

GIGABYTE™



Single-phase Immersion Cooling

One Stop Solution

Data centers must be reimagined if they are to sustain the compute performance required to continue quantum leaps in discoveries and provide timely insights. To keep pace, GIGABYTE has researched and developed a new approach that goes beyond air cooled infrastructure, and into a method that dissipates heat better, **Single-phase Immersion Cooling**. This has proven to be more energy efficient and scalable for deployments across the globe, while being environmentally friendly and safe. For this new approach, GIGABYTE has created a one stop solution.

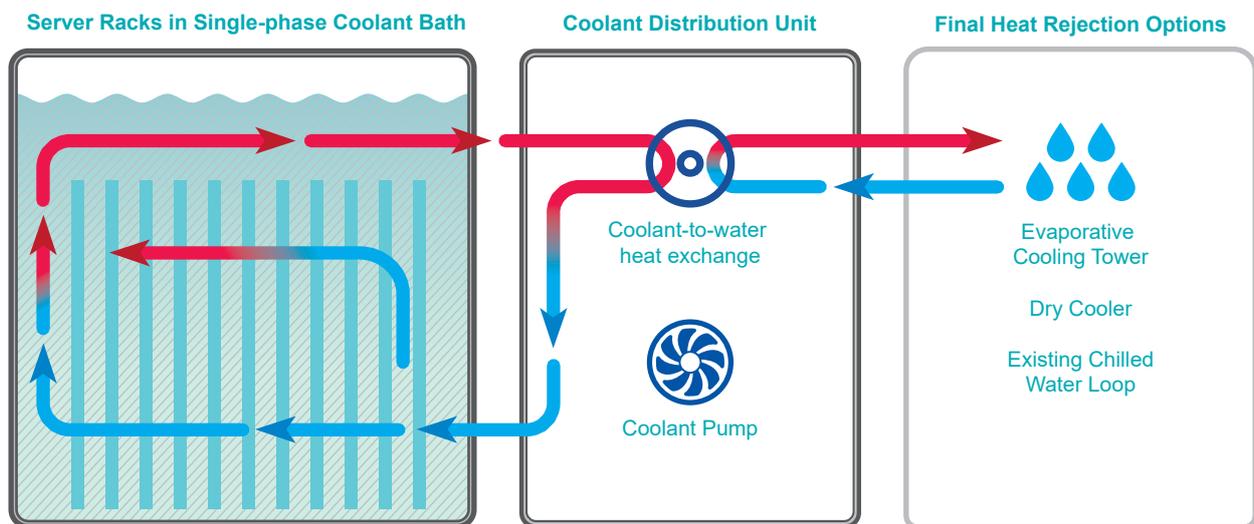


Explore Alternative Cooling Solutions

Reliability, availability, and serviceability are must-haves in data centers. As IT hardware and technology continue to improve, they are also making it tough for data centers to be sustainable with the traditional fans, HVAC, and hot/cold aisles. Why? Increasing rack power density. For each new generation of chips, the die size is shrunk while the number of transistors has increased. Users are happy with the overall performance associated with higher core counts and clock speeds, but the tradeoff is that more power is needed and more heat is generated. For instance, a 2U GPU server can support CPUs and GPUS up to 300W TDP each, but new generations of hardware are increasing the TDP by 25% or more, which is unsustainable in the same space. As a consequence, servers are reaching thermal limitations that can only be maintained by throttling performance or reducing the amount of IT equipment within. To maintain the same hardware density, another cooling approach is needed. And one that is more energy efficient. Data center architects realize this and quantify this efficiency using power usage effectiveness (PUE). PUE is a ratio that compares how much power enters the data center to the power delivered to IT equipment. Ideally, the PUE value would be 1.0; however, traditional air-cooled data centers achieve a PUE of

~1.65, which isn't horrible, but it shows room for improvement. One developed solution that can better it is single-phase immersion cooling that goes down to a PUE of ~1.02-1.03.

Single-phase immersion cooling redefines the data center from how IT equipment is cooled to the reduction in the amount and complexity of the data center infrastructure. By submerging IT equipment into a dielectric liquid bath, heat is removed faster than air while no damage or degrading occurs to all components. The liquid coolant with a higher specific heat capacity than air can quickly remove the heat. The heat given off by CPUs, GPUs, and other components is transferred directly to the liquid or via a heat-sink. The warm liquid is then pumped out by a coolant distribution unit (CDU). In the CDU a second transfer occurs as the heat is then transferred to a water loop that comes from facility water. The resulting cooled coolant is pumped back into the immersion tank while the warmed water continues on to a heat exchanger to be expelled. And the cycle continues. Also, as the name implies, the fluid in the immersion tank does not change state, so there is no evaporation or condensation occurring, which ensures operator safety and allows for easy servicing of the tank and IT equipment.



• Heated coolant exits top of rack. Coolant returns to rack cooled at user-specified temperature.

The GIGABYTE One Stop Immersion Solution

“ Immersion Tank + Immersion Ready Server + Coolant + Service ”

GIGABYTE aims to give customers a hub to design and acquire all the necessary technology to deploy a single-phase immersion cooling data center. As a leader in enterprise technology, GIGABYTE has the ability to leverage current server designs to accommodate new specialized servers for immersion cooling deployments in tanks provided by GIGABYTE or its other global immersion partners. The first wave of immersion ready servers came as a result of customers' requests so it's best to contact a GIGABYTE sales representative to start the path to joining the immersion era.



Compatibility



Scalability



High Performance



Power Efficiency



Lower TCO



High Availability

Immersion Ready Servers

G292-Z45

G292-Z43

G292-280



Workloads	HPC, AI, ML, and data analytics		
Form Factor	2U	2U	2U
CPU	Dual AMD EPYC 7003	Dual AMD EPYC 7003	Dual 3rd Gen Intel Xeon Scalable
Memory	16 x DDR4	16 x DDR4	24 x DDR4
Expansion Slots	8 x dual-slot GPUs 2 x half-length low-profile	16 x single-slot GPUs 2 x half-length low-profile	8 x dual-slot GPUs 2 x half-length low-profile
Hot-swap Bays	8 x 2.5" SATA/SAS	4 x 2.5" NVMe/SATA/SAS 4 x 2.5" SATA/SAS	4 x 2.5" NVMe/SATA/SAS 4 x 2.5" SATA/SAS
LAN Ports	2 x 1GbE	2 x 10GbE	2 x 10GbE
Version	ICU1: Dual 2200W (Platinum) ICM1: Dual 2200W (Titanium)	ICU1: Dual 2200W (Platinum) ICM1: Dual 2200W (Titanium)	IAY1: Dual 3200W (Platinum) IAP1: Dual 3000W (Titanium)

G152-Z12

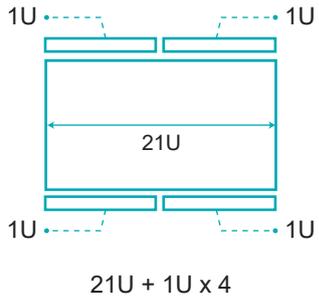
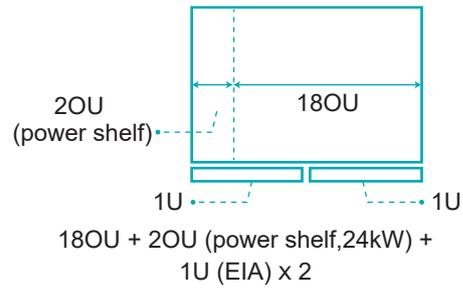
H262-Z6B

S251-300



Workloads	HPC, AI, ML, and data analytics	HPC, HCI, and hybrid/private cloud	Storage
Form Factor	1U	2U	2U
CPU	AMD EPYC 7003	Dual AMD EPYC 7003	2nd Gen Intel Xeon Scalable
Memory	8 x DDR4	64 x DDR4	8 x DDR4
Expansion Slots	v200: 2 x dual-slot GPUs 2 x half-length low-profile	v400: 4 x single-slot GPUs	8 x half-length low-profile 4 x OCP 3.0
Hot-swap Bays	2 x 2.5" NVMe	8 x 2.5" NVMe/SATA	24 x 3.5" SATA/SAS 2 x 2.5" SATA
LAN Ports	2 x 10GbE	8 x 1GbE	2 x 1GbE
Version	Redundant 2000W (Platinum)	ICU1: Redundant 2200W (Platinum) ICP1: Redundant 3000W (Titanium)	IBC1: Redundant 1300W (Platinum) IBH1: Redundant 1300W (Titanium)

Immersion Tanks

	25U EIA Tank	180U OCP Tank
Hardware Capacity	 <p>21U + 1U x 4</p>	 <p>180U + 20U (power shelf, 24kW) + 1U (EIA) x 2</p>
Heat Dissipation Capacity	80 kW	
Dimensions (L x W x H)	Tank (0.91m x 1.28m x 1.49m) CDU (0.90m x 0.55m x 1.62m)	
Weight	Tank: 450 kg (w/o coolant); 1100kg (w/ coolant) CDU: 300 kg	
CDU Power Consumption	0.75 kW	
Coolant Volume	800 L	
Electrical Connection	CE Type x 3 Plug(3P+N+E 63A IEC 60309) AC 380-400V 63A 50/60Hz	
Footprint	2.04m x 0.91m	
Server Depth Supported	900mm	
Cooling Water Inlet	17-35°C	
Water Flow Rate	240 LPM	
PUE	1.02	

The GIGABYTE Immersion Solution



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