weight	Up to 40 kg	Up to 80 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 Elevation: above sea level and below 2500 m		

OS and software

Operating Systems	SuSE® Linux Enterprise Server, Red Hat® Enterprise Linux®, VMware® vSphere (ESXi™), Microsoft® Windows Server, Oracle Linux®

System management

BMC server management processor	Aspeed AST2600
Remote management	Redfish® API, web GUI server Hardware Console based on OpenBMC, HTML5 remote console display, virtual drives
Management software	Ansible® playbooks and Zabbix™ templates

Availability and RAS features

RAS features	Integrated features to prevent, detect and correct various memory, CPU, I/O, system and UPI errors
Serviceability	Hot swap devices: PSUs, PCIe blades, fans, NVMe drives DIMMs and CPUs serviceable without extracting the whole server
Redundancy	Power Supply Units, fans, NVMe drives with RAID

	BullSequana SH20	BullSequana SH40	BullSequana SH80

Warranty and services

Standard warranty	3 years		
Warranty extension	Under specific contract		
Maintenance services	Bronze, Silver, Gold, 24x7 Service Level Agreements (SLAs)		
Other services	Factory industrialization services (rack integration: servers: storage, network, software) On-site installation and integration services		

Regulations and safety

Compliance	Global: CB, RoHS, REACH, WEEE Per country: CE, ErP Lot 9, CSA, ICES-003, FCC, BIS, BSMI, VCCI, KC, RCM, … (consult Atos sales representative for exhaustive list)		

BullSequana SH160 technical specifications

	BullSequana SH160

Design

Form factor	19U

Processors

Name	4th Gen Intel® Xeon® Scalable processors
Numbers	10, 12, 14 and 16 (max 960 cores / 1920 threads)
Type	8400, 6400 series
Cores per processor	8 to 60
Base frequency	1.9 to 3.7 GHz
Max Turbo Frequency	3.4 to 4.1 GHz
L3 shared cache per processor	22.5 to 112.5 MB

Architecture

Chipset	Intel® C741 chipset (Emmitsburg)
Ultra-Path Interconnect (UPI)	Intel® UPI 2.0: 4 links per socket (up to 16GT/s)
Scalability	10 to 16 processors
Hardware partitioning	Yes

Memory

DIMM slots	Up to 256
Min/max DRAM	640 GB up to 64 TB (256 x 256 GB[1])
DRAM type	• 32GB, 64GB, 96GB DDR5 RDIMM • 128GB, 256GB[1] DDR5 RDIMM-3DS
Maximum memory capacity	64 TB

Embedded I/O ports

Management ports	Management interface 1 x 1GbE (RJ45) per HW partition
USB ports	2 x USB 3.1
Video port	1 VGA port per HW partition
Serial port	1 serial port per HW partition

[1] 256GB: check availability with your sales representative

	BullSequana SH160

I/O options

PCIe slots (hot swap)	Up to 32 PCIe Gen5 x8 and 24 PCIe Gen5 x16, or up to 40 PCIe Gen5 x16Up to 20 PCIe Gen5 x16
NIC adapters	1GbE, 10GbE, 25GbE, 100GbE, 200GbE (1,2 or 4 ports per NIC according to model)
FC Host Bus adapters	32, 64Gbps: 2 ports per HBA*
RAID M.2 adapters	RAID 0/1 card hosting 2 x M.2 NVMe SSDs

Storage

M.2 slots (hot swap)	16 x M.2 NVMe SSDs
Optional SSD Box	Up to 64 x E1.S 5.9 mm NVMe SSDs (hot swap)
	– Optional RAID card (RAID 0, 1, 5, 6, 00, 10, 50 and 60) 8 GB cache, - JBOD capable
SAN	Any ethernet and FC compliant external array (Dell EMC, Hitachi Vantara, NetApp, PureStorage...)

Graphical Processor Units

Quantity	Up to 16 GPUs

Security

Security features	TPM 2.0 (check for availability), Secure boot, Root-of-Trust, Trusted Execution Architecture

Power supply

Power Supply Unit (PSU)	80 PLUS Titanium, up to 96% efficiency
PSU slots (hot swap)	2 per 2-socket server module (1+1 redundancy)
PSU cable types	C19-C20, 20 A
Max power output per PSU	2200 W or 3000 W, according to configuration
Rated voltage and frequency ranges	100-120 V / 200-240 V @ 50-60 Hz

Cooling

Fans (hot swap)	12 fans per 2-socket server module (N+1 redundancy)

* 8/16 Gbps supported according to model

BullSequana SH160

Physical specifications

Dimensions (H x W x D)	842 mm (19U) x 447 mm (19'') x 855 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 Elevation: above the sea level and below 2500 m

OS and software

Operating Systems	Red Hat® Enterprise Linux®, SuSE® Linux Enterprise Server, Oracle Linux®

System management

BMC server management processor	Aspeed AST2600
Remote management	Redfish® API, web GUI server Hardware Console based on OpenBMC, HTML5 remote console, virtual drives
Management software	Ansible® playbooks and Zabbix™ templates

Availability and RAS features

RAS features	Integrated features to prevent, detect and correct various memory, CPU, I/O, system and UPI errors
Serviceability	Hot swap devices: PSUs, PCIe blades, fans, NVMe drives DIMMs and CPUs serviceable without extracting whole server
Redundancy	PSUs, fans, NVMe drives with RAID

Warranty and services

Standard warranty	3 years
Warranty extension	Under specific contract
Maintenance services	Bronze, Silver, Gold, 24x7 Service Level Agreements (SLAs)
Other services	Factory industrialization services (rack integration: servers: storage, network, software) On-site installation and integration services

Regulations and safety

Compliance	Global: CB, RoHS, REACH, WEEE Per country: CE, ErP Lot 9, CSA, ICES-003, FCC, BIS, BSMI, VCCI, KC, RCM, ... (consult Atos sales representative for exhaustive list)

About Atos

Atos is a global leader in digital transformation with 112,000 employees and annual revenue of c. € 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) and listed on Euronext Paris.

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.

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Let's start a discussion together