



# Ultra-Performance Server for Artificial Intelligence

Date:  
Q2 2018

Application:  
Artificial Intelligence

Tags:  
Artificial intelligence, GPU, Quadro RTX 6000

## CUSTOMER:

### Samsung Group

The world's largest consumer electronics company, based in South Korea with annual turnover > 223 billion USD.

## SOLUTION BRIEF:

As an existing long term supplier to the Samsung group we were tasked with supplying a powerful server to aid in the research and development of a new Artificial Intelligence program.





## Application

- Artificial intelligence
- Testing,
- Deep-Learning
- Research and Development

## Project Background

Over the next 3 years, South Korea's largest conglomerate Samsung Group is planning to invest around \$22 billion in growth areas such as artificial intelligence for projects in Robotics, Self-Driving, Voice Assistant, Healthcare, Consumer Electronics and Financial Advisor.

Samsung approached Broadberry Data Systems Ltd. with the brief to design and build ultra-high-performance servers for internal artificial intelligence testing, deep-learning and research and development.

We were tasked with providing servers that would be capable of completing highly computational tasks whilst proving financially competitive with 3 other leading vendor's proposals.

### Key Requirements:

- Cost-Effective
- Low-Latency
- Adequate Cooling to ensure reliability
- Compatible with latest Linux Kernel and AI libraries (TensorFlow)
- Capable of massive parallel processing



## Broadberry Solution

As a market leader in high performance solutions for artificial intelligence applications, we provided a range of solutions that fit perfectly with Samsung's requirements.

The Broadberry CyberServe Xeon SP - FT77DB7109, configured with 8x NVIDIA Quadro RTX 6000 offered the best performance for the budget in Samsung's specific application.

Our solution came in 56% lower cost than proposed solutions from other leading vendors, whilst boasting a 180% increase in CUDA cores.



### Key Numbers

**56%**  
Lower Cost

**230%**  
More Cores

## Solution Specifications

Our accepted solution was a CyberServe Xeon SP - FT77DB7109, a Dual Root Complex 4U, 8 GPU Server powered by the latest Xeon SP processors.

- 8x NVIDIA Quadro RTX 6000
- Over 36,000 CUDA Cores
- Latest Samsung SSD
- 2x Intel Xeon Gold 6128 Processor - 6 Cores, 3.40GHz, 19.25MB Cache (115Watt)
- 512GB ECC Registered Memory
- 3 year Broadberry On-Site Warranty

### Features:

- Up to 28 CPU cores per socket
- 50% Increased memory bandwidth with 6 memory channels per socket
- Memory speeds up to DDR4-2667 (depending on CPU SKU)
- No slowdown in memory speed when deploying 2 DIMMs per channel
- Increased PCIe connectivity to 48 PCIe Gen3.0 lanes per CPU socket
- Optional Integrated Intel Omni-Path Architecture Host Fabric Interface
- Native support for up to 14 SATA ports
- New Ultra Path Interconnect
- New Advanced Vector Extensions 512 (AVX-512)



## Broadberry CyberServe Xeon SP - FT77DB7109®

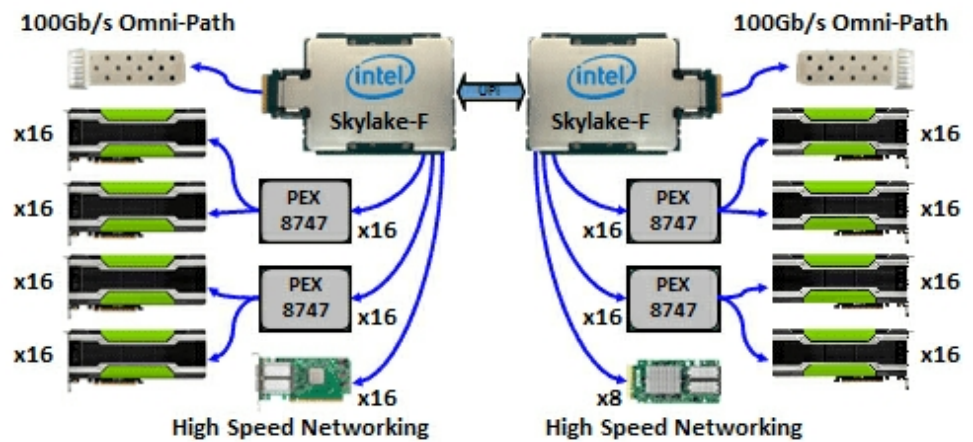
The CyberServe Xeon SP - FT77DB7109® is the fifth generation of our 4U 8GPU server platform based on the new Intel Xeon Scalable Processor Family.

It builds upon the success of previous generations by adding additional features that our customers have asked for over the years.

These enhancements include support for an internal storage mezzanine slot, allowing the deployment of SAS drives without consuming precious PCIe slots in the rear that would otherwise be used by GPU cards.

The CyberServe Xeon SP - FT77DB7109® now accommodates additional space next to the 8 GPU cards in the server for a 9th PCIe x16 slot, ideal for high speed networking or NVMe retimer deployment.

As a dual root complex GPU server, the CyberServe Xeon SP - FT77DB7109® deploys a pair of Xeon Scalable Processors with an even split of GPU cards between the two. The motherboard deploys a set of four PLX PEX8747 PCIe switch chips to provide the connectivity for the 8 GPU card slots and support for Xeon processors with integrated Intel Omni-Path 100 gigabit networking fabric.



### Support for 8GPUs + Single-Wide x16 slot

The new Xeon Scalable Processor Family increases the amount of PCIe lanes available in a system, which the CyberServe Xeon SP - FT77DB7109® takes full advantage of, adding a 17th slot to the rear of the chassis. This allows a single-wide x16 card to be installed next to a full complement of 8 double-wide GPU cards, and is ideal for NVMe deployment or high speed networking like 100 Gigabit EDR Infiniband, 100 Gigabit Ethernet, or 100 Gigabit Intel Omni-Path fabric.

### Optional Integrated Intel® Omni-Path Architecture (Intel® OPA) Host Fabric Interface

The CyberServe Xeon SP - FT77DB7109® supports the Intel Xeon Scalable Processor Family's newest member, the Skylake-F CPU with integrated 100 Gigabit Omni-Path networking fabric as well as support for dual socket SKL-F CPUs for a total of 200Gb/s fabric connectivity. Integrated Intel® Omni-Path Architecture (Intel® OPA) Host Fabric Interface is an end-to-end high-bandwidth, low-latency fabric that features optimized performance and eases the deployment of HPC clusters.

### Native Active/Passive GPU support

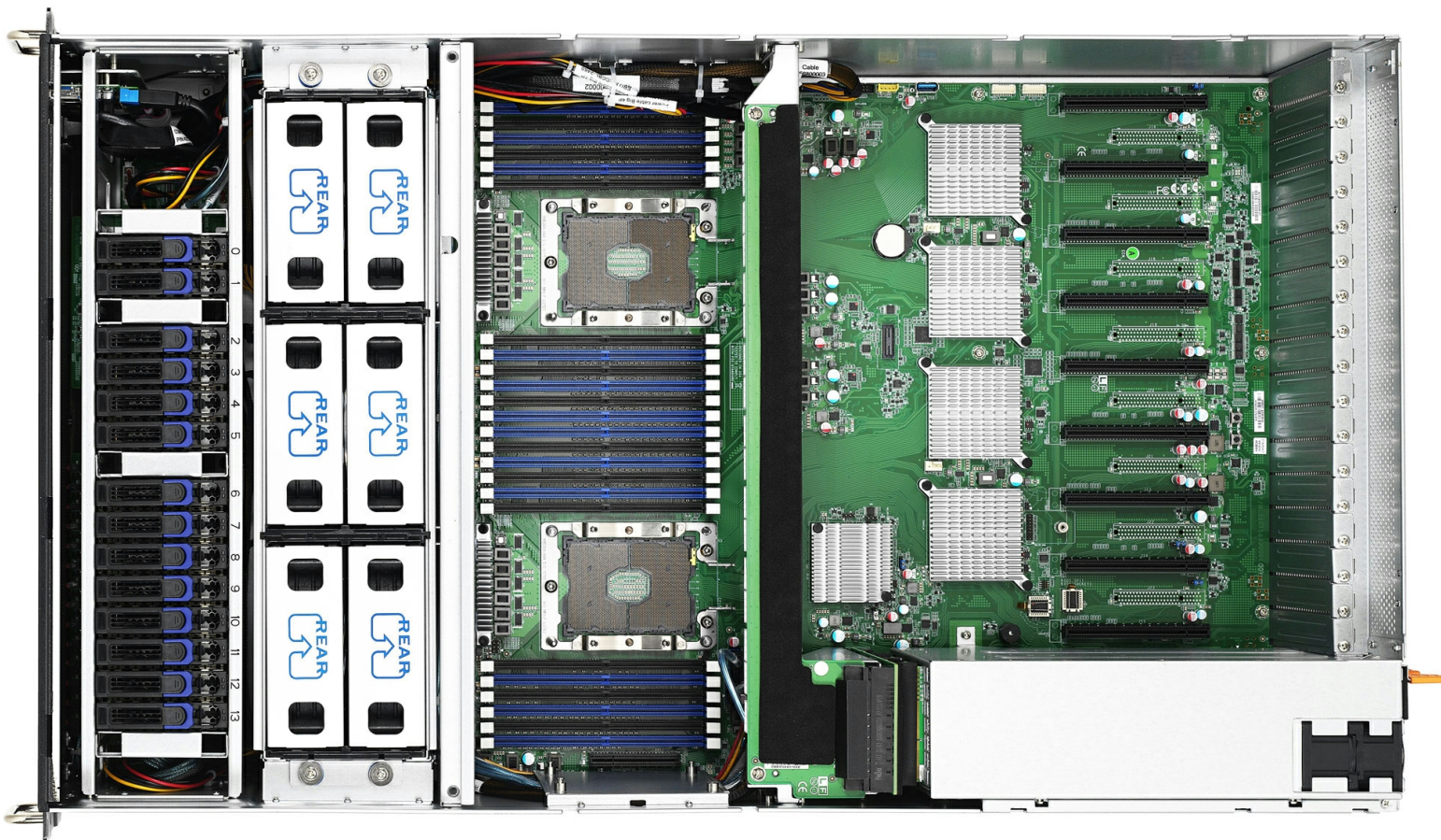
The mechanical design of the chassis allows expansion cards to fully utilise the 4U enclosure, allowing the CyberServe Xeon SP - FT77DB7109® to deploy the widest range of accelerator cards in the industry without requiring a specialised domed lid for the power connectors of active GPU cards.

### Internal PCIe x8 Storage Mezzanine

Featuring a new internal storage mezzanine slot, allowing customers to deploy SAS IOC, SAS RAID, or x8 NVMe risers. This allows customers to run any combination of 14x 2.5" SATA drives, up to 8 SAS drives, and up to 2 NVMe devices without consuming any expansion slots in the rear of the server.

### IPMI 2.0 with Redfish Support

Featuring AMI Megarac firmware, the CyberServe Xeon SP - FT77DB7109® offers support for IPMI 2.0 with iKVM and the DMTF Redfish management protocol.



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