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4,654,520	8,078,511
8,901,705	4,346,501
6,805,210	6,688,570



AV2000

**LIQUID COOLED XEON SCALABLE
3RD GEN ICE LAKE GPU SERVER**



NVIDIA QUADRO RTX A6000

- Thermal Dissipation Coefficient : 15KW
- Liquid Cooled Platform :
Gun Drilled -10 x 800 x 10mm Pass
- CPU: 3rd Gen. Intel Xeon Scalable (ICE LAKE)®
Platinum 8380 (40 x cores, 2.3 GHz, 270W)
- GPU: 4 x NVIDIA QUADRO RTX A6000
(48GB GDDR6, 10,752 CUDA Cores)
- 2TB RDIMM DDR4-3200MHz
- 96TB NVMe SSD (Gen 4.0 PCIe4)
- Dimension: 450 x 800 x 88 mm

Introduction & Key Features

1-1 Overall Introduction

In the modern era, autonomous vehicles have already gained their attention and escalating importance. Data generated from these vehicles is crucial for AI infrastructure and thus demands high speed computing capability system like AV1000 to deal with. Lidars and cameras are two indispensable components for data capturing function. The data rate of a lidar which is supported with full HD, RAW12 and 40fps is close to 220 MB/s while that of a camera is approximately 120MB/s. To sum up, if a vehicle is equipped with 6 lidars and 6 cameras, the vehicle RAW data will roughly be 2.040 MB/s, which is around 80TB in a 10 hour test drive shift.

With **Artificial Intelligence** workloads becoming the industry mainstream, Acquiring HPC capabilities for AI modeling is important. To accommodate this high performance, high density servers, scientists and research institutes must grapple with not only the increased power densities but also the thermal challenges that they present.

Liquid is 4,000 times better at storing and transferring heat than air, liquid cooling solutions can provide immediate and measurable benefits to large data centers alike for both server & facility energy efficiency , even density & performance.

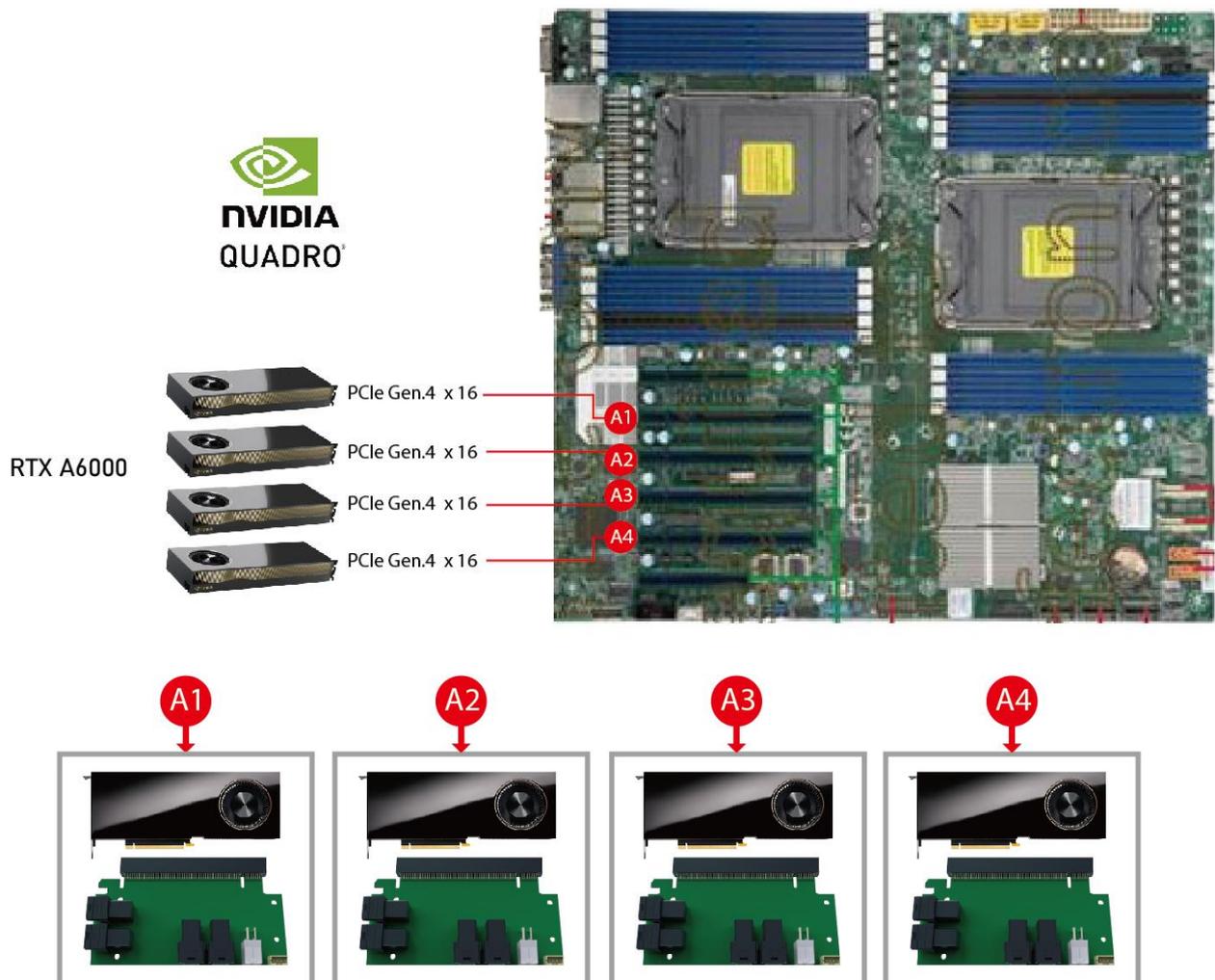
7Starlake's **AV2000 Conduction Liquid Cooled** AI inference rugged server features **3rd Gen. Intel Dual Xeon Ice Lake Scalable Processors** with **4 x NVIDIA RTX A6000 GPU Module** , **2TB RDIMM DDR4-3200MHz** memory and **96TB NVMe SSD**, to provide the seamless performance foundation for the data centric era from the multi-cloud to intelligent edge, and back.



1-2 Intel's 10nm Ice Lake Xeon With 40 Cores , PCIe 4.0

Today's scientific discoveries are fueled by innovative algorithms, new sources and volumes of data, and advances in compute and storage. Machine learning, deep learning, and AI converge the capabilities of massive compute with the flood of data to drive next-generation applications, such as autonomous systems and self-driving vehicles. Recognising this demand, 7STARLAKE employs 3rd Gen Intel® Xeon® Scalable processors that are built specifically for the flexibility to run complex AI workloads on the same hardware as existing workloads to be the CPU of AV2000.

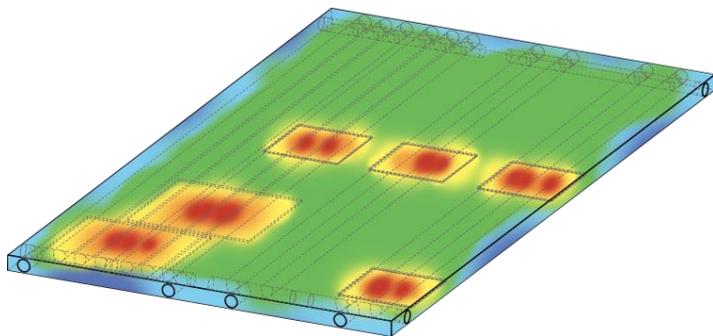
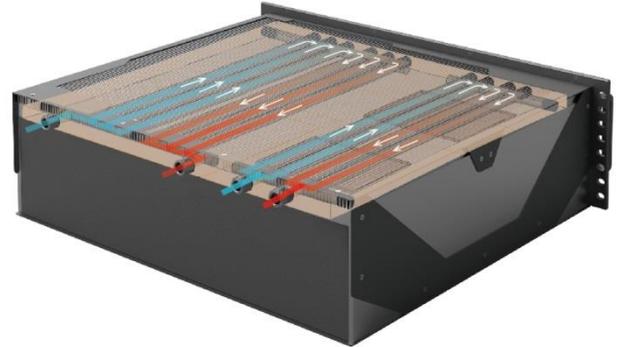
Intel Ice Lake is based on 3rd Generation Intel Xeon Ice Lake Scalable Processor in LGA4189 Socket with C621A chipset, up to 40 cores, 270W TDP. Intel Ice Lake-SP processors will be based on the 10nm+ process node. The main highlight of Ice Lake-SP processors will be support for PCIe Gen 4 and 8-channel DDR4 memory.



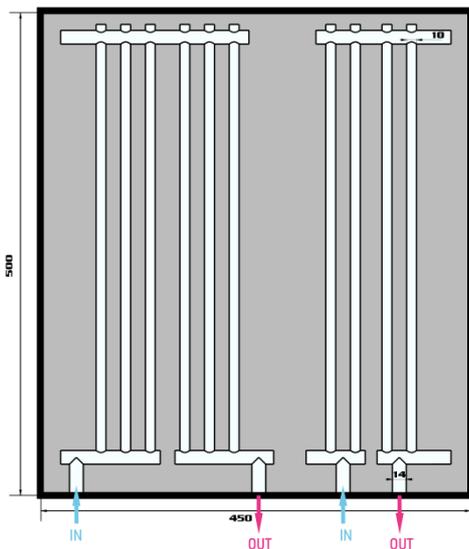
1-3 Conduction Liquid Cooling Plate (C.L.C.P.)

Most liquid cooling solutions are using close loop design — Direct to Chip (D2C) integrated pump & cold plate in the system. Users may worry about potential risk of liquid leakage.

7Starlake highly values system reliability. In the pursuit of stability and power, our experienced team has successfully optimized the thermal design, bringing out an unprecedented model AV2000. Instead of normal D2C design, 7Starlake innovated an unique heat exchanger integrating **Conduction Liquid Cold Plate (CLCP)** on the computing system.



CLCP includes multi-channel cold water inlet/outlet owning high flexibility in adjusting numbers of inlet/outlet (up to 4in 4out) by request. When coolant flows through top sink, liquid can absorb the heat and take it away from the heat sources quickly to the heat exchanger. When heated liquid flushes into the heat exchanger, it will be cooled by 9 units of 12 x 12 cm active fan which can run at 2K~3K RPM.



AV2000

Item	Description
CPU	2 x Intel®Xeon® Platinum 8380
GPU	4 x NVIDIA QUADRO RTX A6000
System Size	450 x 800 x 88mm (W x L x H)
CLCP Size	450 x 800 x 20mm (W x L x H)
Material of CLCP	AL6063
Gun Drilled Hole∅	10mm

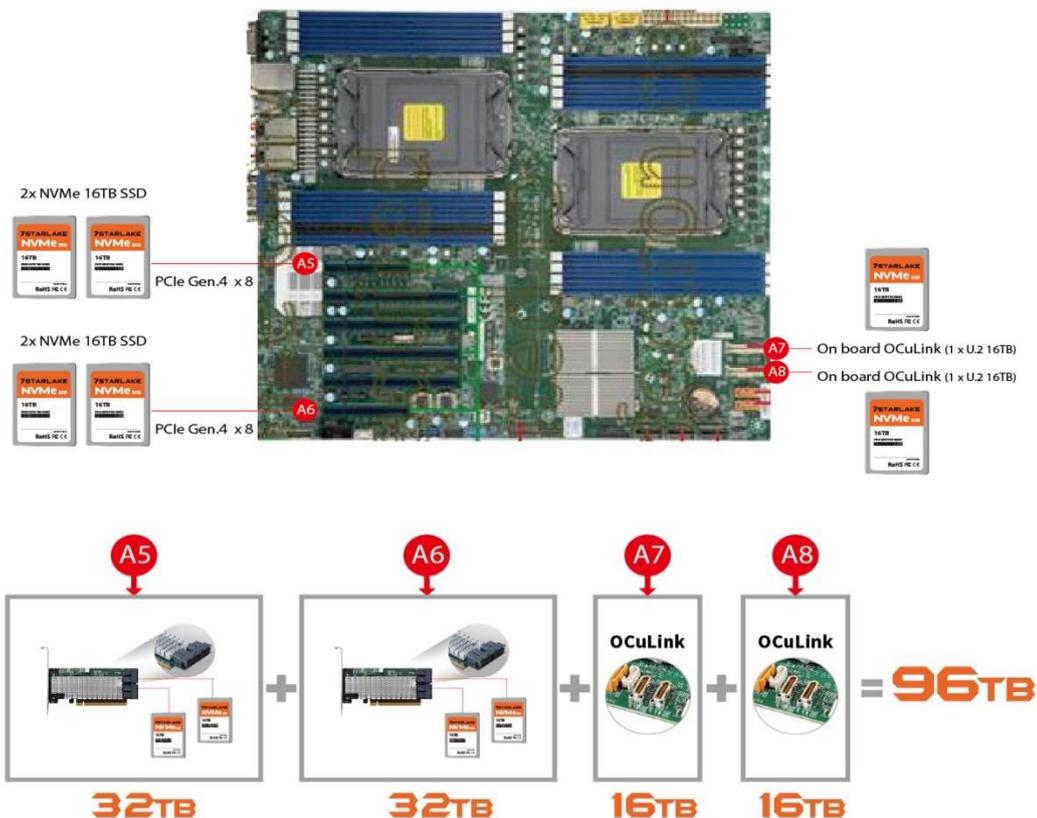
Leveraging both liquid-cooling and air-cooling’s strong points; these features accomplish higher rack density and efficiency, comprehensive reduction in power use, and increase of overclocking potential.

1-4: How AV2000 Support 96TB NVMe

PCIe Gen 4 is the upper version of PCIe Gen 3, which surpassed PCIe Gen 2 and Gen 1. The bandwidth provided by PCIe Gen 4 is double as compared to PCIe Gen 3. It is backward compatible with prior generations of PCIe. PCIe Gen 4 is expected to satisfy, to a large extent, the requirements of high speed servers, gaming, graphics and data centers, where number of servers and solid-state devices are increasing as per market demand. PCIe Gen 4 is the new evolution over the PCIe Gen 3. The PCIe Gen 4 provides the data rate of 16 G/Ts as compared to 8G/Ts provided by PCIe Gen 3. It's architecture is fully compatible with all the previous generations of PCIe.

7Starlake is devoted to uncovering the unique way of optimising storage. AV2000 supports 6-slot PCIe x 8 expansions that provide extreme PCIe Gen 4 speed for GPUs at an exceptional value.

AV2000 can make the best use of two PCIe x 8 host connections that associate with four PCIe gen 4 U.2 NVMe. Two extended card are individually installed on A5 and A6 slot (Please refer to the demonstration above); each of them has two ports that can total support 32TB NVMe;(8TB U.2 SSD x 4 Ports x 2 PCIe16 Slot). In other words, one port is able to back 16 TB NVMe. In addition to the 4 x PCIe U.2 NVMe, there are other two on board OCuLink (labelled as A7 and A8) that are capable of offering 16TB each. As a result, AV2000 is able to surmount the limitations of traditional SSDs and supply large data storage.



Specifications

SYSTEM

CPU	2 x 3 rd Gen. Intel® Xeon® Scalable Platinum 8380 CPU (2.3 GHz, 40Cores, TDP 270W)
Memory type	2TB RDIMM DDR4-3200MHz
GPU	4 x NVIDIA RTX A6000, CUDA 3072, 48GB GDDR6

STORAGE

NVMe	96TB NVMe SSD (Gen 4.0 PCIe4)
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ETHERNET

Ethernet	2 x 10G Base-T
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REAR I/O

VGA	1 (M12)
Ethernet	2 x 10GbE (M12)
USB	4 x USB 3.0 (M20)
Button	1 x Power Button w/Indicator LED

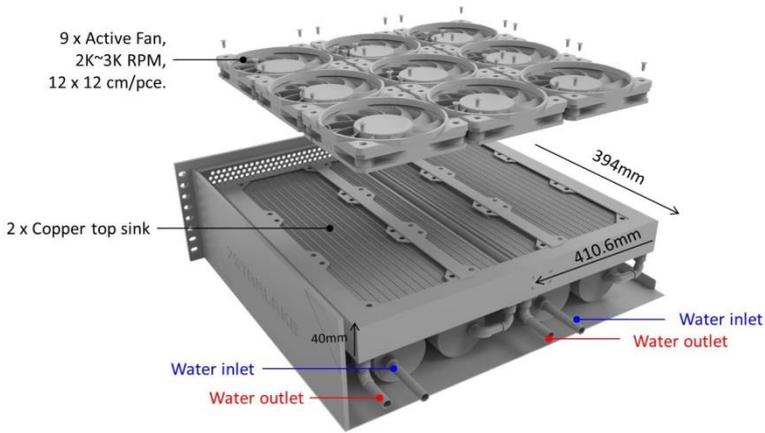
POWER REQUIREMENT

Power	2.4KW (800W*3)
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MECHANICAL

Dimension	450 x 800 x 88 mm (W x D x H)
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Liquid to Air Heat Exchanger



7Starlake CDU-20 low pressure high power CDU (Coolant Distribution Units) is built to meet the increasing demands of data center & AI Training. Capable of managing 20kW+ of heat load in a remarkably small 4U of space, CDU-20 is a **Liquid-to-Air** CDU which dissipates heat from the coolant in the server loop to the ambient environment,

