# 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
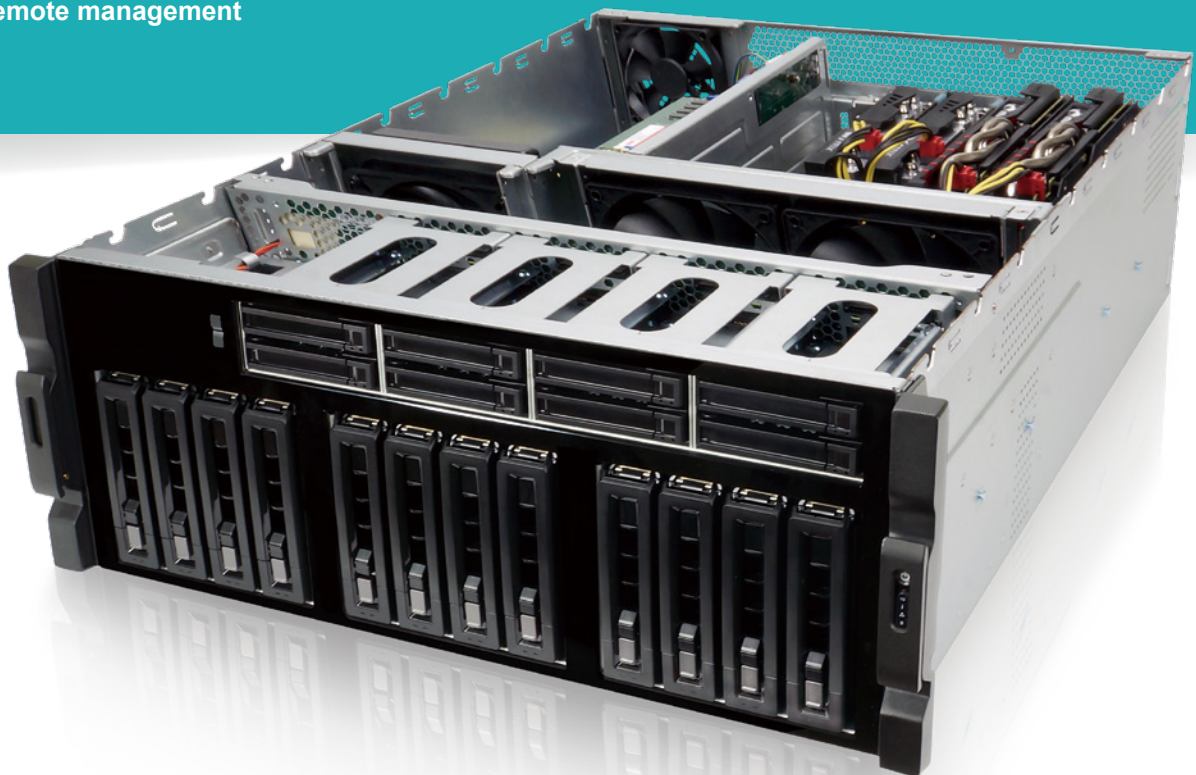
Demand for AI computing is booming

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.
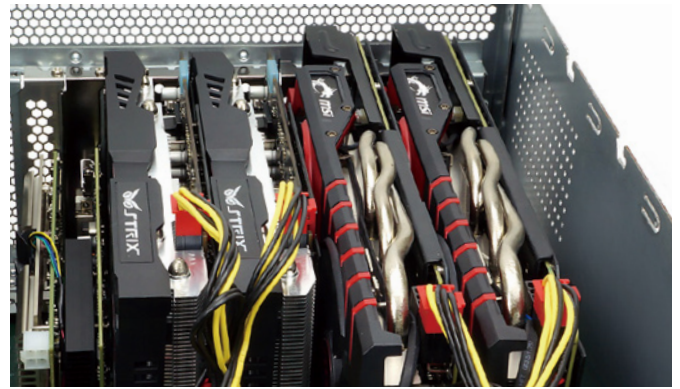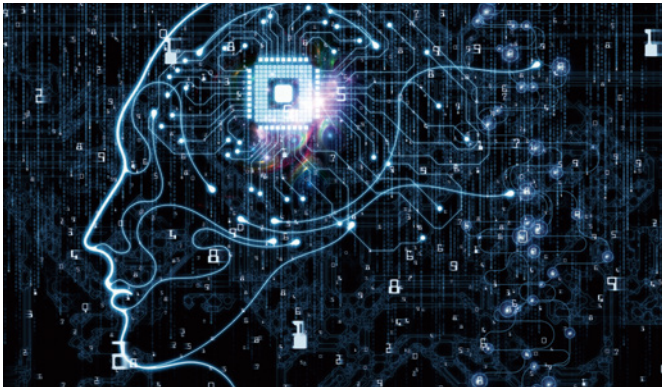
Hyper converged infrastructure

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
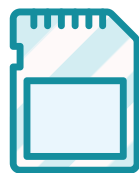
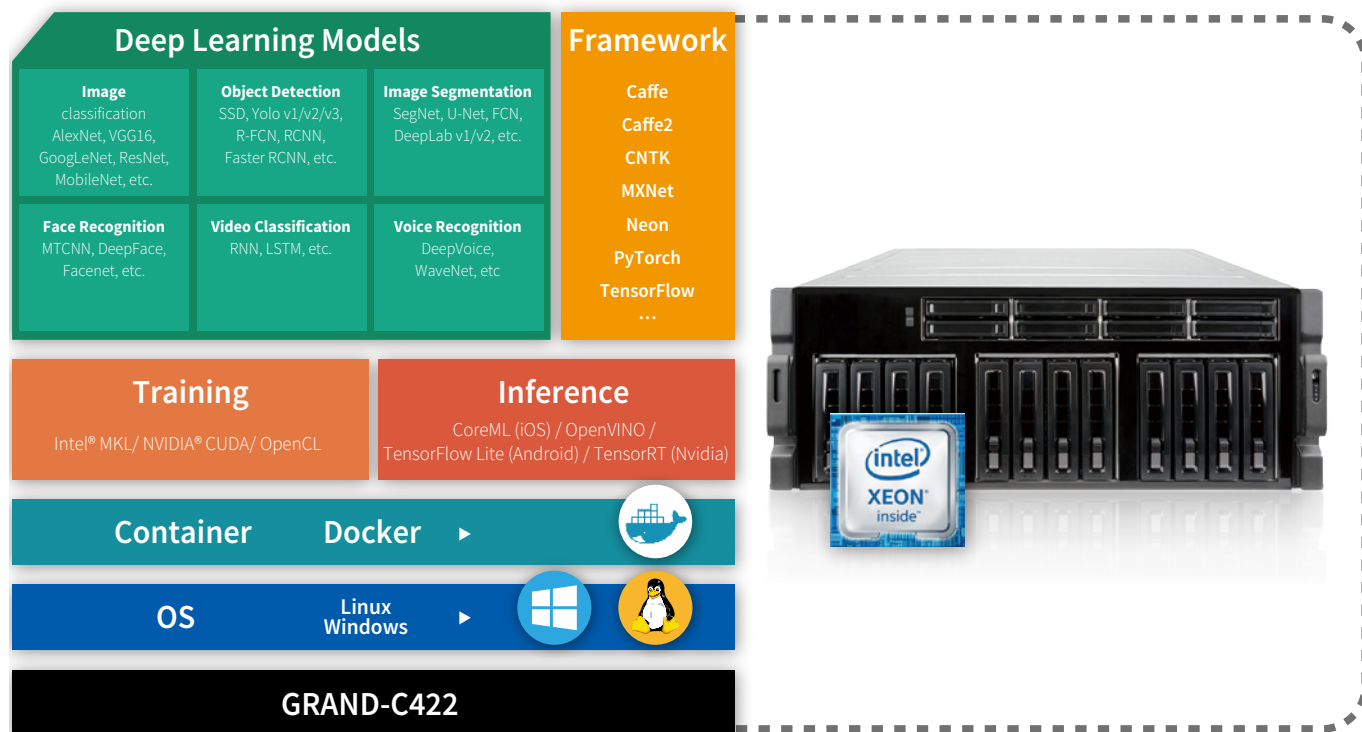Virtual Compute **+** Virtual Memory **+** Virtual Storage **+** Virtual Network **+** Virtual Management

In one easy to manage appliance

》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.
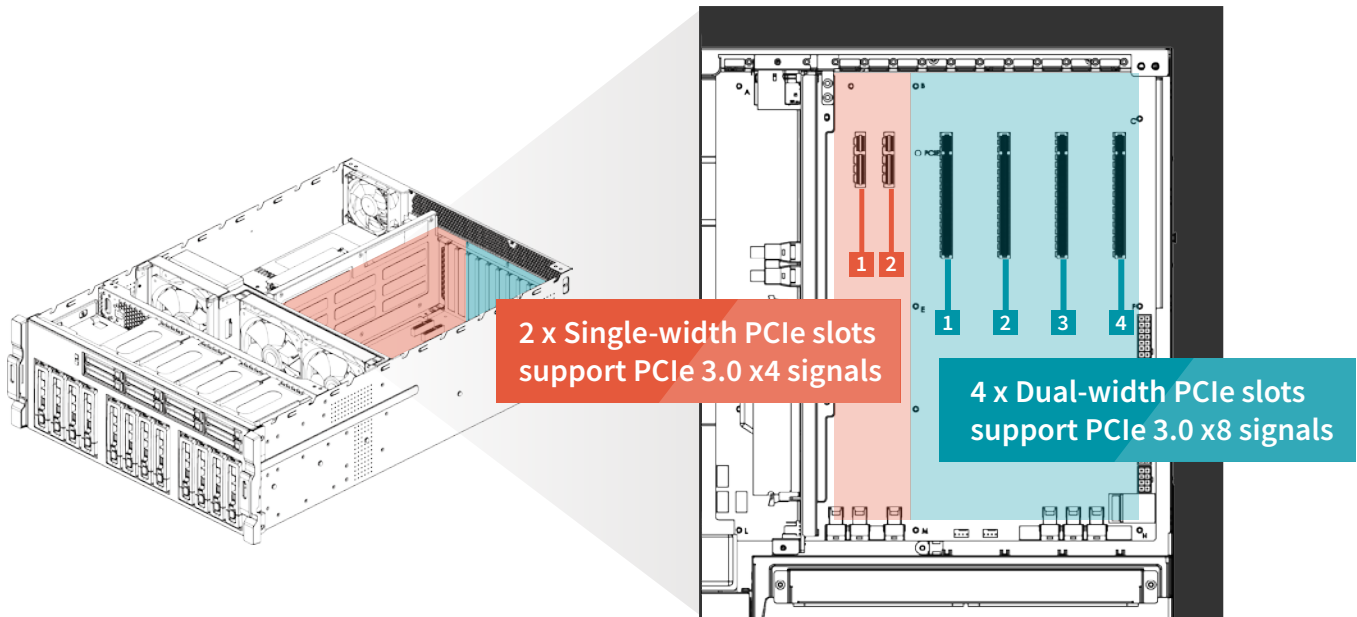
Supported Software

TensorFlow   PyTorch   mxnet   neon   Microsoft CNTK

Keras   Caffe2   Caffe   Chainer

Deep Learning Models			Framework
Image classification AlexNet, VGG16, GoogLeNet, ResNet, MobileNet, etc.	**Object Detection** SSD, Yolo v1/v2/v3, R-FCN, RCNN, Faster RCNN, etc.	**Image Segmentation** SegNet, U-Net, FCN, DeepLab v1/v2, etc.	**Caffe** **Caffe2** **CNTK** **MXNet** **Neon** **PyTorch** **TensorFlow** …
Face Recognition MTCNN, DeepFace, Facenet, etc.	**Video Classification** RNN, LSTM, etc.	**Voice Recognition** DeepVoice, WaveNet, etc	

Training	Inference
Intel® MKL/ NVIDIA® CUDA/ OpenCL	CoreML (iOS) / OpenVINO / TensorFlow Lite (Android) / TensorRT (Nvidia)

Container	Docker ▶

OS	Linux Windows ▶

GRAND-C422

intel XEON inside™
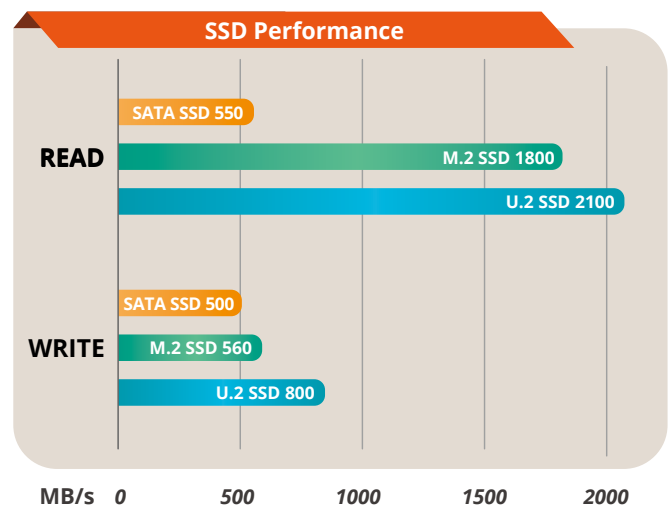
» Expandable to suit your needs

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.
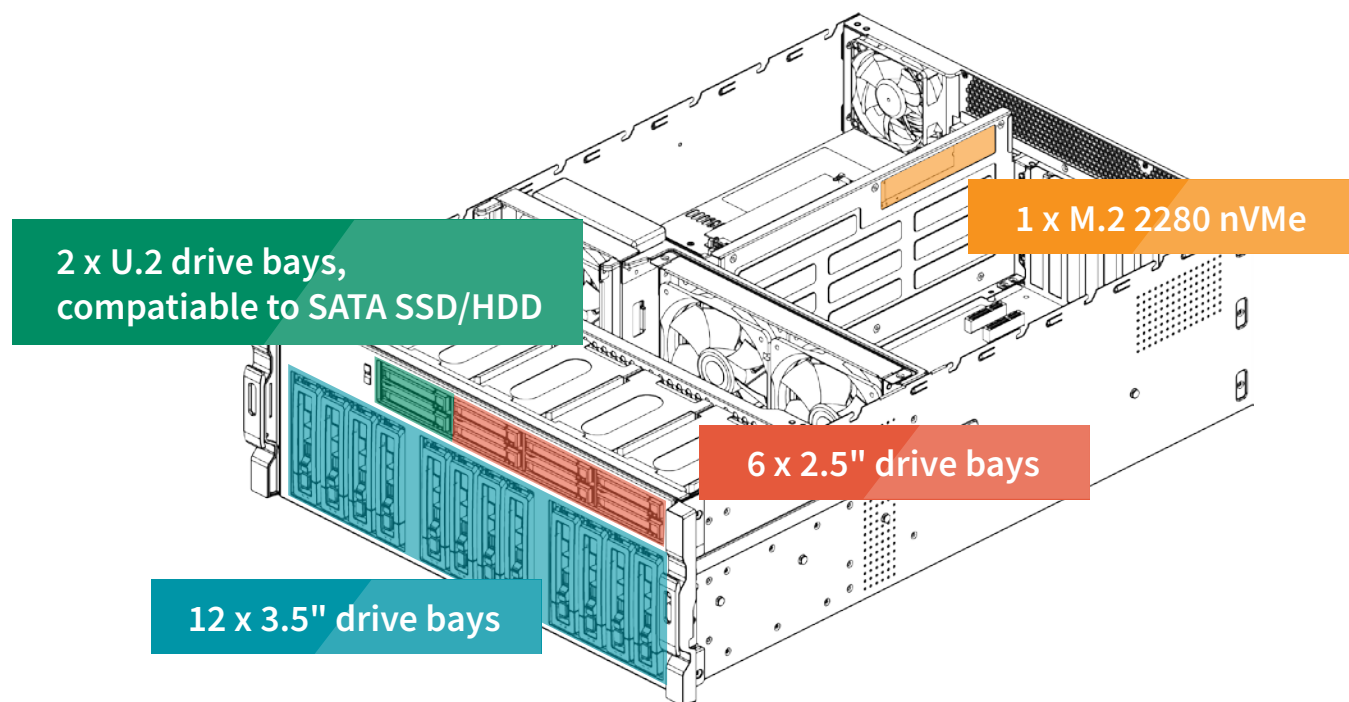
2 x Single-width PCIe slots support PCIe 3.0 x4 signals

4 x Dual-width PCIe slots support PCIe 3.0 x8 signals

» 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 be coexistence because they have different application environment. M.2 is more suitable for laptops or microcomputers, and U.2 is more suitable on a desktop or server. 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 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 the PCIe interface, also compatible with various mainstream hard disc interface such as SATA, SAS and SATA E.

SSD Performance

READ	SATA SSD 550
	M.2 SSD 1800
	U.2 SSD 2100
WRITE	SATA SSD 500
	M.2 SSD 560
	U.2 SSD 800

MB/s 0   500   1000   1500   2000

» Storage (M.2, U.2, SATA)

The GRAND-C422-20D support 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 SDD 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 it is lighter and more power-saving.

2 x U.2 drive bays, compatiable to SATA SSD/HDD

1 x M.2 2280 nVMe

6 x 2.5" drive bays

12 x 3.5" drive bays

» 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 water cooling system for CPU with smaller size, higher efficiency cooling system makes CPU cooler and keep the 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

Specifications

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
	Chipest	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	Ethernat IC	1 GbE NIC: Intel® i210-AT with NCSI support 10 GbE NIC: Aquantia AQC107
I/O Interface	USB 3.1 Gen 1	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 3.1 Gen 1	2 x USB 3.1 Gen 1 (5Gb/s) 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

Part No.	Description
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

Options

Item	Part No.	Description
Slide rail	RAIL-A02-90	Kingslide Rail kit for TS-EC2480U-RP, maximum load 90 kg

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