

Solution Brief

Intel® Select Solution for Professional Visualization

Intel® Xeon® Processor Scalable Family

Powered by Intel® Rendering Framework

Intel® Select Solutions for Professional Visualization with Advantech Servers & Appliances



Overview

In the complex world we live in, the demand for visual prototyping and visual analysis is considerable. The human visual system is the highest bandwidth mechanism for driving and understanding complex information. For studios and gaming industries, images have to be physically accurate, photorealistic, and made with high-fidelity material properties. Not only for the entertainment industry, excellent image fidelity also plays an important role in industries such as architecture, medicine, and engineering to make complex data intelligible.

However, as data size increases significantly, the limitations of graphics-processing hardware makes visualizing data at large scale a significant challenge. While interactive visual computing of large 3D data is becoming critical in many industries, reducing system costs also becomes a significant factor when making decisions.

However, a breakthrough has emerged: Ray tracing techniques, provided by Intel® Rendering Framework, handles large datasets, offers high fidelity visualizations, is optimized for parallel processing architectures, and is open source, thus providing a significant alternative to graphics hardware. Ray tracing performance on graphics hardware proves to be a significant challenge when the data size is too large to fit into limited GPU memory. Intel® Xeon® Scalable processor based implementations, utilizing its inherent parallel processing features, enable leading performance that is often competitive with traditional hardware-accelerated, rasterized triangle rendering. The technical solutions available with GPU-based rendering no longer provide a strong balance between performance, visual fidelity, and cost.

Advantech has chosen to partner with Intel to verify its HPC-8212 and ASMB-925 server board and SKY-524 server as Intel® Select Solutions for Professional Visualization. This enables users of the systems to benefit from Intel's experience in simulation, modeling and visualization markets with workload-optimized performance from Intel Xeon Scalable processors.

The Advantech system with Frontend node (Advantech HPC-8212 Chassis + ASMB-925 Server board) and 3 Compute nodes (Advantech SKY-524) are verified Intel Select Solutions for Professional Visualization that benefit end users and developers with faster access to optimized and stable platform configurations to accelerate use and development of visualization solutions.

Ready to ship as pre-configured platforms and also available for benchmarking in Advantech's Remote Evaluation Service labs, interested users can utilize these platforms to conduct testing and modeling of solutions that will define next-generation compute and visualization capabilities.

Introduction to Intel Select Solutions for Professional Visualization

Intel Select Solutions for Professional Visualization provide a fast path for purchasing and deploying a cluster to enable compute and visualization workloads with less cost, limitations, and system challenges. Intel Select Solutions for Professional Visualization consist of a pre-validated selection of software and hardware components designed to meet the demands of HPC and enterprise applications that include visualization workflows. These systems also provide the capabilities and agility needed to eliminate the need for multiple single-purpose systems. In addition, the performance of key system characteristics is verified for Intel Select Solutions for Professional Visualization at both the node and cluster level.

Configurations

Infrastructure solutions are a key target for today's complex workloads, based on Intel® Xeon® Scalable processors with high speed network interconnects. Also, the new Intel Select Solution for Professional Visualization eases multiple customers and end users through complex selection processes to help them make smarter and faster price-performance choices based on data.

The Intel Select Solution for Professional Visualization performance requirements have been established using HPL, HPCG, DGEMM, STREAM, IMB PingPong, OSPRay, and ParaView benchmarks. Intel Select Solutions consists of select hardware, various Intel® Xeon® processor technologies, Intel® Omni-Path interconnect along with optimized software and firmware configurations. It consists of the following components.

The system must be comprised of at least one Frontend node (Advantech HPC-8212 Chassis + ASMB-925 Serverboard) and 3 Compute nodes (Advantech SKY-524).

Frontend Node (Advantech HPC-8212 Chassis + ASMB-925 Server board)

Hardware	Intel Reference Platform	Advantech System
CPU	Intel® Xeon® Gold 6148 CPU @ 2.40 GHz / 20C/40T or higher number CPU	Intel Gold 6150 x2
Memory	192 GB or higher with 2 GB/core or higher, 1 DPC 2666 MHz	32GB 2666MHz x12
Message Fabric	Intel® Omni-Path Host Fabric Interface (Intel® OP HFI) Adapter 100 Series	Omni-Path Host Fabric Interface Adapter 100 Series x1
Operating System Drive	Intel® SSD DC S3520 Series or better, or Intel® SSD DC P3520 Series or better	DC S3610 400GB x1
Data Drive	Four Intel® SSD DC P4500 Series 4 TB or better/larger	NVME SSD DC P4510 4TB x4

Frontend Node Introduction - Advantech HPC-8212

The HPC-8212 series are 2U storage chassis with 12 3.5" hot-pluggable HDD bays designed for NVR and CMS servers to support digital surveillance and cloud storage applications. Following the latest industrial design concepts, HPC-8212 provides users with high-performance computing in a state-of-the-art platform.

The highly efficient switch-mode power supply and easy-to-maintain cooling fans enable HPC-8212 to support diverse EATX/ATX/micro ATX motherboards. The platform's next-generation SAS 12 Gbp backplane with 4-port NVMe interface offers premium storage performance with the inclusion of a SAS12G RAID card or optional NVMe riser card. Additionally, the chassis features a 7-slot low-profile I/O bracket in the rear panel as the default, and can be fitted with optional 3-slot full-height I/O brackets. The HPC8212 series also supports a wide input power range and a 550W to 800W redundant power supply.

Advantech HPC-8212 Overview

- 2U rackmount 540mm/620mm depth chassis.
- Supports EATX, ATX, uATX Server-board
- Front access 12x 3.5"/2.5" hot-swappable HDD bays
- New generation SAS12G backplane with 4x NVMe (U.2) slots support
- 6x LP expansion slots (1 slot is occupied by SAS Raid Card) by default, optional for 2x FH expansion slots (1 slot is occupied by SAS RAID card)
- Fan : 4 x8038 (middle), Easy maintenance
- Supports high efficiency (80+) redundant power supplies
- Certificate: CE/FCC Class A

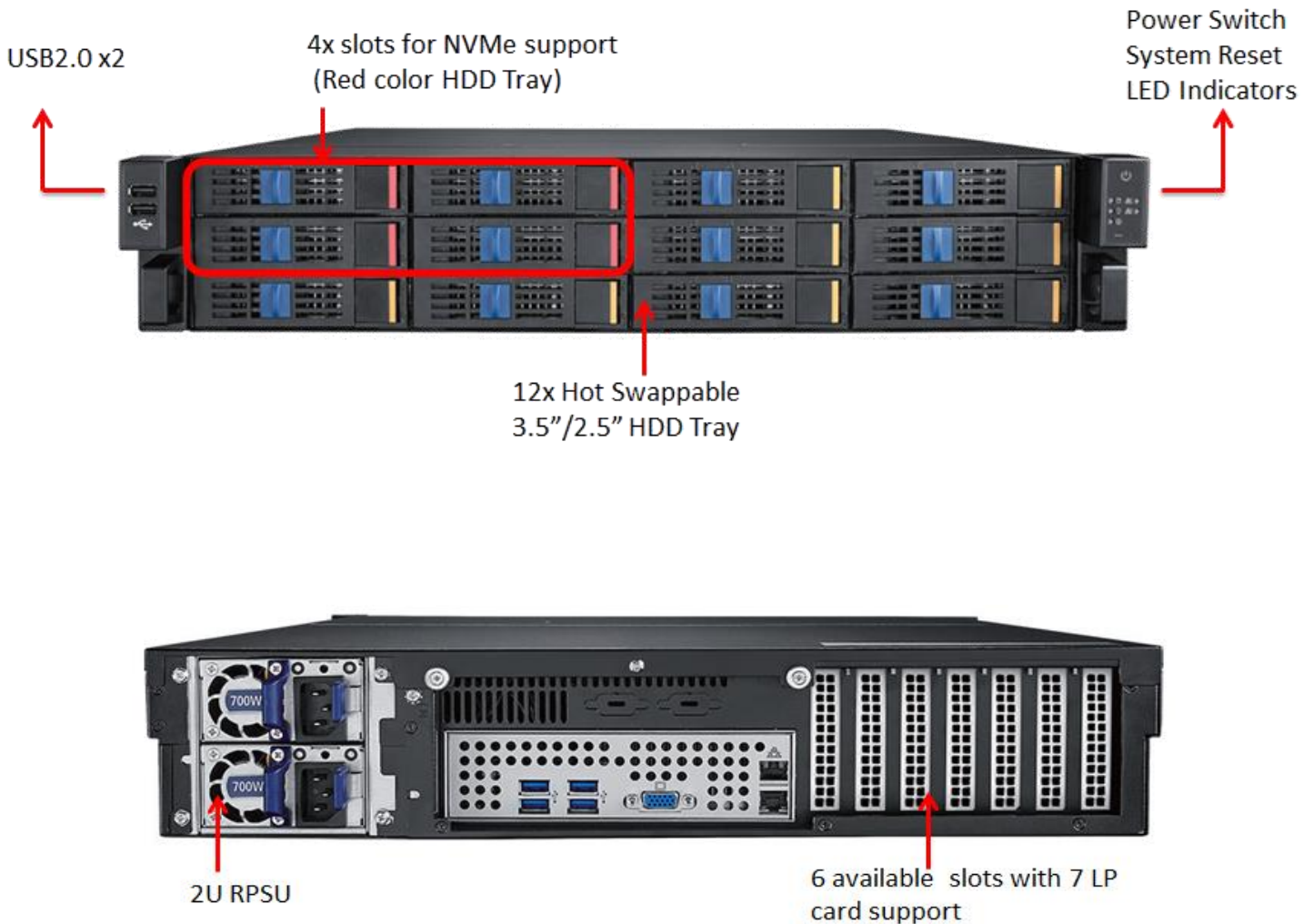


Figure 1. Advantech Chassis HPC-8212 Front Views and Rear Views

Frontend Node Introduction –Advantech Server Board ASMB-925

The ASMB-925 server board is the most advanced Intel Xeon Processor scalable family series board for server-grade IPC applications that require high-performance computing power & multi-expansion slots. This server board supports Intel Xeon Scalable series processor and DDR4 ECC-REG 2133/2400/2666 MHz memory up to 768 GB.

ASMB-925 provides five PCIe x16 and one PCIe x8 in Gen3 speed. In addition, the full ASMB-925 SKU has dual Gigabit and dual 10GbE Ethernet LAN ports that eliminate network bottlenecks. (ASMB-925 I & T2 SKUs only)

One of RJ-45 LAN connector (LAN2) is shared for IPMI function that allows remote control management. High reliability and outstanding performance makes ASMB-925 the ideal platform for industrial server/networking applications.

By using the Intel C621/C622 chipset, the ASMB-925 offers a variety of features such as 6 x USB3.0 and 5 x USB 2.0 connectivity, 8 x onboard SATA III. It supports software RAID 0, 1, 10 and 5 (Windows only*), and with the latest Intel RSTe (Rapid Storage Technology Enterprise) it provides a compelling RAID solution for NVMe SSDs via Intel VROC (Virtual RAID on CPU) HW key. These powerful I/O capabilities ensure even more reliable data storage capabilities and high-speed I/O peripheral connectivity

Advantech ASMB-925 Overview

- Intel Skylake-SP and Cascade Lake-SP processor (LGA 3647-P0)
- Expansion: 5*PCIe x16 + 1*PCIe x8, 1*PCI
- DDR4 2666 MHz RDIMM up to 786 GB (12 LRDIMMs), support Apache Pass 8*SATA III Ports
- 2*Intel GbE LAN + 2*Intel 10 GbE LAN (ASMB-925T2 SKU)
- 6*USB3.0 (4 rear, 2 via header) + 5*USB2.0 (4 via header, 1 Type A)
- 0~40°C operating temperature range
- Certificate: CE/FCC class A

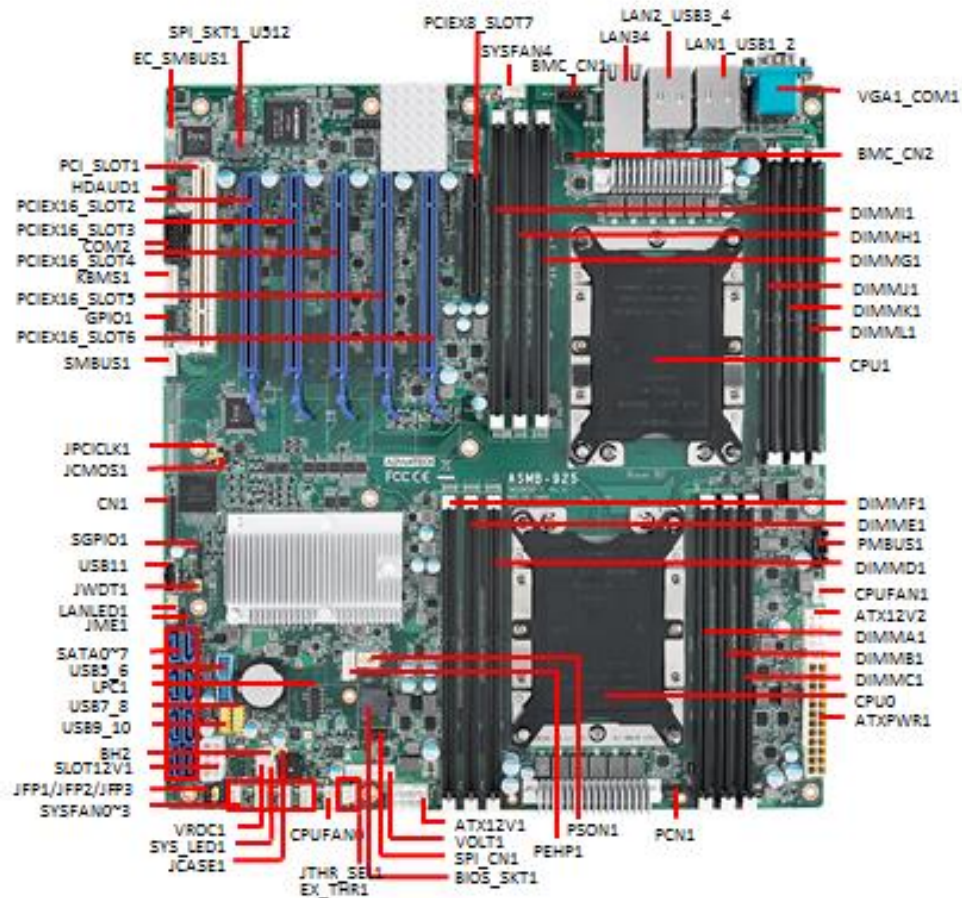


Figure2. Advantech Server Board ASMB-925 View

Compute Node (Advantech SKY-524 Server)

Hardware	Intel Reference Platform	Advantech System
CPU	Intel® Xeon® Gold 6148 CPU @ 2.40 GHz / 20C/40T or higher number CPU	Intel Gold 6150 x2
Memory	192 GB or higher with 2 GB/core or higher, 1 DPC 2666 MHz	32GB 2666MHz x12
Message Fabric	Intel® Omni-Path Host Fabric Interface (Intel® OP HFI) Adapter 100 Series	Omni-Path Host Fabric Interface Adapter 100 Series x1
Data Drive	Intel® SSD DC S3520 Series or better, or Intel® SSD DC P3520 Series or better	DC S3610 400GB x1

The Advantech SKY-524 server, it is a highly configurable and high performance server designed to balance server-class processing with flexible I/O and offload density in a 20" depth chassis. The system is a cost effective, robust platform optimized for high reliability in network, edge and industrial computing.

It is specifically designed for high density PCIe card payloads where maximum I/O connectivity is needed or the integration of industry leading offload and acceleration technology is essential. Equipped with flexible I/O options, it is easy to upgrade to 1G/10G/40G/100G LAN via daughter boards.

Architected around the Cutting edge technologies with Intel Xeon Scalable processor family and support up to 24 DIMMs per Node (Intel® Xeon® Gold 6150 processors in Intel Select Solution for Professional Visualization configurations)

Advantech SKY-524 Overview

- 2U High-density Multi-Node Server (2U, 4 Node)
- Support 8 Intel Xeon Scalable processor (up to 140W, LGA3647 socket)
- 24 x2.5” SASIII / SATAIII hot-swap bay (6 HDD per node, 2 of them support NVMe)
- Power Supply: 1+1 2200W Redundant Power Supply 2x M.2 storage
- System fan: 6x80x38 fan (2 for CPU, 4 for card charge)
- Certificate: CE/FCC class A
- Specification per Node:
 - *24xDDR4 DIMM slot support ECC-REG 2400/2133, Max. 768GB per Node.
 - *2x M.2 storage
 - *2x Intel X557 10Gb LAN
 - *Remote Management 1x dedicate IPMI LAN
 - *2x Low Profile PCIe16 Expansion
- Specification per System (with 4 Node)
 - *96*DDR4 DIMM slot support ECC-REG 2400/2133, Max. 3072GB per System
 - *8x M.2 storage
 - *8x Intel X557 10Gb LAN
 - *Remote Management: 4x dedicate IPMI LAN
 - *8x Low Profile PCIe16 Expansion

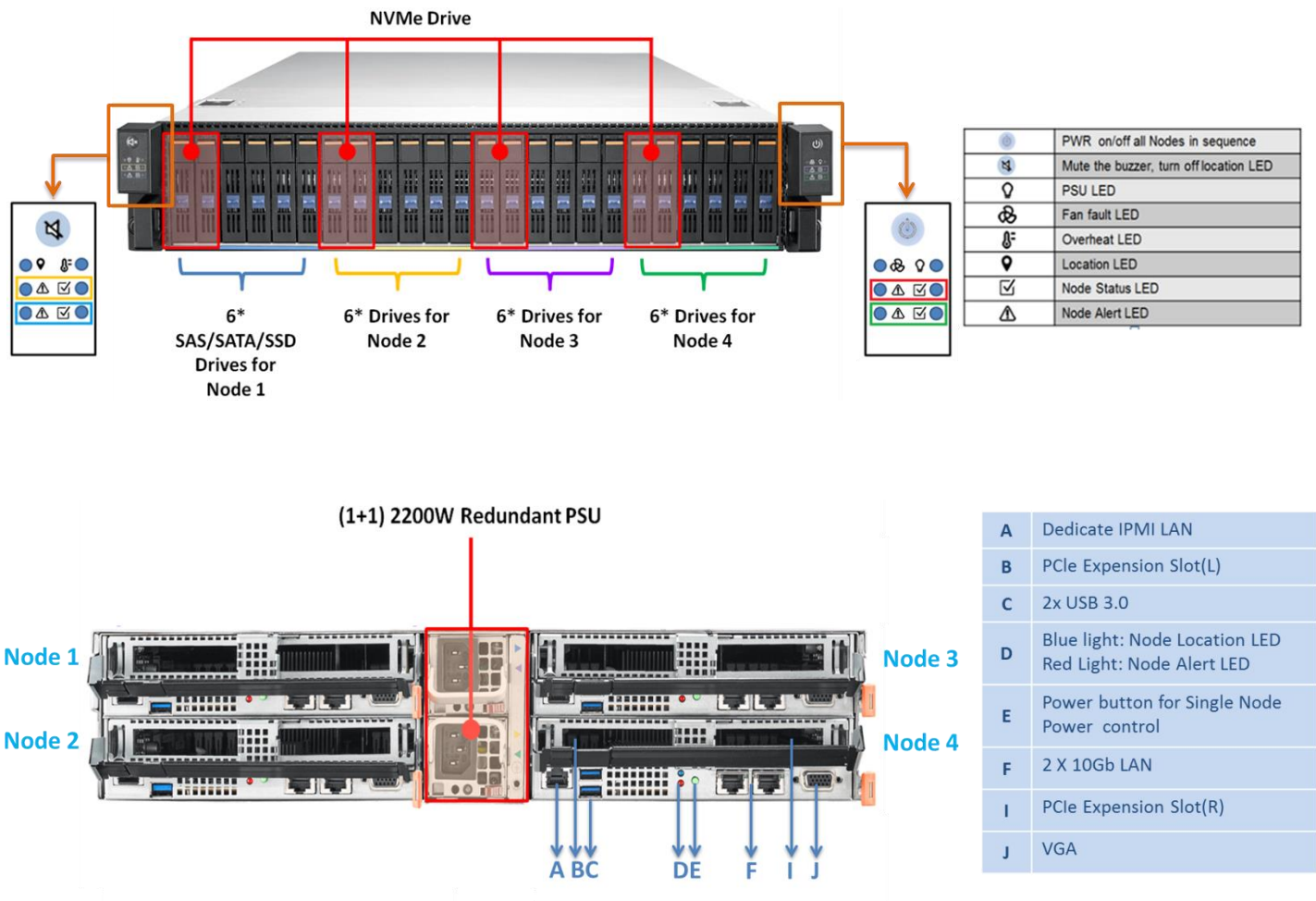


Figure3. Advantech SKY-524 Server Front View and Rear View

For more information of Advantech HPC-8212, ASMB-925 Server board, and SKY-524 verified Intel® Select Solutions for Professional Visualization, please go to the following website or contact Advantech directly:

Advantech's Intel Select Solutions for Professional Visualization:

<http://www.advantech.com/resources/case-study/2018-issprovis>

Advantech Web: <http://www2.advantech.com/intelligent-systems>

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