EVIDEN

BullSequana SH series

Powered by Intel® Xeon® 6 processors

Technical specifications

In-memory computing to deploy your
critical & AI applications with confidence

In a data-driven world, it is crucial for organizations to ensure that their computing infrastructures can handle ever-growing volumes to meet their demands. Building on the strength of the series, the new BullSequana SH servers guarantee security, scalability, and reliability while significantly boosting performance, thanks to Intel Xeon 6 processors and Eviden's direct liquid cooling technology, which enhances energy efficiency. This x86 server range is perfectly suited to the needs of businesses, cloud provider, and hyperscalers, enabling them to confidently deploy their critical and artificial intelligence applications.

Managing data for AI & critical applications

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 Eviden with public cryptographic root-of-trust keys anchored in silicon and a hardened operating system, TeaCore, developed by ProvenRun on Eviden 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.

Eviden's industrialization services

In addition, to accelerate decarbonization, we have 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.

Reducing carbon footprint

Tackling climate changes

At the forefront of decarbonization, BullSequana SH integrates sustainability into every facet of operations, from product design to adherence to environmental directives and judicious supplier selection. By deploying cutting-edge technologies, it empowers businesses across industries to meet their sustainability targets via the efficient use of CPU core resources, built-in accelerators and extensive power management features, such as power capping and eco-mode for optimized energy consumption.

Additionally, Eviden's state-of-the-art Direct Liquid Cooling (DLC) solution can be integrated, delivering superior cooling and thermal conductivity while consuming less energy for heat transport. With up to 97% heat dispersion efficiency and functional at a 40°C inlet water temperature, Eviden stands as a pioneer and global leader in DLC technology.

Efficient on-demand scalability

To preserve investments and power the most demanding environments, the new generation of BullSequana SH supports up to 128 TB memory and up to 16 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.

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 server 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 Intel® Xeon® 6 processors that increase efficiency and performance across AI, data analytics and networking.

A powerful and scalable range

Based on a very flexible architecture, the new BullSequana SH 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 Eviden for larger configurations with ultra-scalability from 8 sockets up to 32 sockets.

BullSequana SH21

2 CPUs, up to 8TB DRAM, up to 2 GPUs

BullSequana SH41

4 CPUs, up to 16TB DRAM, up to 4 GPUs

BullSequana SH81

up to 8 CPUs, up to 32TB DRAM, up to 8 GPUs

BullSequana SH161

up to 16 CPUs, up to 64TB DRAM, up to 16 GPUs

BullSequana SH321

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 16 sockets by adding one UBox embedding the necessary Node Controllers, and up to 32 sockets by adding two UBox.

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 are realized through the front and rear connecting boxes, and with the UBox 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.

Each 2-socket server module embeds:

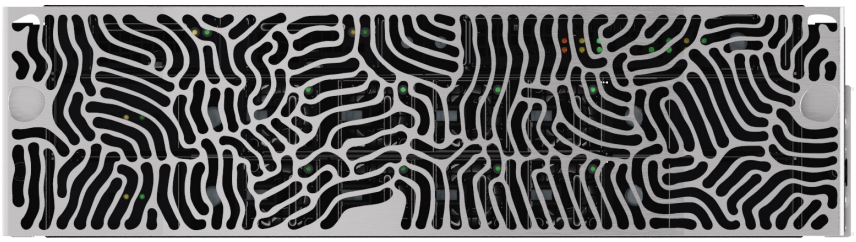
- A 2-socket compute drawer that includes:
  - Two Intel® Xeon® 6 processors, with a large choice of models that are best fit for your applications in terms of frequency, number of cores or power consumption
  - Up to 32 DRAM DDR5 DIMMs
  - 12 hot swappable fan modules
  - 2U extended heatsink trays 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. 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 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 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 SH21, SH41 and SH81

	BullSequana SH21	BullSequana SH41	BullSequana SH81
Design			
Form factor	2U	4U	8U
Processors			
Name	Intel® Xeon® 6 Processors		
Numbers	2 (max 172 cores/ 344 threads)	4 (max 344 cores/ 688 threads)	6[1] or 8 (max 688 cores/ 1376 threads)
Type	Intel® Xeon® 6700P & 6500P series		
Cores available per processor	8 to 86		
Base frequency	2.0 to 4.0 GHz		
Max turbo frequency	3.8 to 4.3 GHz		
L3 shared cache per processor	48 to 336 MB		
Architecture			
Ultra Path Interconnect (UPI)	Intel® UPI 2.0: 3-4 usable links per socket, up to 24 GT/s per link	Intel® UPI 2.0: 3 usable links per socket, up to 24 GT/s per link	Intel® UPI 2.0: 4 usable links per socket (3 links only for 6-socket), up to 24 GT/s per link
Scalability	From 2 to 8 sockets by 2-socket increment[1]		
Hardware partitioning	No	Yes	Yes
Memory			
DIMM slots	32	64	Up to 128
Min/max DRAM	512 GB up to 8 TB (32 x 256 GB[1])	1 TB up to 16 TB (64 x 256 GB[1])	8 TB up to 32 TB (128 x 256 GB[1])
DRAM type	• 64 GB, 96 GB, 128 GB DDR5 RDIMM • 256 GB[1] DDR5 RDIMM-3DS		

[1]6-socket server and 256 GB DIMMs: check availability with your sales representative

	BullSequana SH21	BullSequana SH41	BullSequana SH81

Embedded I/O ports

Management ports	Management interface 1 x 1GbE (RJ45) per hardware partition		
USB ports	2 x USB 3.1	2 x USB 3.1 per hardware partition	2 x USB 3.1 per hardware partition
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 6 PCIe Gen5 x8 and 2 PCIe Gen5 x16 or up to 5 PCIe Gen5 x16	Up to 12 PCIe Gen5 x8 and 4 PCIe Gen5 x16 or up to 10 PCIe Gen5 x16	Up to 24 PCIe Gen5 x8 and 8 PCIe Gen5 x16 or up to 20 PCIe Gen5 x16
NIC adapters	1GbE, 10GbE, 25GbE, 100GbE, 200GbE, 400GbE		
FC Host Bus adapters	32, 64Gbps*		
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 NVMe SSDs (hot swap)	Up to 16 x E1.S NVMe SSDs (hot swap)	Up to 32 x E1.S 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	Platform Firmware Resiliency, TPM 2.0, Secure boot, Root-of-Trust, Trusted Execution Architecture; Intel® Software Guard Extensions (SGX) and Trust Domain Extension (TDX) Connect ; Intel® Multi-Key Total Memory Encryption (MKTME); Vector AES, SHA2-256 extensions, VPMADD52

* 8/16 Gbps supported according to model

	BullSequana SH21	BullSequana SH41	BullSequana SH81

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, OneBSM

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

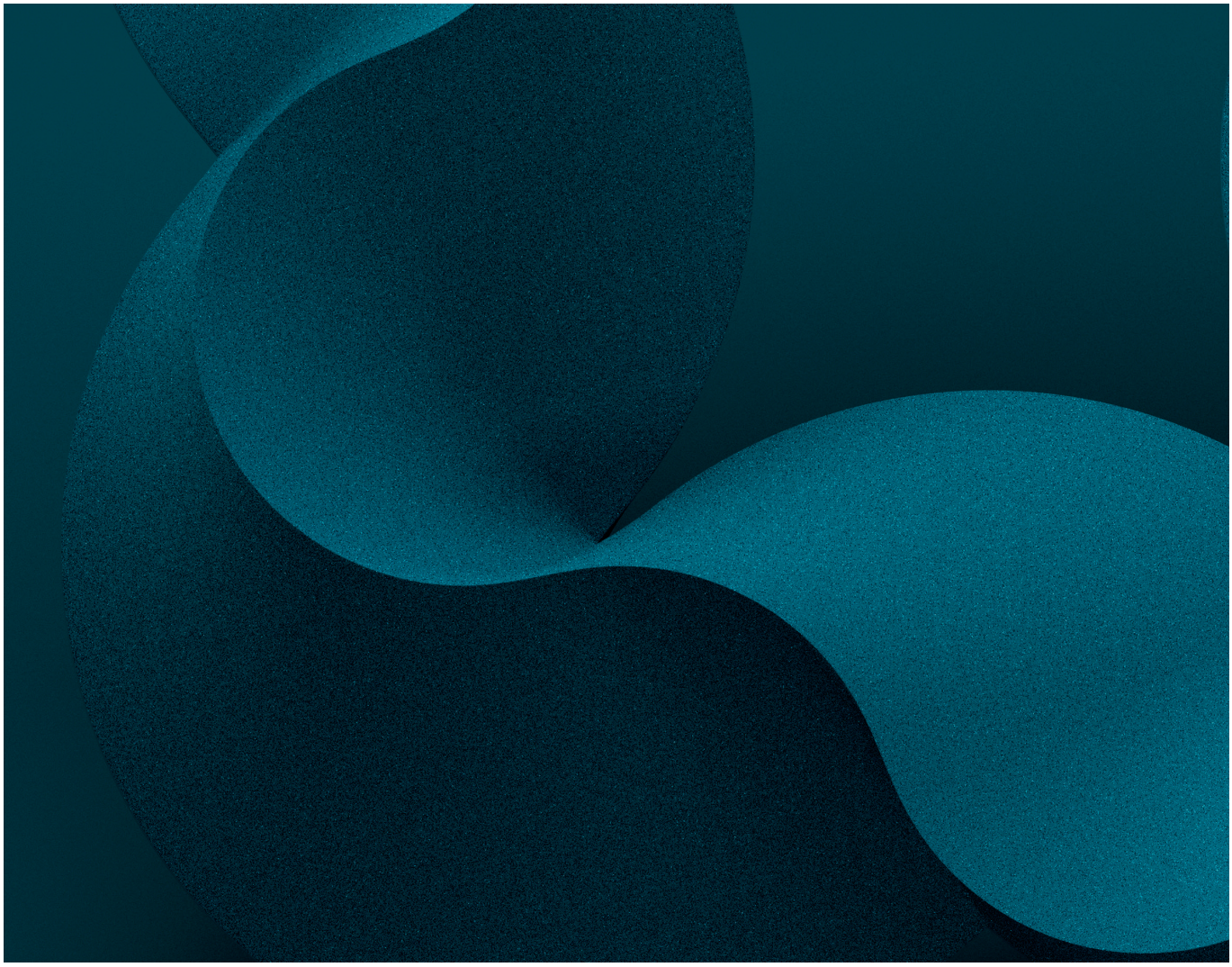
	BullSequana SH21	BullSequana SH41	BullSequana SH81

Warranty and services

Standard warranty	3 years CRU
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 Eviden sales representative for exhaustive list)



BullSequana SH161 technical specifications

	BullSequana SH161
Design	
Form factor	19U
Processors	
Name	Intel® Xeon® 6 Processors
Numbers	10, 12, 14 and 16 (max 1376 cores / 2752 threads)
Type	Intel® Xeon® 6700P series
Cores per processor	24 to 86
Base frequency	2.0 to 2.9 GHz
Max turbo frequency	3.8 to 4.2 GHz
L3 shared cache per processor	144 to 336 MB
Architecture	
Ultra-Path Interconnect (UPI)	Intel® UPI 2.0: 4 links per socket (up to 24 GT/s per link)
Scalability	10 to 16 processors
Hardware partitioning	Yes
Memory	
DIMM slots	Up to 256
Min/max DRAM	4 TB up to 64 TB (256 x 256 GB[1])
DRAM type	• 64 GB, 96 GB, 128 GB DDR5 RDIMM • 256 GB[1] DDR5 RDIMM-3DS
Embedded I/O ports	
Management ports	Management interface 1 x 1 GbE (RJ45) per hardware partition
USB ports	2 x USB 3.1 per hardware partition
Video port	1 VGA port per hardware partition
Serial port	1 serial port per hardware partition

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

	BullSequana SH161

I/O options

PCIe slots (hot swap)	Up to 48 PCIe Gen5 x8 and 16 PCIe Gen5 x16, or up to 40 PCIe Gen5 x16
NIC adapters	1GbE, 10GbE, 25GbE, 100GbE, 200GbE, 400Gbe
FC Host Bus adapters	32, 64Gbps*
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 32 GPUs

Security

Security features	Platform Firmware Resiliency, TPM 2.0, Secure boot, Root-of-Trust, Trusted Execution Architecture; Intel® Software Guard Extensions (SGX) and Trust Domain Extension (TDX) Connect; Intel® Multi-Key Total Memory Encryption (MKTME); Vector AES, SHA2-256 extensions, VPMADD52

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 SH161

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
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