

READY FOR **ANY** vForum2015

9 December 2015 | Taipei, Taiwan

Advanced High Performance VSAN/ VDI By Integrating Hyper-Turbo, NVMe, and GPU
整合低擾動超頻，GPU加速以及NVMe閃存的更高性能VSAN/ VDI

Ryan Wang 王世全
Director, Technology Enablement of Marketing

Agenda

- **Performance Raised VDI**
 - NVMe Acceleration
 - Hyper-Turbo Acceleration
 - GPU Virtualization
 - Fully Integrated High Performance VDI System
- **VSAN Ready For Any Workloads**
 - Use Cases And Values
 - Hybrid VSAN Ready Systems
 - All Flash VSAN Ready Systems – All NVMe!!
 - GPU Integrated VSAN Ready Systems
- **Q&A**



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Blade Solution



Twin Architecture



Xeon Phi/GPU



SuperStorage



MicroCloud™



Embedded / IoT



Switch



Software



Service



Total Solutions

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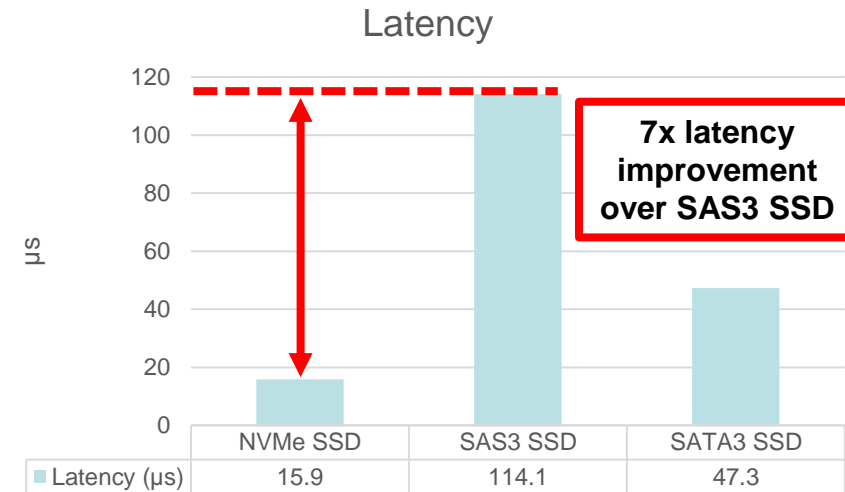
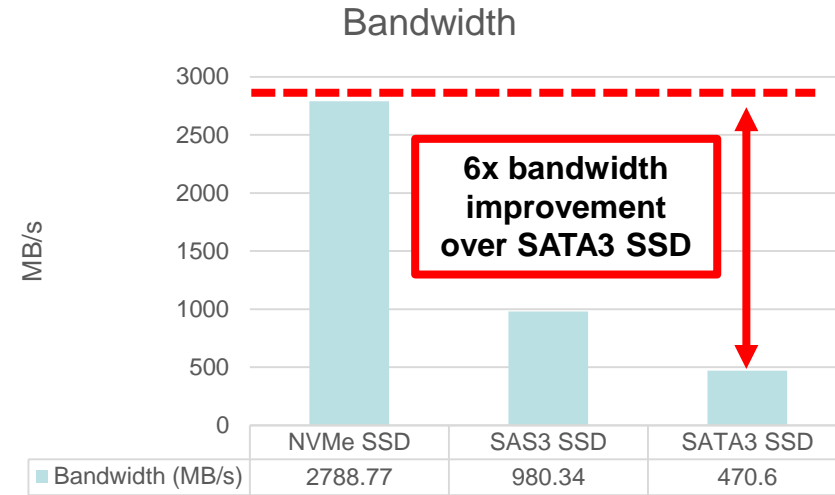
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NVMe SSD Benefits

- **Scalable**
 - PCIe for scalable performance
 - Flexible form factors and industry stability
- **Increase Bandwidth**
 - 4GB/s per device (PCIe Gen3 x4)
 - 6x bandwidth improvement over SATA3 SSD
- **Lower Latency**
 - 7x improvement over SAS3 SSD
 - increase efficiency
 - lower CPU utilization, power, TCO
- **Low Power**
 - No SAS HBA AOC saves 7-10W
 - Lower wattage per IOPS
 - Many SMC models uses “direct attached”



http://www.supermicro.com/white_paper/white_paper_NVMe.pdf



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IOPS Acceleration Using NVMe

- **IOPS: Input Output operation Per Second**
- **Boot Storm**
 - 150 VMs to boot simultaneously ~ 39,000 IOPS (Peak) (32 bit Win7)
 - ~ 20,000 IOPS (Avg.)
- **Steady State**
 - 150VMs consume 1,700 read IOPS and 1,000 write IOPS
- **Input Output operations Per Second**

● 7,200 rpm SATA3 HDD	100 IOPS	17
● 10,000 rpm SATA3 HDD	140 IOPS	
● 15,000 rpm SAS HDD	200 IOPS	9
● SATA3 SSD	1,100 IOPS	2
● NVMe SSD	2,600 IOPS	1



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Hyper-Turbo Mode: Max Frequency Stabilization

- New **Hyper-Turbo** mode
 - Keeps maximized CPU frequency infinitely with proprietary power delivery algorithm
- Without Hyper-Turbo
 - Standard platforms under 100% load drop frequency within couple seconds and fluctuate frequency among CPUs

Standard

COMPONENT	FREQUENCY (...)	USAGE (...)	TEMPER...	DTS	VO
▶ SKT 0: CPU	2742.26	100.00	59	27	0.8
▶ SKT 0: Memory			64		
▶ SKT 1: CPU	2580.70	100.00	59	27	0.8
▶ SKT 1: Memory			64		

Hyper-Turbo

COMPONENT	FREQUENCY (...)	USAGE (...)	TEMPER...	DTS	VOLTAGE ...
▶ SKT 0: CPU	2905.75	100.00	55	31	0.856
▶ SKT 0: Memory			224		
▶ SKT 1: CPU	2905.74	100.00	60	26	0.884
▶ SKT 1: Memory			224		

*Tested with top-bin E5-2699 v3 CPUs



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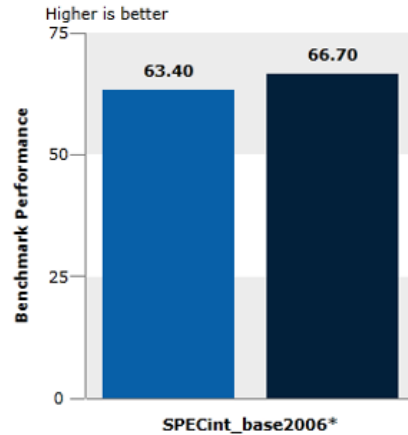


World Record Latency/Jitter on STAC-N1

- **STAC(Securities Technology Analysis Center)-N1**
 - An independent benchmark council who test network stack performance using a market data style workload
 - **Lowest mean latency, max latency, and jitter (std_dev) ever published on STAC-N1**

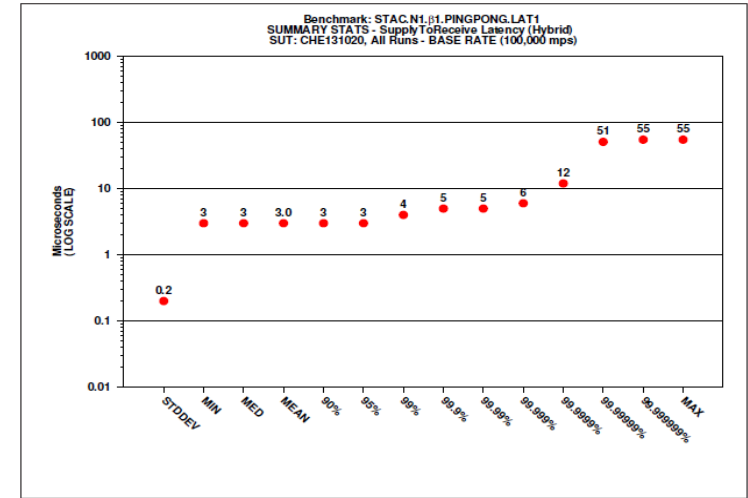
STAC-N1 Report: <http://www.STACresearch.com/SFC141110>

Intel Generational Performance on SPECint*_base2006

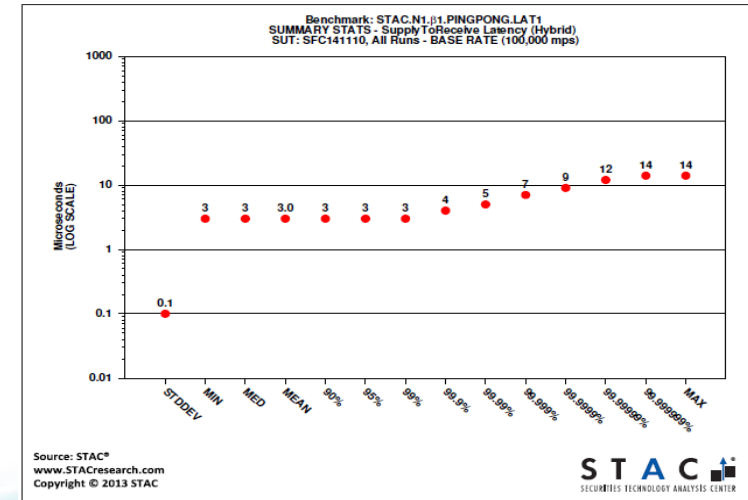


- **SPEC int/fp 2006**
 - **Up to 2.5% higher than 2nd place competitor**
- <https://www.spec.org/cpu2006/results/cpu2006.html>

Previous Record



New Record



Source: STAC*
www.STACresearch.com
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GPU Virtualization With GRID 2.0

- NVIDIA GRID CERTIFIED SERVERS**



2X
Users

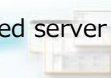
2X
Performance

2X
Platforms

2X
OS



MODEL	RACK UNITS	NODE PER CHASSIS	MAXIMUM CARDS PER NODE			
			GRID K1	GRID K2	M6	M60
Supermicro SYS-1028GR	2	1	2	3	-	3
Supermicro SYS-1028U / 6018U	1	1	1	1	-	-
Supermicro SYS-2027GR	2	1	2	4	-	-
Supermicro SYS-2028GR	2	1	2	4	-	-
Supermicro SYS-2028U / 6028U	2	1	-	3	-	-
Supermicro SYS-7047GR-TRF	4	1	2	4	-	-
Supermicro SYS-7048GR-TR	4	1	2	4	-	-
Supermicro SYS-F627G	4	4	-	3	-	-



Note: This list for M60 is still under review and the final result is subject to GRID certified server list on Nvidia's website.

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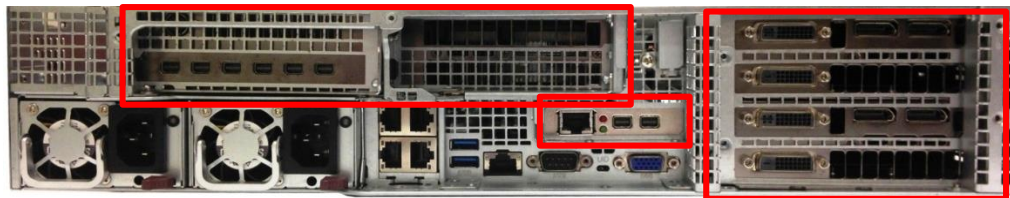
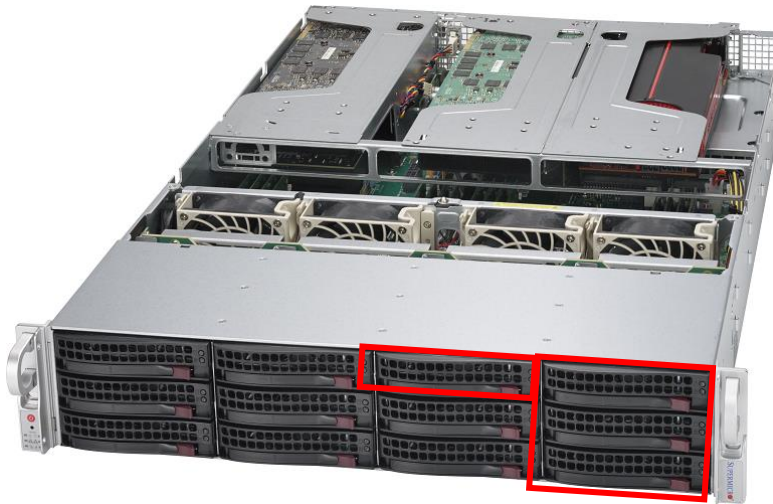
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SYS-6028UX-TR4: High Performance VDI System



Up to 36 cores and up to 160 W



Up to 1 TB DDR4 Memory



Up to 4 double-width **GPUs**



12x 3.5" HDDs with option of SAS3 and/or **4x NVMe**

Hyper-Turbo



- Level 1: 101.30%
- Level 2: 102.47%
- Level 3: 103.78%



Hardware PCoIP accelerator for remote access



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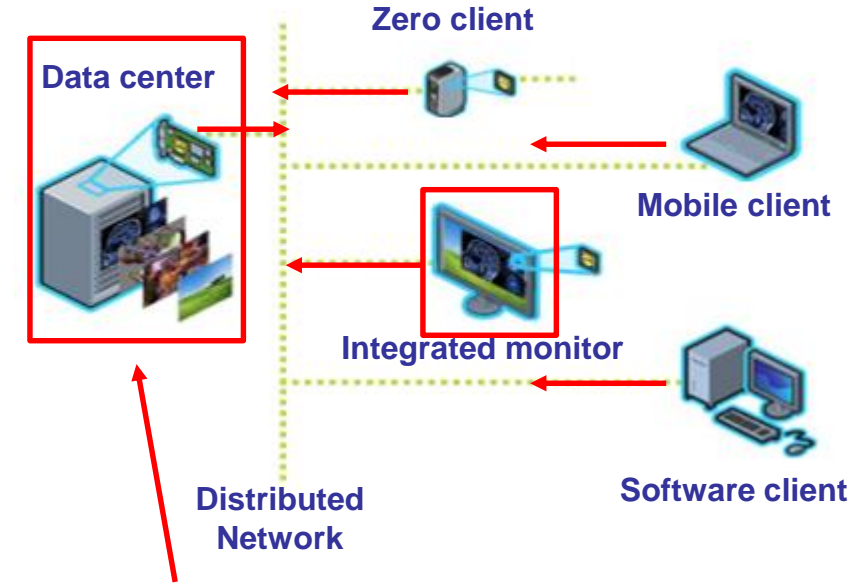


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SYS-6028UX-TR4 Use Case

● VDI: Immigrate Desktops to Data Center

- Desktops reside in the data center instead of on the desk
- Connect from anywhere via a variety of devices
- One-to-many configurations are possible
- Encrypted pixel stream transmits the seamless display
- Sensitive data sets remain securely in the data center



● Targeted Applications



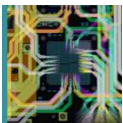
CAD/CAM/CAE

- AutoCAD
- Ansys
- Dassault



Digital Content Creation

- 3DS Max
- Side Effects
- Black Magic
- Adobe
- Avid
- Pinnacle



Electronic Design Automation

- Cadence
- Synopsys
- Mentor Graphics



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VSAN Ready For Any Workloads

Virtual Infrastructure



Best storage for VMs

Optimized for Virtual Infrastructure

Enterprise-class

Ready for business critical apps



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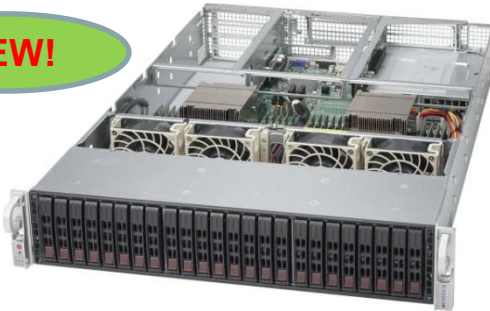
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Supermicro Hybrid VSAN 6.0 Ready Systems

High: ~400 VM

NEW!



SYS-2028U-VSN011/012L

- Up to **400** VMs (4-node cluster)
- Up to **160K** IOPs (4-node cluster)
- Total of **48TB** raw capacity (4-node cluster)
- 24 cores / 384GB DIMM per node
- 2 disk groups per node -
1x 400GB SSD + 5x 1.2TB 10K HDD
- Room for future capacity growth

Medium: ~200 VM

NEW!



SYS-2028TP-VSN011/012M

- Up to **200** VMs (4-node cluster)
- Up to **80K** IOPs (4-node cluster)
- Total of **24TB** raw capacity (4-node cluster)
- 24 cores / 256GB DIMM per node
- 1 disk group per node -
1x 400GB SSD + 5x 1.2TB 10K HDD

Economy: ~120 VM



SYS-1028U-VSN011/012E

- Up to **120** VMs (4-node cluster)
- Up to **40K** IOPs (4-node cluster)
- Total of **16TB** raw capacity (4-node cluster)
- 20 cores / 128GB DIMM per node
- 1 disk group per node -
1x 200GB SSD + 4x 1TB 7.2K

Low: ~ 80 VM



SYS-1018R-VSN001S

- Up to **80** VMs (4-node cluster)
- Up to **20K** IOPs (4-node cluster)
- Total of **20TB** raw capacity (4-node cluster)
- 12 cores / 64GB DIMM per node
- 1 disk group per node -
1x 200GB SSD + 5x 1TB 7.2K

VM Profile: 2 vCPU, 6 GB RAM and 2x60GB storage (4:1 vCPU to core)



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VSAN Ready Node – SYS-VSAN200NT(P)



Supports up to 200 VMs*

- Appliance HW Features**
- ✓ 3U/3-Node VSAN Cluster
 - ✓ 72 Processor Cores
 - ✓ 1.1TB Memory
 - ✓ 28.8TB Raw Capacity
 - ✓ 6 Disk Groups
 - ✓ NVMe SSD Caching
 - ✓ 10G Networking

Per Node Specification	
CPU	24 cores (2x Intel Xeon 2670v3)
Memory	384GB (24x 16GB DDR4)
ESXi Boot	32GB SLC SATADOM
Caching Tier	800GB (2x 400GB NVMe SSD)
Capacity Tier	9.6TB (8x 1.2TB SAS 10K HDD)
IO Controller	SMC 3008 (IT mode)
Networking	2-port 10G (RJ45 or SFP+) for VSAN 2-port 1G RJ45 for MGMT Dedicated RJ45 port for BMC



***VM profile: 2 vCPU, 6GB vRAM, 60GB vmdk, with redundancy**



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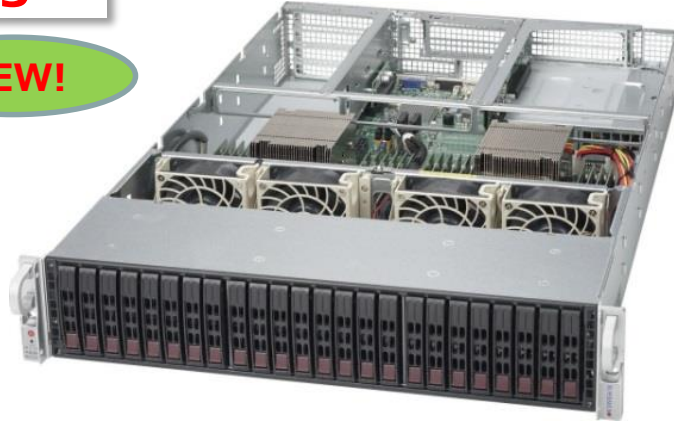
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Supermicro All Flash VSAN 6.0 Ready Systems

High

NEW!



Medium

NEW!



SYS-2028U-VSNF11/12L

- Up to **480 VMs** (4-node cluster)
- Up to **320K IOPs** (4-node cluster)
- Total of **48TB** flash raw capacity (4-node cluster)
- 24 cores / 384GB DIMM per node
- 2 disk groups per node -
1x 400GB SSD + 5x 1.2TB SSD
- Room for future capacity growth

SYS-2028TP-VSNF11/12M

- Up to **200 VMs** (4-node cluster)
- Up to **200K IOPS** (4-node cluster)
- Total of **25.6TB** flash raw capacity (4-node cluster)
- 24 cores / 256GB DIMM per node
- 1 disk group per node -
1x 400GB SSD + 4x1.6TB SSD

VM Profile: 2 vCPU, 6 GB RAM and 2x60GB storage (4;1 vCPU to core)



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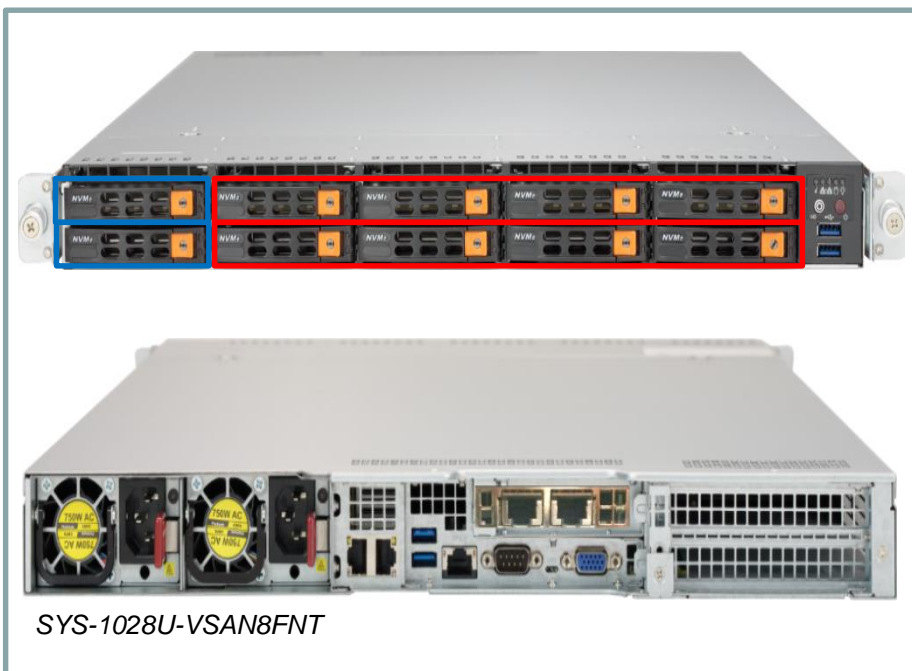
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VSAN SAN Ready Node – 1028U-VSAN8FNT(P)

- AF-8 Ready Node Profile (All-Flash NVMe)



vmware® **nvm** EXPRESS



	Per Node Specification
CPU	24 cores (2x Intel Xeon 2680v3)
Memory	384GB (24x 16GB DDR4)
ESXi Boot	16GB SLC SATADOM
Caching Tier	800GB (2x 400GB NVMe SSD)
Capacity Tier	16TB (8x 2TB NVMe SSD)
IO Controller	NVMe
Networking	4x 10G RJ45 or 2x 10G RJ45 + 2x 10G SFP+ (P model) Dedicated 1G Port for BMC
Expansion	2x PCIe x8 Slots



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All NVMe Servers & High Density Storage Servers

All-Flash Server Solutions

Highest Performance • Up to **6x** the bandwidth of SATA 3.0 (6Gbps) SSDs
 • **>7x** Lower Latency than SAS 3.0 (12Gbps) SSDs • Widest Variety of Systems Available

2U 48 NVMe
SSG-2028R-NR48N



2U 24 NVMe
SYS-2028U-TN24R4T+



1U 10 NVMe
SYS-1028U-TN10RT+



NEW!



SSG-6048R-E1CR60N

- 4U 60x 3.5" SAS3/SATA3 hot-swap

CSE-946ED-R2KJBOD

- 4U 90x 3.5" SAS3 hot-swap

NEW!



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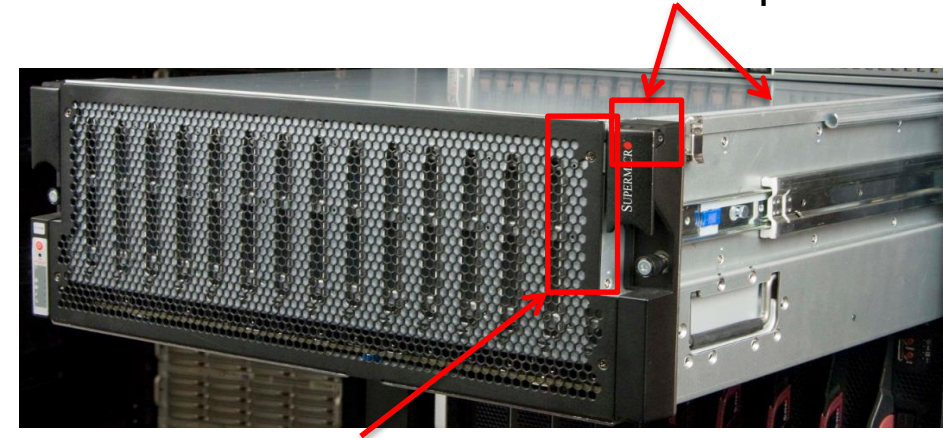


The Highest Density Storage

- 4U High Capacity, 3.5" SAS3 (12Gb/s) x90, top-load, hot-swappable



Tool-less side open cover



Tool-less Chassis Handles

LED indicators

Tool-less release clip



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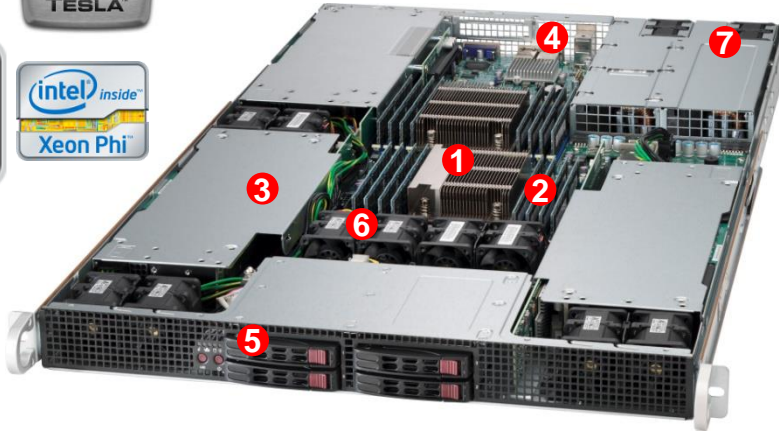
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VSAN/GPU/VDI : 3 - 1U DP SYS-1028GR-TR/TRT

- Motherboard: X10DRG-H/-HT
- Chassis: CSE-118GH-R1K66B



DDR4



1 Processor Support

Dual Haswell EP CPU (Socket R3)

2 Memory Capacity

16 DIMM, up to 1TB ECC LRDIMM, 512GB ECC RDIMM, DDR4, up to 2133MHz

3 Expansion Slots

4 PCI-e x16 Gen 3 for double width GPU cards
1 x8 (in x16 slot) LP card

4 I/O ports

1x VGA, 2x Gbit or 2x 10GbaseT LAN, 2x USB 2.0, and 1x IPMI dedicated LAN port.

5 Drive Bays

4 hot-swap 2.5" drives bays

6 System Cooling

10 counter rotating fans with optimal fan speed control
1 air shroud

7 Power Supply

1600W Platinum level efficiency redundant power supply

Key Features

- Support up to 3 double width GPU cards
- 4 Hot Swap 2.5" HDD
- 16 DIMM, up to 1TB memories
- Platinum level 1600W power supply

Key Application

- VDI technology & VSAN
- HPC
- Machine Learning
- Computational Finance



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