

iei®



GRAND-C422-20D

AI ready in deep learning solution

www.ieiworld.com

GRAND-C422-20D

GRAND AI training server system

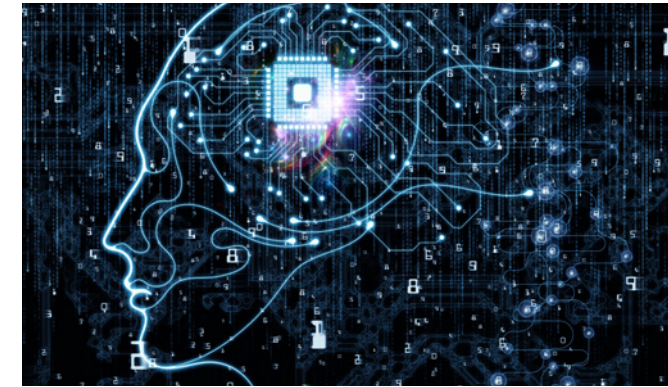
The GRAND-C422-20D is an AI training system which has maximum expansion ability to add in AI computing accelerator cards for AI model training or inference.



- » Intel® Xeon® W family processor supported
- » 6 x PCIe Slot, up to 4 dual width GPU cards
- » Water cooling system on CPU
- » Support two U.2 SSD
- » Support one M.2 SSD M-key slot (NVMe PCIe 3.0 x4)
- » Support 10GbE network
- » IPMI remote management

➤ Demand for AI computing is booming

The application of AI computing is absolutely not enough through the CPU computing. With the decentralized architecture, the huge data is calculated to obtain the computing result. Therefore, we have developed a water-cooled chassis system with high expansion capability by adding multiple GPUs, FPGA or VPU acceleration cards for AI deep learning and inference.



➤ Hyper converged infrastructure

Hyper converged infrastructure (HCI) is scale-out software-defined infrastructure that converges core data services on flash-accelerated, industry-standard servers, delivering flexible and powerful building blocks under unified management.

Efficient, agile, flexible, and integrated, these systems allow for easy scale-out storage, cost-savings, and simplicity to manage your systems. To find out if hyperconverged is the best solution for your Data Center, consider the following.

Hyper Converged Infrastructure



Virtual
Compute



Virtual
Memory



Virtual
Storage



Virtual
Network



Virtual
Management

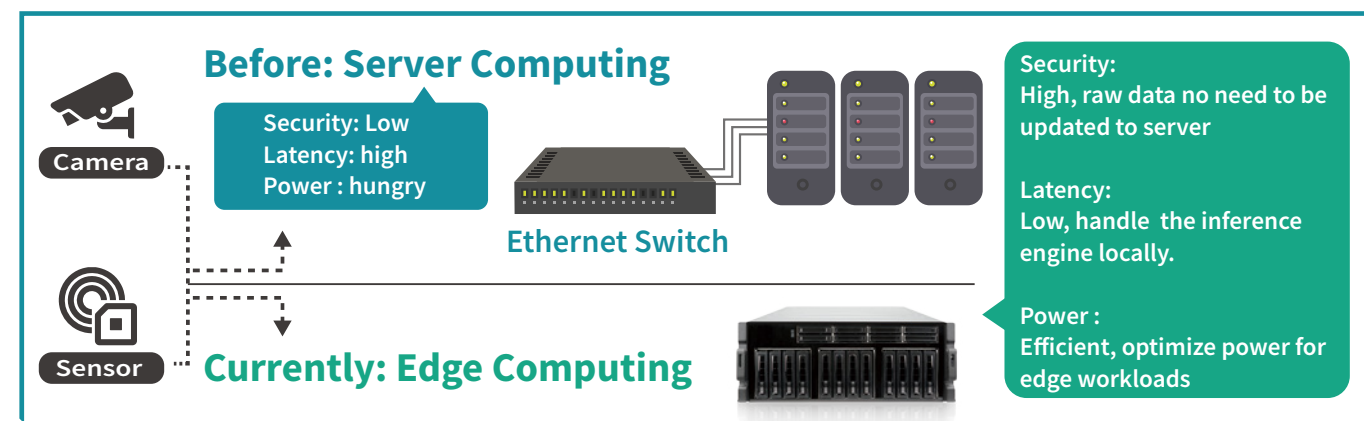
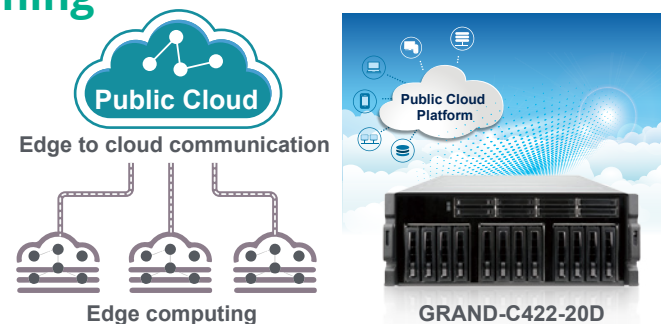
In one easy to manage appliance

➤ Edge computing server in training

The GRAND-C422-20D is perfectly suited for edge computing server in data training or inference. With edge computing, you can pre-process data generated within your organization or across your devices on-premise, to filter out irrelevant information and only keep valuable insights, and then further utilize them by sending or uploading to cloud platforms. You can save a great deal of cloud platform and bandwidth fees as your data to be analyzed is filtered and only relevant data will be further dealt with.

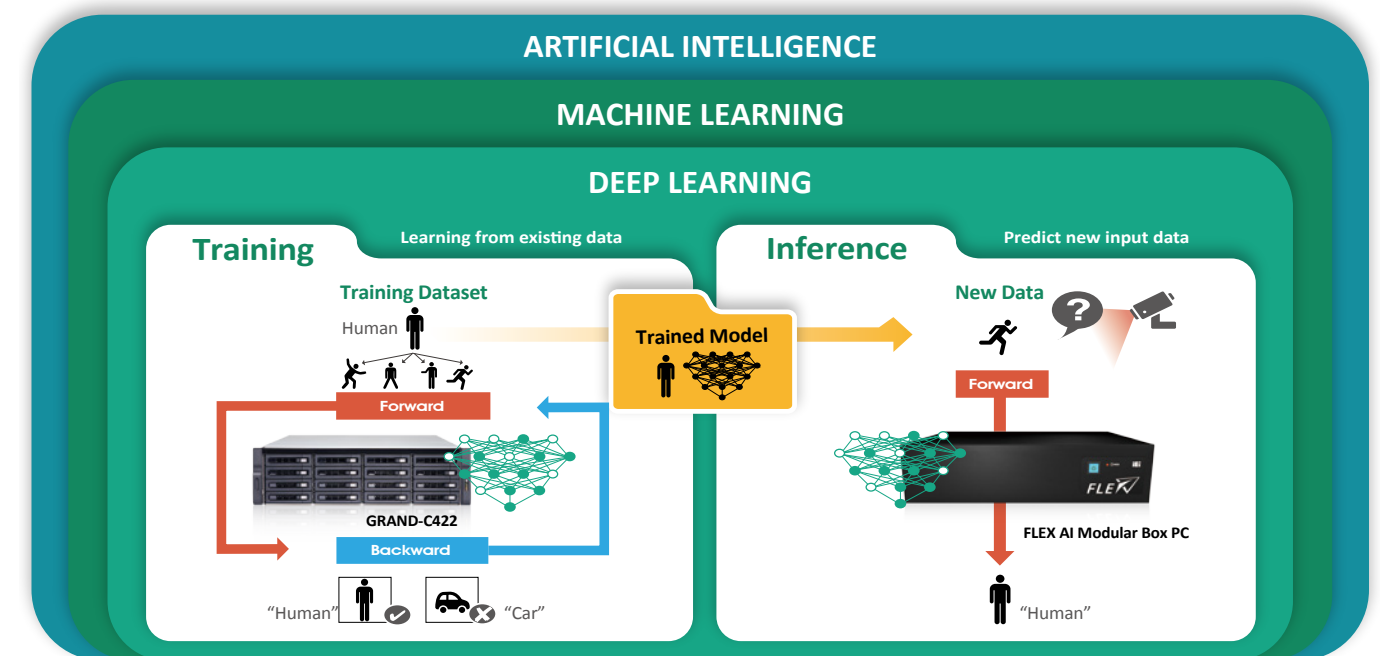
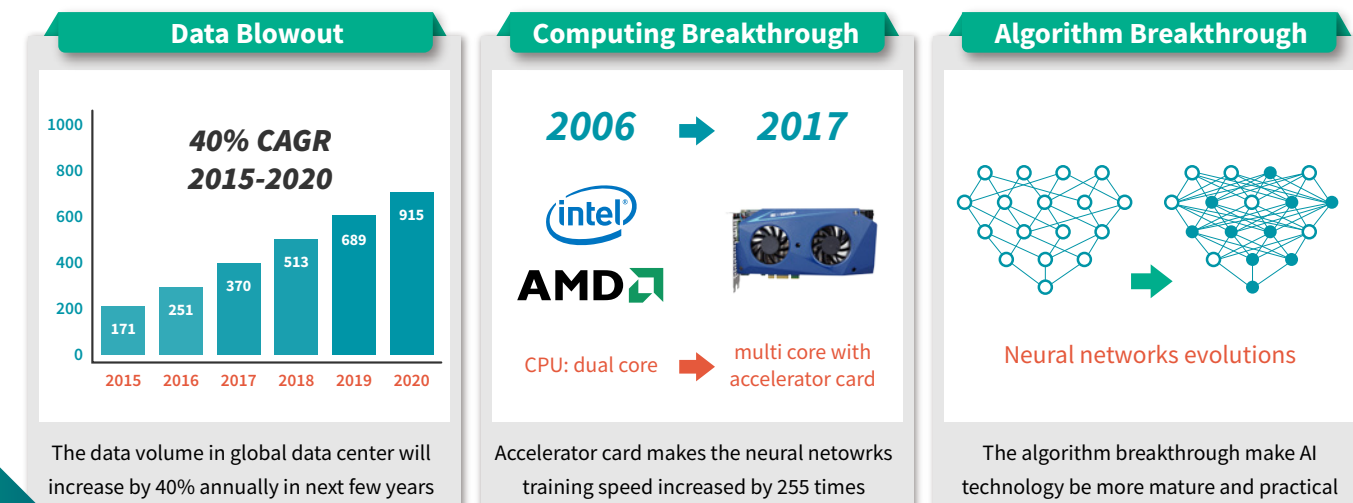
The advantages of edge computing:

- Reduce data center loading, transmit less data, reduce network traffic bottlenecks.
- Real-time applications, the data is analyzed locally, no need long distant data center.
- Lower costs, no need to implement sever grade machine to achieve non-complex applications.



➤ Deep learning breakthrough

With the introduction of deep learning, the most important issue is the "data blowout", and the fields of voice, image have the breakthrough due to the data-supported algorithms and computing power grew up rapidly. Artificial intelligence has ushered the new opportunities for developing new appliance. This time, it will lead the whole society to change in deeper level, this is the future we can see. The outbreak of artificial intelligence began from the Internet which brought many demands, including search, social, shopping, and so on. These demands are increasing, and it makes huge amount of data go online.



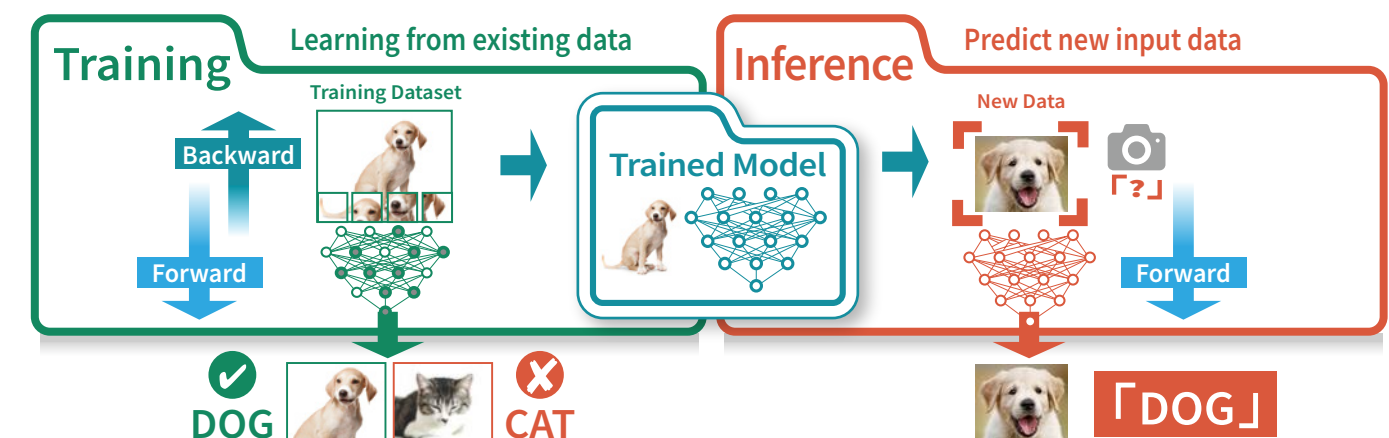
➤ What is deep learning

• Training

In deep learning, each level learns to transform its input data into a slightly more abstract and composite representation. In an image recognition application, the raw input may be a matrix of pixels; the first representational layer may abstract the pixels and encode edges; the second layer may compose and encode arrangements of edges; the third layer may encode a nose and eyes; and the fourth layer may recognize that the image contains a face. Importantly, a deep learning process can learn which features to optimally place in which level on its own.

• Inference

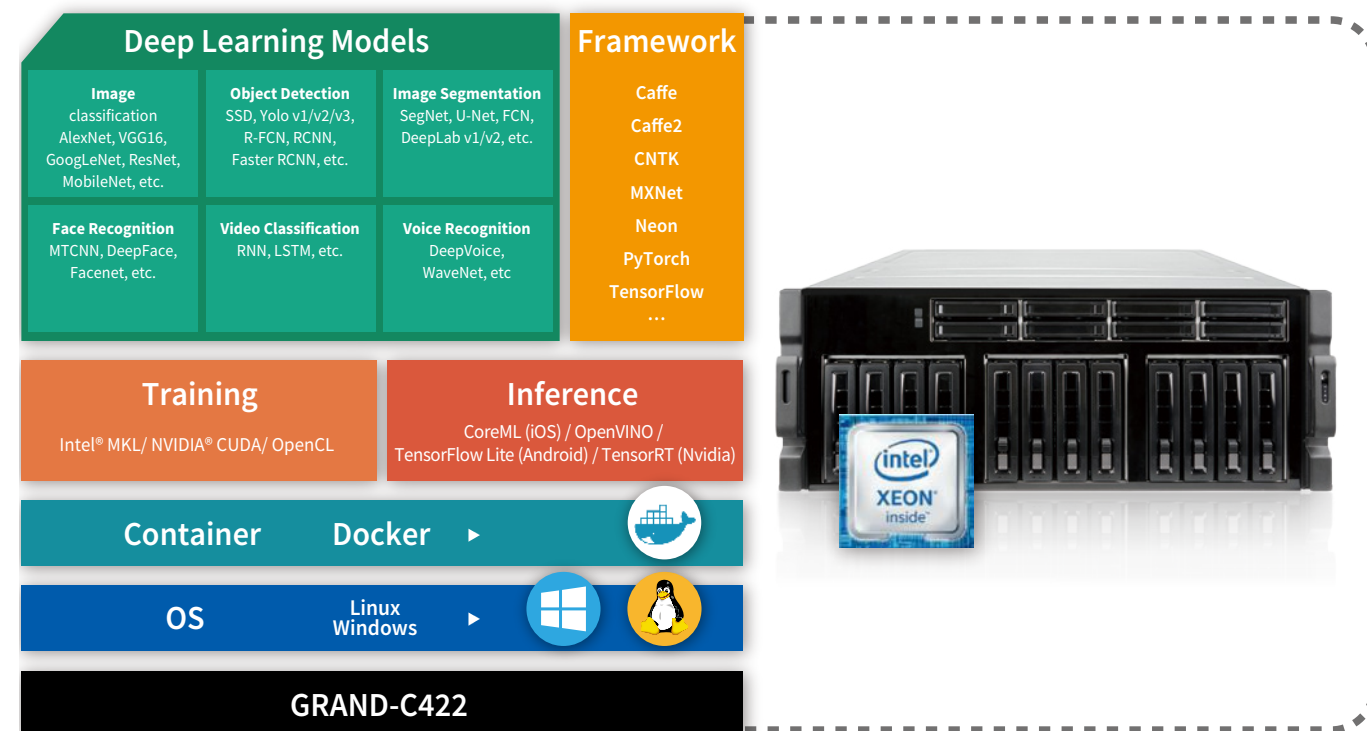
In the field of Artificial Intelligence, inference engine is a component of the system that applies logical rules to the knowledge base to deduce new information. The first inference engines were components of expert systems. The typical expert system consisted of a knowledge base and an inference engine. The knowledge base stored facts about the world. The inference engine applies logical rules to the knowledge base and deduced new knowledge. This process would iterate as each new fact in the knowledge base could trigger additional rules in the inference engine.



➤ AI Training System

The AI training system GRAND-C442 is dedicated for these tasks because it offers a wide range of slots for storage expansion, acceleration cards and video capture, Thunderbolt™ or PoE add-on cards for unlimited data acquisition possibilities. In order to develop a useful training model, existing and widely used deep learning training frameworks such as Caffe, Tensor-Flow or Apache MXNet are recommended. These facilitate the definition of the apt architecture and algorithms for a distinct AI application.

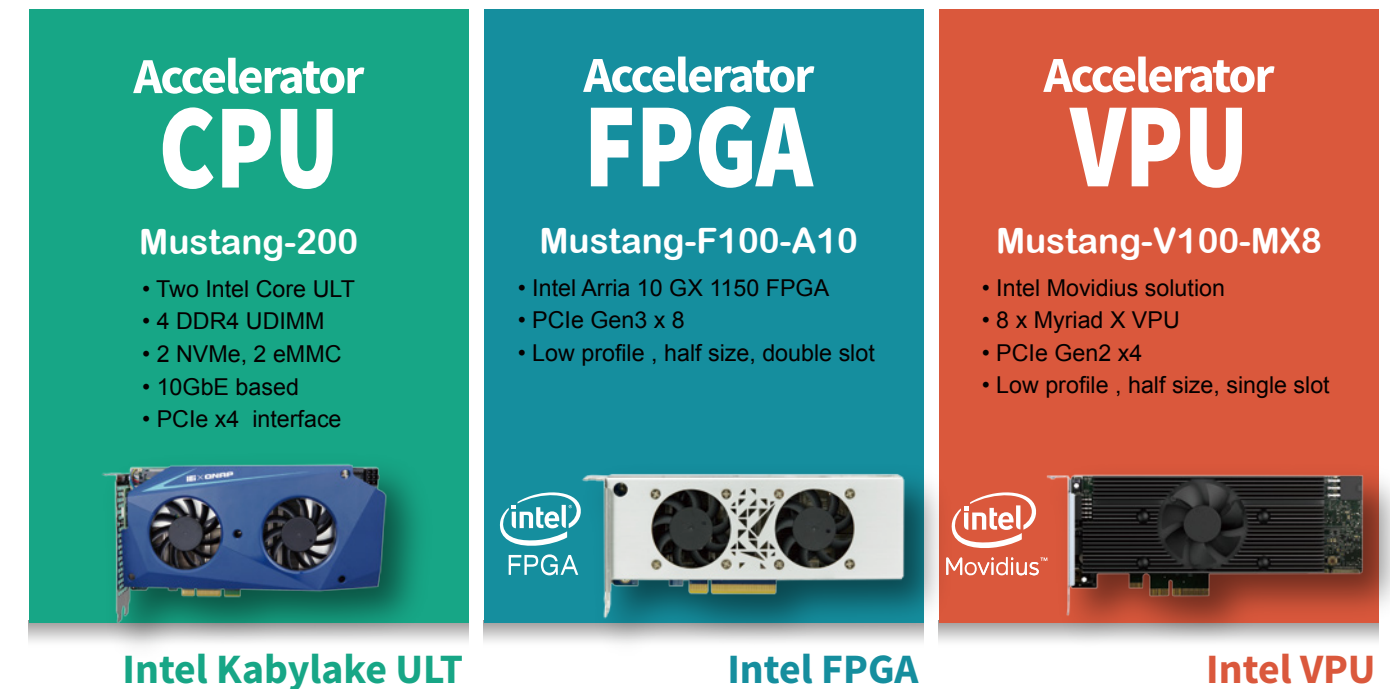
Supported Software



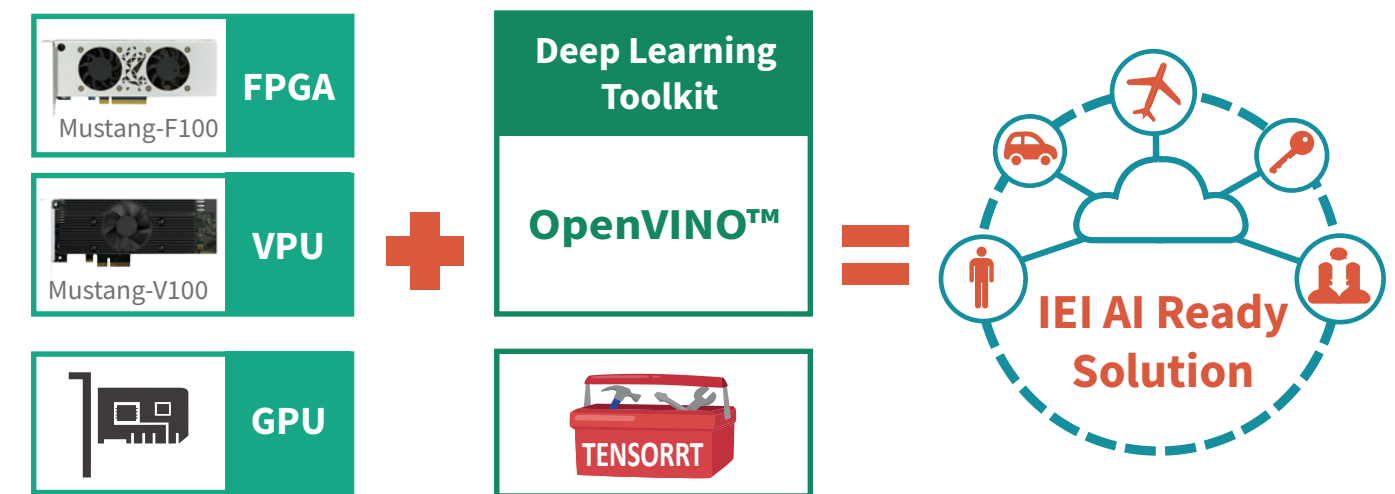
➤ AI infernece System

IEI offers three different acceleration cards. Whereby the Mustang-V100-MX8 is based on Intel® Movidius Myriad X and the Mustang-F100-A10 is based on Intel® Arria 10GX 1150 FPGA. Both are designated for inference enhancement. The CPU acceleration card Mustang-200 combined two Intel® Core ULT CPUs and offers additional boost for training systems.

Computing accelerator models

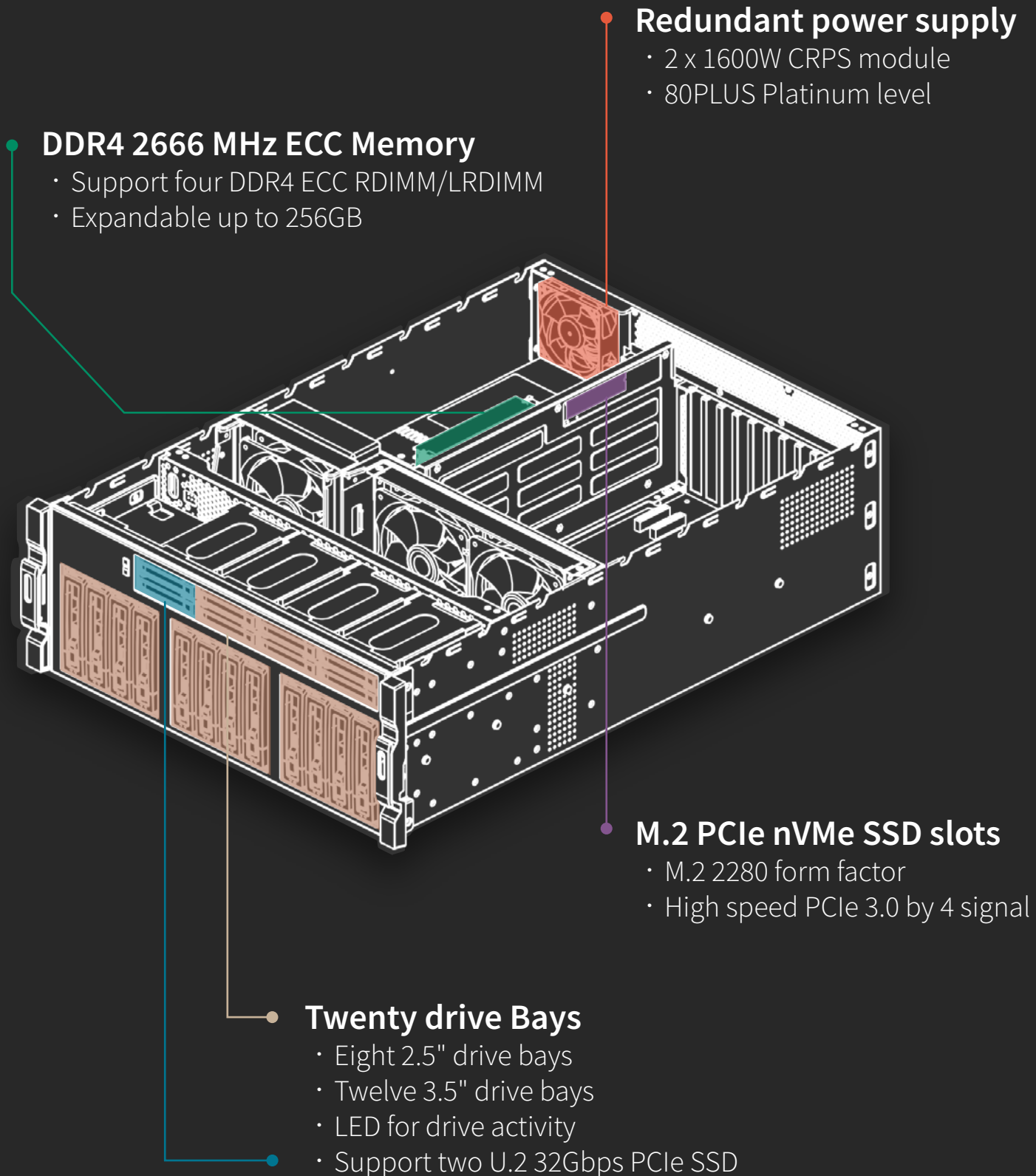


In addition, the performance of both the DL training and optimized inference models can be further enhanced by adding heterogeneous low profile computing acceleration cards such as the Mustang-F100-A10 with Intel® FPGA or Mustang-V100-MX8 with Intel® VPU or GPU card. The combination of GRAND-C422, TANK-870AI, the accelerator cards and a DL toolkit form IEI's AI ready solution.



GRAND-C422-20D

➤ Hardware Architecture

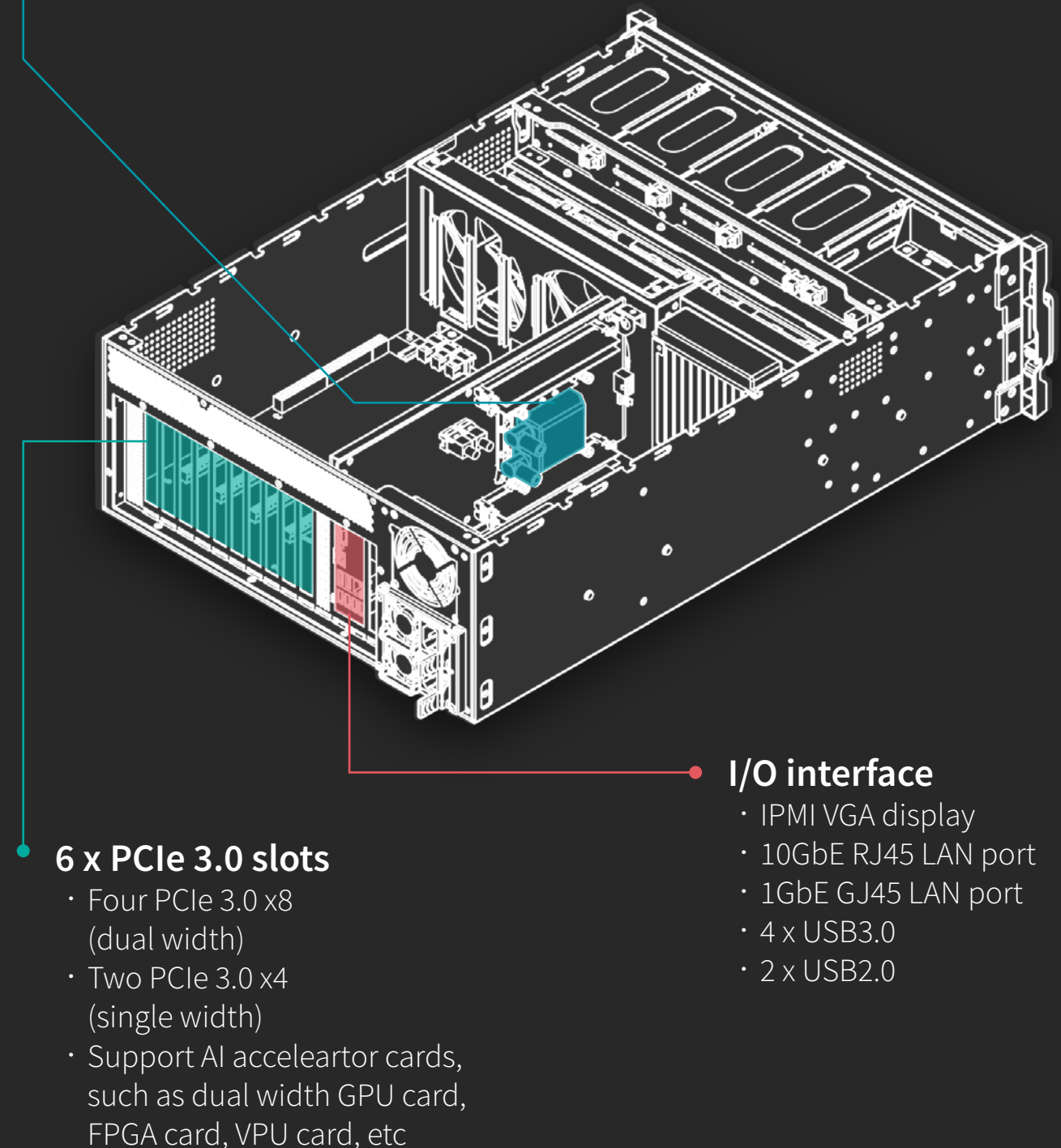


Intel® Xeon® Processor W Family

The Xeon W family targets business and enterprise-class performance workstations, situated below the scalable Xeon family and above the Xeon E3. Xeon W come with more cores, more PCIe lanes, ECC memory, generally almost all available technologies offered by the chip, volume management and various RAS features.

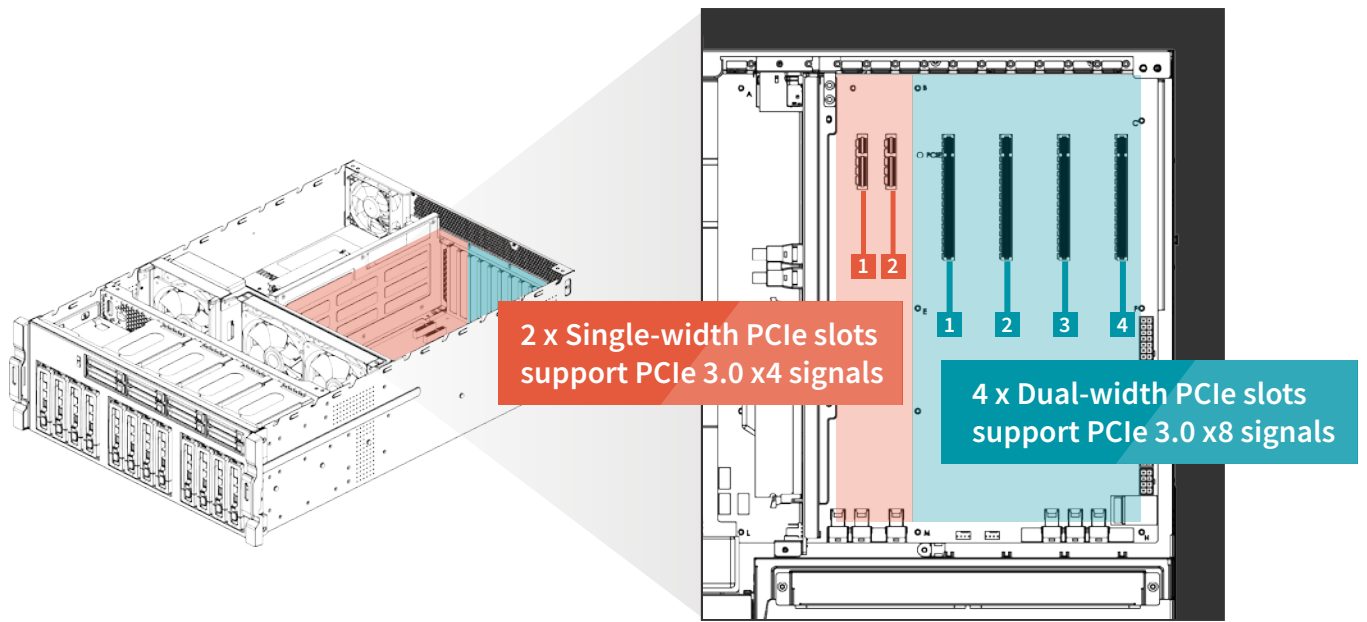
Water cooling system

- Gen 4 Integrated Pump and Copper Cold Plate
- Standard 120mm Aluminum Heat Exchanger
- Designed for Single Fan Operation



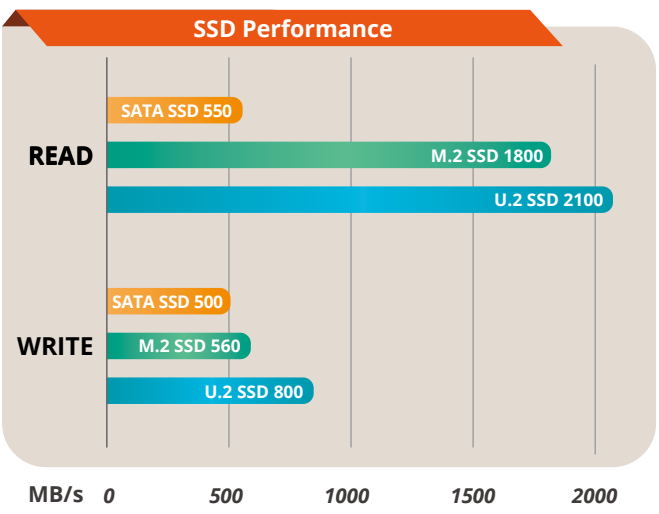
➤ Expandable to suit your needs

- AI computing requires huge computing power, so our system can support up to 4 dual-width expansion slots (PCIe x8) and 2 single-width expansion slots (PCIe x4) for maximum expansion ability to meet computing needs.
- All six of the backplane slots connect directly to the system host board. This is perfect for applications that require minimal latency.



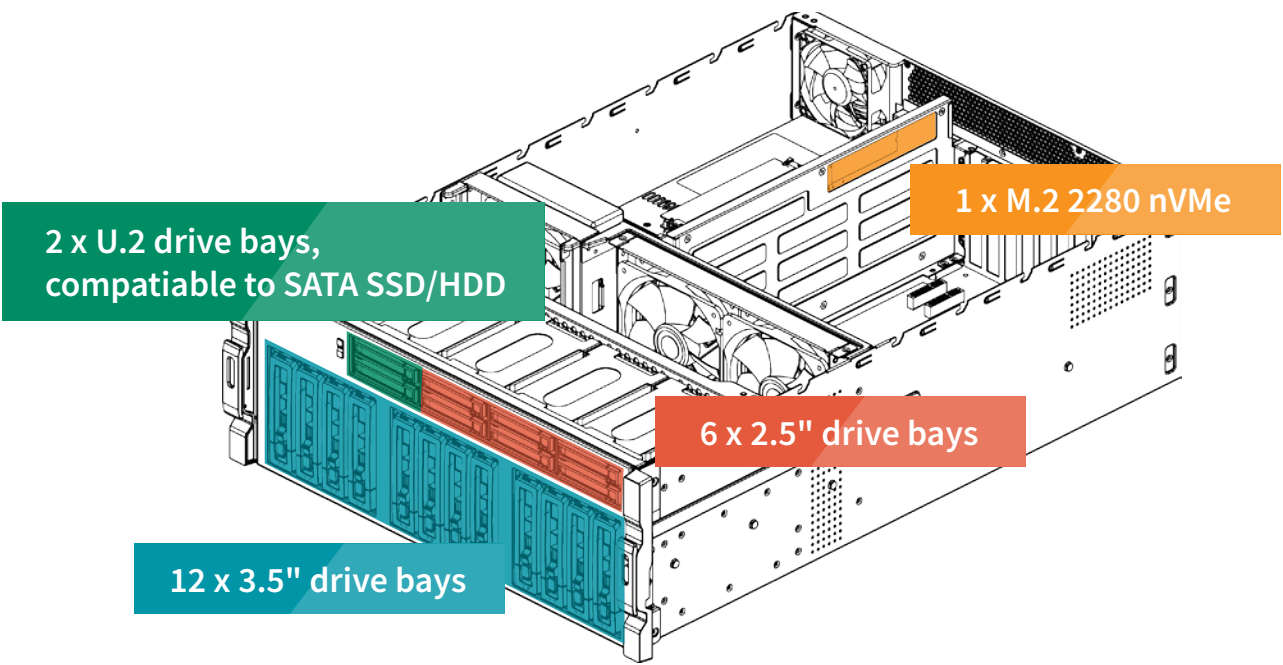
➤ U.2 SSD

U.2 uses the same concept as a general hard disk. With a connection cable, a hard disk can be installed in the case without occupying the space of the motherboard. Therefore, M.2 and U.2 interfaces can coexist because they have different application environments. M.2 is more suitable for laptops or microcomputers, and U.2 is more suitable for desktops or servers. The U.2 interface features high-speed, low-latency, low-power, NVMe standard protocol, and PCIe 3.0 x4 channel. The theoretical transmission speed is up to 32Gbps, while SATA is only 6Gbps, which is 5 times faster than SATA. The U.2 interface utilizes the existing physical interface, but the bandwidth is faster. The four-channel design makes the bandwidth upgrade from PCIe x2 to PCIe 3.0 x4, which is several times more than the SATA interface. The U.2 interface combines the features of SATA and SAS, and uses the signal pin to fill the connector of the SAS interface. The L-type foolproof design, except for the PCIe interface, is also compatible with various mainstream hard disk interfaces such as SATA, SAS, and SATA E.



➤ Storage (M.2, U.2, SATA)

The GRAND-C422-20D supports M.2 nVMe SSD, U.2 SSD, and SATA HDD/SSD. It has a built-in M.2 nVMe port and 20 bays of HDD/SSD slots, including two U.2 SSD slots. The GRAND-C422-20D supports M.2 solid-state disk, which is the next-generation small-sized form factor introduced by Intel after mSATA. It has better performance than general SATA SSD but is lighter and more power-saving.



➤ Water Cooling System for CPU

- IEI uses the latest 14nm Intel Xeon Processor W family, which uses the LGA2066 interface and Skylake-SP architecture with 4, 6, 8, 10, 14, and 18 core versions.
- High performance means higher power consumption, therefore IEI designed a water cooling system for CPU with a smaller size, higher efficiency cooling system to make the CPU cooler and maintain high performance, and it can support up to 250W TDP.

	Water Cooling	Air Cooling
Cooler Size	Small	Large
Working Noise	Small	Large
Cooling Efficiency	Better	Worse

Selection Guide

Model		GRAND-C422-20D
Chassis	Dimensions (H x W x D)	176.15 mm x 480.94 mm x 644 mm
	System Fan	2 x 120 mm, 12V DC
	Chassis Construction	4U, Rackmount
	System Cooling	2 x Cooling Fans with Smart Fan
Motherboard	CPU	Support LGA-2066 Intel® Xeon® W family processor
	Processor Cooling	Water cooling system
	Chipset	C422
	Memory	Total slot: 4 x DDR4 ECC RDIMM/LRDIMM Memory expandable up to: 256GB (4 x 64GB)
Security	TPM	1 x TPM 2.0 Pin header
IPMI	IPMI Solution	IPMI LAN port, IPMI VGA
Storage	Hard Drive	12 x 2.5" / 3.5" drive bay 8 x 2.5" drive bay
	M.2	1 x M.2 built in on SBC
	U.2	2 x U.2 SSD drive bay compatible to SATA
Networking	Ethernet IC	1 GbE NIC: Intel® i210-AT with NCSI support 10 GbE NIC: Aquantia AQC107
I/O Interface	USB 3.0	4
	USB 2.0	2
	Ethernet	1 x 1GbE RJ45 combo LAN ports / IPMI 1 x 10GbE RJ45 LAN port
	Display	1 x IPMI VGA display
	Buttons	Power button
Internal I/O	COM port	2 x RS232 pin header
	USB 3.0	2 x USB 3.0 pin header
	USB 2.0	1 x USB DOM header
Indicator	LEDs	10 GbE, Status, LAN, Storage Expansion Port Status
	LCM	LCM, 2 buttons
Expansion	PCIe	4 x PCIe 3.0 x8 2 x PCIe 3.0 x4
Power	Power Input	110-240 AC, 47-63Hz
	Power Consumption	In Operation: 285W
	Type/Watt	Redundant Power 1600W
Reliability	Operating Temperature	0~40°C
	Relative Humidity	5 to 95% non-condensing, wet bulb: 27 °C.
	Weight	23.59 kg
	Certification	CE/FCC
OS	support OS	Windows server 2016 Linux

Ordering information

GRAND-C422-20D-S1A1-R10	20-bay(3.5" x12, 2.5" x 8) 4U Rackmount, Intel® Xeon® W-2123 with C422 chipset, 32G DDR4 w/ECC, 6 x PCIe expansion slot, and 1600W redundant PSU, RoHS
GRAND-C422-20D-S1B2-R10	20-bay(3.5" x12, 2.5" x 8) 4U Rackmount, Intel® Xeon® W-2133 with C422 chipset, 64G DDR4 w/ECC, 6 x PCIe expansion slot, and 1600W redundant PSU, RoHS
GRAND-C422-20D-S1C3-R10	20-bay(3.5" x12, 2.5" x 8) 4U Rackmount, Intel® Xeon® W-2145 with C422 chipset, 128G DDR4 w/ECC, 6 x PCIe expansion slot, and 1600W redundant PSU, RoHS
GRAND-C422-20D-S1D3-R10	20-bay(3.5" x12, 2.5" x 8) 4U Rackmount, Intel® Xeon® W-2155 with C422 chipset, 128G DDR4 w/ECC, 6 x PCIe expansion slot, and 1600W redundant PSU, RoHS
GRAND-C422-20D-S1E4-R10	20-bay(3.5" x12, 2.5" x 8) 4U Rackmount, Intel® Xeon® W-2195 with C422 chipset, 256G DDR4 w/ECC, 6 x PCIe expansion slot, and 1600W redundant PSU, RoHS

Packing list

Flat head screws (for 2.5" HDD)	Flat head screws (for 3.5" HDD)	1 x Cat5e LAN cable	1 x QIG	2 x Power cord	1 x Cat6A LAN cable
------------------------------------	------------------------------------	---------------------	---------	----------------	---------------------

Headquarters

威強電工業電腦 IEI Integration Corp.

No. 29, Zhongxing Rd., Xizhi Dist., New Taipei City 221, Taiwan
TEL : +886-2-86916798 / +886-2-26902098 FAX : +886-2-66160028
sales@ieiworld.com www.ieiworld.com

America

IEI Technology USA Corp.

138 University Parkway, Pomona, CA 91768
TEL : +1-909-595-2819 FAX : +1-909-595-2816
sales@usa.ieiworld.com usa.ieiworld.com

China

威強電工業電腦 IEI Integration (Shanghai) Corp.

上海市闵行莘庄工业区申富路515号
515, Shen Fu Rd., Xin Zhuang Industrial Develop Zone, Shanghai, 201108, China
TEL: +86-21-3116-7799 FAX: +86-21-3462-7797
sales@ieiworld.com.cn www.ieiworld.com.cn