

QNAP

Introducing

# TS-2088XU

Rendering

Rendering

Rendering



QNAP

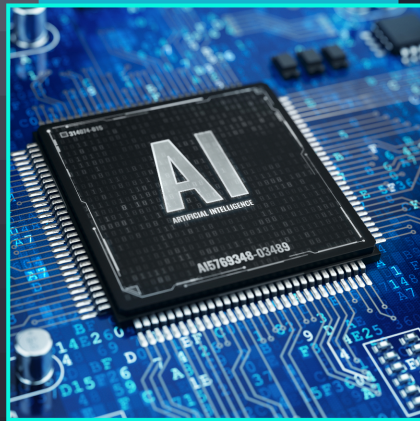
# TS-2088XU

## Computing in a Storage



# High Performance Computing is the Foundation of Data Science

AI/DL  
(GPU/VPU)



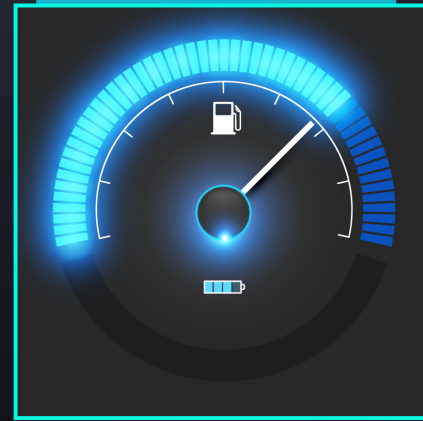
3D/2D Rendering  
(GPU/CPU)



Data  
Compression/Encryption  
(CPU/FPGA)

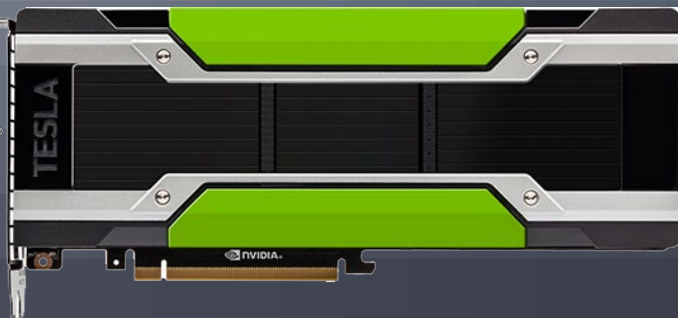


VM GPU  
Passthrough (GPU)

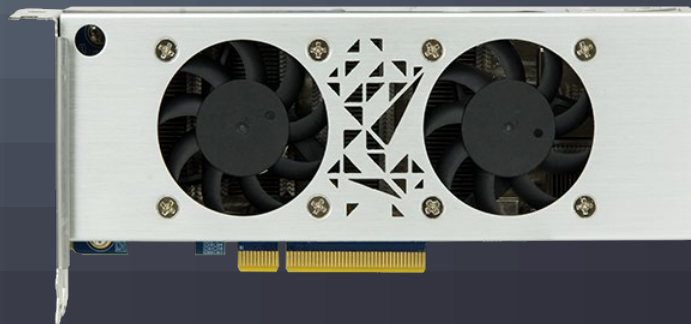


# Tools for Acceleration

TS-200000



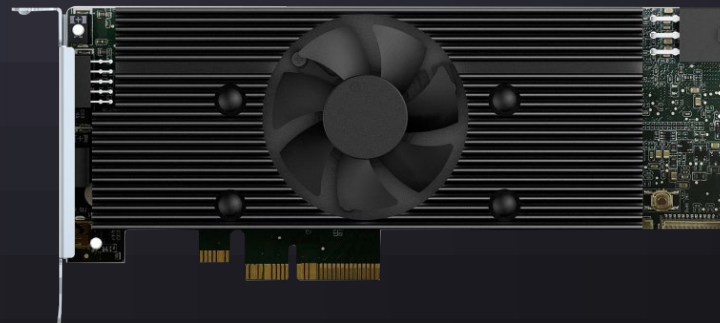
DL Graphic Card(PCIe Gen3 x16)



Mustang-F100 FPGA Card (PCIe Gen3 x8)



GPU Card(PCIe Gen3 x16)



Mustang-V100 VPU Card (PCIe Gen2 x4)



# TS-2088XU

TS-2088XU



## Intel Xeon W Processor



Up to **18 cores** and **36 threads** with up to **4.5 GHz** Intel® Turbo Boost Technology 2.0 frequency, combined with DDR4 ECC RDIMM 2666 MHz memory support delivering rapid workload loading and processing.

# Compute and Storage in a Box

TS-2088XU

- Versatile storage interface
- Take care for the demand of storage capacity and performance

2.5" U.2 SSD port  
(PCIe Gen3 x4)

2.5" SATA 6Gb/s SSD port

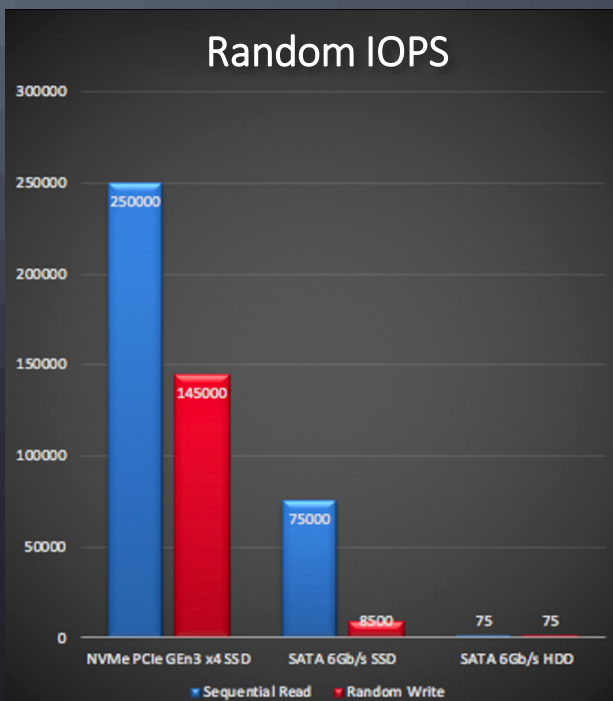
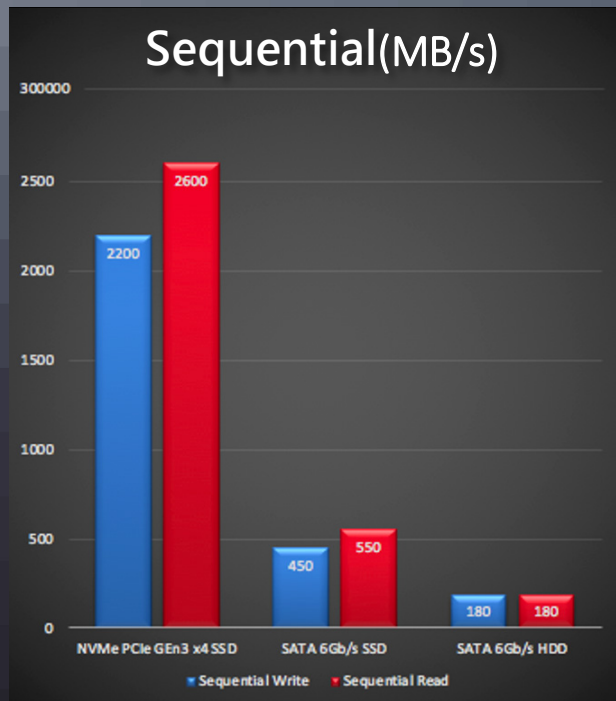
3.5" SATA 6Gb/s HDD  
port



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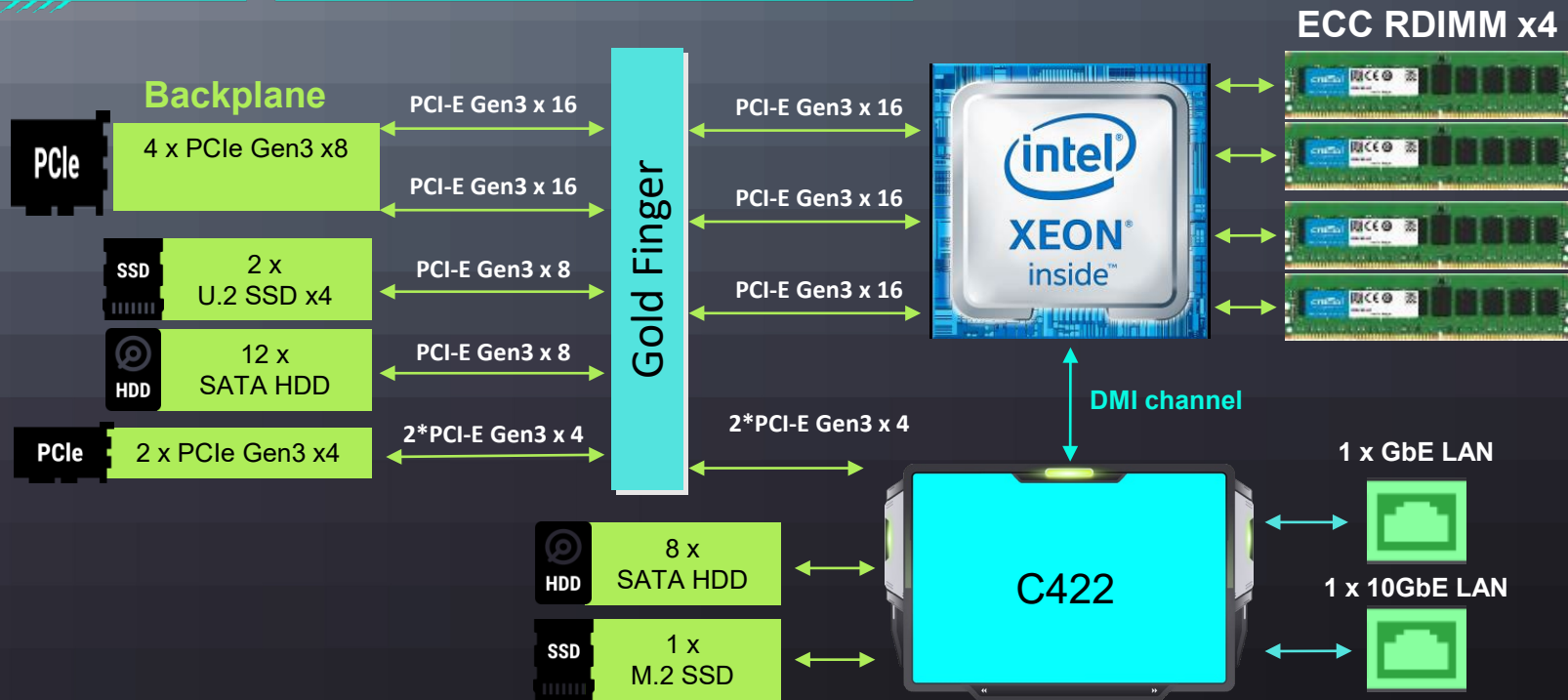
# PCIe Gen3 x4 U.2 NVMe SSD

TS-2000U



# System Block Diagram

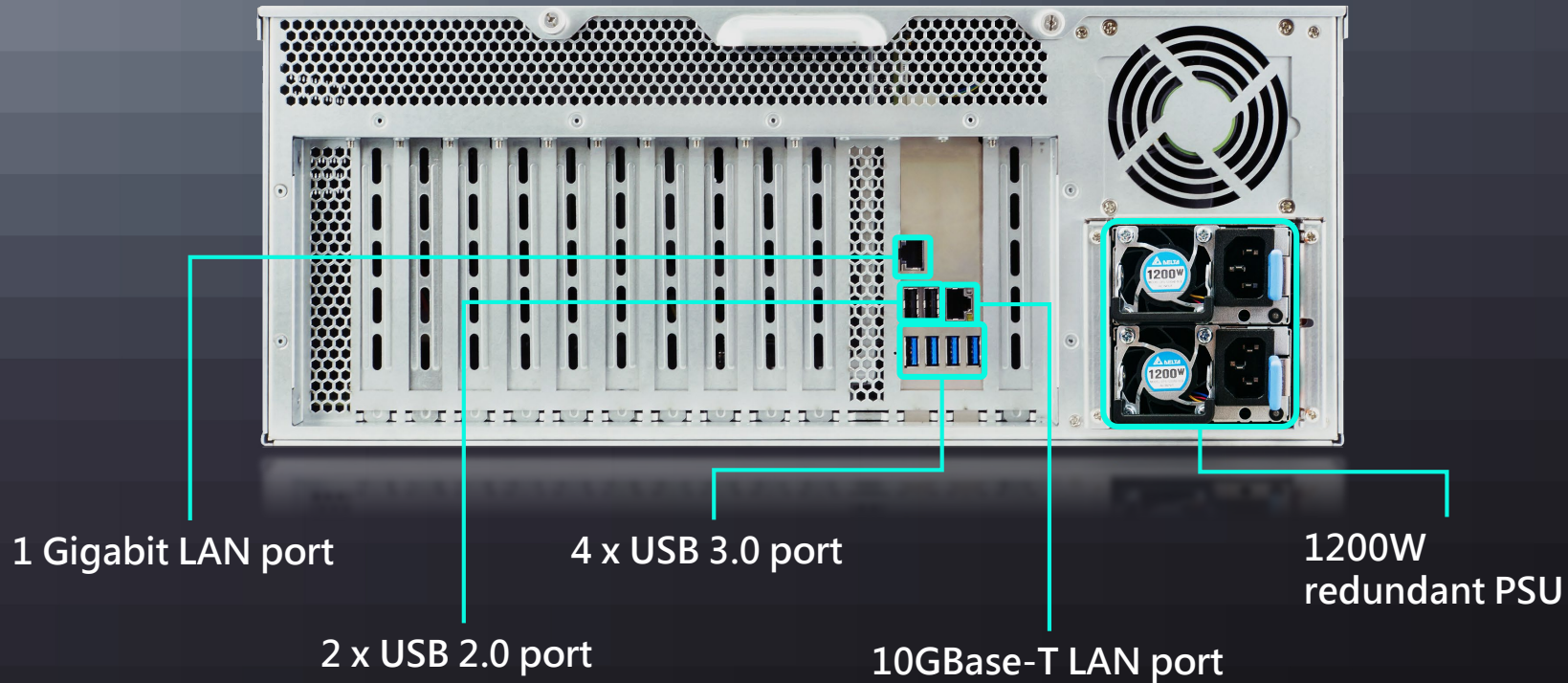
TS-2090RU





# Rear View

TS-8000U



**Max depth 330mm**

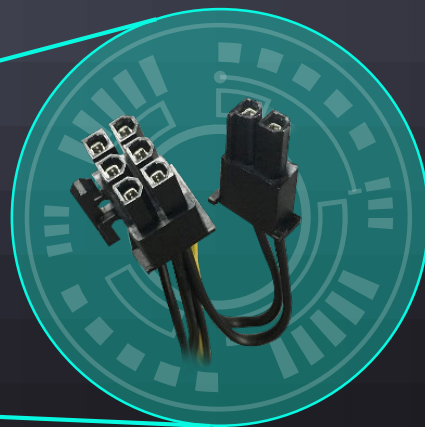
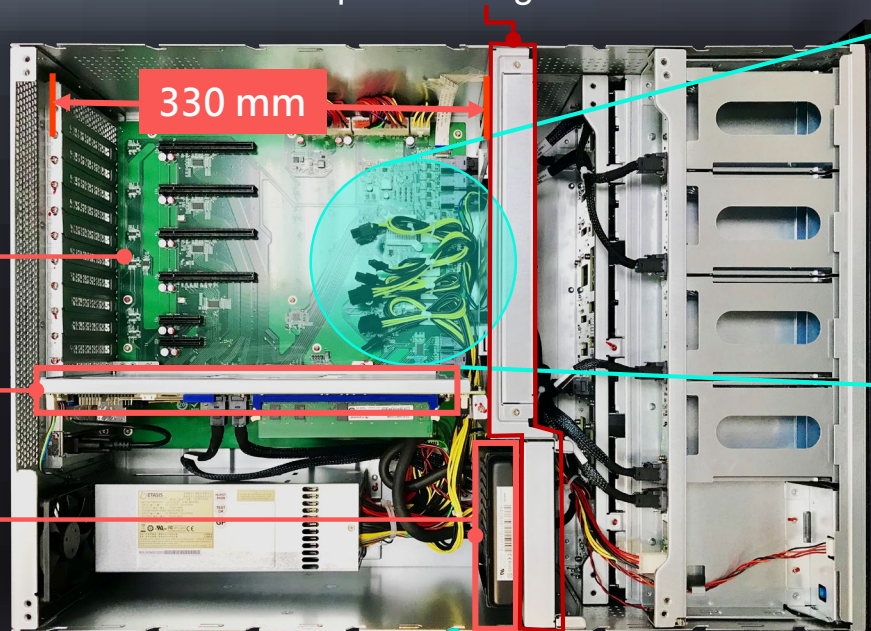
- ## Main Board

## Liquid cooling radiators

**3x 12 cm cooling fan**

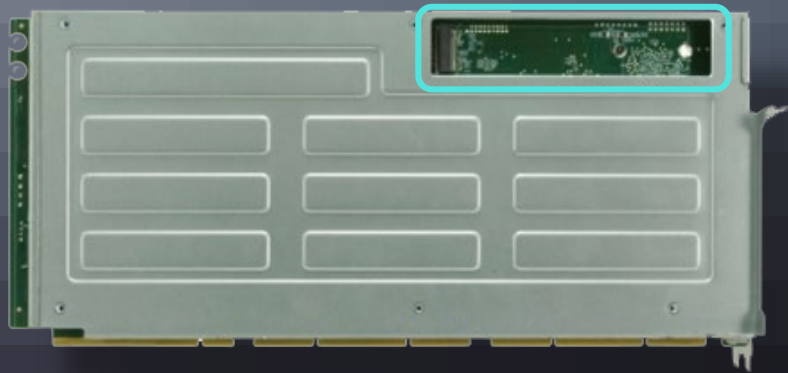
- Front-to-back airflow for HDD and GPU cards
- 12cm quiet cooling fans

4 x 6+2 pin PCIe power connector



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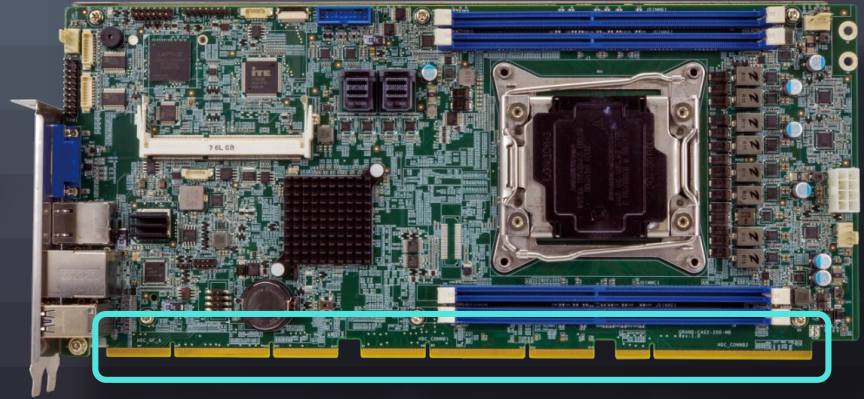
# SBC Main Board



## M.2 2280 nVMe SSD

### General Signal

- Front panel
- SMBUS
- CLOCK
- SGPIO for HDD LED



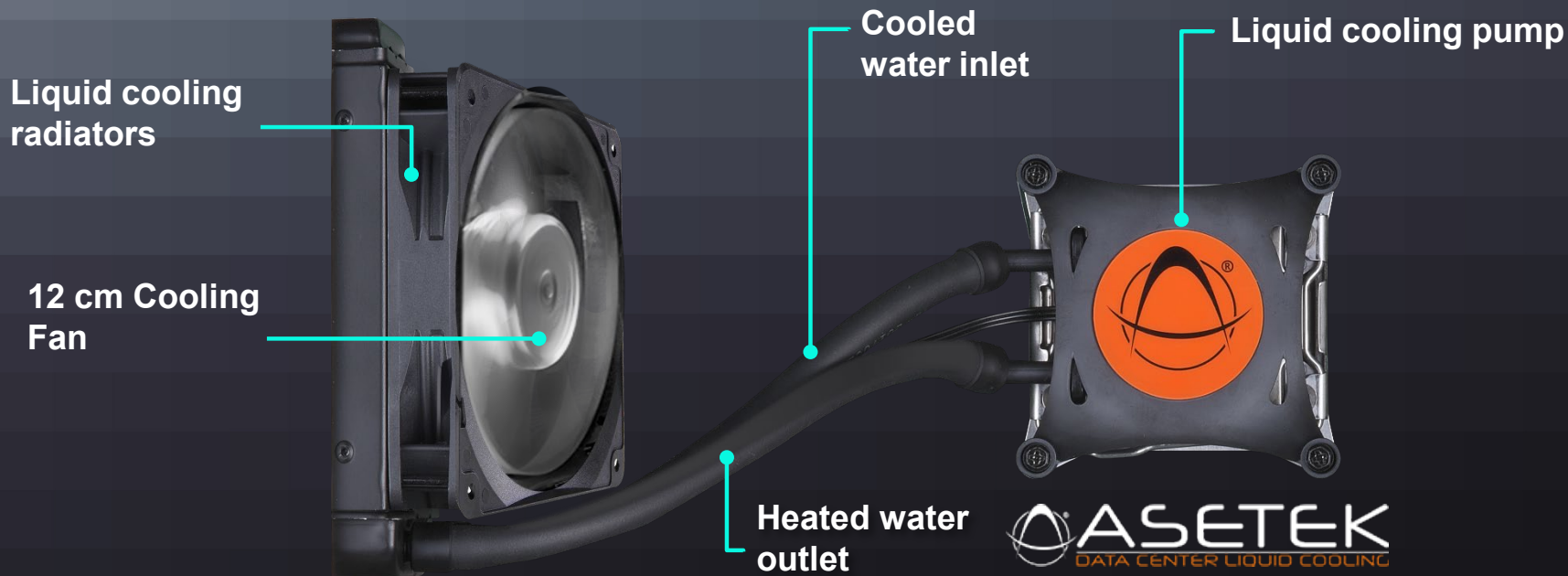
## High Speed Signal

- PCIE : 56 lanes to gold finger
- USB 3.0: 4 ports
- Mini SAS on-board
- 10GbE ethernet

# ASETEK CPU Liquid Cooling System

TS-2000RU

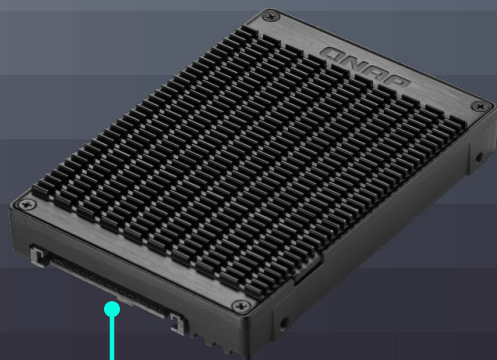
Unparalleled Cooling Performance for 140W Xeon



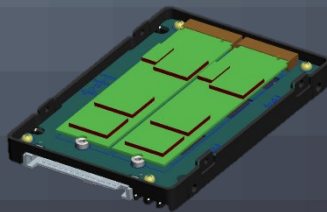


# QDA U.2 to M.2 Drive Converter

TS-2000U

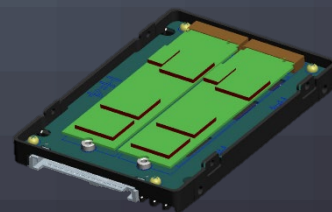


U.2 port



QDA-U2MP

Dimension : 100.2 x 69.85 x 15mm (2.5" HDD)  
Controller : Asmedia 2812X  
RAID : N/A  
U.2 interface : PCIe Gen3 x4  
M.2 interface : 2 x PCIe Gen3 x4 M.2 port, 2280.

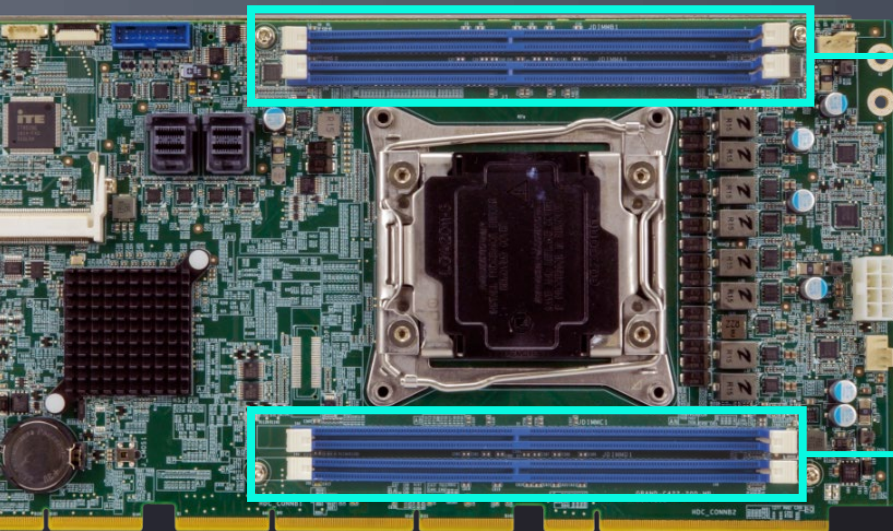


QDA-U2MPR

Dimension : 100.2 x 69.85 x 15mm (2.5" HDD)  
Controller : Marvell NevoX  
RAID : **Hardware RAID0**, RAID1  
U.2 interface : PCIe Gen3 x4  
M.2 interface : 2 x PCIe Gen3 x4 M.2 port, 2280.

# 4-Channel DDR4 Memory

TS-2000U



## 4 Memory Slot

- Up to 256GB
- Installing memory in 4 to take advantage of 4-channel

# Memory Accessory

TS-20880U

Ordering P/N	Specification
RAM-8GDR4ECK0-RD-2666	DDR type: DDR4(288PIN) ECC RDIMM Capacity: 8 GB Manufacturer: Kingston Frequency: DDR4-2666 Manufacturer P/N: KSM26RS8/8MEI
RAM-16GDR4ECK0-RD-2666	DDR type: DDR4(288PIN) ECC RDIMM Capacity: 16 GB Manufacturer: Kingston Frequency: DDR4-2666 Manufacturer P/N: KSM26RS4/16MEI
RAM-32GDR4ECK0-RD-2666	DDR type: DDR4(288PIN) ECC RDIMM Capacity: 32 GB Manufacturer: Kingston Frequency: DDR4-2666 Manufacturer P/N: KSM26RD4/32MEI
RAM-64GDR4ECS0-LR-2666	DDR type: DDR4(288PIN) ECC LRDIMM Capacity: 64 GB Manufacturer: Kingston Frequency: DDR4-2666 Manufacturer P/N: M386A8K40BM2-CTD



**LRDIMM & RDIMM  
cannot be used at the  
same time.**

# Choose Your TS-2088XU

## TS-2088XU-W2123-32G

Xeon® W-2123 4-core/8-thread 3.6GHz processor(Turbo 3.9 GHz)  
32GB DDR4 ECC RDIMM (4 x 8GB)

## TS-2088XU-W2133-64G

Xeon® W-2133 6-core/12-thread 3.6GHz processor(Turbo 3.9 GHz)  
64GB DDR4 ECC RDIMM (4 x 16GB)

## TS-2088XU-W2145-128G (BTO)

Xeon® W-2145 8-core/16-thread 3.7GHz processor(Turbo 4.5 GHz)  
128GB DDR4 ECC RDIMM (4 x 32GB)

## TS-2088XU-W2175-128G (BTO)

Xeon® W-2145 14-core/28-thread 2.5GHz processor(Turbo 4.3 GHz)  
128GB DDR4 ECC RDIMM (4 x 32GB)

## TS-2088XU-W2195-256G (BTO)

Xeon® W-2195 18-core/36-thread 2.3GHz processor(Turbo 4.3 GHz)  
256GB DDR4 ECC RDIMM (4 x 64GB)





QNAP

TS-2088XU

Build Up High  
Performance  
Computing Storage  
with QTS 4.4.1



# Fibre Channel Adopt Industries

"Fibre Channel is safe. It's trusted. It's still a rock-solid solution. And customers aren't looking to rip everything out and change their protocols. Changing protocols is something that usually takes many years to happen," said Stuart Miniman, principal research contributor at Wikibon, a community-focused research and analyst firm based in Marlborough, Mass.

## Banking

- Low latency
- High security



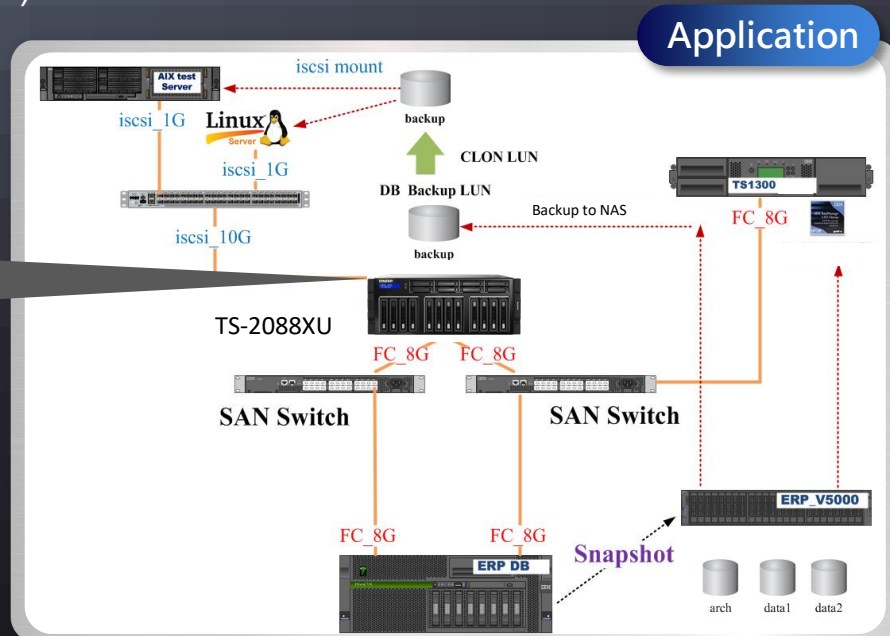
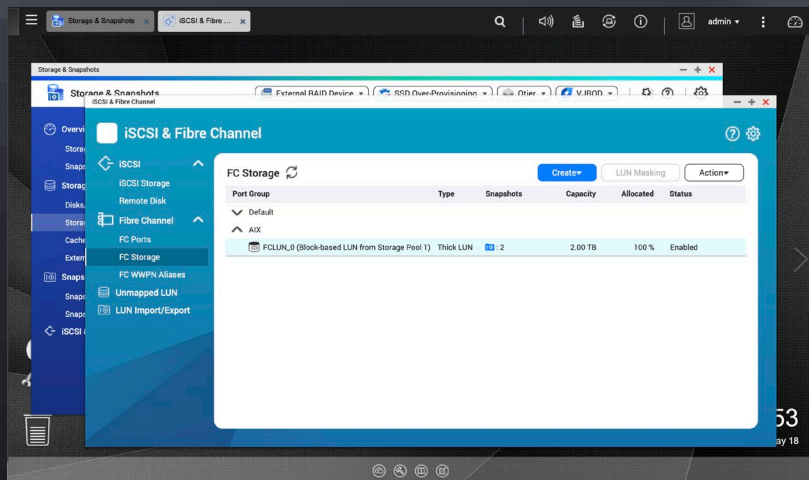
## Online e-commerce

- Database transaction



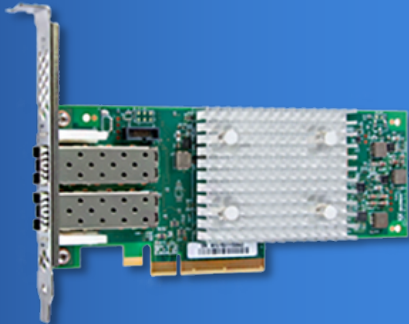
# Fibre Channel & CDM

- QTS 4.4.1 will support iSCSI & FC Manager
- LUN (LUN clone) can be mapped between iSCSI target and FC port group for copy data management (CDM)



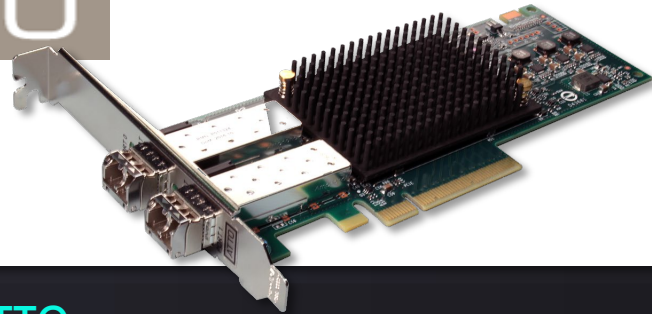
# Supported Fibre Channel adapters

Partnering with industry-leading FC adapter vendors for the most economical FC SAN storage solution



**Support Marvell**  
Qlogic 32Gb/16Gb/8Gb/4Gb FC adapters

ATTO



**Support ATTO**  
Celerity 32Gb/16Gb FC adapters

HAL : <http://www.qnap.com/compatibility/>



# Deep Learning NAS- TS-2088XU

TS-2088XU

## Deep Learning Models

### 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.

### Face Recognition

MTCNN, DeepFace,  
Facenet, etc.

### Video Classification

RNN, LSTM, etc.

### Voice Recognition

DeepVoice,  
WaveNet, etc

## Framework

Caffe  
Caffe2  
CNTK  
MXNet  
Neon  
PyTorch  
Tensorflow  
...

## Training

Intel® MKL/ NVIDIA® CUDA/ OpenCL

## Inference(tool kit/SDK)

CoreML (iOS)/ OpenVINO/ Tensorflow Lite  
(Android) / TensorRT (Nvidia)

Container Station

NVIDIA Driver

IGD Driver

QTS 4.4.1

The all-in-one solution for  
computing and storage



QNAP

# The ready-to-use AI environment - QuAI



Ready-to-use GPU driver and Container Station enable users to easily and quickly construct containers such as Caffe, TensorFlow, MXNet, and pytorch with GUI in QTS.



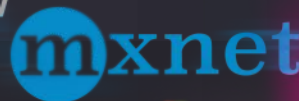
# QTS



QNAP



neon



PYTORCH



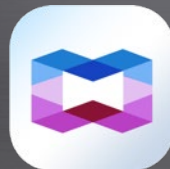
# QTS & virtualization increase productivity

TS-2090XU

**Supports  
Windows/Linux VMs and containers**



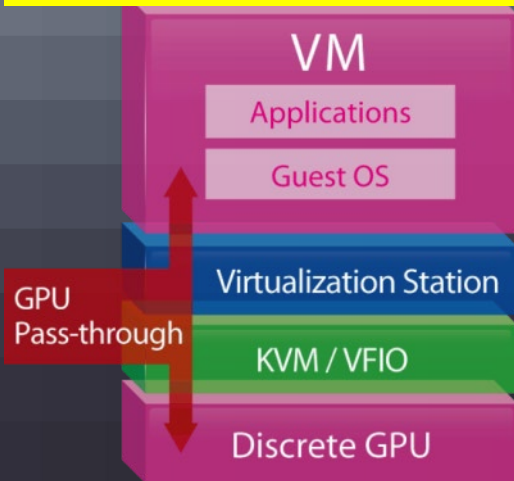
**Virtualization Station**



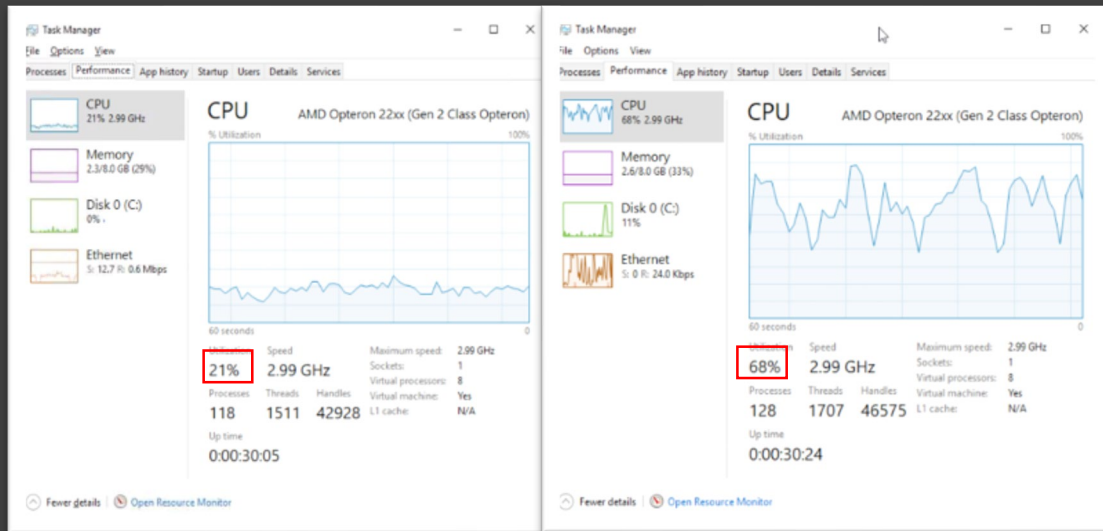
**Container Station**

# GPU boosts image/video processing

For OpenGL & DirectX applications



H/W accelerated with GPU to lower CPU usage.



w/ GPU

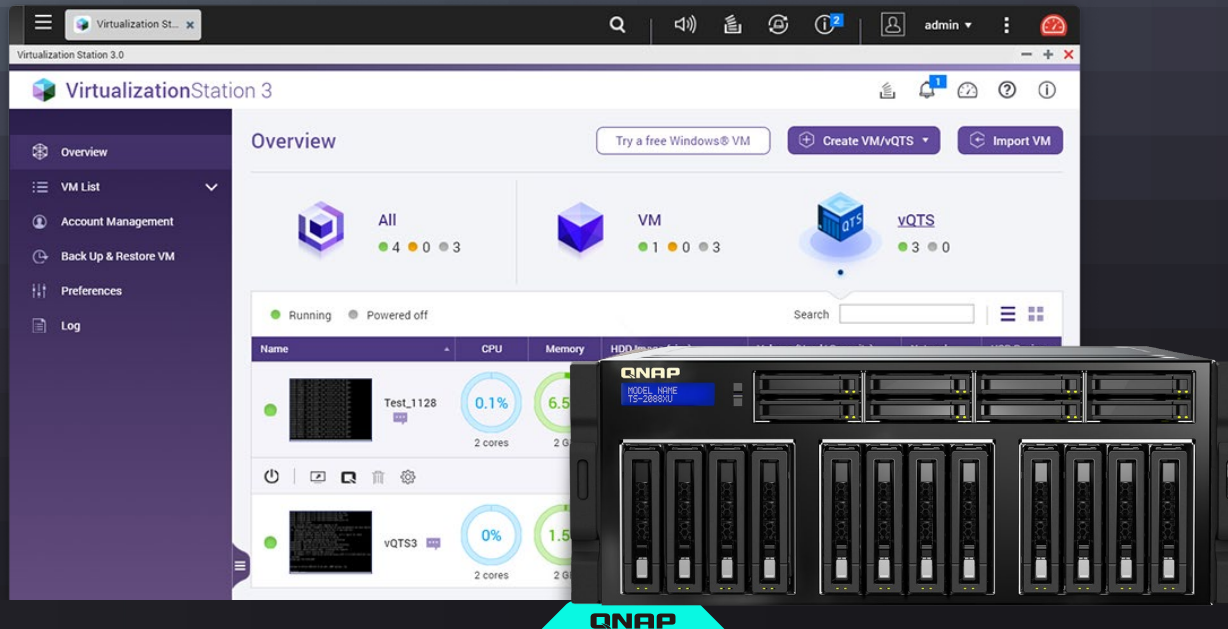


w/o GPU

# vQTS – Virtual QTS

TS-200809

- Host multiple virtual NAS in a physical NAS
- Resource segregation (CPU, memory and networking)
- Savings on energy, cost and physical space.





# HBS 3.0 Back up with source-side data deduplication

TS-20000U

## Feature highlights

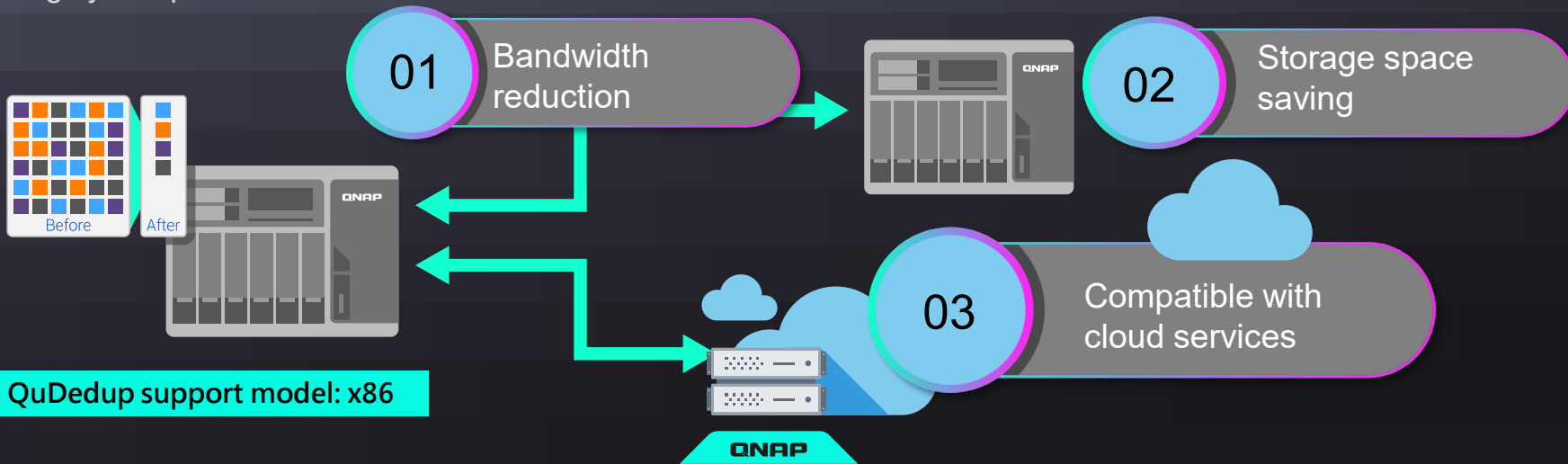
### Source-side data deduplication

#### Advantages

- Bandwidth reduction
- Storage space saving
- Highly compatible with cloud services

VM image Size	Deduped File Size	Compression Rate
15.48 GB	7.59 GB	2.04:1

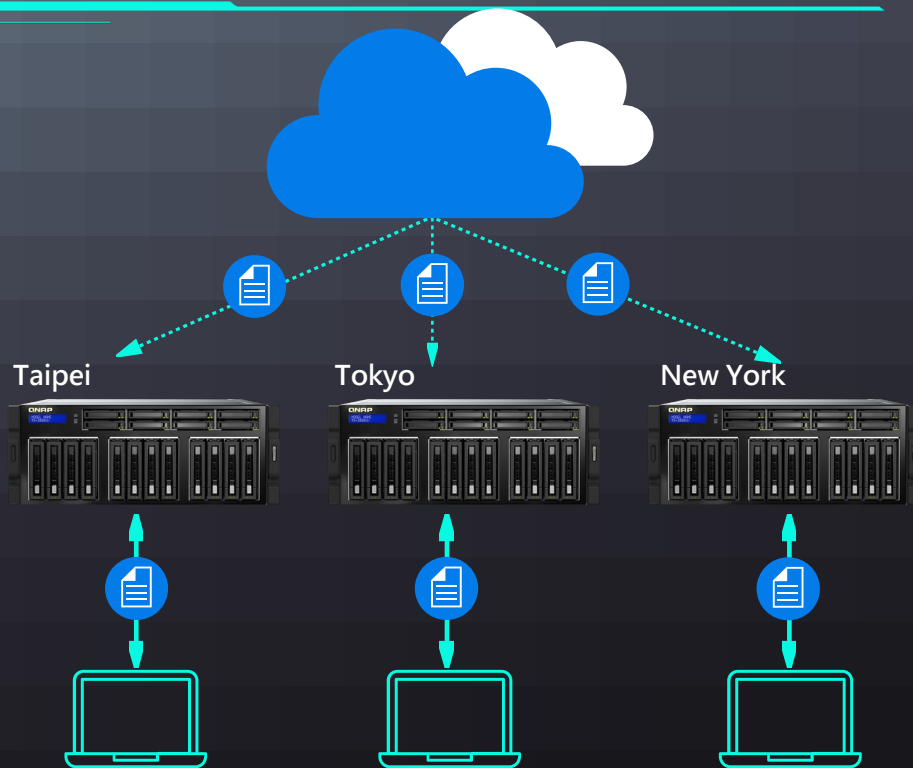
Note: This is the compression rate of one VM image file.



# Hybrid Cloud Solution to Embrace The Advantages of Both

- Security
- Storage extension
- Access speed
- Powerful computing
- Access anywhere

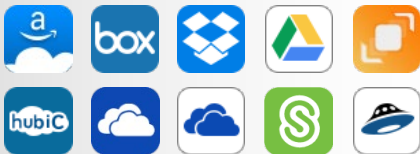
Hybrid cloud solution is one of the best choices for the enterprise!  
Keep the old service investment and get the elasticity advantage!



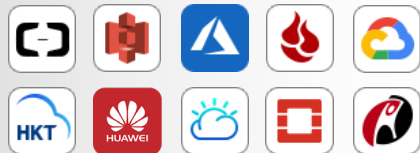
# QNAP Hybrid Cloud Solution: CacheMount

## Supports 20 Cloud Services

### File-based Storage



### Object-based Storage



CacheMount

## 4 New experiences

**Cache Function:**  
Much smoother access

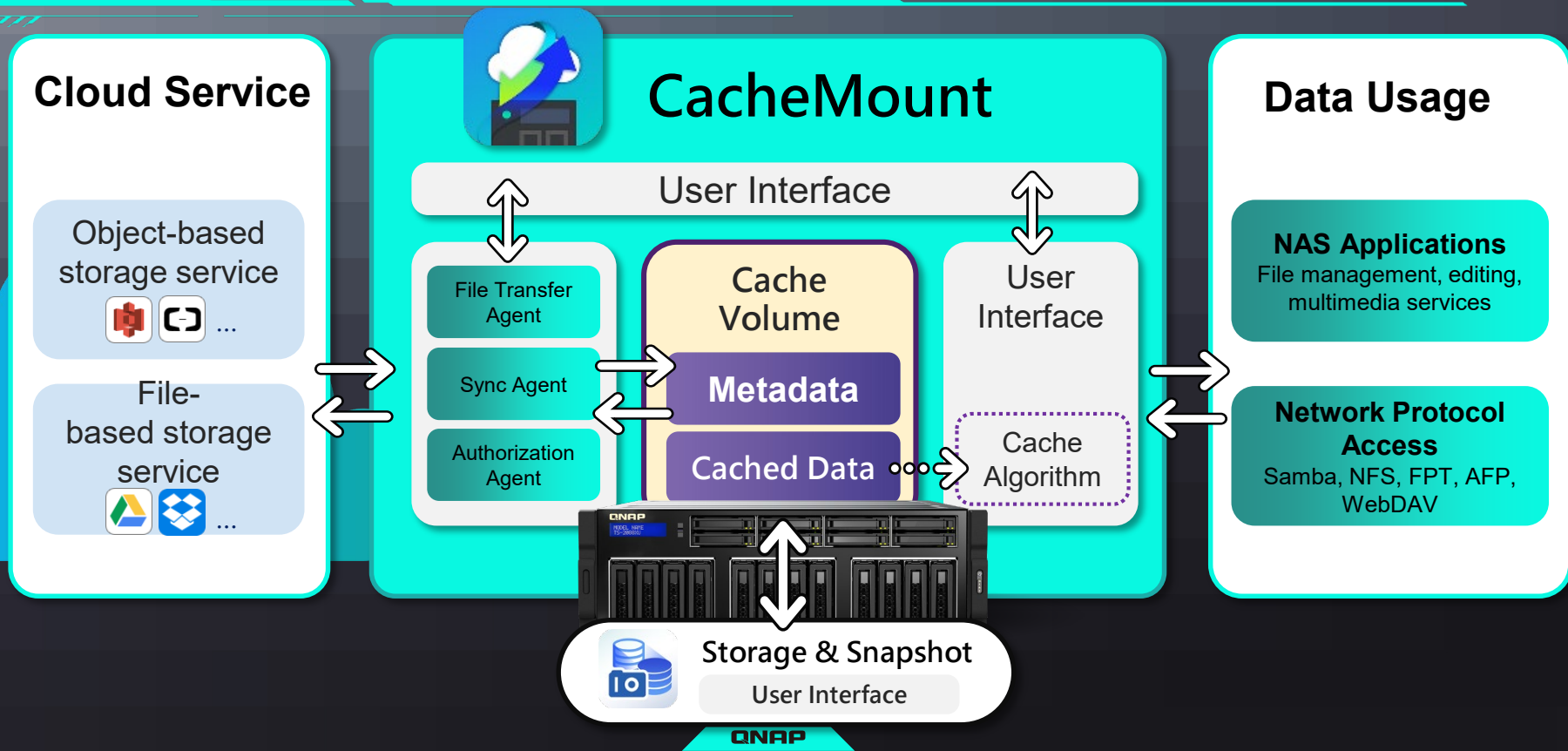
**PC can access cloud storage**  
through SMB/AFP

**Share files between**  
multiple site office on time

**Horizontally integrate QTS**  
APPs to use cloud data

# CacheMount as a Bridge to the Cloud

TS-2000RU



QNAP

TS-2088XU

QNAP NAS

is Your Best Choice



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