



# Disruptive

## Server / Storage / Networking Solutions

for

### High-Performance-Computing



Simply Double

April 4, 2016  
HPC for Wall Street Event



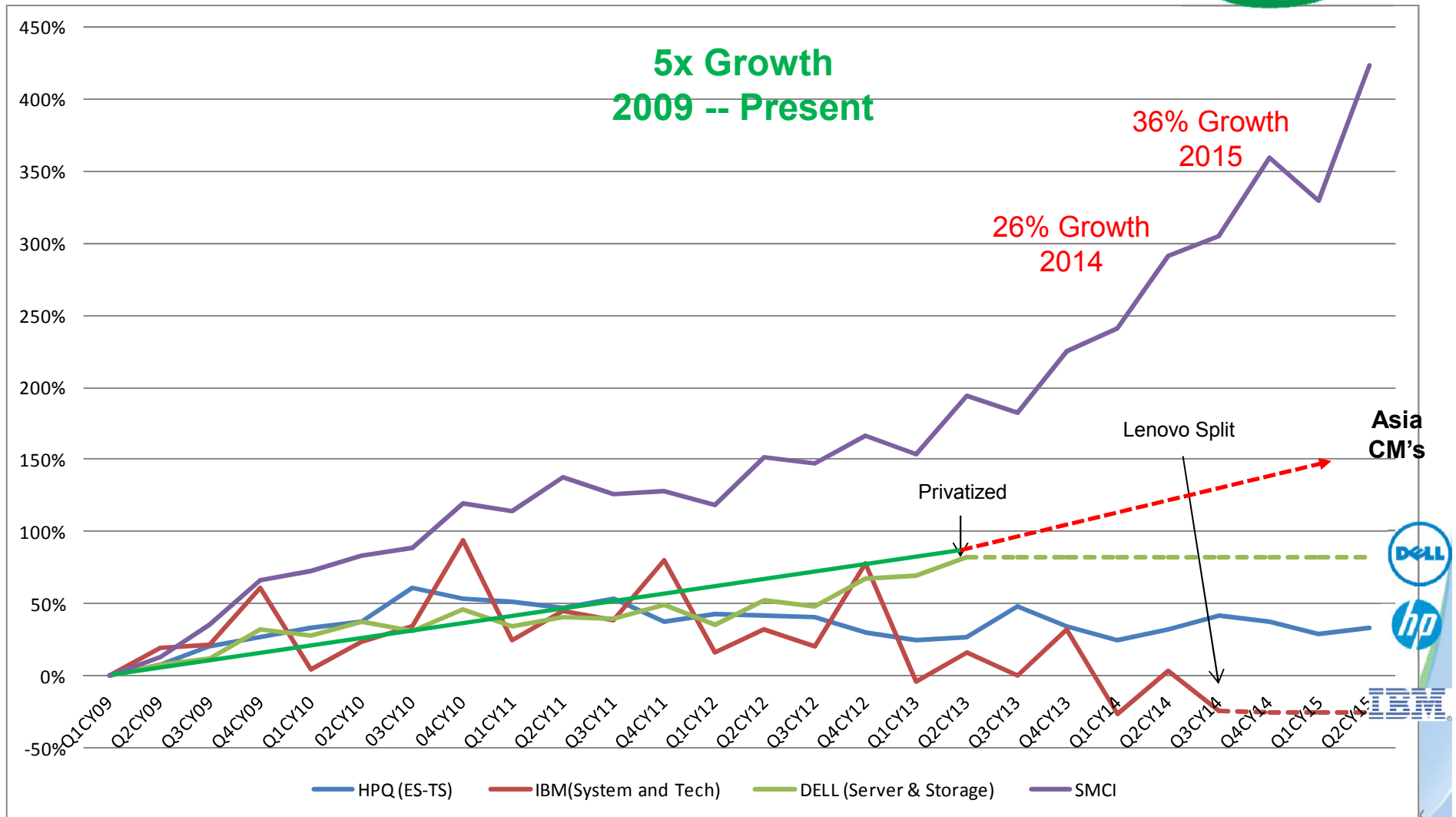
# Supermicro Introduction

## Executive Overview

*How can an organically grown, USA based, Multi-National Company,  
(that many people outside the server/storage industry have never heard of),  
**Drive Disruptive Technology Solutions?***



# Supermicro Growth



**WHY IS SUPERMICRO OUTPACING THE INDUSTRY?**





# Supermicro Global Reach



- Multi-National, Public Company – NASDAQ: SMCI
- USA Headquarters (Corporate Offices, R&D Center, Logistics SuperHub)
- Three SuperHubs: Americas (San Jose), Asia (Taipei), EMEA (Holland)



1993

2009

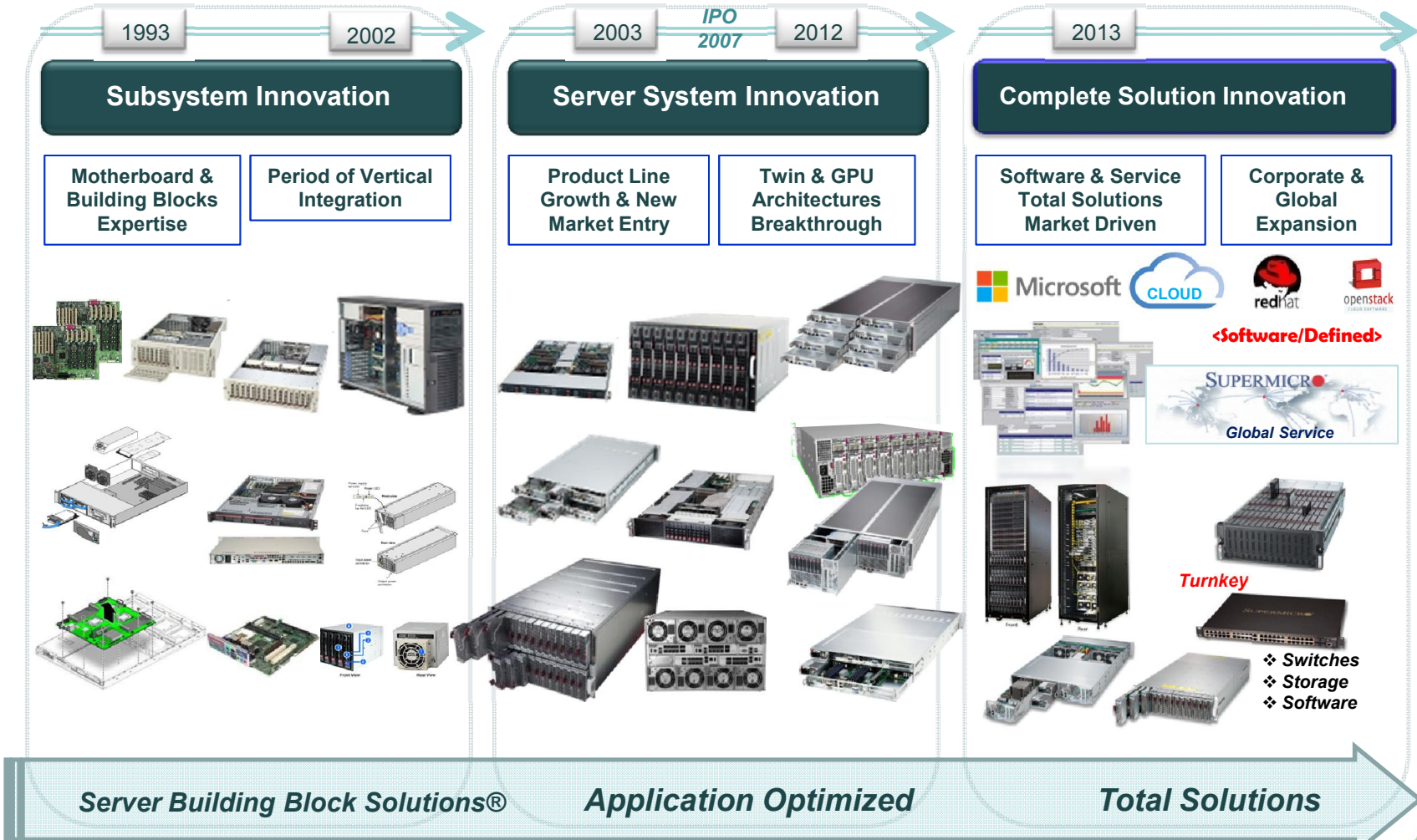
2015

5X



# Supermicro Disruptive Solution Evolution

Building Expertise, Scale, and Innovation at Every Phase



1993

2009

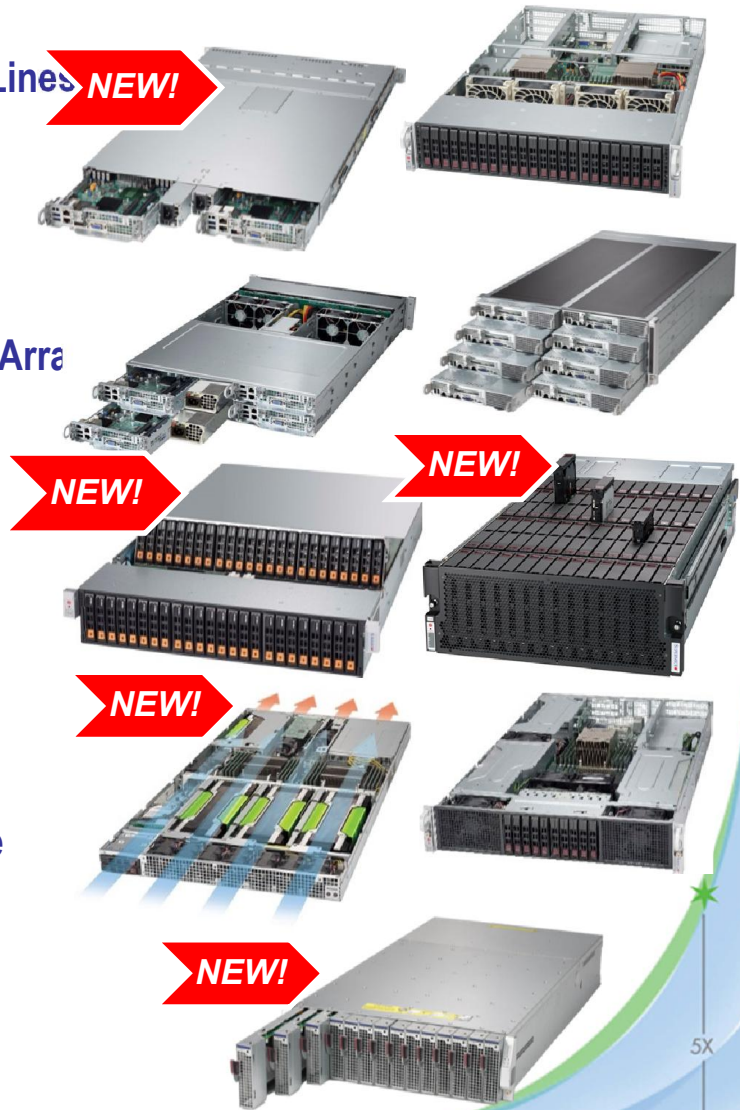
2015

5X



# Industry Leading Server/Storage Product Lines

- Simply Double – NVMe / SAS Solutions
- The Ultra 1U and 2U Haswell/Broadwell/SkyLake Product Lines
  - 3 to 15% less power consumption than competition
- The 1U/2U TwinPro and 4U FatTwin
  - Best performance/watt and price/performance ratio
- 847, 846, 836, 826, 226 Storage, JBOD & All-Flash Storage Arra
  - Highest storage density and performance
- 947, 947S(R), 927S(R)
  - Big Data and Software Defined Storage Solutions
- GPU/Xeon Phi Product lines
  - Highest computing density and power efficiency
- SuperBlade, MicroBlade and MicroCloud
  - Densest computing nodes, 0.05U/0.1U/0.2U per node
- Management Software and Virtualization Solutions





## East Coast Hub – Jersey City

525 Washington Blvd  
Jersey City, NJ

- Local Sales & Service
- Demo / POC Center
- Reflects Supermicro Investment in 3x Capacity Growth over next three years



1993



# Disruptive Technology Examples

*Deployed by Supermicro*







# Non Volatile Memory Express

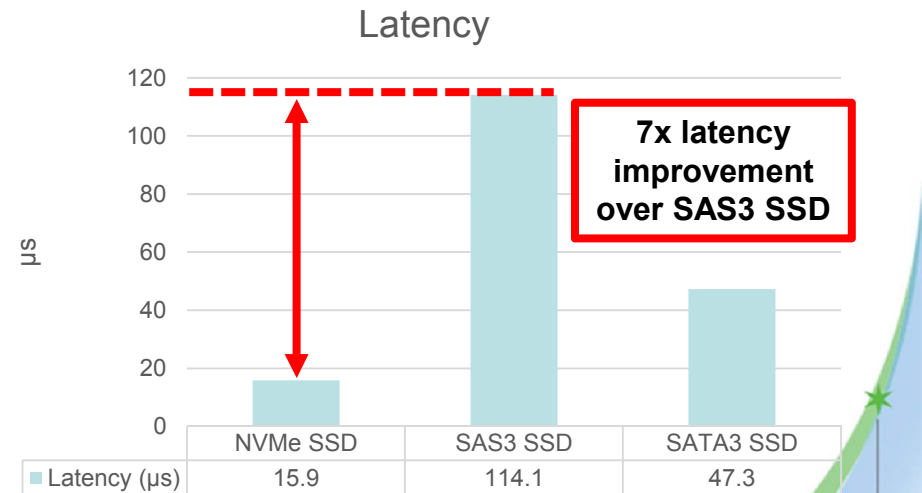
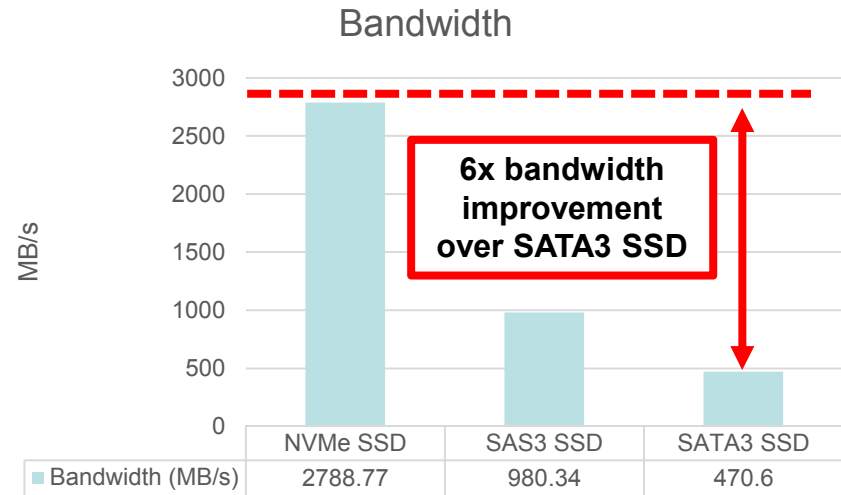


Simply Double



# 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
- Lower Power
  - Lower wattage per IOPS



1993

2009

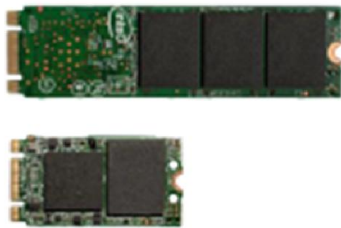
2015

[http://www.supermicro.com/white\\_paper/white\\_paper\\_NVMe.pdf](http://www.supermicro.com/white_paper/white_paper_NVMe.pdf)



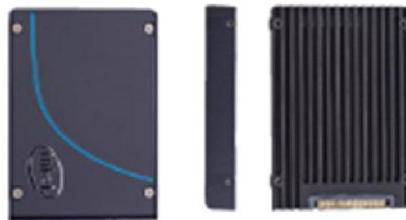
# NVMe Form Factors

## M.2



42, 80, and 110mm lengths,  
Smallest footprint of PCIe®,  
use for boot or for max  
storage density.

## U.2 2.5in (SFF-8639)



2.5in makes up the majority  
of SSDs sold today because  
of ease of deployment,  
hotplug, serviceability, and  
small form factor.

## Add-in-card



Add-in-card (AIC) has maximum  
system compatibility with  
existing servers and most  
reliable compliance program.  
High power envelope, and  
options for height and length.





# Highest Adoption Rate with 2.5" NVMe form factor

- Supermicro leads the market in category and density options for NVMe technology
  - Competitors playing catch-up.
- 2.5" Benefits
  - Existing Mechanical Ecosystem
  - Frees up expansion slots
  - **Higher drive density (up to 48 NVMe support)**
  - **Hot-Swap Features**
  - Easier Serviceability
  - Drive tray locking mechanism
    - Helps security and accidental eject

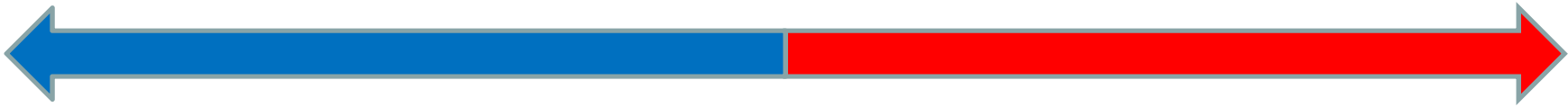




# Deployment Considerations

Read

Write



**SYS-1028U-TN10RT+**

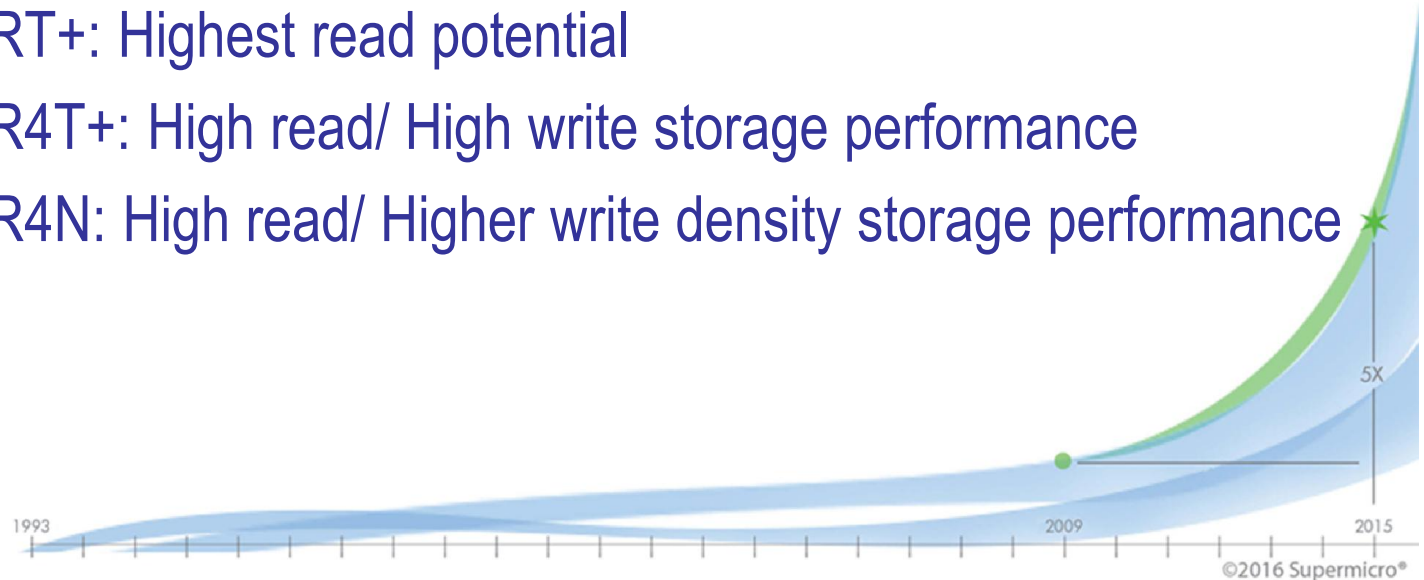


**SYS-2028U-TN24R4T+**



**SSG-2028R-NR48N**

- General Rule:
  - IOPS Reads are dependent on # of PCIe lanes/drive
  - IOPS Writes are dependent on drive count
- 1028U-TN10RT+: Highest read potential
- 2028U-TN24R4T+: High read/ High write storage performance
- 2028U-TN24R4N: High read/ Higher write density storage performance





# NVMe All Flash Examples

### SYS-1028U-TN10RT+



#### Scalable Performance

- 10 hot-swap 2.5" NVMe drives
- 40 PCIe lanes to 10 NVMe drives
- Performance
  - IOPS (4K Random Read): up to 7M
  - IOPS (4K Random Write): up to 3.6M
- 1000W Titanium level high efficiency digital power supply
- Dual Port 10G Base-T

### SYS-2028U-TN24R4T+



#### High Performance Storage

- 24 hot-swap 2.5" NVMe drives
- 32 PCIe lanes to 24 NVMe drives
- Performance
  - IOPS (4K Random Read): up to 5M
  - IOPS (4K Random Write): up to 6.2M
- 1600W Titanium level high efficiency digital power supply
- Quad Port 10G Base-T
- 2 Rear hot-swap 2.5" SATA drives

### SSG-2028R-NR48N



#### High Performance Storage

- 48 hot-swap 2.5" NVMe drives
- 32 PCIe lanes to 48 NVMe drives
- Performance
  - IOPS (4K Random Read): 5.6M
  - IOPS (4K Random Write): up to 6.4M
- 1620W Titanium level high efficiency digital power supply
- SIOM
- 2 Rear hot-swap 2.5" SATA drives



1993

2009

2015

5X



# SMC NVMe Whitepaper



## All Flash NVMe SuperServers

Supermicro has developed a family of SuperServer® systems optimized for highest performance and capacity using all flash NVMe SSD storage technology. NVMe (Non-Volatile Memory Express) provides a scalable, high performance direct connection from CPU PCIeExpress ports to NVMe SSD data storage devices. NVMe SSDs installed in Supermicro systems have demonstrated up to a 7 times latency improvement over SAS 12Gb/s SSDs and up to 6 times the throughput of SATA 6Gb/s SSDs. By deploying Supermicro NVMe solutions, customers can thus benefit from reduced latency, increased IOPS, and also lower power consumption. Customers' solutions can perform more work in less time, translating into lower costs, increased revenues, and improved ROI.

- SYS-1028U-TN10RT+ is a 1U Ultra system with 10 NVMe drive bays, the industry's highest density
- SYS-2028U-TN24RT+ is a 2U Ultra system with 24 NVMe drive bays
- SSG-2028R-NR48N is a 2U Simply Double storage system with 48 NVMe drive bays, the highest density in the industry

## Test Results

The fio-2.1.7 test results for Random Read IOPS and Random Write IOPS at peak performance for all three systems were measured. Supermicro is unrivaled in the industry, offering the highest-performance, highest-density server, storage and networking solutions on the market. Innovation is at



	4KB Random Read I/O's	4K Random Write I/O's
SYS-1028U-TN10RT+	7,177,300	3,578,400
SYS-2028U-TN24RT+	4,738,800	6,222,500
SSG-2028R-NR48N	5,633,100	6,407,000

Table 1: Performance Results

The test results for Read and Write IOPS were graph the core of our product development and benefits

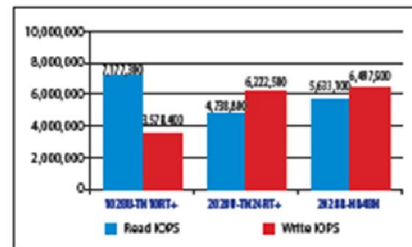


Chart 1: IOPS Performance Results

These Supermicro all flash SuperServer® solutions are targeted at low latency/high capacity applications such as media entertainment and streaming (no frame drop), and high throughput environments such as Engineering & Science, HPC, and Energy Exploration.

## Test Configurations

Three Supermicro all flash server/storage models with varying form factors and drive capabilities were tested with fio-2.1.7, an IO tool used for benchmark and stress/hardware verifications. All three systems support the latest Intel® Xeon® ES-2600 v4 (Broadwell) product family processors, 24 DIMMs of memory, and all drive bays fully populated with NVMe SSDs. Red Hat Enterprise Linux Server release 6.7, BIOS settings and test environments was also identical except as noted\*.

## SUPERMICRO® Supermicro All Flash NVMe Systems



MODEL	SuperServer® SYS-1028U-TN10RT+	SuperServer® SYS-2028U-TN24RT+	SuperStorage SSG-2028R-NR48N
Processor Support	Dual Intel® Xeon® Processor ES-2600 v3 product family with QPI up to 9.6 GT/s	Dual Intel® Xeon® Processor ES-2600 v3 product family with QPI up to 9.6 GT/s	Dual Intel® Xeon® Processor ES-2600 v3 series with QPI up to dual 9.6 GT/s
Key Applications	<ul style="list-style-type: none"> <li>• Virtualization</li> <li>• Cloud Computing</li> <li>• High End Enterprise Server</li> </ul>	<ul style="list-style-type: none"> <li>• Virtualization</li> <li>• Cloud Computing</li> <li>• High End Enterprise Server</li> <li>• All-Flash Storage</li> </ul>	<ul style="list-style-type: none"> <li>• Corporate Database</li> <li>• Data Center</li> <li>• Database Processing &amp; Storage</li> <li>• Enterprise Server</li> <li>• HPC</li> <li>• SCSI SAN</li> </ul>
Outstanding Features	<ul style="list-style-type: none"> <li>• 10 NVMe SSDs Support</li> <li>• 160W CPU support</li> <li>• 24 DIMM slots</li> <li>• 3 PCI-E Add-on cards</li> <li>• 1000W Titanium Level Power Supply</li> <li>• 2 SATA DOMs Support with Embedded Power</li> </ul>	<ul style="list-style-type: none"> <li>• 24-port NVMe SSD Support</li> <li>• 20x 2.5" hot-swap drive bays</li> <li>• 24 DIMM slots</li> <li>• 160W CPU support</li> <li>• Titanium Level Power Supply</li> <li>• 2 SATA DOMs Support with embedded power</li> </ul>	<ul style="list-style-type: none"> <li>• 48x 2.5" NVMe Drive in 2U Form Factor</li> <li>• Supports dual 140W Haswell CPU</li> <li>• 24 DIMM slots</li> <li>• Support 80M Card for Multiple IO Option</li> <li>• Redundant 1600W Titanium Level high-efficiency power supplies</li> </ul>
Serverboard	SUPER® X10DRU-1+	SUPER® X10DRU-1+	SUPER® X10DSC+
Chipset	Intel® C612 Chipset	Intel® C612 Chipset	Intel® C612 chipset
System Memory (Max.)*	Up to 1.5TB ECC LRDIMM, 700GB ECC RDIMM, DDR4-2133MHz in 24 DIMM slots	Up to 1.5TB ECC LRDIMM, 700GB ECC RDIMM, DDR4-2133MHz in 24 DIMM slots	Up to 1.5TB ECC LRDIMM, 700GB ECC RDIMM, DDR4-2133MHz in 24 DIMM slots
Expansion Slots	3 PCI-E 3.0 x 8 (2 FH, 10.5" L, LP)	2 PCI-E 3.0 x 16 (2 FH, 10.5" L) 1 PCI-E 3.0 x 8 (LP)	2 PCI-E 3.0 x 16 1 PCI-E 3.0 x 8
Onboard Storage Controller	Intel® C612 controller for 10 SATA3 (6Gbps) ports; RAID 0, 1, 5, 10	Intel® C612 controller for 10 SATA3 (6Gbps) ports; RAID 0, 1, 5, 10	Onboard NVMe controller
Connectivity	2 10Gbase-T Ethernet; 5 USB 3.0 ports (2 Rear, 2 Front, 1 Type A); 1 Serial Port	2 10Gbase-T Ethernet; 5 USB 3.0 ports (2 rear, 2 onboard header, 1 Type A); 1 Serial Port	80M card for multiple IO option.
VGA/Audio	AST2400 VGA	AST2400 VGA	AST2400 VGA
Management	IPMI 2.0 + KVM with dedicated LAN, Intel® Node Manager, SMM, SPB, SSM, SuperDoctor® 5, Watchdog	IPMI 2.0 + KVM with dedicated LAN, Intel® Node Manager, SMM, SPB, SSM, SuperDoctor® 5, Watchdog	IPMI 2.0 + KVM with dedicated LAN, Intel® Node Manager, SMM, SPB, SSM, SuperDoctor® 5, Watchdog
Drive Bays	10 Hot-Swappable 2.5" NVMe SSD Drive bays Support and 4 NVMe/SAS3/SATA3 Hybrid Ports (SATA3/SAS3 optional)	25 hot-swap 2.5" drive bays support; 20 NVMe ports (12 NVMe from CPU, 8 NVMe from CPU2); 4 NVMe/SAS3 hybrid ports (4 NVMe from CPU2, SAS3 support with optional storage controller card)	48x 2.5" hot-swap NVMe SAS3/SATA3 drive bays
Peripheral Bays	N/A	N/A	2x 2.5" optional rear hot-swap drive bays
Power Supply	1000W Titanium Level Power Supply	1600W Titanium Level (90%+) Power Supply	1600W Redundant Titanium Level high-efficiency power supplies with FC & PMBus
Cooling System	8 Heavy Duty fans w/ Optimal Fan Speed Control, 1 Air Shroud	4 heavy duty fans w/ Optimal Fan Speed Control, 1 Air Shroud	5x fans hot-swap redundant PWM cooling fans
Form Factor	1U Rackmount 437 x 45 x 705.5mm (17.2" x 1.7" x 27.8")	2U Rackmount 437 x 89 x 705.5mm (17.2" x 3.5" x 27.8")	2U Rackmount 437 x 89 x 664mm (17.2" x 3.5" x 26")

\*This document performance of components on a per-bay for test in specific systems. Differences in hardware, software, or configuration will affect actual performance. Configurations: 2x Intel® Xeon® ES-2600 v4, 2x 8GB DDR4-2133MHz, 16x 2.5" 480GB NVMe SSDs.

[http://www.supermicro.com/white\\_paper/white\\_paper\\_NVMe.pdf](http://www.supermicro.com/white_paper/white_paper_NVMe.pdf)



# Industry's Leading Hot-Swap NVMe Solutions

Increasing your Data Center Productivity and Throughput

New ALL FLASH Solutions!

Multi Node Solutions!



SYS-1028U-TN10RT+  
(1U 10 NVMe)



SYS-2028U-TN24RT+  
(2U 24 NVMe)



SYS-2028R-NR48N  
(2U 48 NVMe)



SYS-2028TP-DNCR  
(2U 2 Node NVMe/node)



SYS-F628R3-RTBN+  
(4U 4 Node 2 NVMe/node)



SYS-F618R2-RTN+  
(4U 8 Node 2 NVMe/node)



SBI-7428R-C3N  
(3 NVMe per blade)

- Supermicro has the complete NVMe (PCI-e SSD) product offering
- Over 40 NVMe ready SKUs (All Flash/Hybrid) solutions in 9 different server categories
- Breakthrough performance and lower latency
- Ideal for caching, burst buffering, memory swap, faster storage and much more



Contact your Supermicro sales representative for more information, or visit our website

[www.supermicro.com/NVMe](http://www.supermicro.com/NVMe)





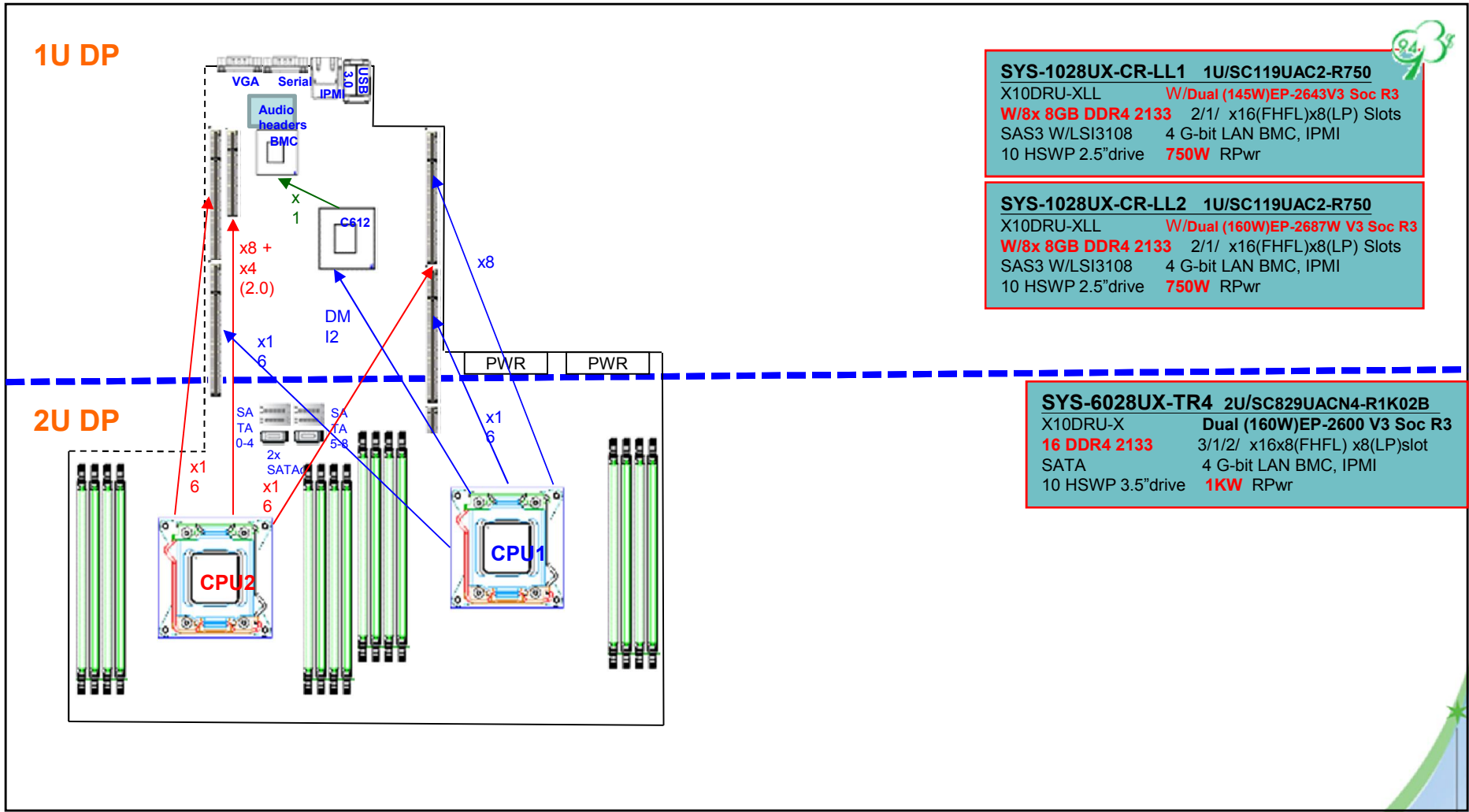
# HYPER-SPEED

**Leveraging Supermicro Ultra Architecture**





# X10 Hyper-Speed



**SYS-1028UX-CR-LL1 1U/SC119UAC2-R750**  
 X10DRU-XLL W/Dual (145W)EP-2643V3 Soc R3  
 W/8x 8GB DDR4 2133 2/1/ x16(FHFL)x8(LP) Slots  
 SAS3 W/LSI3108 4 G-bit LAN BMC, IPMI  
 10 HSWP 2.5"drive 750W RPwr

**SYS-1028UX-CR-LL2 1U/SC119UAC2-R750**  
 X10DRU-XLL W/Dual (160W)EP-2687W V3 Soc R3  
 W/8x 8GB DDR4 2133 2/1/ x16(FHFL)x8(LP) Slots  
 SAS3 W/LSI3108 4 G-bit LAN BMC, IPMI  
 10 HSWP 2.5"drive 750W RPwr

**SYS-6028UX-TR4 2U/SC829UACN4-R1K02B**  
 X10DRU-X Dual (160W)EP-2600 V3 Soc R3  
 16 DDR4 2133 3/1/2/ x16x8(FHFL) x8(LP)slot  
 SATA 4 G-bit LAN BMC, IPMI  
 10 HSWP 3.5"drive 1KW RPwr

07/14

08/14

09/14

10/14

11/14

12/14

5X



1993

2009

2015



# Ultra Low Latency: 1U SYS-1028UX-CR-LL2

- Motherboard: X10DRU-XLL
- 1U Chassis: CSE-119UAC2-R750



# W/160W CPU



LSI 3108 SAS3 x8 + 2xSATA ports and Optional 2 NVMe ports

## KEY FEATURES

- 8 hot-swap 2.5" SI 3108 SAS3 port + 2 X SATA3 2.5" Drive
- Up to 3 PCI-E 3.0 Add-on cards (1 double width GPU)
- Optimized for Low Latency Applications
- NVMe support (Optional)
- Platinum level high efficiency digital power supply
- 2 SATA ports with built-in SATA DOM power Support



1	<b>Processor Support</b> W/Dual Haswell EP 2687W V3 (160W)
2	<b>Memory Capacity</b> 16 DIMM, with 8GBx8 Reg. ECC DDR4 up to 2133MHz
3	<b>Expansion Slots</b> 2 PCI-E Gen 3.0 x16 (2 full height 10.5" length) 1 PCI-E Gen 3.0 x8 (1 low profile) 1 internal low profile with LSI 3108
4	<b>I/O ports</b> Four Gigabit Ethernet ports 1 Built-in video 1 COM/Serial port (rear) 5 USB 3.0 ports (2 rear, 2 front, 1 Type A)
5	<b>System management</b> Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	<b>Drive Bays</b> 10 hot-swap 2.5" drives bays (8x SAS3 2x SATA3 ports) Optional 2 NVMe ports support via AOC-URN2-i2XT
7	<b>System Cooling</b> 8 heavy duty fans w/ Optimal Fan Speed Control; 1 Air Shroud
8	<b>Power Supply</b> 750W High-efficiency (Platinum level) digital redundant power supply

## KEY APPLICATIONS

- Low Latency Applications
- Financial markets





# SIMPLY DOUBLE

Breakthrough in Drives per Rack Unit

**Patented Supermicro Architecture**



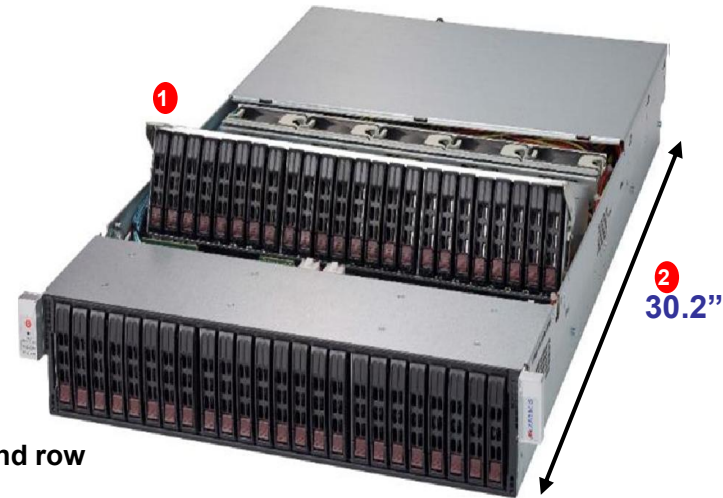


# SC226S 2U/48 Simply Double Server Chassis - Overview

## KEY FEATURES

- 1 2U 48x Hot-Swap 2.5" drive bays  
Chassis depth: 30.2"
- 2 HDD backplane option:
- 3 (a) 48x 2.5" NVMe\*  
(b) 48x 2.5" SAS3 12Gb/s / SATA3\*  
\*(up to 4 hybrid slots)  
2x Rear Hot-Swap 2.5" HDD (Optional)  
SIOM for flexible networking option
- 4 Redundant 1600W Titanium Power Supply
- 5 3 low-profile PCIe expansion slots
- 6 Cable management arm for hot-swap access of second row
- 7
- 8

## DESIGN PATENT PENDING



- 3 (1) 48x 2.5" NVMe  
(2) 48x 2.5" SAS3 12Gb/s / SATA3



Available: Now

1993

2009

2015

©2016 Supermicro®

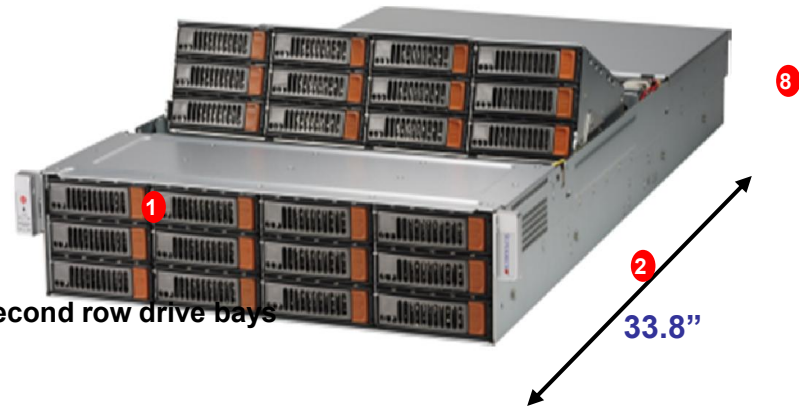


# SC826S 2U/24 Simply Double Server Chassis- Overview

## KEY FEATURES

- 1 2U 24x Hot-Swap 3.5" drive bays  
Chassis depth: 33.8"
- 2 HDD backplane: 3.5" SAS3 12Gb/s / SATA3\*
- 3 \*(up to 4 NVMe/SAS3 hybrid slots)  
2x Rear Hot-Swap 2.5" HDD (Optional)
- 4 SIOM for flexible networking option
- 5 Redundant 1600W Titanium Power Supply
- 6 3 low-profile PCIe expansion slots
- 7 Cable management arm for hot-swap access of second row drive bays
- 8

## DESIGN PATENT PENDING



1993

2009

2015

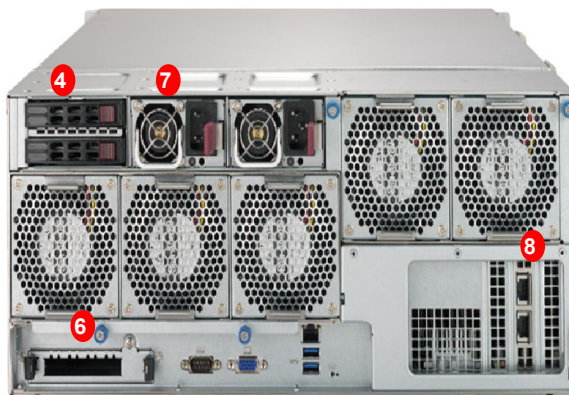
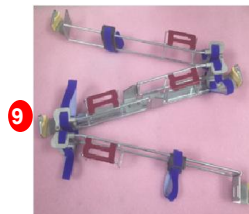
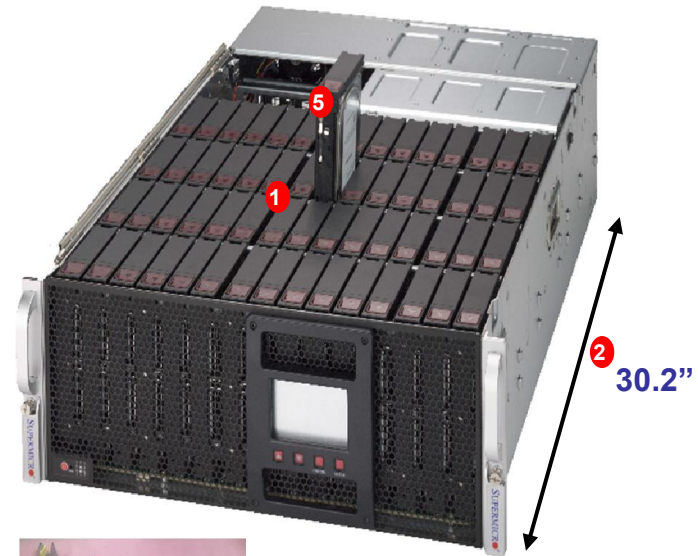
5X



# SC946S 4U/60 Top-Load Server Chassis- Overview

## KEY FEATURES

- 1 4U 60x Hot-Swap, 3.5" SAS3 12Gb/s /SATA3 bays
- 2 Chassis depth: 30.2"
- 3 Front 3.5" LCD panel
- 4 2x Rear Hot-Swap 2.5" HDD (Optional)
- 5 6x top-load 2.5" NVMe (Optional)
- 6 SIOM for flexible networking option
- 7 Redundant 2000W Titanium/Platinum Power Supply
- 8 3 low-profile PCIe expansion slots
- 9 Cable management arm for hot-swap access



1993

2009

2015

©2016 Supermicro®

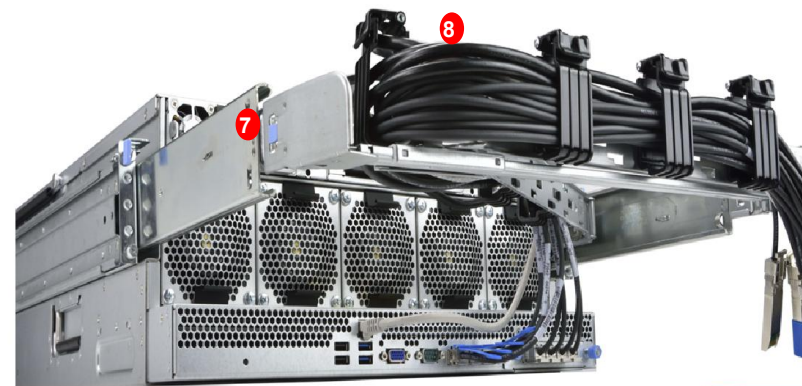
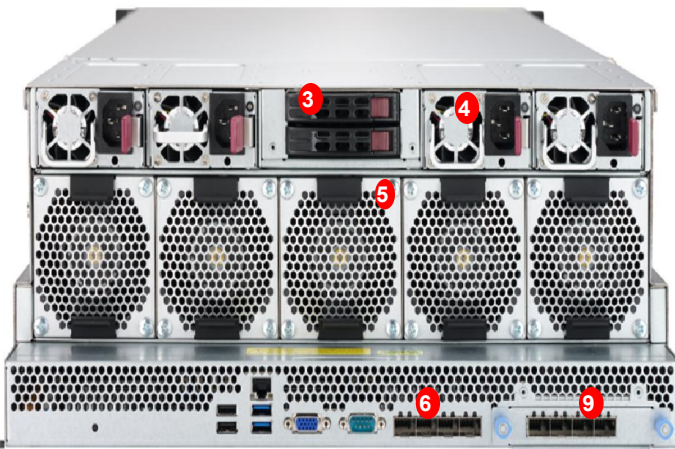
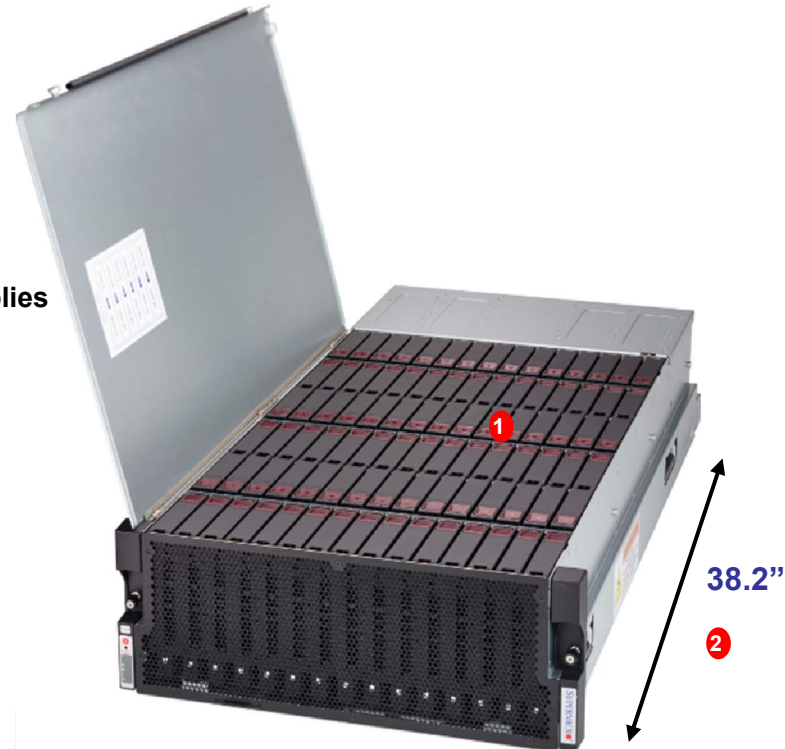
5X



# SC946ED 4U 90-bay Top-Load Server Chassis - Overview

## KEY FEATURES

- 1 4U 90x Hot-Swap 3.5" 12Gb/s SAS3/SATA3 bays  
Chassis depth: 38.2"
- 2 2x Rear Hot-Swap 2.5" HDD
- 3 4x 1000W (N+1) Titanium Redundant Power Supplies
- 4 5x 8080 Hot-swap cooling fan modules
- 5 On-board 4x 10Gbps SFP+
- 6 Slide Rails
- 7 Cable management arm for hot-swap access
- 8 1 x SIOM module (4 x 10Gbps Base-T or SFP+)
- 9



1993

2009

2015

5X





# GPU / Xeon-Phi Solutions

**Leveraging Supermicro Architecture**





# X10 Xeon-Phi / GPU Server Portfolio



Ratio:  
GPU:CPU

TOWER

RACK

MULTI-NODE

GPU OPTIMIZED

GPU



7048GR  
4:2 (4U)

GPU



4028GR  
8:2 (4U)



1028GQ  
4:2 (1U)



2028GR  
6:2 (2U)



1028GR  
3:2 (1U)



1018GR/5018GR  
2:1 (1U)

FatTwin



F628G3/F628G2  
3:2 (4U / 4Node)



F648G2  
6:2 (4U / 2Node)

Blade



7128RG  
2:2 (7U / 10Node)

Maximum Xeon-Phi / GPU per Node  
Maximum Xeon-Phi / GPU per Rack Unit



1993

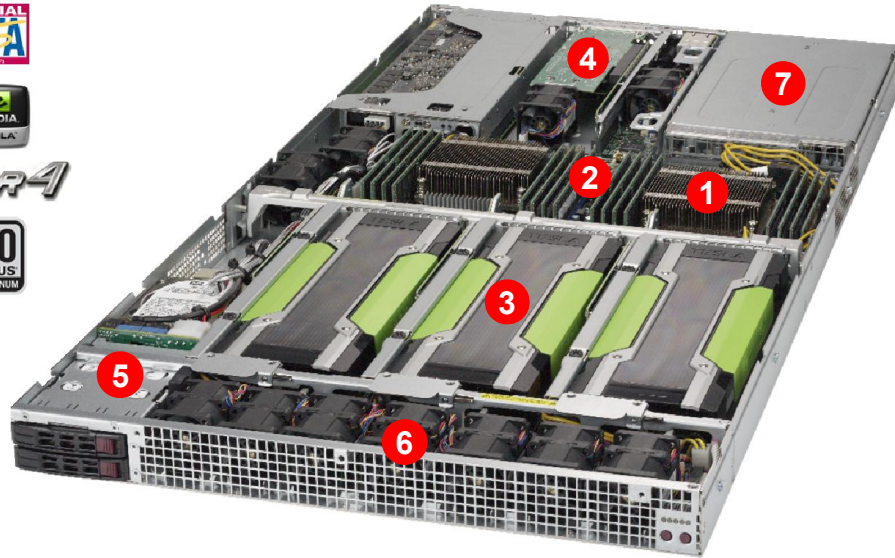
2009

2015

5X



# GPU: 1U DP SYS-1028GQ-TR(T)



**Motherboard: X10DGQ**  
**Chassis: CSE-118GQETS-R2K03P**

## Key Features:

- Supports up to 4 double width GPU cards (including GTX)
- Redundant Platinum Level 2000W power supplies
- No GPU-Preheat
- Cost Optimized System



- 1 Processor Support**  
Dual Xeon E5-2600 v4/v3 CPUs (Socket R3)
- 2 Memory Capacity**  
16 DIMMs, up to 2TB ECC LRDIMM, 512GB ECC RDIMM, DDR4, up to 2400MHz
- 3 Expansion Slots**  
4 PCI-e x16 Gen 3 for double-width GPU cards  
2 x8 (in x16 slot) LP card
- 4 I/O ports**  
1x VGA, 2x GbE or 2x 10GbaseT LAN, 2x USB 3.0, and 1x IPMI dedicated LAN port
- 5 Drive Bays**  
2 hot-swap 2.5" drives bays; 4 total 2.5" HDD bays
- 6 System Cooling**  
9 counter rotating fans with optimal fan speed control
- 7 Power Supply**  
2000W Platinum Level efficiency redundant power supply

## Key Applications:

- Oil & Gas
- Research & Scientifics
- VDI technology
- Computational Finance

1993

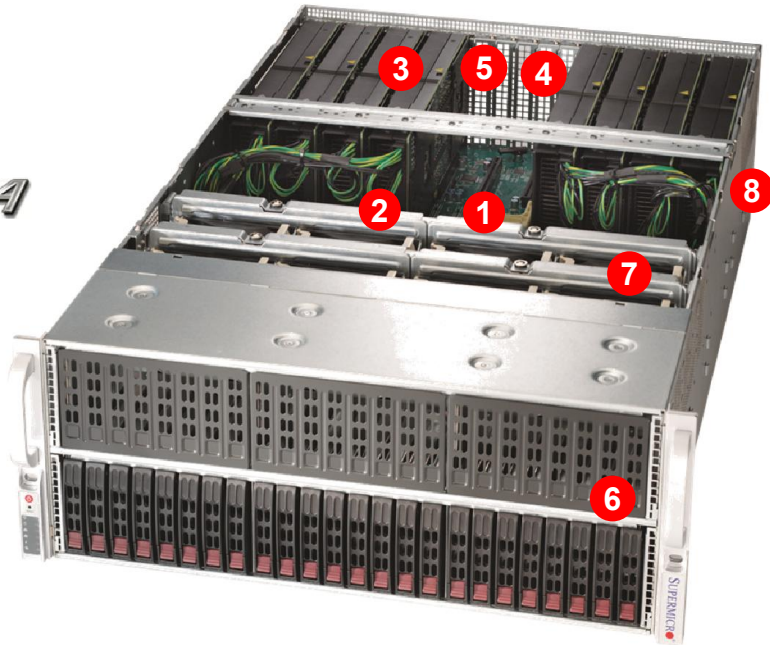
2009

2015

5X



# GPU: 4U DP SYS-4028GR-TR(T)



Motherboard: **X10DRG-O(T)+-CPU**  
Chassis: **CSE-418GTS-R3200B**

## Key Features:

- Supports 8 double width GPU cards
- Support up to 160W CPU
- 24x 2.5" SSD/HDD bays
- 24 DIMMs, up to 3TB memory



- Processor Support**  
Dual Xeon E5-2600 v4/v3 CPUs (Socket R3)
  - Memory Capacity**  
24 DIMMs, 3TB ECC LRDIMM/RDIMM DDR4 2400MHz
  - Expansion Slots**  
8 PCI-e 3.0 x16 for double width GPU cards  
2 PCI-e 3.0 x8 (2 in x16 slots)  
1 PCI-e 2.0 x4 (in x16)
  - I/O ports**  
1x VGA, 2x Gbit LAN, 4x USB 2.0, and 1x IPMI dedicated LAN port
  - System management**  
On board BMC (Baseboard Management Controllers) supports IPMI2.0, media/KVM over LAN with dedicated LAN for system management
  - Drive Bays**  
24 hot-swap 2.5" drives bay
  - System Cooling**  
8 heavy duty fans optimize to support 8 GPU cards  
2 air shroud
  - Power Supply**  
4 x 1600W (2+2) Platinum Level efficiency redundant power supply
- Dimensions**  
H 17.2" (452mm) x W 7" (178mm) x D 29" (673mm)

1993

2009

2015

5X



## STAC-A2 Benchmarks

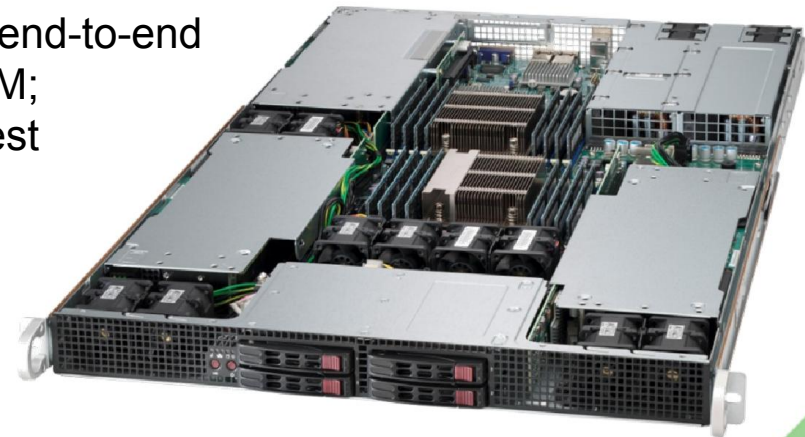
The STAC-A2 Benchmark suite is the industry standard for testing technology stacks used for compute-intensive analytic workloads involved in pricing and risk management. In all, the STAC-A2 specifications deliver nearly 200 test results related to performance, scaling, efficiency, and quality, which are detailed in this report.



**Test System:** Supermicro SYS-1028GR-TR server

### World Record Results

Fastest warm time to date in the baseline end-to-end Greeks benchmark: GREEKS.TIME.WARM;  
This was 1.27x the speed of the next fastest system, a 4-way Haswell-EX system (SUT ID: INTC150811).





# Xeon Phi 2U Twin<sup>2</sup> : SYS-5028TK-HT(T)R

- Motherboard: **K1SPI-P/PT**
- Chassis: CSE-827HQ+-R2K04BP2



DDR-4



1

### Processor Support

Xeon Phi x200 Processor (with option of integrated fabric)  
And Intel C612 chipset

2

3

### Memory Capacity

6 DIMM, up to 384GB DDR4 2400 MHz

4

### Expansion Slots

1 x16 Gen 3.0 LP (unavailable with Fabric SKUs)

5

### I/O ports

2x Gbit or 2x 10GbaseT LAN

6

### Drive Bays

3x hot-swap 3.5" drives bays per node

### Power Supply

2000W Titanium-level efficiency redundant power supply

*NDA Required for full product specs and schedule*

## Key features

- **Density:** Uses popular Twin architecture to achieve 4 hot-pluggable nodes in 2U
- **Processor support:** Full range of Xeon Phi x200 Processor SKUs supported
- **Flexible I/O support:** Integrated dual-port Omni-Path or two low profile PCIe 3.0 x16 slots



1993

2009

2015

5X



# Broadwell Deployment

Partner	Platform	Segment - Benchmark	Importance
	Supermicro SuperServer* 6028TP-HTFR	Technical Speed Computing: SPECfp*_base2006	2-socket world record (tie)

**400+ SKUs released 3/31/16**

**Leveraging Supermicro Architecture**





# Broadwell Advantages

Best-in-class dual processor Broadwell technology delivers the ultimate experience in performance, flexibility, and scalability

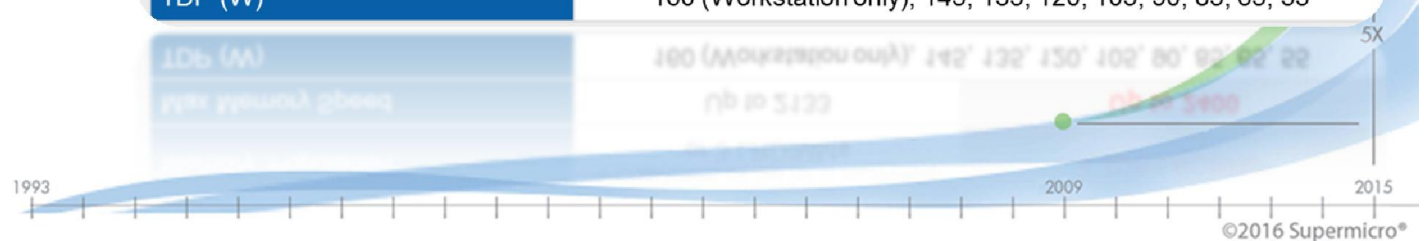
## 1. Better Performance Processor

- I. Up to 22 cores/socket)
- II. Up to 44 threads)
- III. Up to 55 MB LLC (Last-level Cache)

## 2. Faster Memory Speed

- I. Up to 2400MHz

Feature	Xeon E5-2600 v3 (Haswell-EP)	Xeon E5-2600 v4 (Broadwell-EP)
Cores Per Socket	Up to 18	<b>Up to 22</b>
Threads Per Socket	Up to 36 threads	<b>Up to 44 threads</b>
Last-level Cache (LLC)	Up to 45 MB	<b>Up to 55 MB</b>
QPI Speed (GT/s)	2x QPI 1.1 channels 6.4, 8.0, 9.6 GT/s	
PCIe* Lanes/ Controllers/Speed(GT/s)	40 / 10 / PCIe* 3.0 (2.5, 5, 8 GT/s)	
Memory Population	4 channels of up to 3 RDIMMs or 3 LRDIMMs	<b>+ 3DS LRDIMM<sup>&amp;</sup></b>
Max Memory Speed	Up to 2133	<b>Up to 2400</b>
TDP (W)	160 (Workstation only), 145, 135, 120, 105, 90, 85, 65, 55	



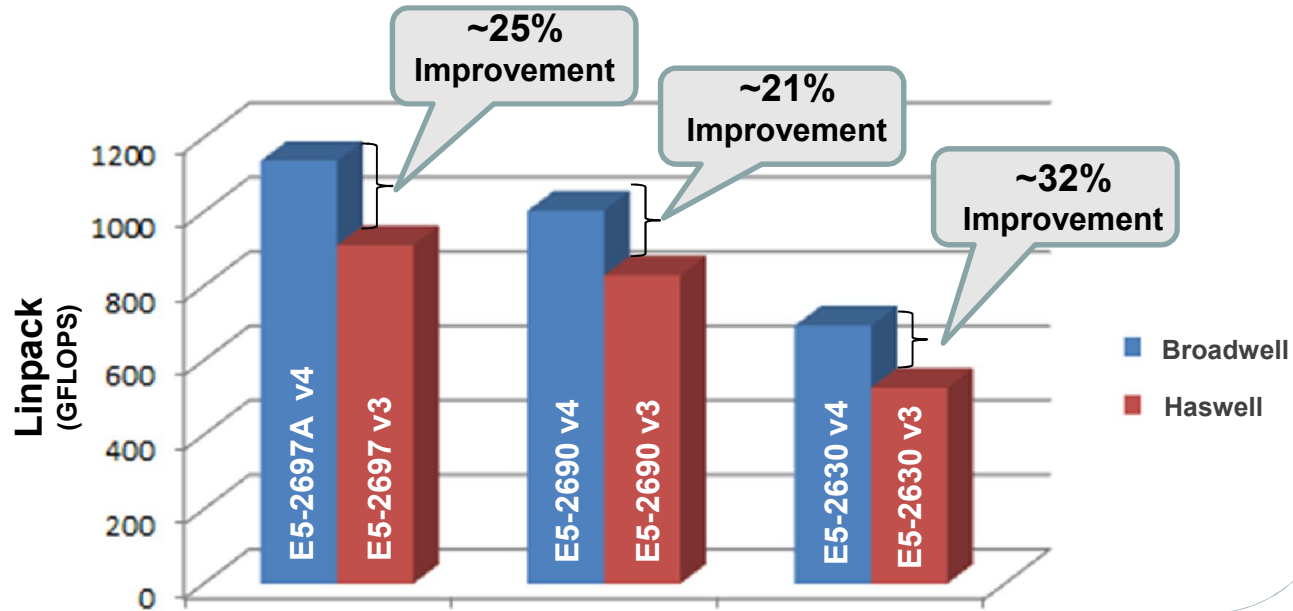




# Broadwell

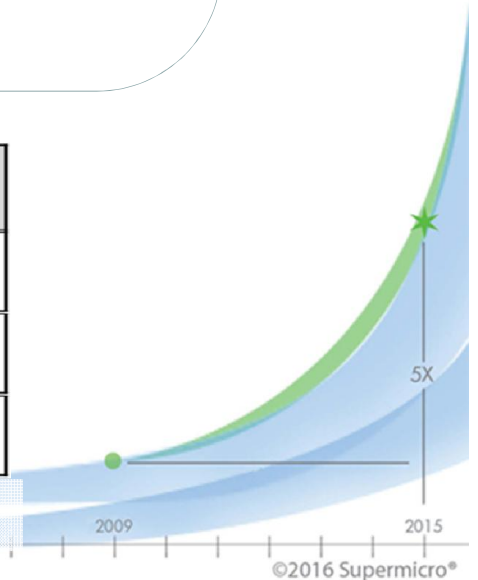
- Improved performance at a comparable price

## Performance (Broadwell vs. Haswell)



High Core Count CPUs	SKU	Frequency/Cores/TDP	Linpack (GFLOPS)	Price
Broadwell	E5-2697A v4	2.6GHz / 16C / 145W	1138	Comparable
Haswell	E5-2697 v3	2.6GHz / 14C / 145W	911	
Broadwell	E5-2690 v4	2.6GHz / 14C / 135W	1004	Comparable
Haswell	E5-2690 v3	2.6GHz / 12C / 135W	829	
Broadwell	E5-2630 v4	2.2GHz / 10C / 85W	694	Comparable
Haswell	E5-2630 v3	2.4GHz / 8C / 85W	527	

Configurations: 8 x Samsung 16GB (PC4-2133 & PC4-2400), 1 x Samsung 845DC Evo 480GB SATA SSD  
Settings: BIOS (Load Optimal Defaults) / Benchmark: Linpack HPL v11.3.0.006





# Fully Validated at Broadwell Introduction

## Product Family

### Twin Architecture

The original Twin architecture innovator. FatTwin, TwinPro & Twin

### Ultra Rack Mount Systems

1U & 2U Ultra systems

### WIO

Resource optimized systems

### Datacenter Optimized Solutions (DCO)

DCO & Short-Depth solutions

### Maximum IO

Up to 11 PCIe Slots

### GPU/Xeon Phi Optimized Solutions

Full line of GPU and Intel Xeon® Phi® optimized solutions

### Ultra Low Latency & Workstation

Optimized for Hyper Speed Ultra Low Latency & Workstation

### UP Systems

UP Mainstream, WIO, Storage systems



FatTwin



TwinPro & Twin



Ultra Rack Mount



WIO



DCO



Maximum IO



GPU/Xeon Phi-optimized



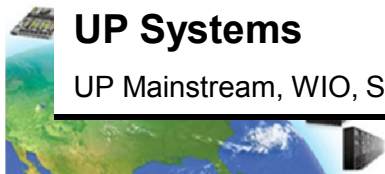
Hyper-Speed & Workstations



UP Systems



UP Storage





# Next Steps



Simply Double



# Supermicro Advantages

- **Enhanced Product Development** – Continuously developing the highest quality products with industry leading technology
  - **Widest range of optimized server/storage products in the industry**
  - First to market with Disruptive Technology total solutions
- **Enhanced Technical Service**
  - Enhanced global services
  - **FAE / Local Support: Worldwide**
- **Enhanced Logistics and Worldwide Operations** – Providing Countless TTM advantages
  - Streamlined fulfillment and support services
  - **Measurable Time-to-Market advantages**





# Call to Action

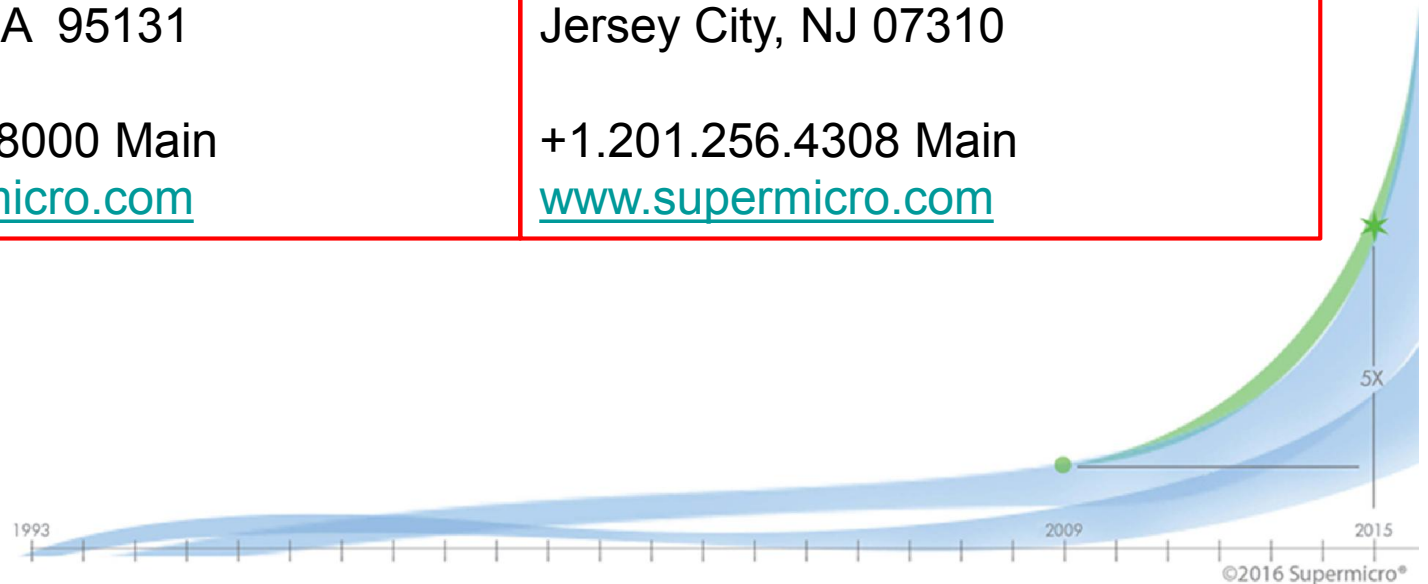
- ***Disruptive technology wins market share***
- Leverage Supermicro East Coast Office Resources – Open to ALL
  - Local Sales & Support
  - Demo Room / POC Labs
  - Spare Parts Depot

Super Micro Computer, Inc.  
980 Rock Avenue  
San Jose, CA 95131

+1.408.503.8000 Main  
[www.supermicro.com](http://www.supermicro.com)

Super Micro Computer, Inc.  
525 Washington Blvd., 20<sup>th</sup> Floor  
Jersey City, NJ 07310

+1.201.256.4308 Main  
[www.supermicro.com](http://www.supermicro.com)





# Q & A

Thanks

