GIGABYTE SOLUTION

2022.Q2

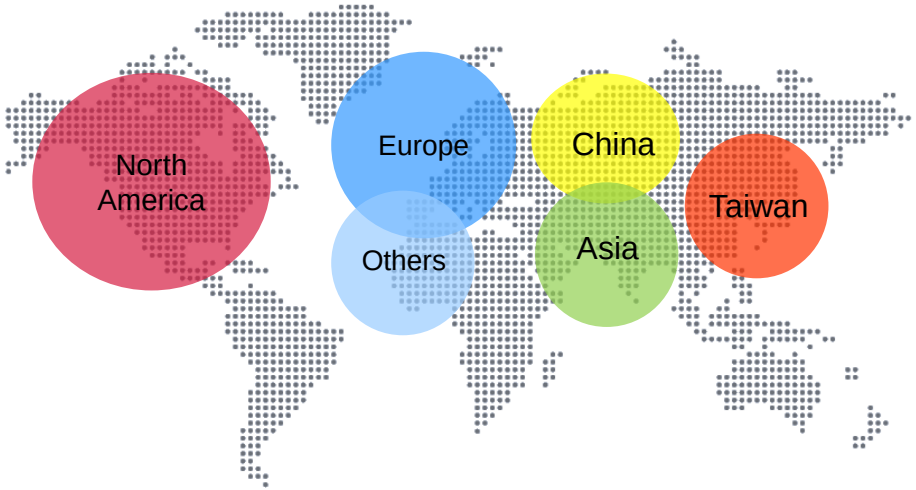
GIGABYTE Overview

Founded April 1986

Listed September 24, 1998
Taiwan Stock Exchange

Capital NTD $6,289 Million Dollars

7,500 Global Employees



15,200+ Awards

National Quality Award, Taiwan Excellence Award, Top 20 International Brands in Taiwan, Top 100 Technology Leaders in Asia, Role Model Award of the GVM's CSR Survey Award - Electronics and Technology Industry, and many more international products design awards.

Internationally Certified

ISO 14064-1:2006, PAS 2050:2008, ISO 14051:2011, IECQ QC 080000:2017, ISO9001:2015, ISO 14001:2015, OHSAS 18001:2007

GIGABYTE Product Overview

Comprehensive product portfolio covering personal, business, entertainment, and cloud data centers

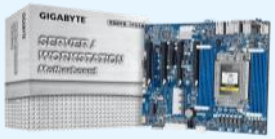
PC Components

Motherboard

Graphics Card

Enterprise Solutions

Embedded System


Server Motherboard

Data Center

Desktop Peripherals

Thin Client

Monitor

Intelligent Video Analytics Platform

5G iMEC Networking Platform

AI/Data Science Cloud Platform

Performance Laptops

Laptop

Gaming Laptop

Liquid Immersion Cooling

DNN Training Appliance

Smart Retail

GIGABYTE Server Business Milestone

From ODM to Channel, 30 Years Server Experience

1990

Started from **Channel** MB design.
The 1st product was delivered to Google USA for the Open Data Center in Oregon State.

2000

To promote R&D design capability and the product quality validation procedure, the BU transformed the strategy to **ODM** rack server development.

2012

Started developing the Open Rack Design with Russian Yandex's **Data Center** for the complete **Rack Cabinet** delivery and deployment.

2016

The market strategy was changed to **ODM + Brand** by enhancing the flexibility of supply to meet the customers' requirement

GIGABYTE Server Product Portfolio

M-Series

Built with the best and most durable components, with features for a wide range of professional applications.

R-Series

General-purpose server family, offering the best balance of compute, memory, storage and expandability ratio.

H-Series

Combines 4 hot-pluggable nodes in a 2U chassis, offering extreme CPU compute density excellent for HPC or virtualization

G-Series

Offering industry leading GPU density due to excellent thermal and mechanical design. Designed for AI & deep learning, VDI, video streaming workloads.

S-Series

Offering high storage density as well as configuration flexibility and high availability features for data integrity

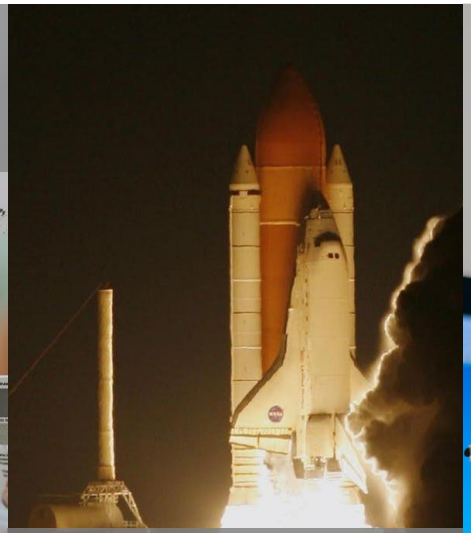
W-Series

A range of tower servers suitable for an office environment, from entry level to high end computing and HPC

RACKLUTION

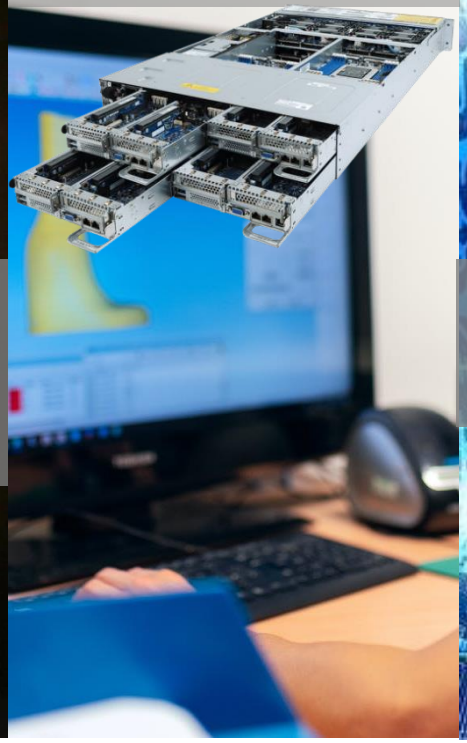
Based on the OCP Open Rack Standards, a datacenter solution highly efficient in power consumption, computing power and configuration

Online Shopping
Data management
R181 Series

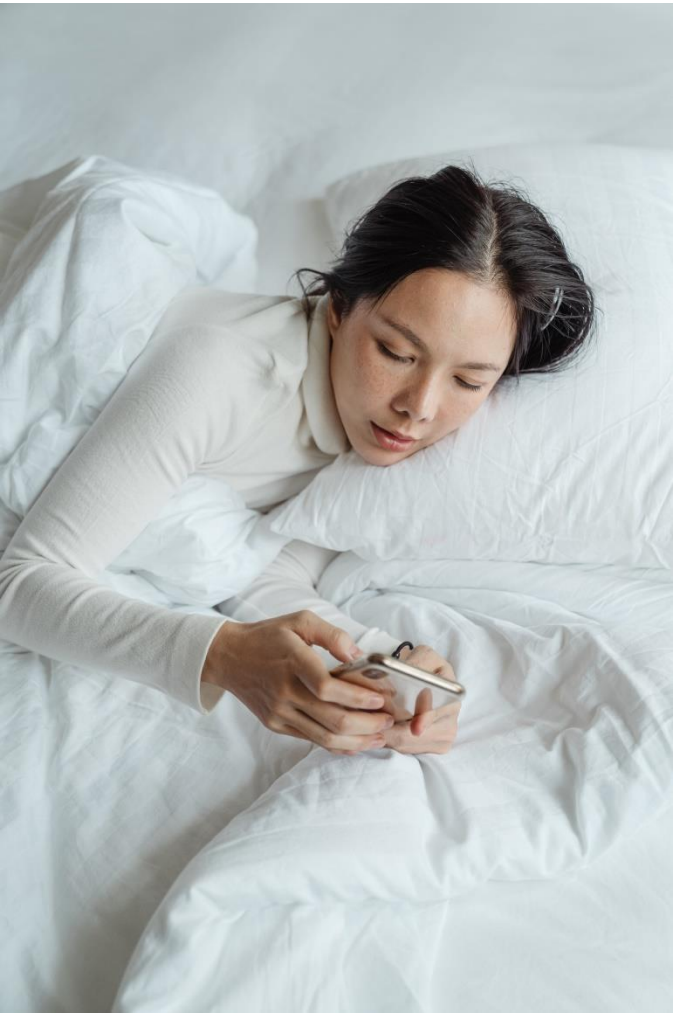


Space & Nuclear Science
Super Computing
H261 & G482 Series

Animation & Simulation
Graphic Rendering & Design
H262 Series

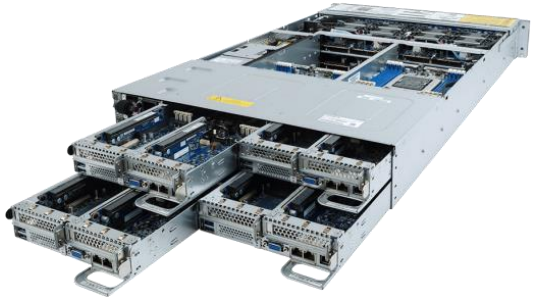


Artificial Intelligence
Machine & Deep Learning
G292 & G482 Series



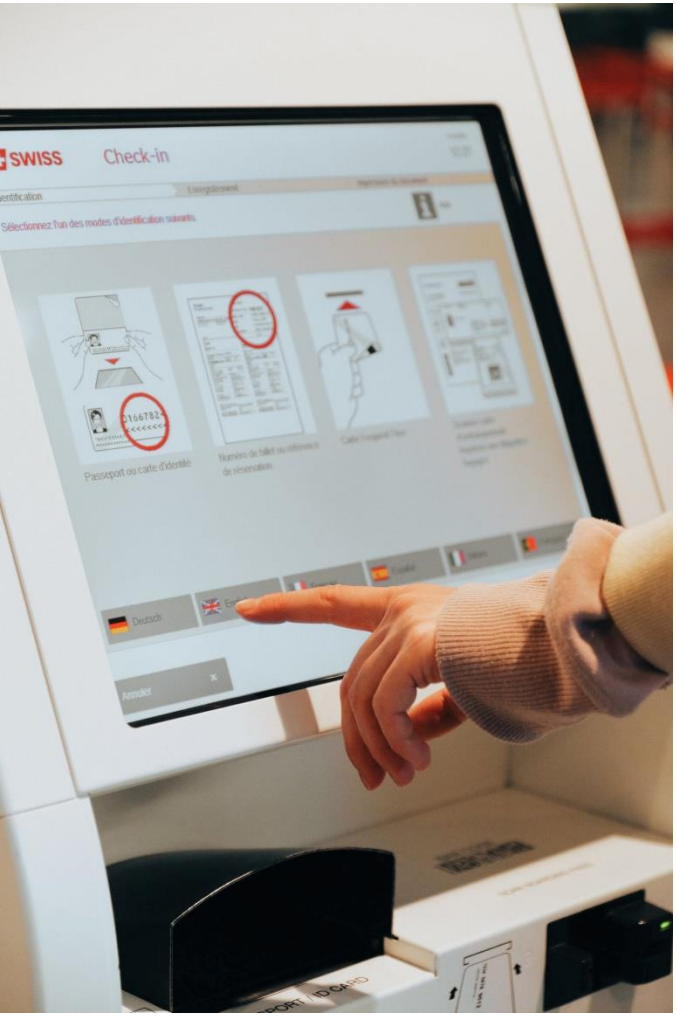
When you wake up in the morning and want to check the weather…

European –
GIGABYTE 2U4N HPC nodes for weather prediction and 2U rackmount nodes as management node



H262 series, Intel 2U4N
2 x CPU, max 280W / node
16 x DIMM, max 128GB / node
24 x storage SATA/SAS/NVMe

R282 series, Intel 2U Rackmount
2 x CPU, max 280W
16 x DIMM, max 128GB
Front: 24 x storage SATA/SAS/NVMe
Rear: 2 x storage SATA/SAS



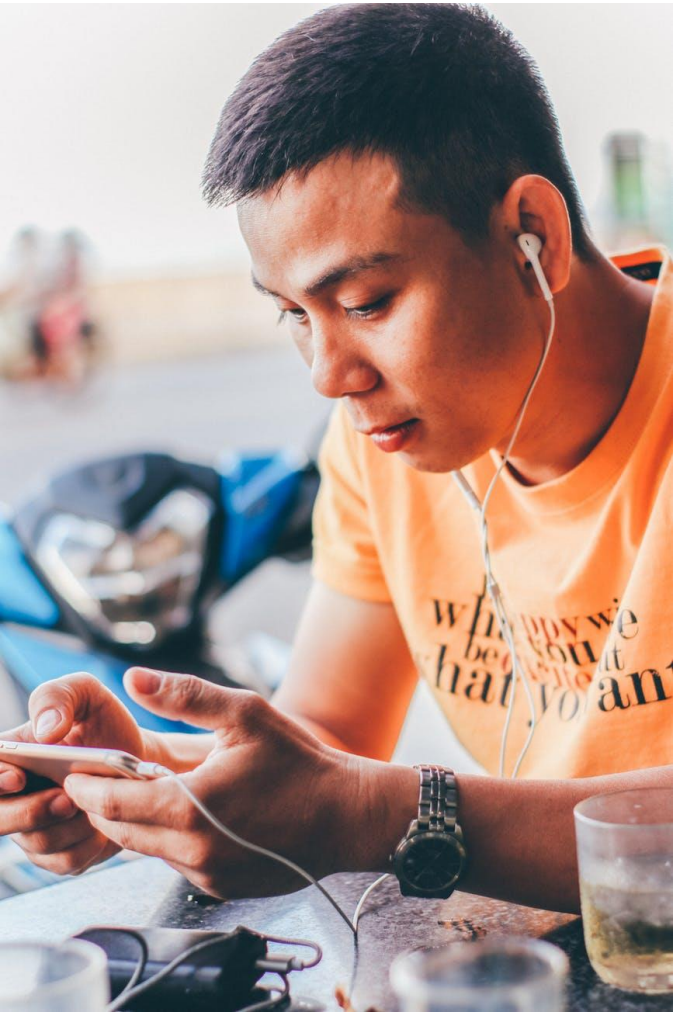
When you go to the convenience store and operate the KIOSK…

Japan –
GIGABYTE micro PCs and MBs are implemented in KIOSK and vending machine

Brix Series

Motherboard

Brix IoT



When you play mobile games during the commute…

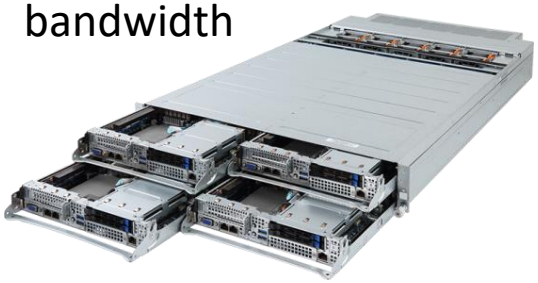
European/Taiwan –
GIGABYTE 1U 2GPU solution is implemented on cloud gaming working on graphic computing, and 2U 4GPU solution works on game streaming

G191 Series, Intel 1U Rackmount
1 x consumer CPU, max 280W
8 x UDIMM
2 x 10GbE
2 x double width GPU

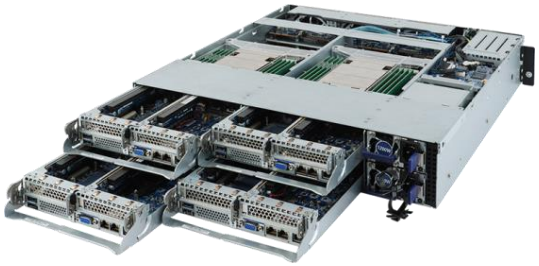
G241 series, Intel 2U Rackmount
2 x Intel CPU, max 165W, 12 x DIMM
4 x double width GPU

After work, you invite friends to watch online concert at home…

USA/Taiwan –
GIGABYTE 2U4N HPC solution plays the key role of multi-access MEC to lower the end-to-end latency and deliver high broadcasting quality content with high bandwidth



H281 series, Intel 2U4N
2 x CPU, max 165W / node
24 x DIMM, max 128GB / node
4 x expansion slot / node



H262 series, 2U4N, short chassis
1 x CPU, max 280W / node
16 x DIMM, max 128GB / node
1 x storage NVMe / node

GPGPU server

nVIDIA A100 Implementations

Form Factor

4U

2U

1U

G481-H80
G481-H81
G482-Z51
G482-Z52
G482-Z53
G482-Z54
G482-Z55
G492-H80/H81
DP, double width GPU

G492-Z50
G492-Z51
DP, double width GPU

G591
DP, 40 single width GPU

G482-Z50
DP, double width GPU

R282-Z93
R281-G30
R281-Z94
DP, double width GPU

G241-G40
G242-Z10
G242-Z11
UP, double width GPU

G291-280/281
G292-Z20
G292-Z22
G292-Z24
UP, double width GPU

G292-Z40
G292-Z42
G292-Z44
G292-Z45
DP, double width GPU

G292-Z43
UP, single width GPU

R162-Z11
R162-Z10
UP, single width GPU

G191-H44
R292-4S0
DP, double width GPU

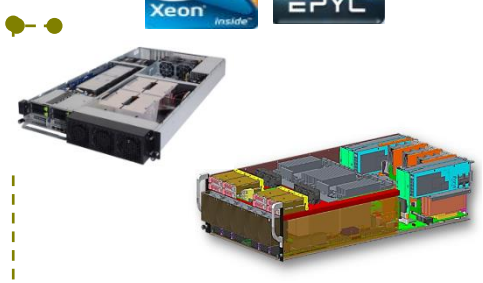
3 4 8 10 16

GPU Q'ty

GIGABYTE AI Strategy

GPGPU Server

G Series Servers



2U/4U Server
For Redstone/Delta

PCIe Type Acclerator

Nvidia

NVIDIA TESLA

A100 G4/A40/A4000/A6000

AMD

AMD

MI100 G4

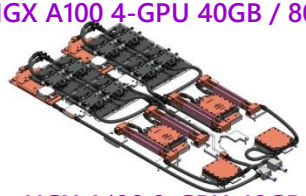
Xilinx

XILINX ALVEO

U280

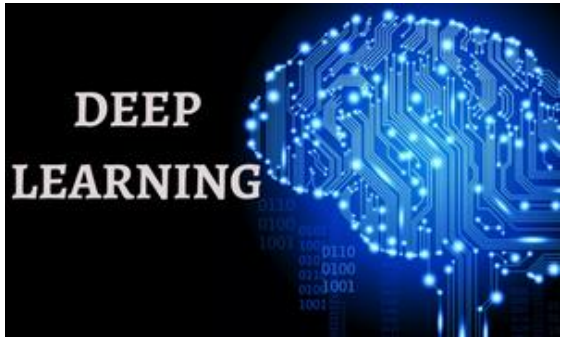
HGX A100 4-GPU 40GB / 80GB

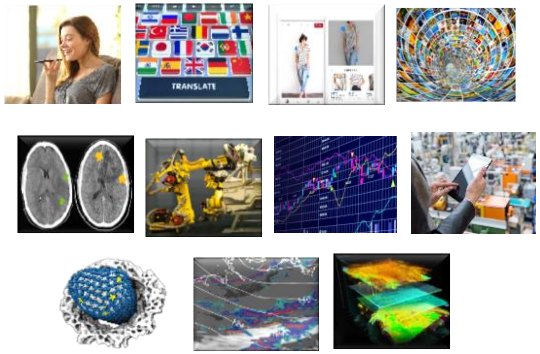
NVIDIA TESLA

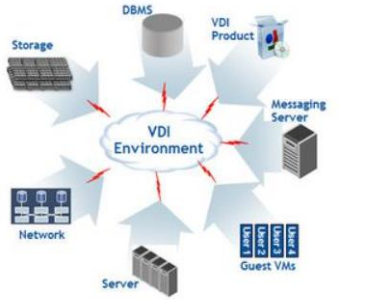


NVIDIA TESLA

HGX A100 8-GPU 40GB / 80GB







1U GPU Accelerated Computing Solution

1U – UP – 1 x GPU

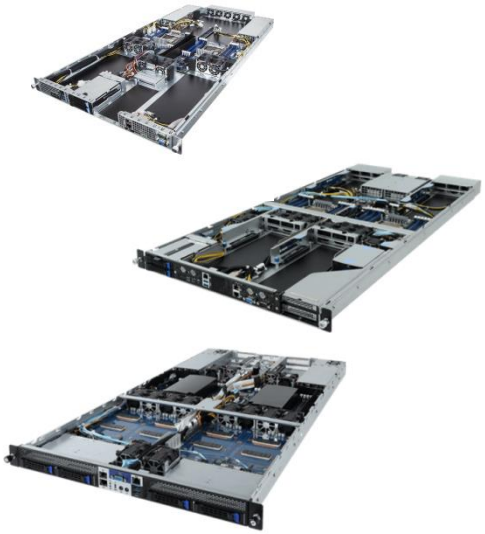
Intel Broadwell-DE (G150-B10)

1U – UP – 2 x GPU

Intel Cascade Lake Refresh (G180)

Intel Basin Falls (G181)

AMD ROME (G181)



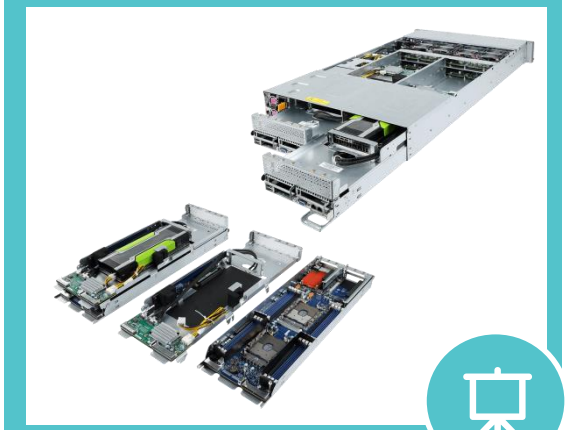
1U – DP – 4 x GPU / SXM2

Intel Cascade Lake Refresh (G191)

Intel Purley (G191)

Intel Grantley (G190)

2U GPU Accelerated Computing Solution

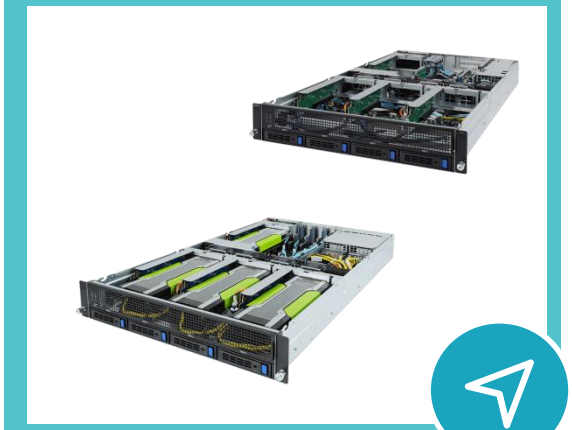


2U – DP - 2N – 2 x GPU

Intel Purley (H231)

2U – DP – 3 x GPU

Intel Grantley (G281)
Intel Purley (R281)
AMD ROME (R282)



2U – UP/DP – 4 x GPU

Intel Purley (G241)
AMD ROME (G242)

2U – UP/DP – 8 x GPU

Intel Grantley (G250)

Intel Purley (G291)

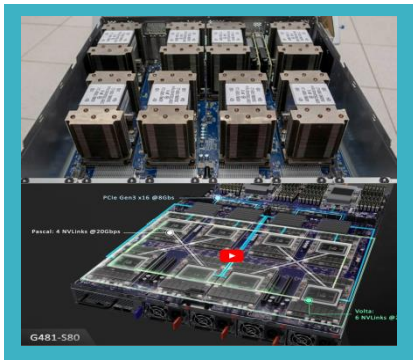
AMD ROME (G292)

2U – DP – 16 x GPU

Intel Purley (G291)

AMD ROME (G292)

4U GPU Accelerated Computing Solution



4U – DP – 8 x GPU

Intel Purley (G481-H80/H81) , w/o PLX

AMD ROME (G482-Z51/Z52), w/o PLX

4U – DP – 10 x GPU

Intel Purley (G481-HA0/HA1) , w/ PLX

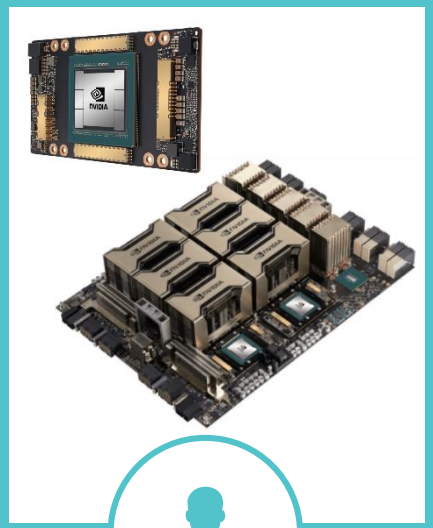
Intel Whitley (G492-HA0), w/PLX

AMD ROME (G482-Z50, G492-Z50) , w/ PLX

4U – DP – 8 x SXM2 & SXM4

Intel Purley (G481-S80)

GPU Compatibility for GIGABYTE Servers



AI & Deep Learning

HGX A100 4 – GPU
40GB/80GB(TBE)
(Redstone Module)

HGX A100 8 – GPU
40GB/80GB (TBE)
(Delta Module)

Cloud & Data Center

nVidia A100 PCIe Gen4
nVidia V100S PCIe Gen3
nVidia T4 PCIe Gen3
nVidia T4-NEXT PCIe Gen4 (TBE)
AMD MI50 PCIe Gen4
AMD MI100 PCIe Gen4

Design & Visualization

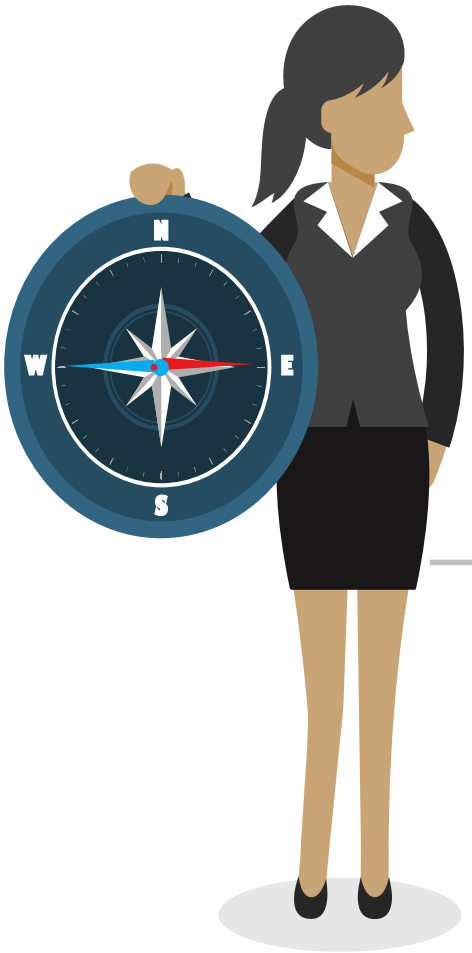
nVidia Quadro Titan RTX
nVidia Quadro RTX8000/6000
nVidia Quadro RTX5000/4000
nVidia RTX A40 (TBE)
nVidia RTX A6000 (TBE)
nVidia RTX A8000 (TBE)

Media & Entertainment

nVidia GeForce RTX3070
nVidia GeForce RTX3080
nVidia RTX3090
AMD 5700XT
AMD 6000XT (TBE)
AMD 6800XT (TBE)

Large Capacity Storage

GIGABYTE Storage Product Line



D120-C20/C21
(MC20-S10)

1U-16bay Storage, UP
Intel Broadwell-DE SOC
Dual 10GbE + Dual GbE
Single 400W PSU

S251-3O0
(MU71-SU0)

2U-24bay Storage, UP
Intel Cascade Lake-SP
24 x 3.5” + 2 x 2.5” U.2
Redundant 1300W PSU

S252-ZC0
(MZC2-CE0)

2U-24bay Storage, DP
AMD ROME / Milan
24 x 3.5” + 2 x 2.5” U.2
Redundant 1300W PSU

S451-3R0
(MD61-SC2)

4U-36bay Storage
Intel Grantley DP
Dual 10GbE + Dual GbE
Redundant 1100W PSU

S451-Z30
(MZ31-AR0)

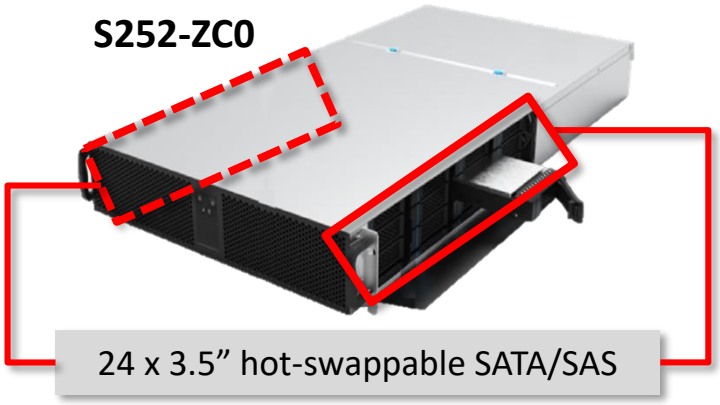
4U-36bay Storage
AMD EPYC DP
Dual 10GbE + Dual GbE
Redundant 1100W PSU

S461-3T0
(MD61-SC2)

4U-60bay Storage
Intel Grantley DP
Dual 10GbE + Dual GbE
Redundant 1200W PSU

AMD Milan/Rome Solutions

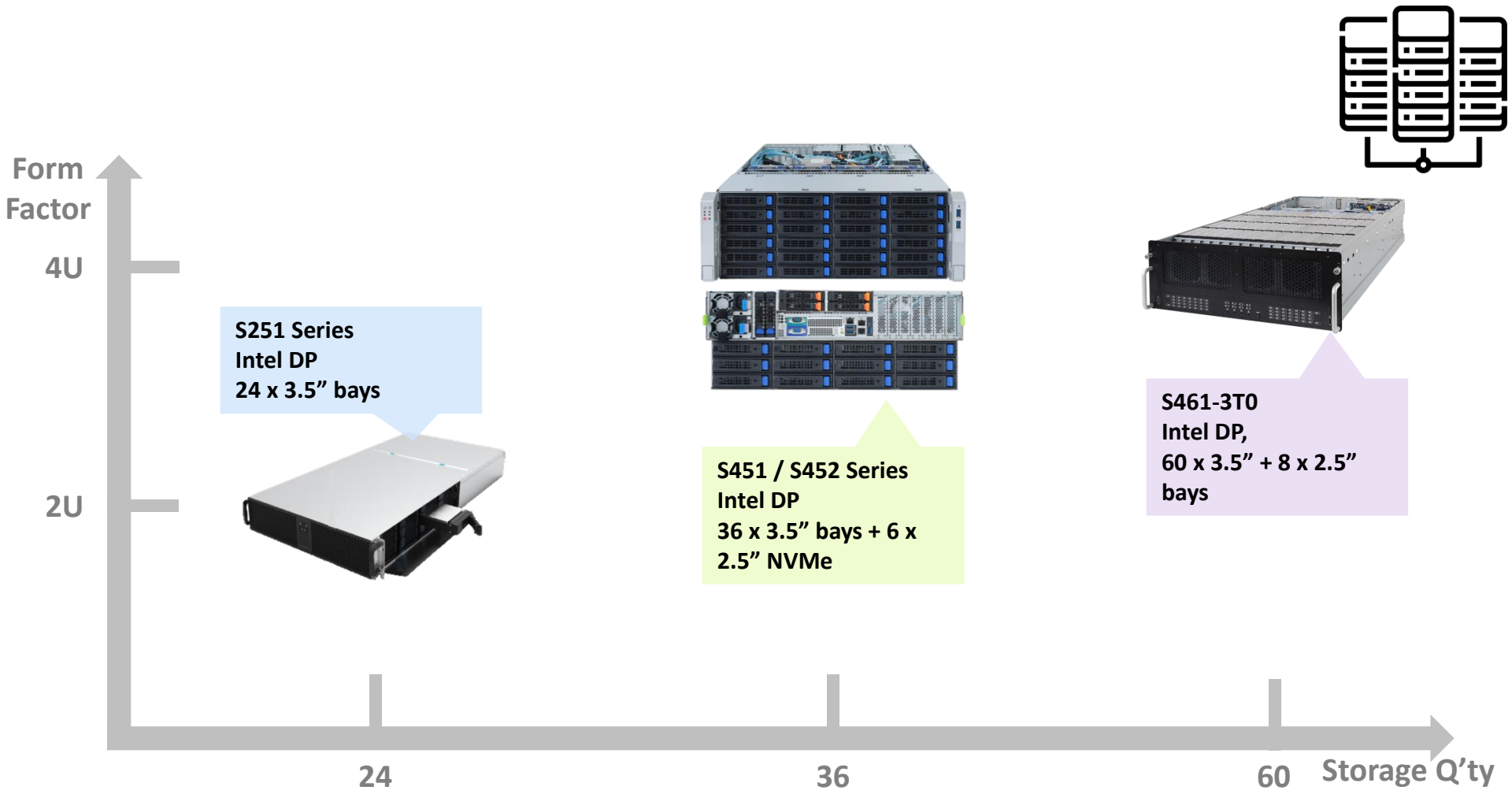
S252-ZC0



S452-Z30

Item	S252-ZC0	S452-Z30
Form Factor	2U	4U
CPU	AMD Rome **Single** 7002 Processor Socket	
Memory	16 x DIMM slots, 8 Channel	
LAN	NA	Dual 1GbE
Expansion Slot	6 x LP Gen4 x16	7 x LP Gen3 x16
Storage	Front: **24 x 3.5” SATA/SAS** Rear: **2 x 2.5”SATA/NVMe**	Front: **24 x 3.5” SATA/SAS** Rear: **12 x 3.5” SAS/SATA** **6 x 2.5” SATA/NVMe**
PSU	2 x 1300W	2 x 1600W

GIGABYTE Data Center Solutions



Next-Generation High-Density Server

H282 – New High Density Server

M/B
Proprietary MZC2-HB0
AMD ROME Zen2 Dual Processor
Up to 280W CPU TDP

Memory
32 x DIMM slots support 8 channel per node
DDR4 Speed up to 2933 MHz (2DPC), 3200 MHZ (1DPC)

Drive Bay
2 x 2.5” 7mm SATA/SAS/U.2 Hot-Swappable HDD/SSD Bays

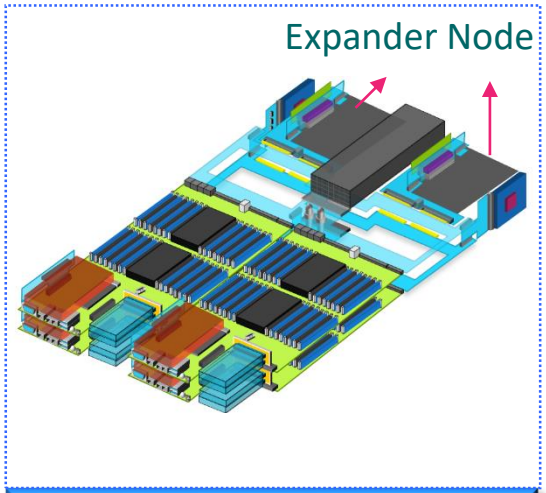
Drive Bay
2 x 2.5” 7mm SATA/SAS/U.2 Hot-Swappable HDD/SSD Bays

Expansion Slot
Per Node
Front Side : 2 x HLLP Slot (@Gen4 x 16) , 1 x OCP 3.0 (@Gen4 x 16)
Rear Side : 2 x HLLP Slot (@Gen4 x 16)

Power Supply
Redundant Delta 3200W 80+ Platinum

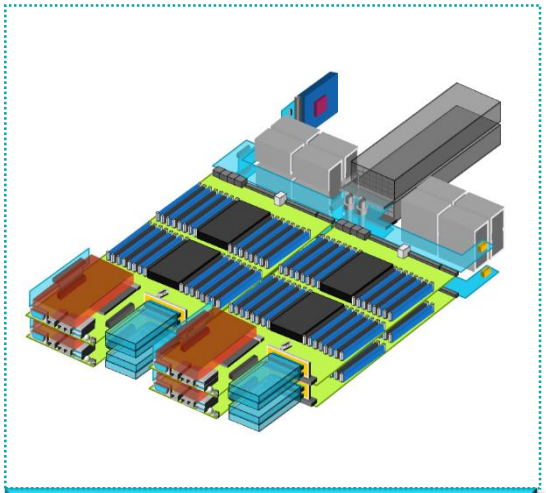
H282 System Overview

Our Skus



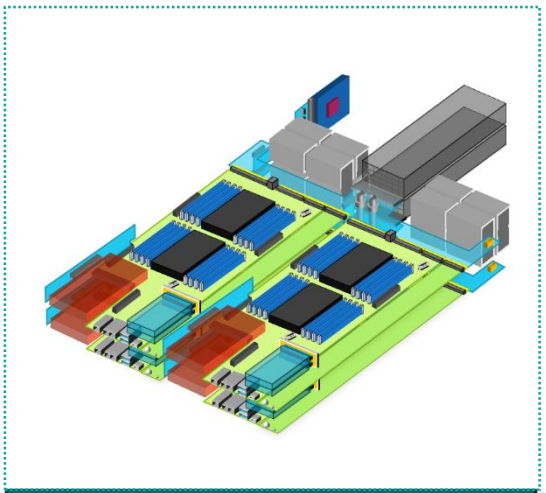
Option 1: Expander Node
H282-ZC0

Sku 1: CMC Board Redundant
Sku 2 : OCP 3.0 (Multi-Host)
Skue 3 : Default CPLD Control



Option 2: No Expander Node
H282-ZC1

Sku 1: Default CPLD Control
Sku 2 : CMC Board
Skue 3 : OCP 3.0 (Multi-Host)



Option 3: No Expander Node
Low-Cost : 16 x DIMMs
H282-Z60
Sku 1: Default CPLD Control
Sku 2 : CMC Board
Skue 3 : OCP 3.0 (Multi-Host)

Intel Sapphire rapids & AMD Genoa

	Intel Eagle Stream Sapphire Rapids	AMD Zen4 Genoa
CPU	CPU:Xeon Platinum / Gold / Silver (Socket E LGA4677) 10+ nm Up to 56 Cores 4 UPI (16GTs) TDP Up to 350W	CPU: Genoa (SOCKET SP5) Up to 96 Zen4 Cores, xGMI3 up to 32Gbps cTDP Up to 400W
PCH	PCH: Emmitsburg (total 20 ports) Up to 20 x PCIe3.0 (bifurcation support up to x8 Up to 20 x SATAIII (6Gb/s) Up to 10 x USB3.1	N/A
Memory	Memory: DDR5 / Crow Pass 8 channels Up to 2 RDIMMs or 2 LRDIMMs per channel Speed up to 4800 MT/s (1DPC)/ 4400 MT/s (2DPC)	Memory: DDR5 12 channels Up to 2 RDIMMs or 2 LRDIMMs per channel Speed up to 5200 MT/s (1DPC)/ 4800 MT/s (2DPC)
PCIe lane	PCIe Lane with CXL: 80 (PCIe5.0 at 32GT/s)	PCIe Lane 128 lanes PCIe5 + up to 8 lanes PCIe3(uS route)
LAN	LAN: LAN: I210 (1G), I350 (1G), X550 (10G) 82599 (10G), XL710 (40G), XXV710 (25G) E810 (10G-100G)	N/A

What We Offer

Intel Sapphire Rapids / AMD Genoa Platform

Motherboard
Server motherboards for demanding applications

R183 / R283 Series
1U 2U Rack Mount Server

R182/R282 ➡ R183/R283

R193 / R293 Series
1U 2U Rack Mount Server
With 1 ~ 4 x GPU Cards

New

H263 / H273 Series
Scalable, Parallel Computing
2U 4-Node High-Density Server

H262 ➡ H263 / H273

G293 / G483 / G493
Accelerate the performance with 2U / 4U Flexible GPU Server Design.

G292/G482/G492 ➡ G293/G483/G493

Mega DC
Building Block Design for Scalable Data Center

New

DGSI Structure

HDD Cage Module

4 x 3.5”
4 x 3.5” + 4 x 2.5”
10 x 2.5”
12 x 2.5”

PSU

Platinum 550W ~ 3000W
Titanium 800W ~ 3000W

Base Chassis

L1 Chassis (L-shape)
L2 Chassis (L-Shape)
M Chassis

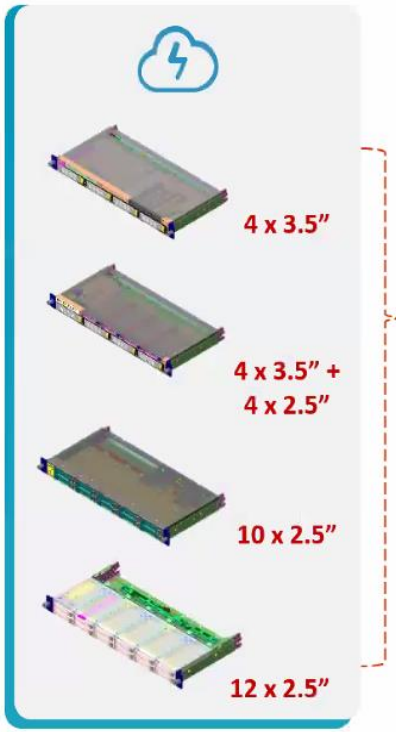
Accessories

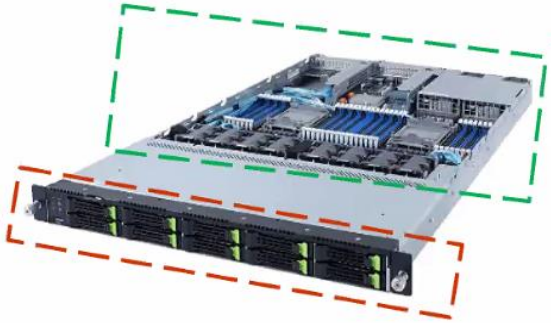
Cable Kits
Fan Duct
CPU Heatsink
Rail Kit

GIGABYTE

DGSI Structure

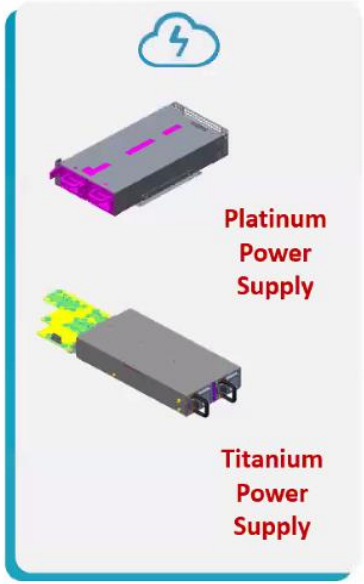
Front Chassis
(Storage Area)





Base Chassis
(Computing)

Power Supply Option



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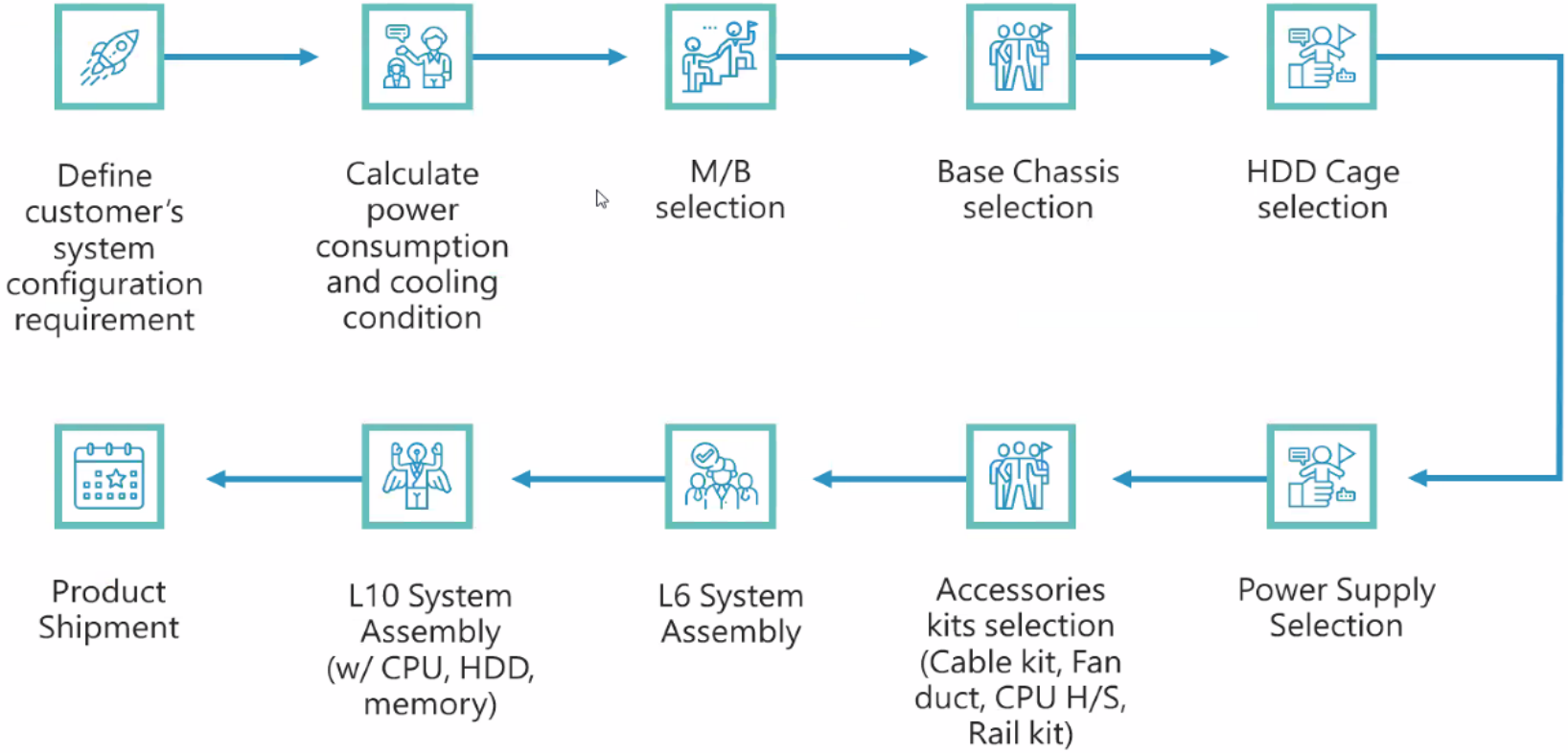
DGSI Operating Process



GIGABYTE

GIGABYTE Rackmount Server – 1U Single Socket

R161/R163 Series

Supports :

- Intel 2nd Generation Xeon Processor
- 16 x RDIMM/LRDIMM ECC DIMM Slot
- 4 x 2.5" or 4 x 3.5" Hot Swap HDD
- GbE LAN Port (Intel i210-AT)
- 1 x 550W 80 Plus Platinum Single PSU (2023.1.1 upgrade to Titanium for EU)

R152/R162/R163 Series

Supports :

- AMD EPYC 7003 / 7002 Processor
- 16 x RDIMM/LRDIMM ECC DIMM Slot
- 4 x 2.5" or 4 x 3.5" Hot Swap HDD
- 10 x 2.5" or 12 x 2.5" Hot Swap HDD
- 10GbE or GbE LAN Ports
- 1 x 550W 80 Plus Platinum Single PSU
- 2 x 650W ~ 800W 80 Plus Platinum Redundant PSU (2023.1.1 upgrade to Titanium for EU)

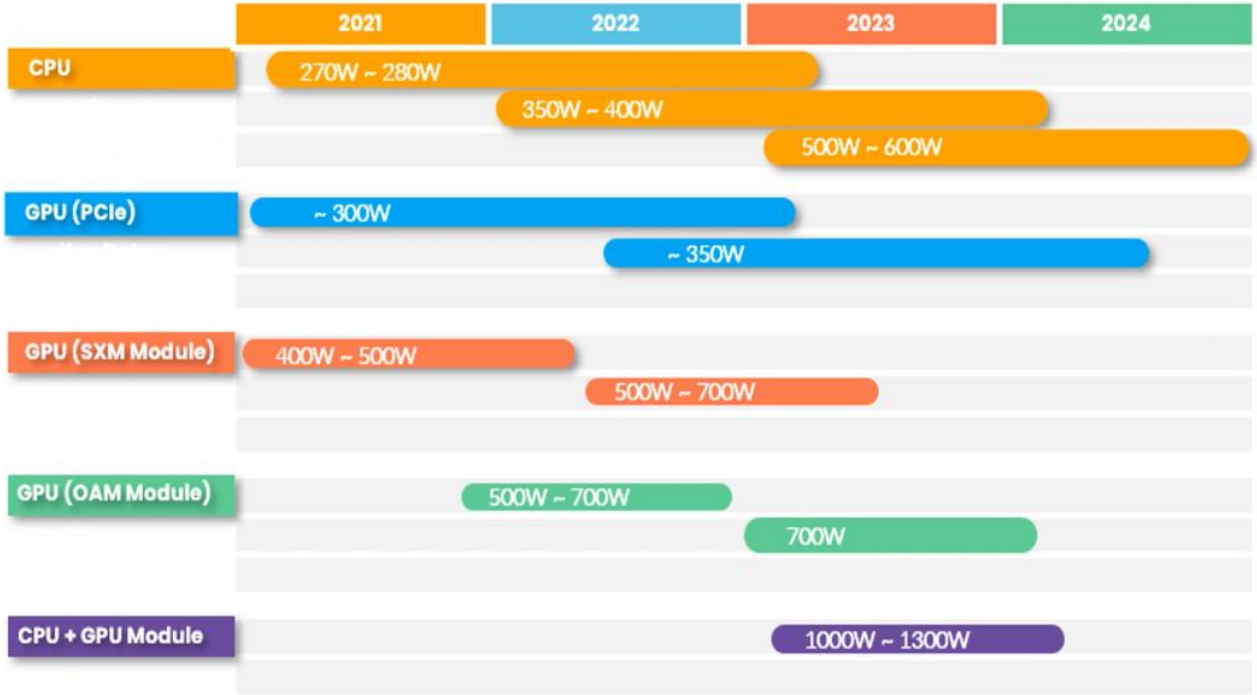
R152-P3X Series

Supports :

- Ampere Altra / Altra Max Processor
- 16 x RDIMM/LRDIMM ECC DIMM Slot
- 4 x 2.5" or 4 x 3.5" Hot Swap HDD
- 10 x 2.5" or 12 x 2.5" Hot Swap HDD
- 10GbE or GbE LAN Ports
- 1 x 550W 80 Plus Platinum Single PSU
- 2 x 650W ~ 800W 80 Plus Platinum Redundant PSU (2023.1.1 upgrade to Titanium for EU)

Advanced Cooling Technology

Product Development Long Term Roadmap

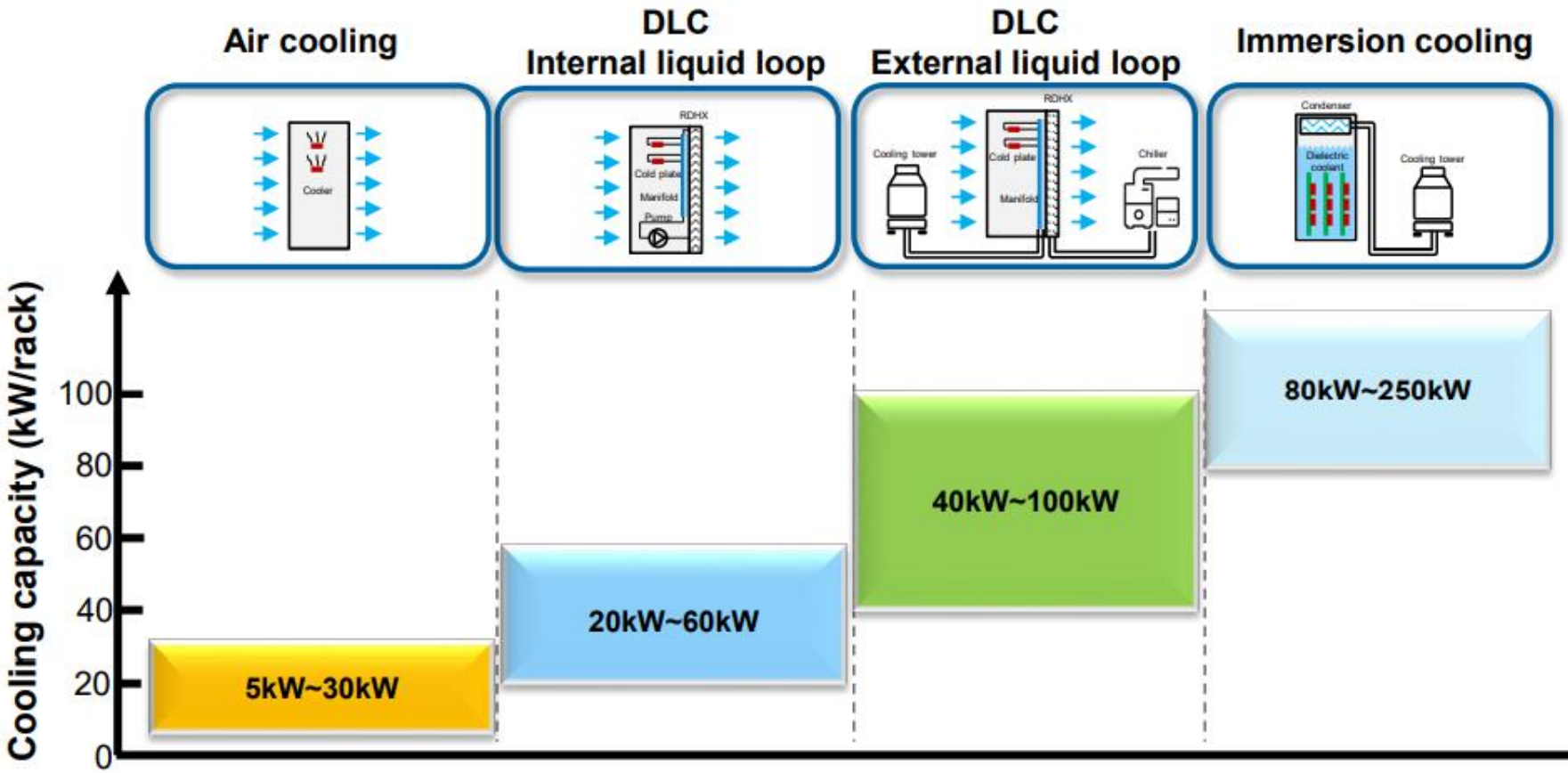


*. CPU : SXM Module = 2 : 4 or 2 : 8

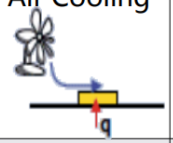
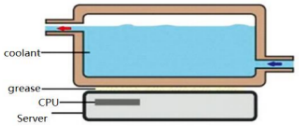
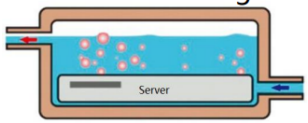
*. CPU : OAM Module = 2 : 4 or 2 : 8

GIGABYTE

Advanced Cooling Technology



Advanced Cooling Technology

	Air Cooling 	Cold Plate 	Immersion Cooling 	**0 means "Base Line"** **+ means "Better"** **- means "Worse"**
Cooling Capacity	0	+	++	Immersion Cooling is the best.
Hardware Integration	0	+	++	No fans in immersion Cooling.
Maintenance	0	--	-	New mechanical design.
Hardware Reliability	0	-	+	Unaffected by dust , humidity and vibration.
Hardware Performance	0	+	++	Cooling helps improving performance.
Energy Efficiency	0	+	++	No fans, chillers, CRAHs.
Heat Recovery	0	+	++	Easy to be recovered from liquid.
Noise	0	+	++	No fans, no noise.
Corrosion	0	+	++	Isolation from air, no corrosion.
Material Compatibility	0	0	?	Material compatibility needs to be tested.
Initial Capex	0	-	--	Liquid cost is temporarily high.
Opex	0	+	++	No fans, chillers, CRAHs. Low PUE.
Weight	0	-	--	Liquid is heavy.

GIGABYTE™

Immersion Cooling for Data Center

- Improved efficiency & reliability for data center, reach IT hardware densities
- Power density increase & so does need for Effective data center Cooling.
- Removing concerns About downtime or disruption from the air conditioning
- PUE of the immersion-cooled data center is About 1.05 which better than another.
- Dissipate the hear produced by the IT hardware without environment temperature leaps.
- The market is into HPC, edge Computing, Cryptocurrency mining, and artificial intelligence.
- Protect the IT hardware, the most valuable asset in a data center
- Aims at supporting data center design, open, economical and customizable.

GIGABYTE

Immersion Cooling Solution

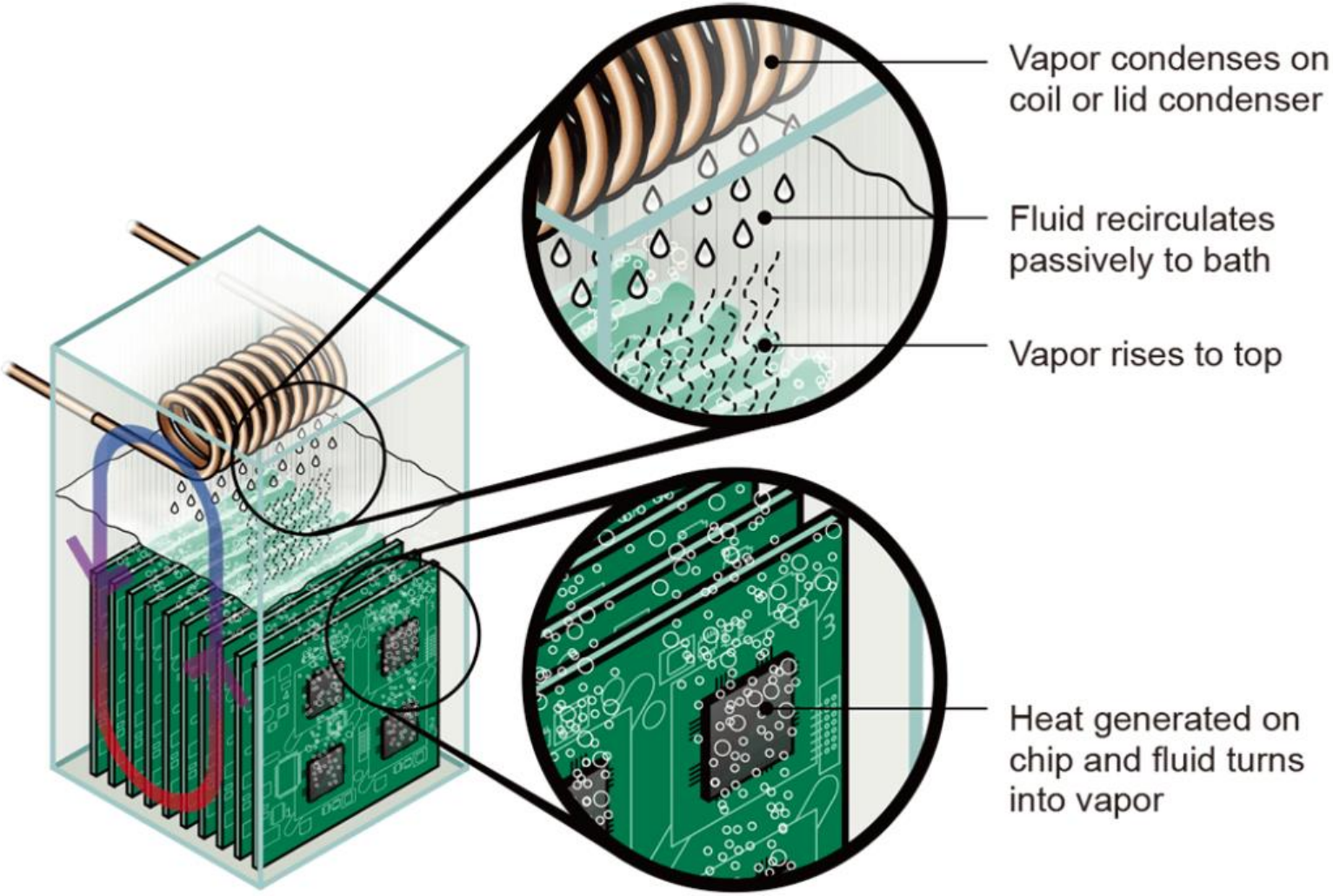
1-Phase Immersion Cooling

Single-phase fluid remains in its liquid form during the entire cooling process, while a two-phase fluid undergoes a phase change and becomes a gas. This difference is critical to understanding the design, operation, and potential hazards of your cooling solution.

2-Phase Immersion Cooling

The high-performance fluid absorbs the heat and begins to boil. The fluid then turns into a vapor that rises and condenses on a heat exchanger within the tank. This circuitous two-phase system allows for the fluid to be completely contained, preventing the loss of any fluid during operations.

GIGABYTE™


Vapor condenses on coil or lid condenser
Fluid recirculates passively to bath
Vapor rises to top
Heat generated on chip and fluid turns into vapor

GIGABYTE IT Server Cooling Solutions

Air Cooling

Direct Liquid Cooling

Immersive Cooling

GIGABYTE

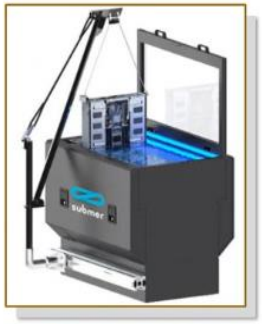
Start from Industry-leading GPU / High-Density Design Technology

19" Server	GBT 2PIC Tank	GBT 1PIC Tank
1-Phase Immersion Ready Tank	GIGABYTE Own Design Tank AI / HPC Servers	GIGABYTE Own Design Tank AI / HPC Servers

GIGABYTE™

Standard 19” Servers for 1-Phase immersion-Ready Tank

Advanced Cooling Technology



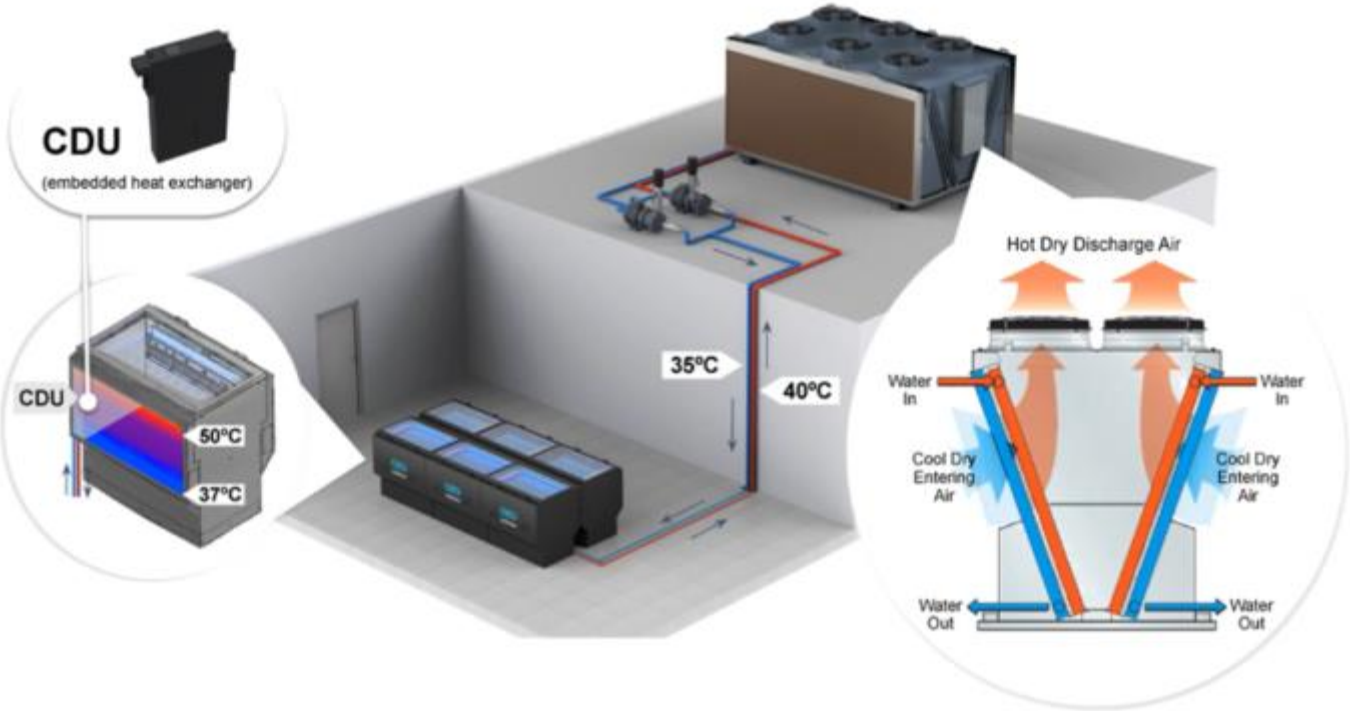
Submer
1PIC Solution
Standard 19" Server

GRC
1PIC Solution
Standard 19" Server

Aspertias
1PIC Solution
Server w/ OCP design

GIGABYTE™

Advanced Cooling Technology



GIGABYTE™

For Oil 1-Phase Immersive – Ready Tank

Design Technology

- **A** GPU Immersive-Ready Series
- **B** Density Immersive-Ready Series
- **C** Storage Immersive-Ready Series
- **D** Edge Immersive-Ready Series

For Oil 1-Phase Immersive – Ready Tank

G292-280 2U-8GPU Series

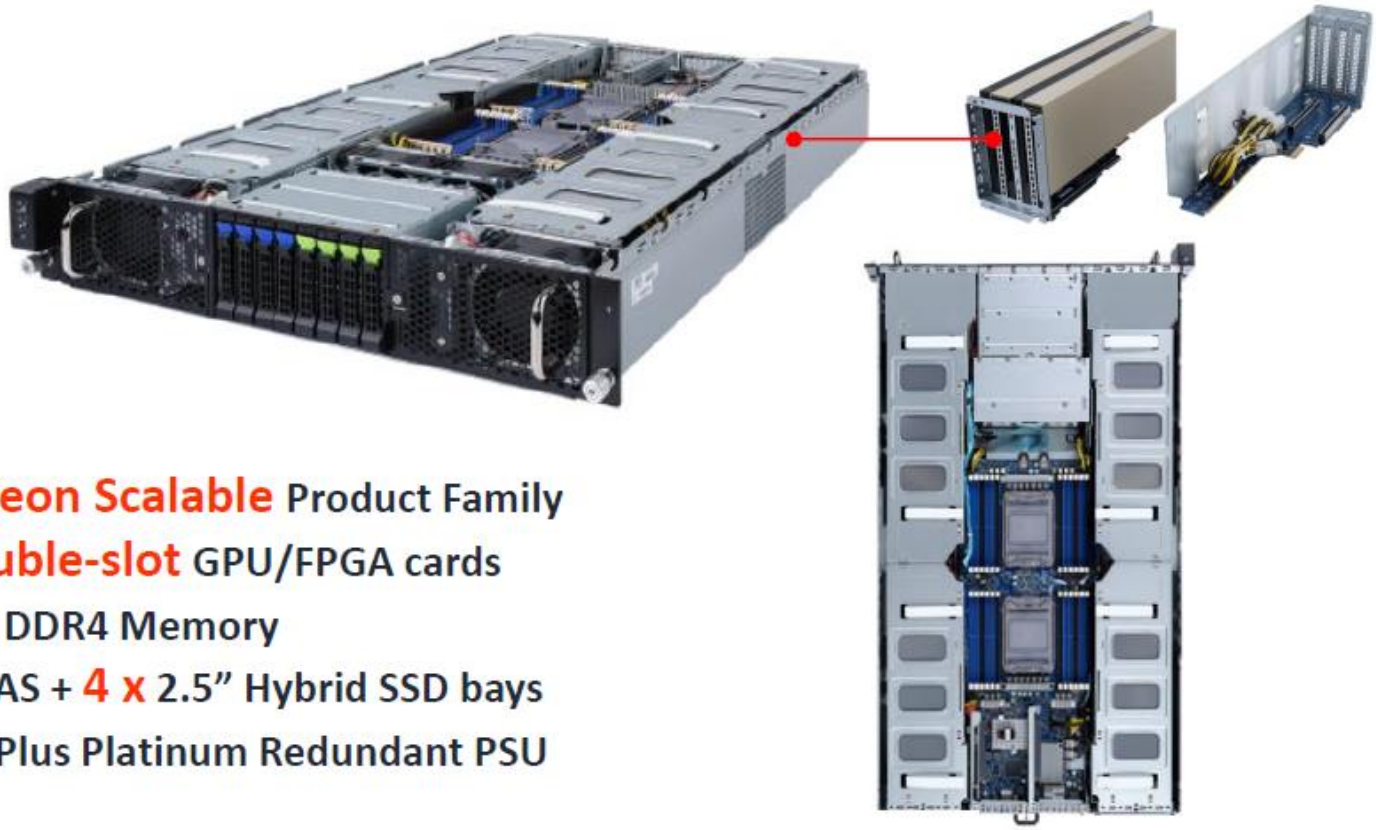
intel XEON

2 x Intel
3rd Generation

24
DDR4 MEMORY

8 x 2.5”
Hot-Swap SSDs

8 x GPUs
Double - Slot



Supports :

- Intel 3rd Gen. Xeon Scalable Product Family
- Support 8 x Double-slot GPU/FPGA cards
- up to 3078 GB DDR4 Memory
- 4 x 2.5” SATA/SAS + 4 x 2.5” Hybrid SSD bays
- 2 x 3200W 80 Plus Platinum Redundant PSU

GIGABYTE™

For Oil 1-Phase Immersive – Ready Tank

G292-Z45 2U-8GPU Series

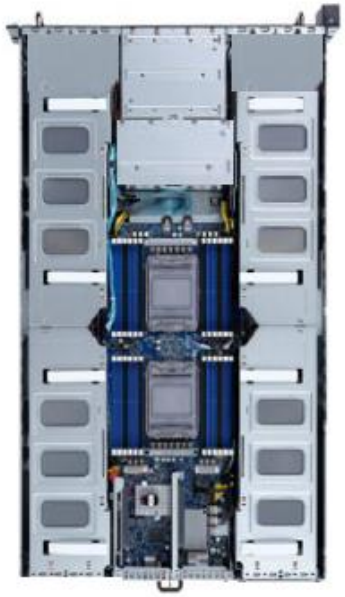
EPYC AMD

2 x AMD
7003 Series

16
DDR4 MEMORY

8 x 2.5”
Hot-Swap SSDs

8 x GPUs
Double - Slot



Supports :

- AMD EPYC **7003 Series** Product Family
- Support **8 x Double-slot** GPU/FPGA cards
- up to **3078 GB** DDR4 Memory
- **8 x** 2.5” SATA/SAS SSD bays
- **2 x 2200W** 80 Plus Platinum Redundant PSU

GIGABYTE™

For Oil 1-Phase Immersive – Ready Tank

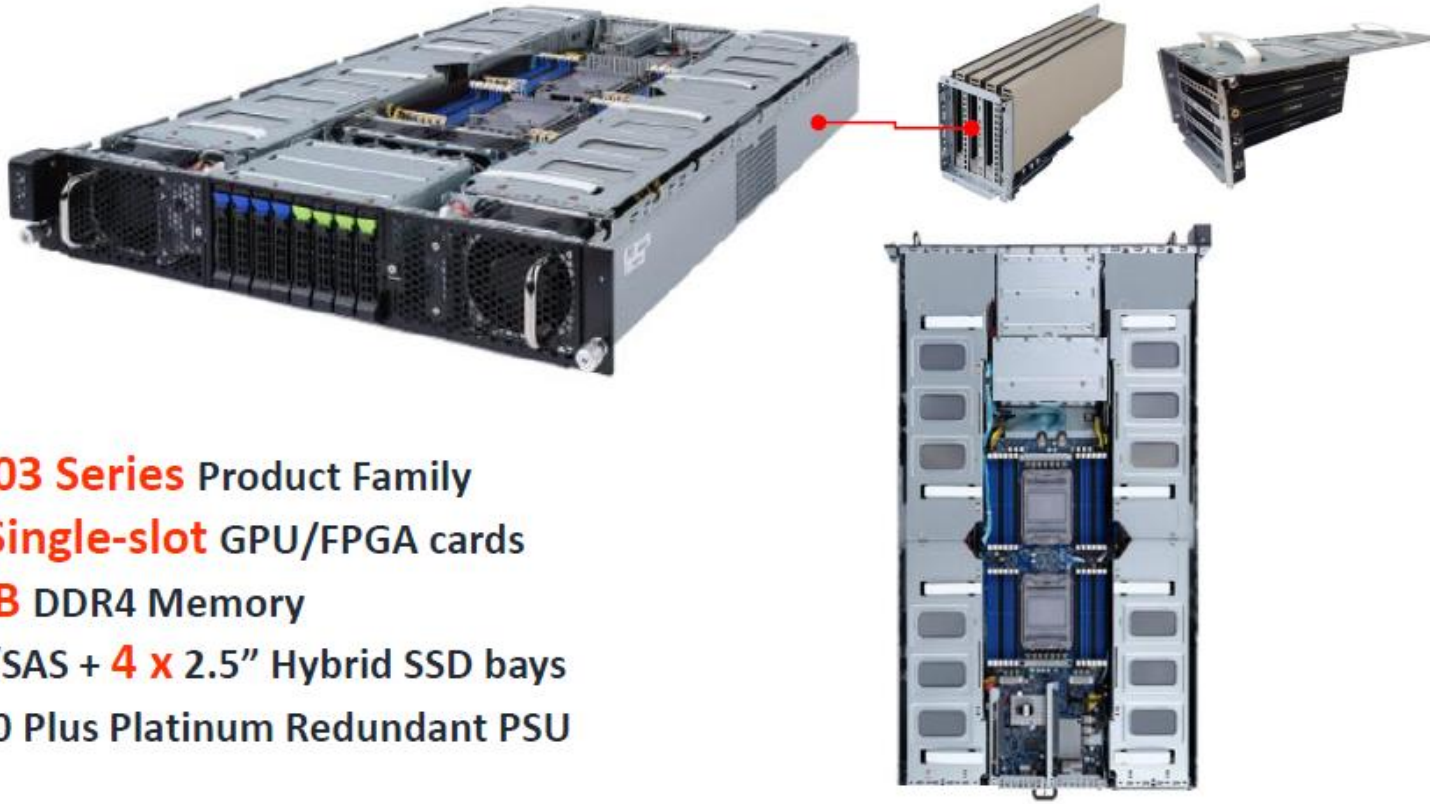
G292-Z43 2U-16 GPU Series

2 x AMD
7003 Series

16
DDR4 MEMORY

8 x 2.5”
Hot-Swap SSDs

16 x GPUs
Single - Slot



Supports :

- AMD EPYC **7003 Series** Product Family
- Support **16 x Single-slot** GPU/FPGA cards
- up to **3078 GB** DDR4 Memory
- **4 x** 2.5” SATA/SAS + **4 x** 2.5” Hybrid SSD bays
- **2 x 2200W** 80 Plus Platinum Redundant PSU

GIGABYTE™

For Oil 1-Phase Immersive – Ready Tank
H262-Z6B 2U4N Rear Access Series

8 x AMD
7003 Series

64
DDR4 MEMORY

8 x 2.5”
Hot-Swap SSDs

HW Level
Root of Trust

Supports :

- AMD EPYC **7003/7002 Series** Product Family
- Support **2U-4Node** Multi-Node Servers
- up to **64 x** DDR4 Memory
- **8 x** 2.5” Hybrid SSD bays
- **2 x 2200W** 80 Plus Platinum Redundant PSU

GIGABYTE™

For Oil 1-Phase Immersive – Ready Tank

S251-3O0 2U-24 x 3.5” Storage Series

intel XEON

1 x Intel
2nd Generation

8
DDR4 MEMORY

24 x 3.5”
Hot-Swap SSDs

Sideload Storage

Supports :

- Intel 2nd Gen. Xeon Scalable Product Family
- Support Sideload storage servers
- up to 8 x DDR4 Memory
- 24 x 3.5” SATA/SAS + 2 x 2.5” rear SSD bays
- 2 x 1300W 80 Plus Platinum Redundant PSU

GIGABYTE™

For Oil 1-Phase Immersive – Ready Tank

Model Name		Platform	Processor	Memory	HDD	GPU	PSU
2U-8GPU	**G292-280-IAY1**	Intel Whitley Icelake	Dual Socket	24 x DIMMs	4 x SAS/SATA 4 x Hybrid	8	Dual 3200W Platinum
2U-8GPU	**G292-280-IAP1**	Intel Whitley Icelake	Dual Socket	24 x DIMMs	4 x SAS/SATA 4 x Hybrid	8	Dual 3000W Titanium
2U-8GPU	**G292-Z45-ICU1**	AMD EPYC 7003	Dual Socket	16 x DIMMs	8 x SAS/SATA	8 (w/o switch)	Dual 2200W Platinum
2U-8GPU	**G292-Z45-ICM1**	AMD EPYC 7003	Dual Socket	16 x DIMMs	8 x SAS/SATA	8 (w/o switch)	Dual 2200W Titanium
2U-16GPU	**G292-Z43-ICU1**	AMD EPYC 7003	Dual Socket	16 x DIMMs	4 x SAS/SATA 4 x Hybrid	16 Single-slot	Dual 2200W Platinum
2U-16GPU	**G292-Z43-ICM1**	AMD EPYC 7003	Dual Socket	16 x DIMMs	4 x SAS/SATA 4 x Hybrid	16 Single-slot	Dual 2200W Titanium
2U-4Node	**H262-Z6B-ICU1**	AMD EPYC 7003	Dual Socket	64 x DIMMs	8 x Hybrid	0	Dual 2200W Platinum
2U-4Node	**H262-Z6B-ICM1**	AMD EPYC 7003	Dual Socket	64 x DIMMs	8 x Hybrid	0	Dual 2200W Titanium
2U-24Bay	**S251-3O0-IBC1**	Intel 2nd Gen W-3200	Single Socket	8 x DIMMs	24 x 3.5" 2 x 2.5" Rear	0	Dual 1300W Platinum
2U-24Bay	**S251-3O0-IBH1**	Intel 2nd Gen W-3200	Single Socket	8 x DIMMs	24 x 3.5" 2 x 2.5" Rear	0	Dual 1300W Titanium

GIGABYTE Own Design
1-Phase immersion-Ready Tank

GIGABYTE Own Design Immersion Cooling Solutions

2PIC

Tank #1 POC
Ready

Tank #2 / #3
Ready

2022.3

2022.5

2022.4

2022.7

Immersion Cooling Solutions

Single Node
4U – 7KW
POC Ready

24U ~ 30U
1st Tank
Sample Ready

1PIC

GIGABYTE

1PIC Tank Design

01 | 1-phase Immersion Cooling Capacity, 100kW

02 | Available for EIA Servers (28 x 1U Node and 6 x Switches)

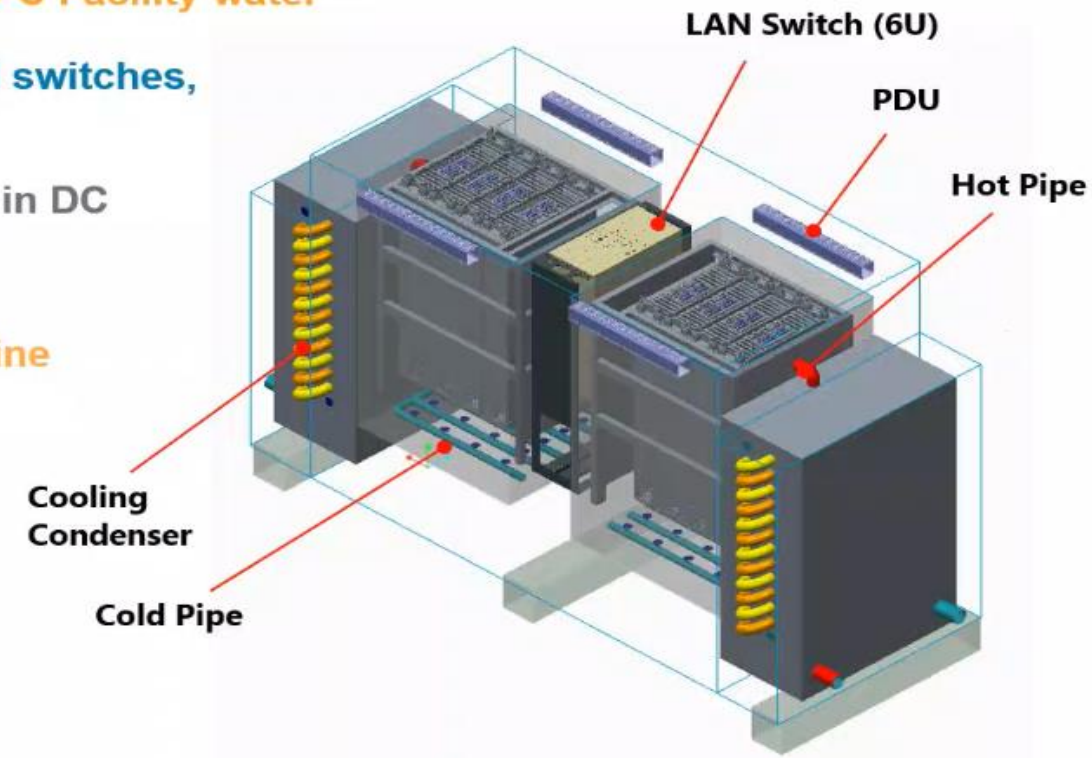
03 | Available for OCP Servers (24 x 1OU nodes and 6 x Switches)

04 | Low PUE 1.03 with rated 35°C Facility water

05 | Leverage exiting air-cooled switches, 500W max / each unit

06 | Easy server transportation in DC with pallet trucks

07 | Friendly HMI (Human Machine Interface)



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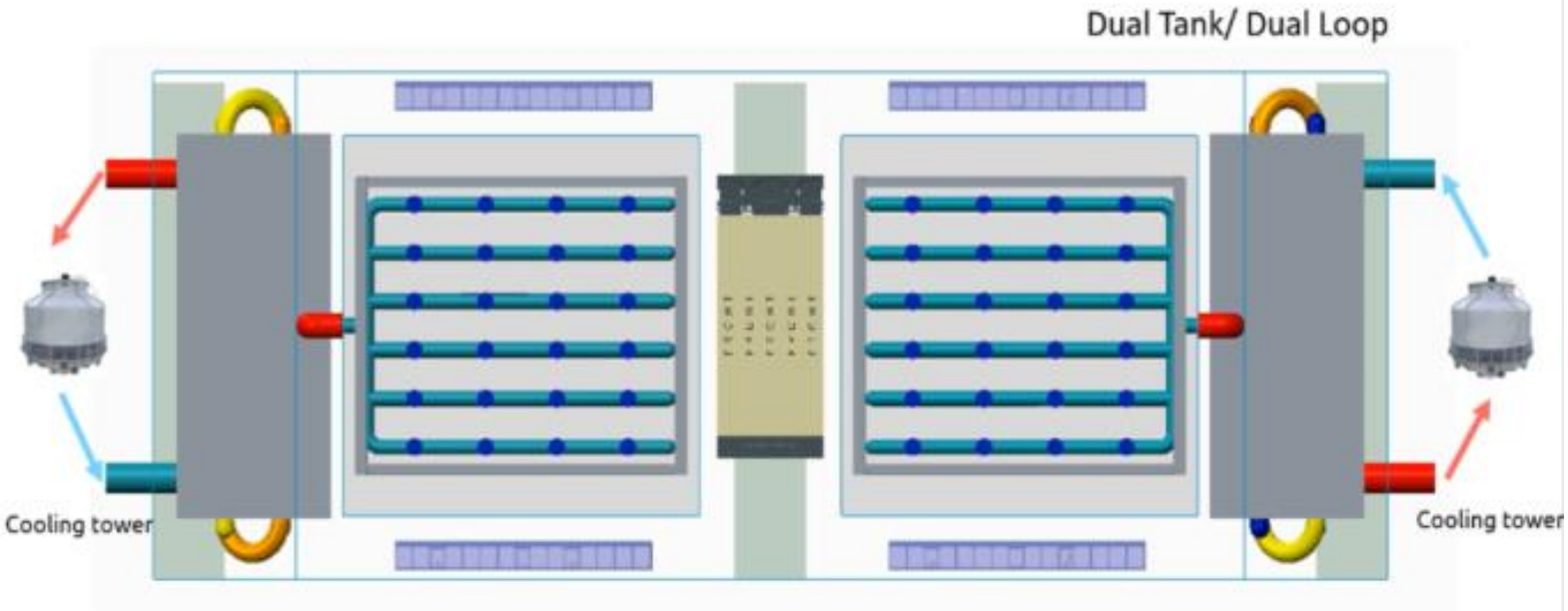
1PIC Tank Design System Placement



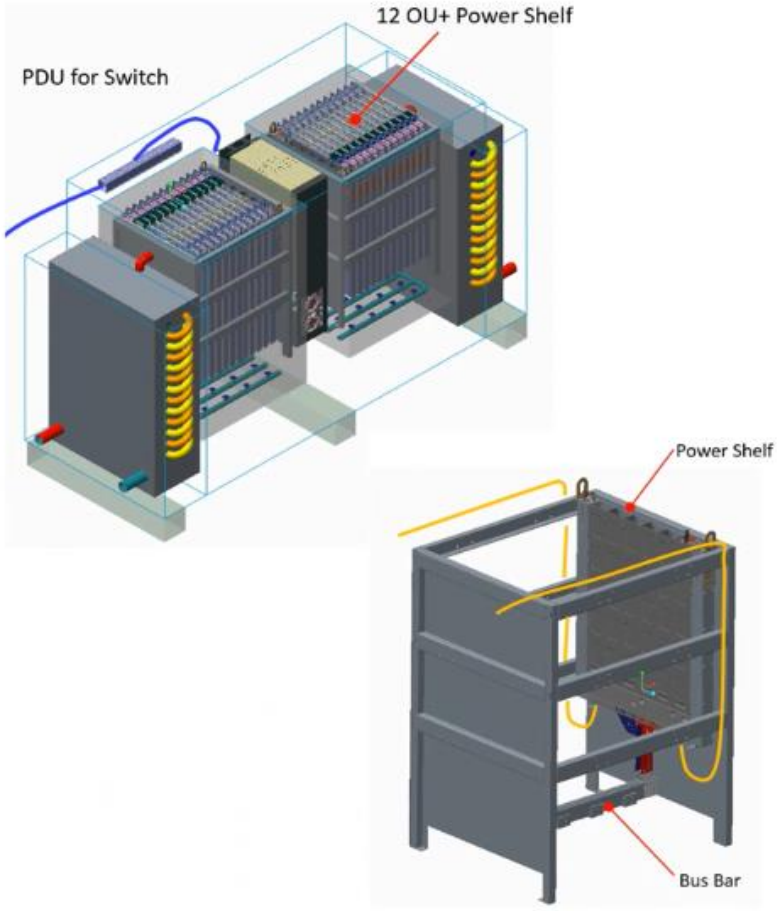
Fluid S5X

ExxonMobil
SpecTraSyn
PA06 / PA08

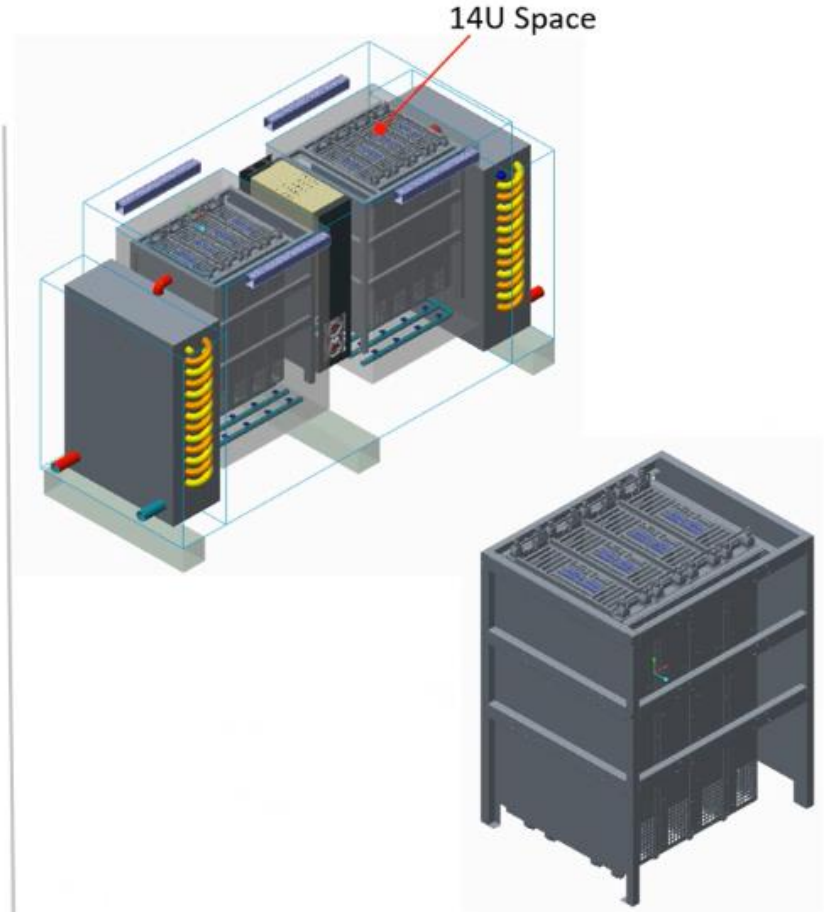
Chevron Phillips CHEMICAL
SynFluid
PAO 4 cST

GIGABYTE

1PIC Tank Design System Placement



OCP Frame



EIA Frame

GIGABYTE Own Design
2-Phase immersion-Ready Tank

2-Phase Immersion Cooling Solution

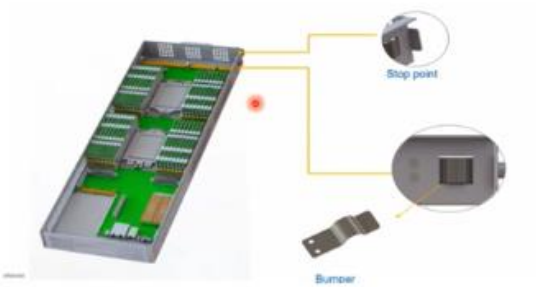
To go deeper into energy-saving and performance, GIGABYTE develops immersion cooling solutions, Reduce power consumption, reduce building costs, increase computing density per sqm, and easy to set up.

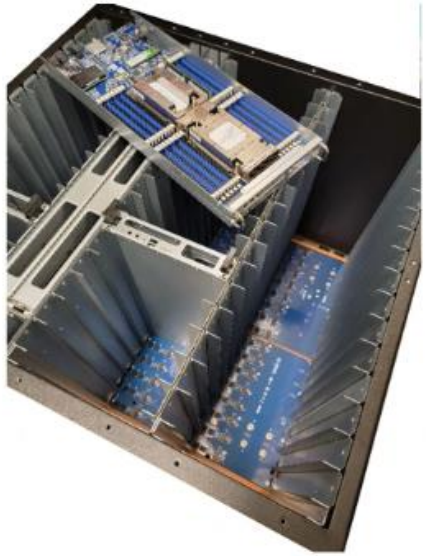
GIGABYTE

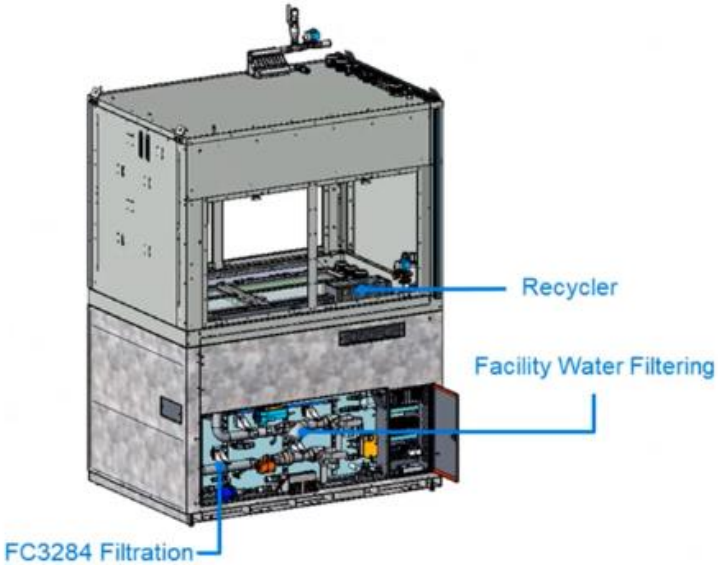
Ultra-Dense Computing Solution

GIGABYTE™

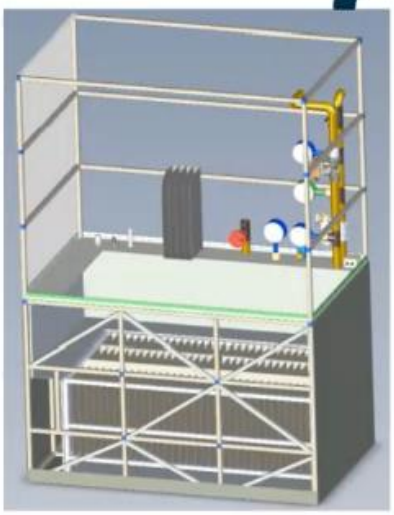
Tank Specification

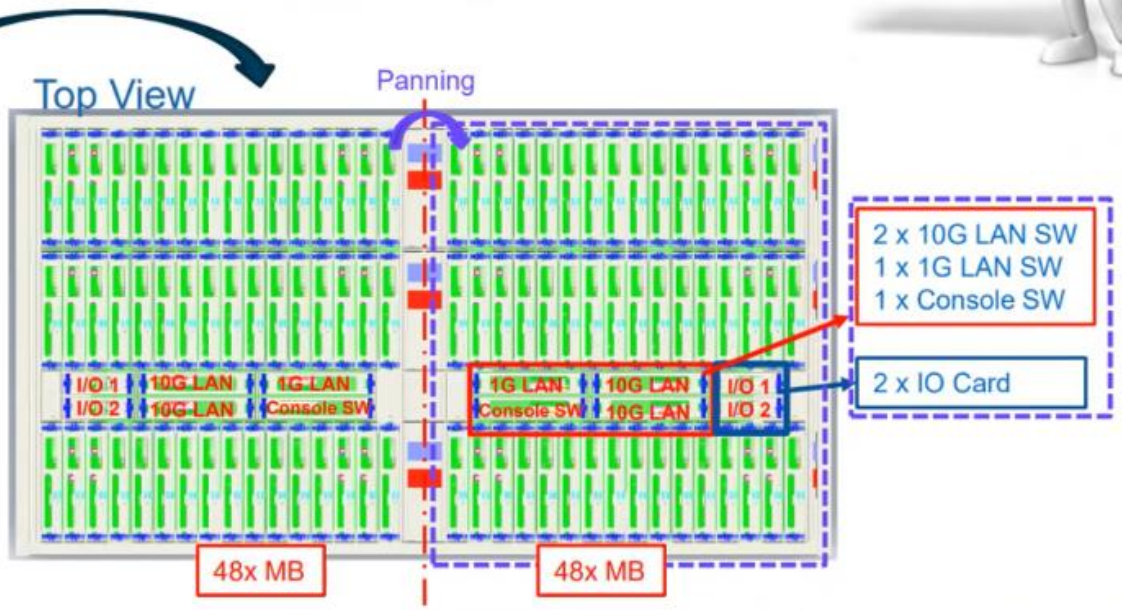






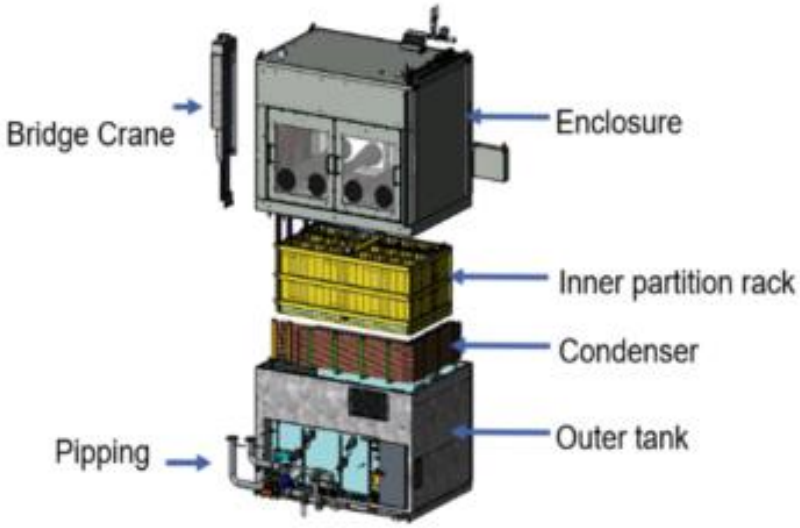
Tank Specification

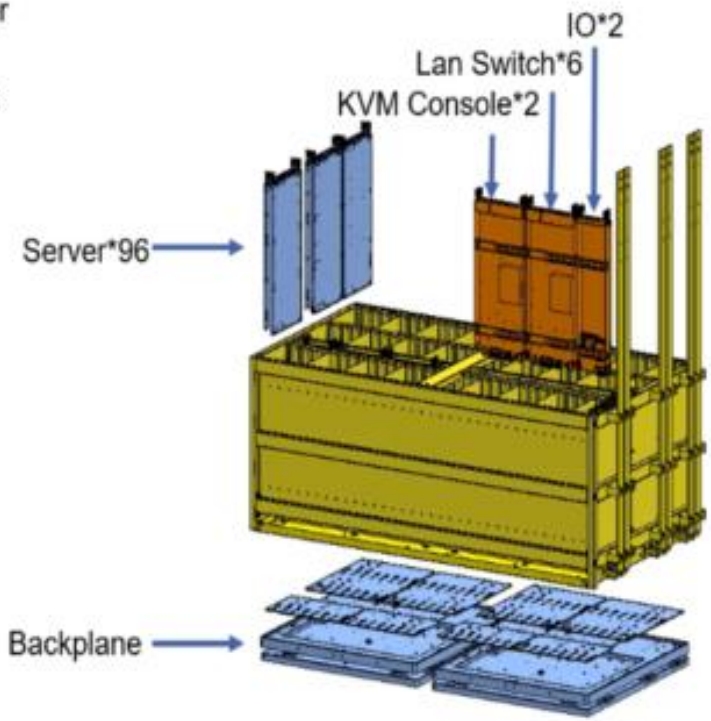




	Feature	Specification
Main SPEC	Dimension(W x L x H)	1100 x 1800 x 2500 mm
	Power Consumption	100KW

Tank Specification





Successful Case

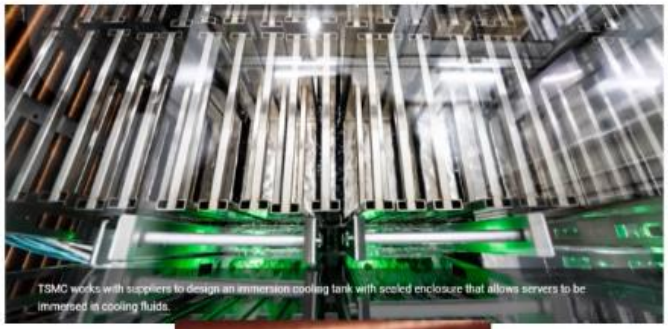
ESG

TSMC Works with Suppliers to Develop Immersion Cooling Solution for HPC Data Center, Aiming to Save Energy by 30% and Reduce Waste by 50%

Implementing the Amazing Idea in the First TSMC ESG AWARD; HPC Performance Up by More Than 10%

2022/01/11

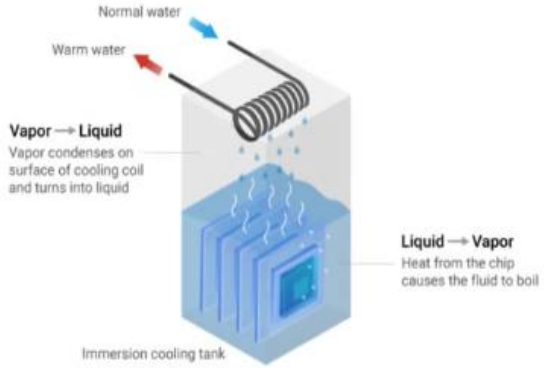
Mike Wu Kevin Lee Felix Wu



TSMC works with suppliers to design an immersion cooling tank with sealed enclosure that allows servers to be immersed in cooling fluids.

TSMC works with suppliers including Delta Electronics, Gigabyte, Accton, MIRLE and 3M to develop this immersion cooling solution, by which we design an immersion cooling tank with sealed enclosure to prevent gas leakage that allows servers to be directly immersed in the cooling fluid. According to the principle of heat transfer with phase change, heat from servers or switch boards causes the fluid to boil, producing vapor that rises from the liquid. When vapor contacts the condenser, it condenses to become liquid again and transfer heat to water in condenser pipes, and the water carries the heat and flows outside of the data center. This cooling process only needs water of normal temperature, and all electronic components can be cooled down and kept at around 50°C temperature. It can save a lot of energy and increase chip computing performance by more than 10%.

TSMC's Immersion Cooling Solution for HPC Data Center



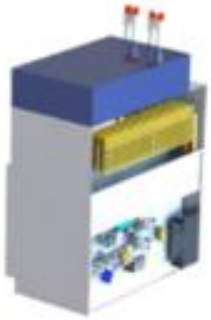
GPU AI-Driven Solution

GIGABYTE™

GIGABYTE 2-Phase Immersion Cooling Solution

Servers

2PIC Tank



GIGABYTE 2-PHASE IMMERSION COOLING

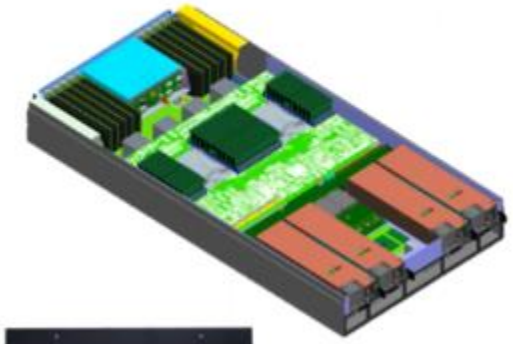
- 2U Delta System (8 x SXM4)
- 12 Server Nodes per tank
- 3M Fluid (FC-3284)
- PDU / Cable Management
- 6 x Data Switch (Mellanox 200G)
- 1 x Management Switch

Fluid

Service

GIGABYTE

I282-ZD0 Immersion Cooling system Specification



Dimension

2U Rack (880L x 447W x 91H mm)

Motherboard Spec

Proprietary AMD Milan Platform (MZ62-G41)

Drive Bay

4 x 2.5" Hot-Swap HDD support 4 x SATA/NVMe;
(Support GPU Direct Storage)

Expansion Slot

8 x SXM4 Module baseboard
10 x Low-profile x 16 PCIe 4.0 MD2 PCIe
(2 x MD2 from CUP, 8 x MD2 from PEX, Support GPU Direct)

Power Supply

CRPS 54Vdc, 3000W 80+ Platinum x 4 , Redundant 3+1

Front Panel

X550 AT2 for 2 x 10G Base-T
Power on-off SW; Reset Button; ID SW
System Status LED; HDD Status LED; 2 x LAN Status LED; 1 x VGA port;
2 x USB 3.0 ; 1 x MLAN

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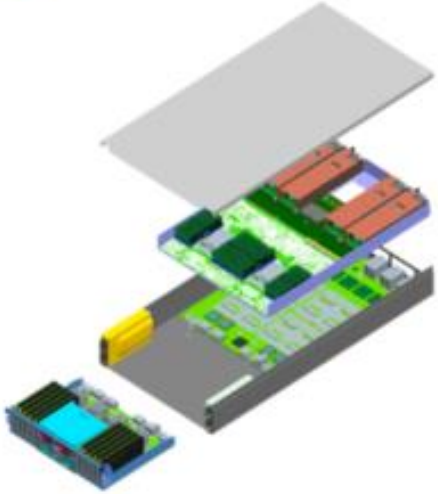
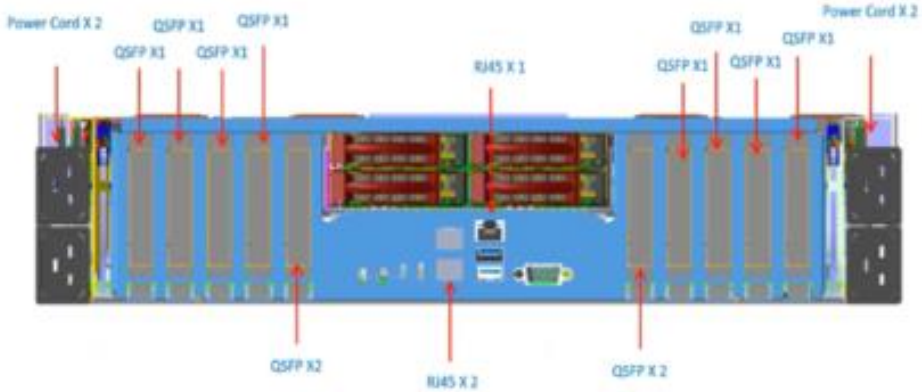
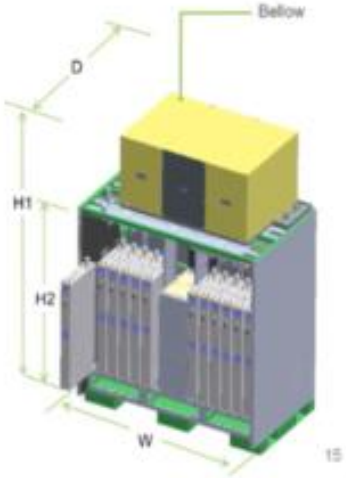
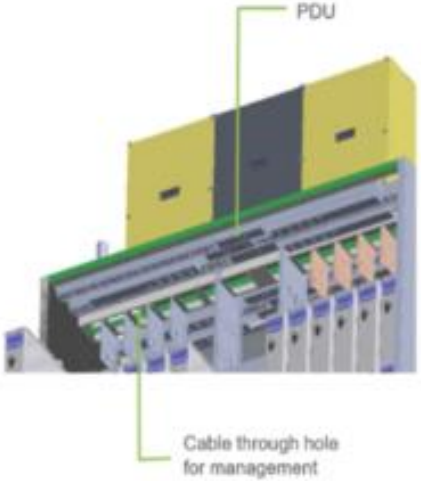
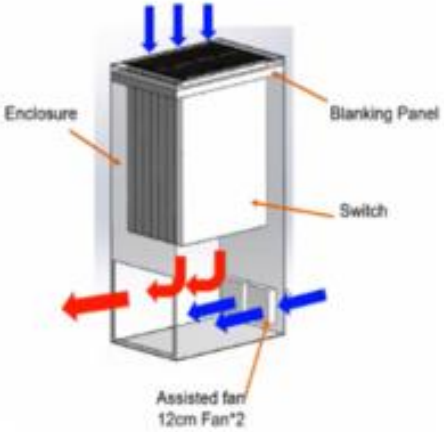
Immersion Cooling system Specification











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2PIC Tank Design

01 High Density Nodes, G1 5.6kW / G2 7.4kW

02 Available for 12 Server Nodes

03 2-phase Immersion Cooling Capacity

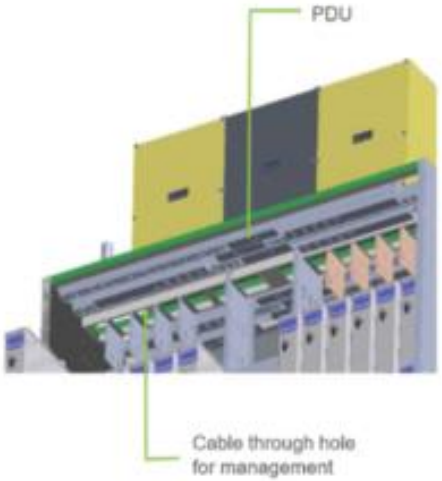
04 Low PUE with rated 35°C Facility water

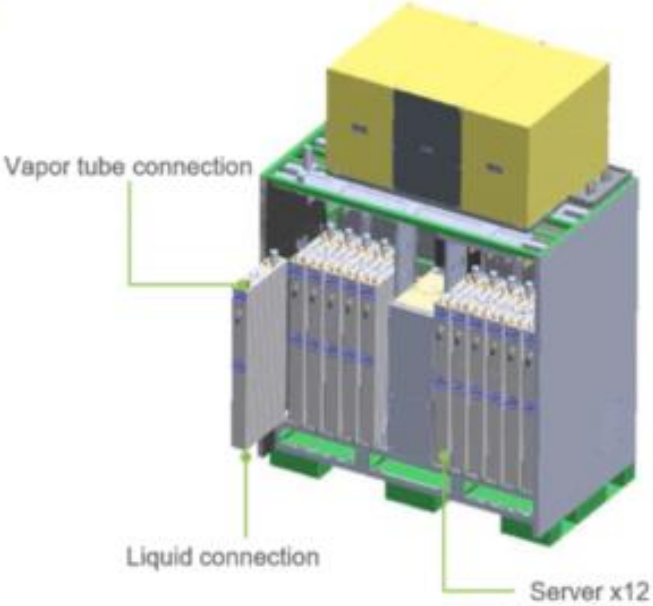
05 Leverage exiting low-density & air-cooled switches

06 Low Leakage rate with Quick Disconnector (QD) and Isolated Server Node

07 Easy Server Transportation with Pallet trucks

08 Friendly HMI (Human Machine Interface)





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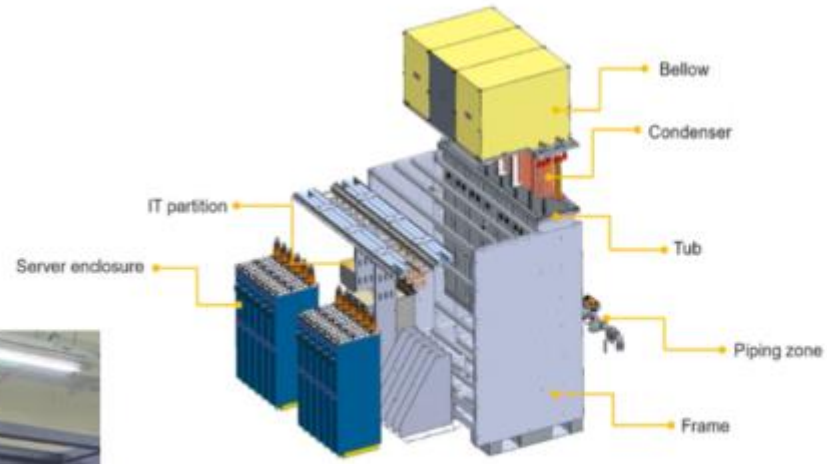
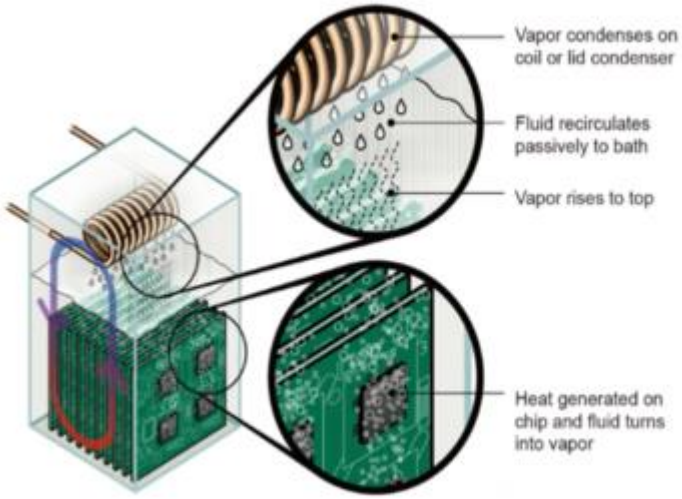
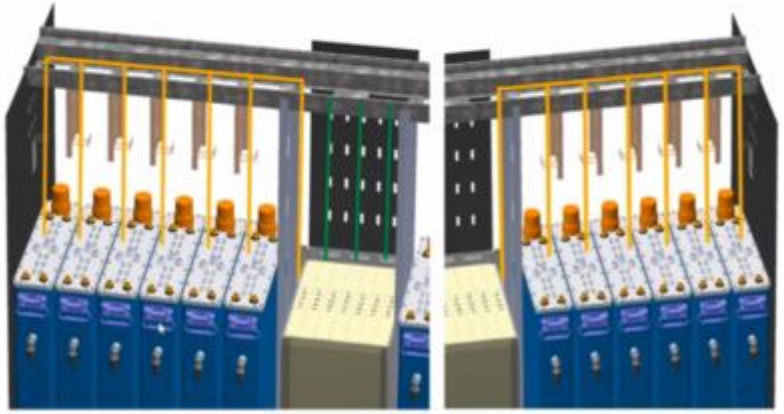
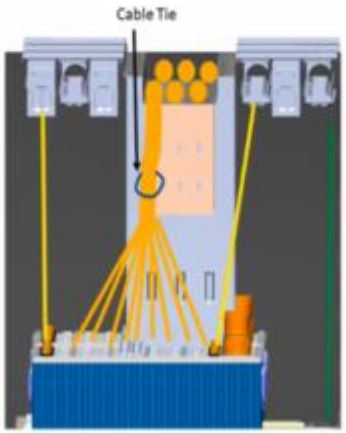
2PIC Tank Design



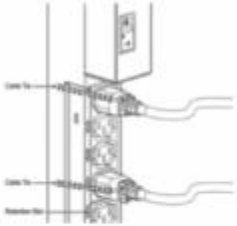


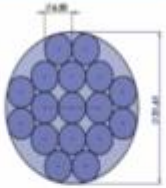
Cable Management Design





- LAN Cable
- Switch Power Cable
- C19/C20 Power Cable





total 15pcs
31.61 x 1.4 = 45mm

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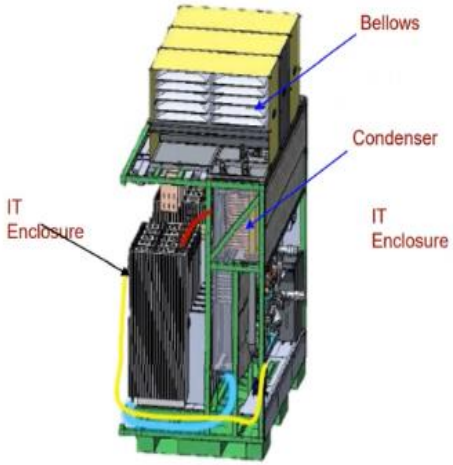
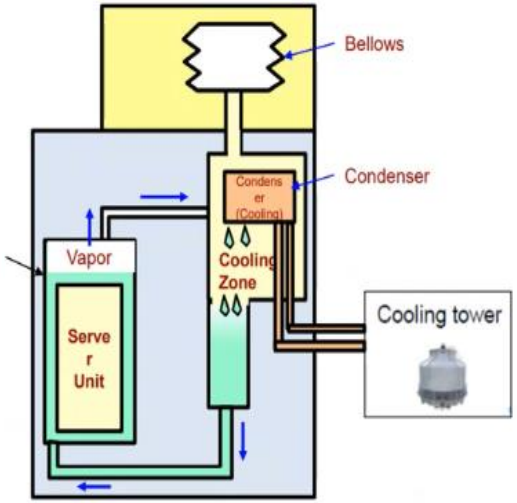
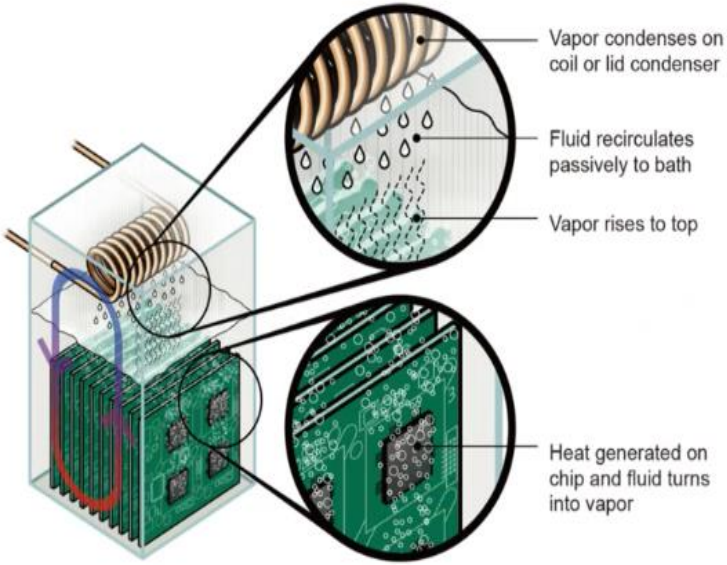
Vapor & Heat Mechanism Design







1 phase

- building cost lower
- Use oil, price lower
- Countries have regulations on the preservation of oil, and although the ignition point is high, there may be accidents
- The server soaked in oil is difficult to clean, and some GPU cards soaked in oil cannot be guaranteed by the original factory
- POC is expected in July, mass production in Q1 next year

2 phase

- building cost higher
- Use 3M fluid, price much higher, need to fill up often in case of any leakage
- Regulation on the preservation more loose
- No need to wash, can be directly dried
- Due to the global shortage of 3M, the current research and development schedule may be postponed to next year,

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- Globally located RMA & repair centers, onsite technical support services
- Reverse logistics, product warehousing and component storage solutions

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