



UP is the Future – Channel Update

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System Solution PM

UP Server Department



Agenda

- UP Success, Positioning, Leadership & Application
- UP X11 Platforms
 - Greenlow- Kaby Lake Xeon E3-1200 v6
 - Mehlow- Coffee Lake Refresh Xeon E-2200
 - Purley- Cascade Lake Refresh (2nd Gen Xeon Scalable Processors)
- UP X12 Roadmap
 - Whitley- Ice Lake (3rd Gen Xeon Scalable Processors)
- UP is the FUTURE

UP Success

- Number of Intel UP SKUs has increased dramatically
- TDP, Frequency, and Core Count of UP have soared
- UP is the most competitive CPU space
- More SMCI salespeople are quoting UP
- **28 of the top 100 SMCI system SKUs are UP (2020)**

UP Positioning



Appliance
Security, Gateway,
Firewall



Performance Datacenter
Purley
Colocation, Web-hosting, VM

Volume
Greenlow



Storage
Big Data, Content Archive

Entry
Mehlow



Telco/Edge Computing
Smart Retail, Healthcare, Industrial



Surveillance
Media Server, Streaming,
On-line Gaming

UP Leadership



- Data Center

- BlueHost (Hosting)
- IBM (IaaS)
- Packet Host (Bare Metal)
- Coresite (Colocation)
- Softlyer "IBM" (Hosting)
- Mega.io (Hosting)

- Appliance

- Fortinet (Firewall)
- FireEye (Firewall)
- Inforblox (Firewall)
- Pulse Secure (Firewall)

- Telco / Edge

- AT&T, Verizon & Comcast
- NTT Corp
- Century Link
- SK Telecom
- Brake & Motor (Smart Retail)

- Storage

- Hitachi Vantara (HDS)
- Nutanix (HCI)
- Pure Storage (SaaS)

- Security & Surveillance

- Axis Communications
- BOSCH
- Honeywell
- VISA & Mastercard

Technical/Mathematical/Industrial Appliance



- Semiconductor Industrial (Coffee Lake)
- Video Surveillance (Coffee Lake)
- Media Entertainment, Game Streaming (Cascade Lake)
- Edge Computing (Coffee Lake & Cascade Lake)
- Data Center (Coffee Lake)
- Industrial (Coffee Lake & Cascade Lake)
- Retail (Coffee Lake)
- Medical (Coffee Lake & Cascade Lake)
- Healthcare (Coffee Lake & Cascade Lake)
- Storage (Cascade Lake)

3 UP X11 Platforms

Greenlow || Mehlow || Purley

The 4 UP X11 Platforms: Greenlow || Mehlow || Purley



- when to choose which platform - **Platform = CPU + PCH Chipset**

Notes

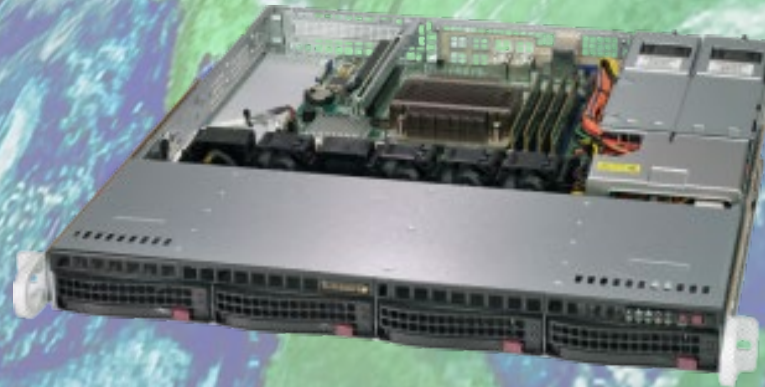
* [Source: Intel ARK](#)



Top BIN, ARK Ref. Price	E3-1285 v6, \$450*	E-2288G, \$539*		Platinum 8280 Processor, \$10,009*
Key Specs	(8M Cache, 4.1GHz - 4.5GHz)	(16M Cache, 3.7GHz – 5.0GHz)		(38.5M Cache, 2.7GHz – 4.0GHz)
Platform	Greenlow (SKL/KBL + C230)	Mehlow (CFL/CFL-R + C240)		Purley (SKL/CLX + C620)
Platform Application	UP Only	UP Only		UP, DP, MP (4-way, 8-way)
CPU Socket	H4, LGA-1151	H4, LGA-1151		P, LGA-3647
CPU Family	E3-1200 v5/v6	E-2200		82xx,62xx,52xx,42xx,32xx
Chipset	C230 series	C240 series		C620 series
Platform Positioning	Entry Level, Low Cost	Entry Level, Low Cost		High-end, High-performance
CPU Socket Type	H -SKT	H -SKT		P -SKT
Max CPU Core Counts	Up to 4	Up to 8		Up to 28
Max Memory Capacity	Up to 64GB	Up to 128		Up to xTB
Max PCIe Slots	Up to 4	Up to 3		Up to 6

X11 E3-1200 System

Based on Intel Greenlow/Kaby Lake Platform



X11 UP E3-1200 family Skylake v5– Kaby Lake v6 Line Up



SYS-5019S-L	SYS-5019S-ML	SYS-5019S-M	SYS-5019S-MR	SYS-5019S-MN4	SYS-5019S-MT	SYS-1019S-MC0T	SYS-5019S-WR
Entry Appliance	Entry Appliance	Cloud, Hosting	Cloud, Hosting	Network-Centric	Entry Caching Appliance	Entry Level Storage	Flexible I/O
510-203B X11SSL-F	512F-350CB1 X11SSH-F	813MFTQC-350CB X11SSH-F	813MFTQC-R407CB X11SSH-F	813MFTQC-350CB X11SSH-LN4F	813MFTQC-350CB X11SSH-TF	113MFAC2-341CB X11SSH-CTF	815TQC-R504WB X11SSW-F
Intel® Skylake E3-1200v5/v6, Core i3 Gen6 LGA1151 Socket H4, C232 Express chipset	Intel® Skylake E3-1200v5/v6, Core i3 Gen6 LGA1151 Socket H4, C236 Express chipset	Intel® Skylake E3-1200v5/v6, Core i3 Gen6 LGA1151 Socket H4, C236 Express chipset	Intel® Skylake E3-1200v5/v6, Core i3 Gen6 LGA1151 Socket H4, C236 Express chipset	Intel® Skylake E3-1200v5/v6, Core i3 Gen6 LGA1151 Socket H4, C236 Express chipset	Intel® Skylake E3-1200v5/v6, Core i3 Gen6 LGA1151 Socket H4, C236 Express chipset	Intel® Skylake E3-1200v5/v6, Core i3 Gen6 LGA1151 Socket H4, C236 Express chipset	Intel® Skylake E3-1200v5/v6, Core i3 Gen6 LGA1151 Socket H4, C236 Express chipset
Up to 4x ECC/Non-ECC DDR4 UDIMM Slot, Up to 64GB DDR4-2400MHz	Up to 4x ECC/Non-ECC DDR4 UDIMM Slot, Up to 64GB DDR4-2400MHz M.2 Mini-PCIe connector: support 2280	Up to 4x ECC/Non-ECC DDR4 UDIMM Slot, Up to 64GB DDR4-2400MHz M.2 Mini-PCIe connector: support 2280	Up to 4x ECC/Non-ECC DDR4 UDIMM Slot, Up to 64GB DDR4-2400MHz M.2 Mini-PCIe connector: support 2280	Up to 4x ECC/Non-ECC DDR4 UDIMM Slot, Up to 64GB DDR4-2400MHz M.2 Mini-PCIe connector: support 2280	Up to 4x ECC/Non-ECC DDR4 UDIMM Slot, Up to 64GB DDR4-2400MHz	Up to 4x ECC/Non-ECC DDR4 UDIMM Slot, Up to 64GB DDR4-2400MHz	Up to 4x ECC/Non-ECC DDR4 UDIMM Slot, Up to 64GB DDR4-2400MHz M.2 Mini-PCIe connector: support 2280
1 x8 PCI-E 3.0 slot	1 x8 PCI-E 3.0 slot	1 x8 PCI-E 3.0 (in x16) slot	1 x8 PCI-E 3.0 (in x16) slot	1 x8 PCI-E 3.0 (in x16) slot	1 x8 PCI-E 3.0 slot	1 x8 PCI-E 3.0	2 x8 PCI-E 3.0, 1 x4 PCI-E 3.0 (in x8) slot
2x GbE port, 1x dedicated IPMI port	2x GbE port, 1x dedicated IPMI port	2x GbE port, 1x dedicated IPMI port	2x GbE port, 1x dedicated IPMI port	4x GbE port, 1x dedicated IPMI port	2x 10GbE port, 1x dedicated IPMI port	2x 10GbE port, 1x dedicated IPMI port	2x GbE port, 1x dedicated IPMI port
2x USB 2.0, 2x USB 3.0, VGA, Serial	2x USB 2.0, 2x USB 3.0, VGA, Serial	2x USB 2.0, 4x USB 3.0 (front/rear), VGA, Serial	2x USB 2.0, 4x USB 3.0 (front/rear), VGA, Serial	2x USB 2.0, 4x USB 3.0 (front/rear), VGA, Serial	2x USB 2.0, 4x USB 3.0 (front/rear), VGA, Serial	2x USB 2.0, 2x USB 3.0, VGA, Serial	2x USB 2.0, 2x USB 3.0, VGA, Serial
1x internal 3.5" or 2x 2.5" drive option	2x internal 3.5" or 3x 2.5" drive option	4x 3.5" Hot-swap SATA3 bays w/ RAID	4x 3.5" Hot-swap SATA3 bays w/ RAID	4x 3.5" Hot-swap SATA3 bays w/ RAID	4x 3.5" Hot-swap SATA3 bays w/ RAID	LSI 3008 SAS3 8x 2.5" Hot-swap bays w/ RAID	4x 3.5" Hot-swap SATA3 bays w/ RAID
200W High-Efficiency Power Supply	350W High-Efficiency Power Supply	350W High-Efficiency Power Supply	Redundant 400W 1+1 power w/ BBP® option	350W High-Efficiency Power Supply	350W High-Efficiency Power Supply	340W High-Efficiency Power Supply	Redundant 500W 1+1 High-Efficiency Power
1.7" x 17.2" x 11.3" Less than 12" depth	1.7" x 17.2" x 14.4" Less than 15" depth	1.7" x 17.2" x 19.8" Less than 20" depth	1.7" x 17.2" x 19.8" Less than 20" depth	1.7" x 17.2" x 19.8" Less than 20" depth	1.7" x 17.2" x 19.8" Less than 20" depth	1.7" x 17.2" x 19.98" Less than 20" depth	1.7" x 17.2" x 25.6"
SATA DOM support Optional 2.5" drive bracket Up to 3x internal FAN position	SATA DOM support Optional 2.5" drive bracket Optional slim DVD drive	SATA DOM support Optional 2.5" drive tray Optional slim DVD drive Additional FAN option SAS3 Backplane support SAS3 AOC (option)	SATA DOM support Optional 2.5" drive tray Optional slim DVD drive Additional FAN option SAS3 Backplane support SAS3 AOC (option)	SATA DOM support Optional 2.5" drive tray Optional slim DVD drive Optional slim DVD drive Additional FAN option SAS3 Backplane support SAS3 AOC (option)	SATA DOM support Optional 2.5" drive tray Optional slim DVD drive Additional FAN option SAS3 Backplane support SAS3 AOC (option)	SATA DOM support Optional 2.5" drive tray Optional slim DVD drive Additional FAN option SAS3 Backplane support	SATA DOM support Optional 2.5" drive tray Optional slim DVD drive Additional FAN option SAS3 Backplane support SAS3 AOC (option)

X11 E-2100/2200 System

Based on Intel Mehlow/Coffee Lake-R Platform



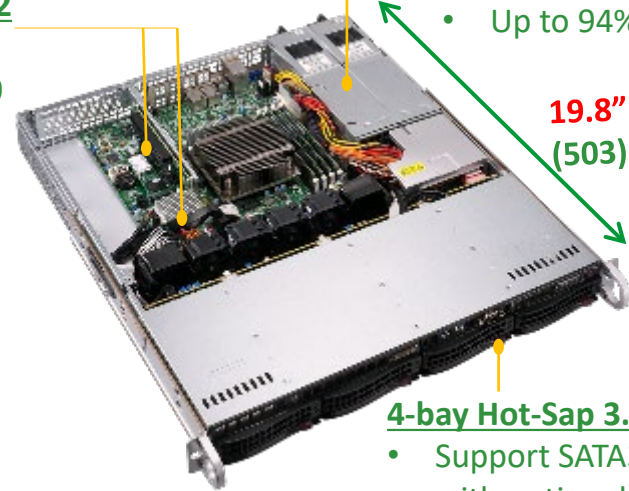


X11 Coffee Lake-R UP Product Family



Mainstream

Dual NVMe M.2 & SuperDOMs:
• 22110, 2280



19.8" (503)

Platinum-level Power Supply (-MR):
• 400W 1+1 Hot-Swap Redundancy
• Up to 94% high power efficiency



4-bay Hot-Sap 3.5" Disk Bay

- Support SATA3 and SAS
- SYS-5019C-M
SYS-5019C-MR



High Memory Capacity:

- 4 DIMM, 2-channel Speed
- Up to **128GB** DDR4-2666MHz

WIO

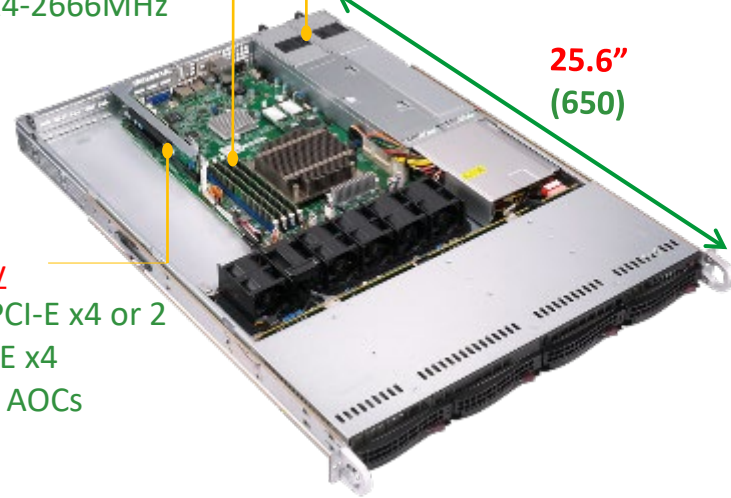
WIO Flex-Expandability

- 1 PCI-E x16 and 1 PCI-E x4 or 2 PCI-E x8 and 1 PCI-E x4
- Support Full-height AOCs

SYS-5019C-WR

Platinum-level Power Supply:

- 500W 1+1 Hot-Swap Redundancy
- Up to 94% high power efficiency



25.6" (650)

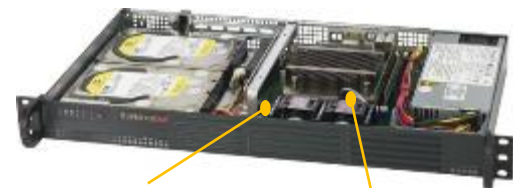


Appliance

SYS-5019C-L
SYS-5019C-FL
SYS-5019C-M4L

Flex-Storage Disk Bays

- Support max. two (2) 3.5" or four (4) 2.5" with optional converter kits (without riser Expansion)



NVMe M.2
• 2280FF

SuperDOMs



- 2x 1GbE ports
- 4x USB 3.1/2.0 ports
- Dedicated IPMI/KVM LAN port



Front I/O Design

- Front Access and one-sided maintenance



4x LAN Design for Network Appliance

- Load balance and fault tolerance
- Optional AOC for more LANs



4x 1GbE ports

4x USB 3.1/2.0 ports

Dedicated IPMI/KVM LAN port



X11 UP System

Based on Intel Purley/Cascade Lake-R Platform



FACTS:



❖ MOOR Insights & Strategy: Published June 5th, 2019

- 1 out of 3 DP server from data center are only populated with **ONE CPU**

- Run the performance monitor (**PerMon**) utility against any server in the data center
 - **CPU utilization** in the **25~35% range**

- Even large enterprise IT organizations, CPUs utilized less than **20%**

- Years ago, high volume server the top PSU was **750 Watts**, **NOW** PSU offerings **2400 Watts**
 - This is leaving **racks half empty**, creates data center **HOT-SPOTS**

<http://www.moorinsightsstrategy.com/research-paper-single-socket-servers-are-disrupting-the-server-market/>

WHY SINGLE-SOCKET SERVERS COULD RULE THE FUTURE



❖ The NEXT Platform: Published April 24th, 2019

➤ Top List of Why 1-Socket Could Rule the FUTURE!

1. More than **enough cores** per socket:
 - AMD Rome (64 Cores) H12
 - Intel Cascade (28 Cores) X11
 - Intel Ice Lake (38 Cores) X12
2. Lower cost: 1 CPU instead of 2. (Low PCB cost, less layers, less component count, smaller PSU)
3. Lower software licensing cost are **50% reduction** eg. VMware, vSAN

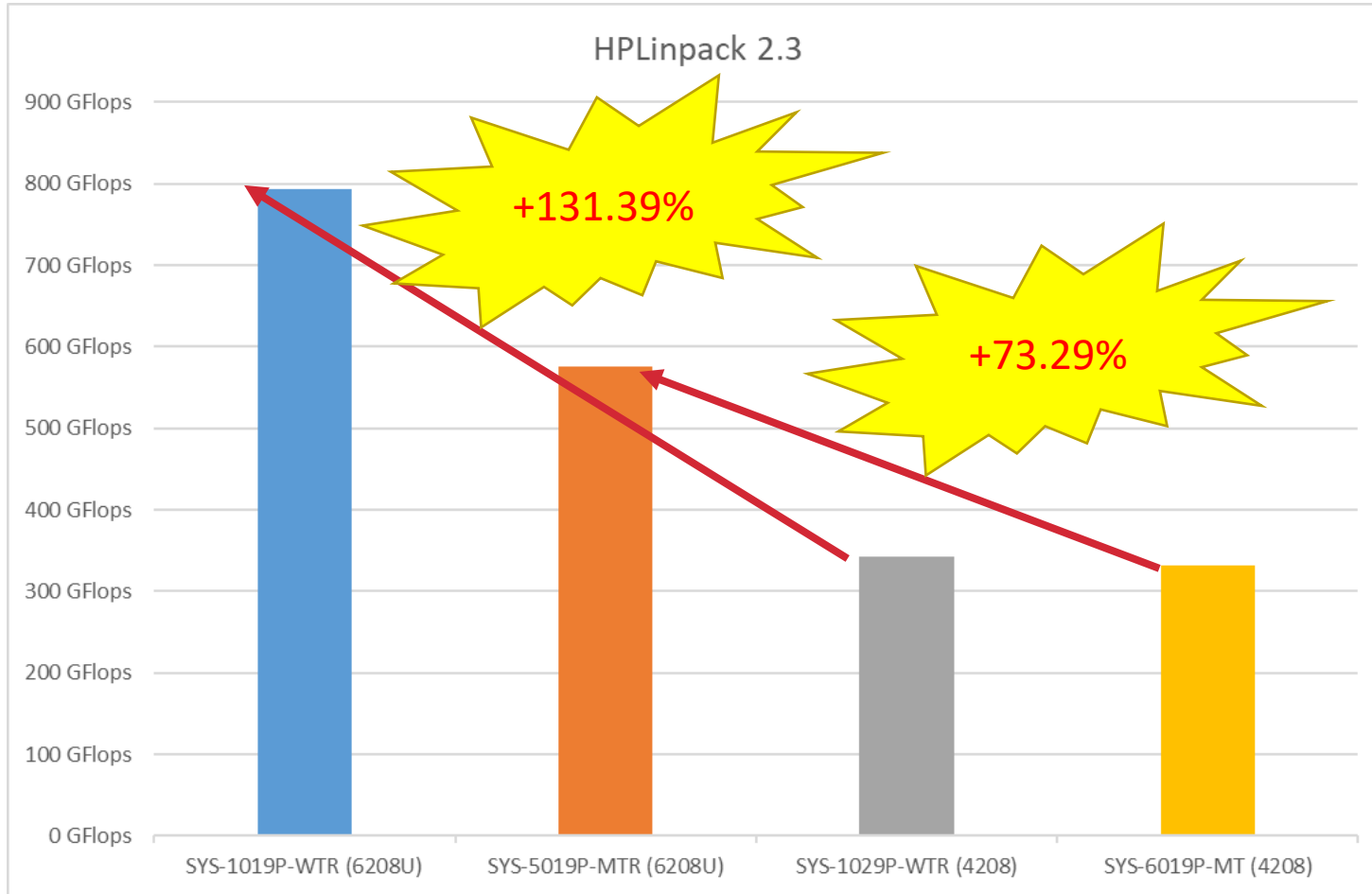
<https://www.nextplatform.com/2019/04/24/why-single-socket-servers-could-rule-the-future/>

➤ Gartner agrees and did a paper: Published December 5th, 2018 - ID G00373722

- Using Single-Socket Server to **Reduce Costs** in the Data Center
- By **2021**, x86 single-socket servers will be able to address **80%** of the **workloads**, up from **20%** in **2018**
- Single CPU to reduce acquisition costs of **30%** hardware costs and **50%** software licenses costs

<https://www.gartner.com/doc/reprints?id=1-680TWAA&ct=190212&st=sb>

X11 UP vs X11 DP CPU Performance

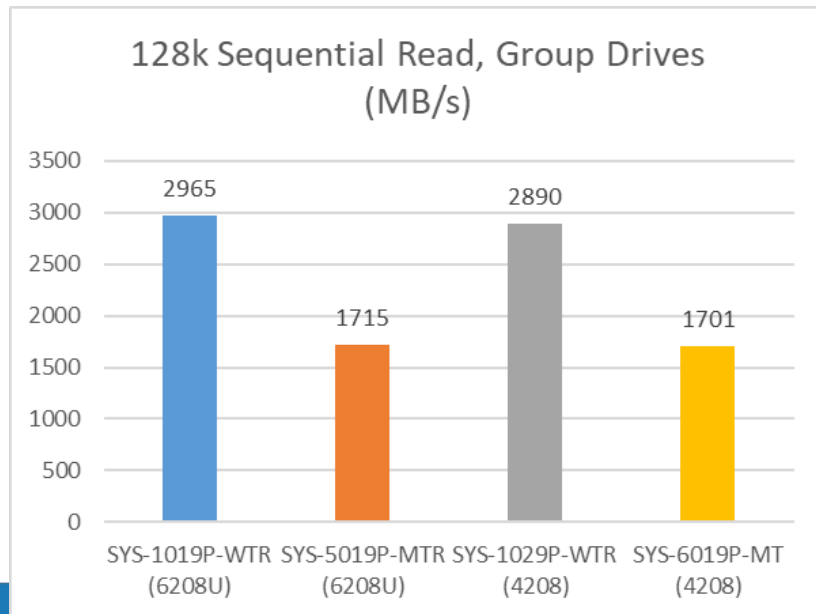
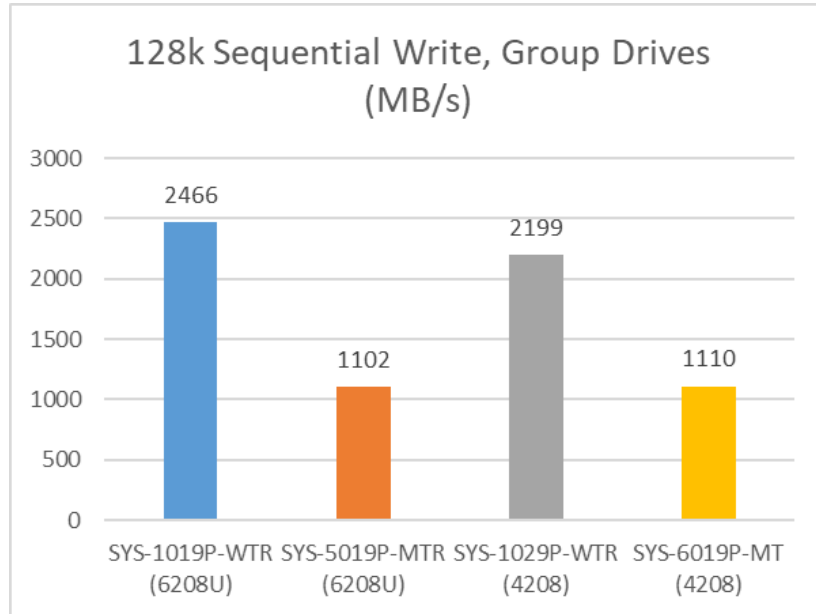


CPU	Spec	Price
1x 6208U	1x (16C, 2.9G/3.9G, 22MB, 150W)	\$989
2x 4208	2x (8C, 2.1G/3.2G, 11MB, 85W)	\$856 (=2x \$428)

Take away:

2x CPU Performance with, similar CPU cost & lower power consumption

X11 UP vs X11 DP Drive Performance



System	Spec	Total Capacity
SYS-1019P-WTR (winner)	10x 2.5" SATA/SAS drives	10x Intel S4510 240GB SATA SSD
SYS-5019P-MTR	4x 3.5" SATA/SAS drives	4x Intel S4510 240GB SATA SSD
SYS-1029P-WTR	8x 2.5" SATA/SAS drives	8x Intel S4510 240GB SATA SSD
SYS-6019P-MT	4x 3.5" SATA/SAS drives	4x Intel S4510 240GB SATA SSD

Take away:

Drive performance is approx. linear to the number of drives.

UP system SYS-1019P-WTR offer the best drive performance, with lower TCO.

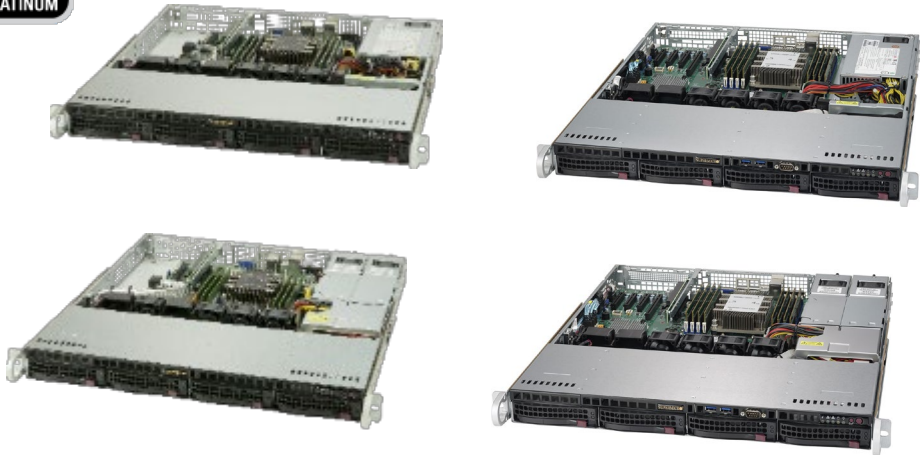


X11 Skylake & Cascade Lake-R UP Product Family



Mainstream

WIO



SYS-5019P-M
SYS-5019P-MR
SYS-5019P-MT
SYS-5019P-MTR



SYS-1019P-WTR
SYS-5019P-WTR
SYS-5019P-WT
SYS-5029P-WTR

SSG

GPU



SSG-5029P-E1CTR12L
SSG-5049P-E1CTR36L
SSG-5049P-E1CTR45L
SSG-5049P-E1CTR45H

SYS-1019GP-TT
SYS-5019GP-TT



X12 UP Servers



Ice Lake-SP on Whitley

3rd Gen Intel Xeon Scalable Processors on the One-or-Two Socket Whitley Platform

BUILT-IN AI ACCELERATION WITH INTEL DL BOOST

PERVASIVE PERFORMANCE

UP TO 18% HIGHER INSTRUCTIONS PER CLOCK (IPC)¹
VS. CASCADE LAKE-SP

ENHANCED ARCHITECTURE & NEW MANUFACTURING PROCESS
ENHANCED DELIVERED PERFORMANCE
VS. CASCADE LAKE

NEW INTEL SPEED SELECT TECHNOLOGY
THREE CAPABILITIES SUPPORTED
ON ALL ICE LAKE GOLD 5300 AND HIGHER SKUS

UP TO 40% PERFORMANCE IMPROVEMENT
(SPECRATE2017 INT_BASE)
ON NEW ICE LAKE SKU OFFERINGS VS. CASCADE LAKE²

BUILT-IN AI & SECURITY

INTEL DEEP LEARNING BOOST
BUILT-IN AI ACCELERATION

NEW HARDWARE-ENHANCED SECURITY³

ENHANCED CRYPTO PROCESSING
INTEL SOFTWARE GUARD EXTENSIONS⁴
INTEL TOTAL MEMORY ENCRYPTION⁴

ENHANCED CRYPTO PROCESSING ACCELERATION
VS. CASCADE LAKE

ADVANCED ENCRYPTION STANDARD PUBLIC KEY CRYPTO GENERATION SECURE HASH ALGORITHM

NEXT GEN PLATFORM

NEW INTEL OPTANE PERSISTENT MEMORY 200 SERIES
UP TO 512GB PMem, UP TO 6TB/SOCKET
TOTAL SYSTEM MEMORY (DDR + PMem)

ENHANCED I/O
8CH DDR4/3200 (2 DPC)
64 LANES PCI EXPRESS 4
INTEL RESOURCE DIRECTOR TECHNOLOGY

1.60X MEMORY BANDWIDTH INCREASE
8CH 3200 MT/S (2 DPC) VS.
CASCADE LAKE 6CH 2666 MT/S (2 DPC)

2.66X MEMORY CAPACITY INCREASE
IN A TWO SOCKET CONFIGURATION
8 CHANNELS (256GB DDR4) VS.
CASCADE LAKE 6 CHANNELS (128GB DDR4)

DELIVERING GEN-ON-GEN PLATFORM AND TECHNOLOGY ADVANCEMENTS IN 2020 AND BEYOND

For more complete information about performance and benchmark results, visit www.intel.com/benchmarks.

1- GEOMEAN based on SIR and at the same core count, frequency and memory bandwidth when comparing to prior generation. Other workload IPC measurements may vary.

2- Configuration: SPEC CPU2017, memory at 3200 MT/s, 3 - No product or component can be absolutely secure. 4 - This technology is not supported when using Intel Optane persistent memory

FEATURE SHELVING EVOLUTION

Platinum-8XXX

Cascade Lake

(8S support)

Gold-6XXX

3 UPI links @ 10.4 GT/s
DDR4-2933 1DPC
AVX512 – 2 FMA
Node controller support

Gold-5XXX

2 UPI links @ 10.4 GT/s
DDR4-2666
Advanced RAS
Intel Optane DC persistent memory module
(8S support)

Silver-4XXX

2 UPI links @ 9.6GT/s
DDR4 2400
AVX512 -1 FMA
Standard RAS
Intel® Turbo Boost
Intel® Hyper-Threading

Ice Lake⁽¹⁾

DDR4 3200
SGX up to 512GB

DDR4 3200⁽²⁾

3 UPI links @ 11.2 GT/s
DDR4 2933⁽²⁾
Advanced RAS
Intel Optane DC persistent memory module
Speed select SST-BF, SST-TF, SST-CP
SGX 64GB

2 UPI links @ 10.4 GT/s
DDR4 2666
Standard RAS
Intel® Turbo Boost
Intel® Hyper-Threading
SGX 8GB enclave size
AVX512-2FMA
TME-MT 64 Keys



(1) Changes in feature set from Purley to Cascade highlighted in green
(2) Segment optimized SKUs may use lower speeds

ICE LAKE ROADMAP SKU PROCESSORS

SKUs Optimized for Highest Per-Core-Performance

XCC (100%)
HCC (95%)

Mainline SKUs

CASCADE LAKE	ICE LAKE
RCP	SIR 2017
\$2,612 28C 2.2G 165W 6238R	\$3,450 32C 2.2G 205W 8352Y
\$2,200 24C 2.4G 165W 6240R	\$2,612 32C 2.0G 205W 6338
\$1,894 26C 2.1G 150W 6230R	\$1,977 24C 2.4G 185W 6336Y
\$1,555 24C 2.2G 150W 5220R	\$1,894 28C 2.0G 205W 6330
\$1,273 20C 2.1G 125W 5218R	\$1,555 26C 2.2G 185W 5320
\$900 16C 2.1G 100W 4216	\$1,273 24C 2.1G 165W 5318Y
\$694 12C 2.4G 100W 4214R	\$1,002 20C 2.3G 150W 4316
\$501 10C 2.4G 100W 4210R	\$694 16C 2.4G 135W 4314
\$562 8C 2.5G 85W 4215	\$501 12C 2.1G 120W 4310
\$417 8C 2.1G 85W 4208	\$501 8C 2.8G 105W 4309Y

CASCADE LAKE	ICE LAKE
\$3,950 28C 2.7G 205W 6258R	\$8,099 40C 2.3G 270W 8380
\$2,700 24C 3.0G 205W 6248R	\$6,302 38C 2.4G 270W 8368
\$2,529 20C 3.1G 205W 6242R	\$4,702 36C 2.4G 250W 8360Y
\$3,803 18C 3.1G 200W 6254	\$3,950 32C 2.6G 250W 8358
\$3,286 16C 3.4G 205W 6246R	\$3,072 28C 2.6G 235W 6348
\$2,214 8C 3.3G 130W 6234	\$2,529 24C 2.8G 230W 6342
\$1,300 16C 2.9G 150W 6226R	\$2,445 18C-39M 3.0G 205W* 6354
\$1,221 10C 2.5G 85W 5215	\$2,300 16C-36M 3.1G 205W* 6346
\$1,221 4C 3.8G 105W 5222	\$2,214 8C-18M 3.6G 165W* 6334
\$794 8C 3.2G 130W 4215R	\$1,300 16C 2.9G 185W 6326
	\$950 12C 3.0G 150W 5317
	\$895 8C 3.2G 140W 5315Y

Updates from 80% Comms: No Price Changes

* SKU based on 2U+ Extended Air Cooling

For more complete information about performance and benchmark results, visit www.intel.com/benchmarks. Configuration details: SMT Enabled, Turbo Enabled, Integer throughput workload, memory up to 3200MT/s.

All SKUs, frequencies, and performance estimates are PRELIMINARY and can change without notice.

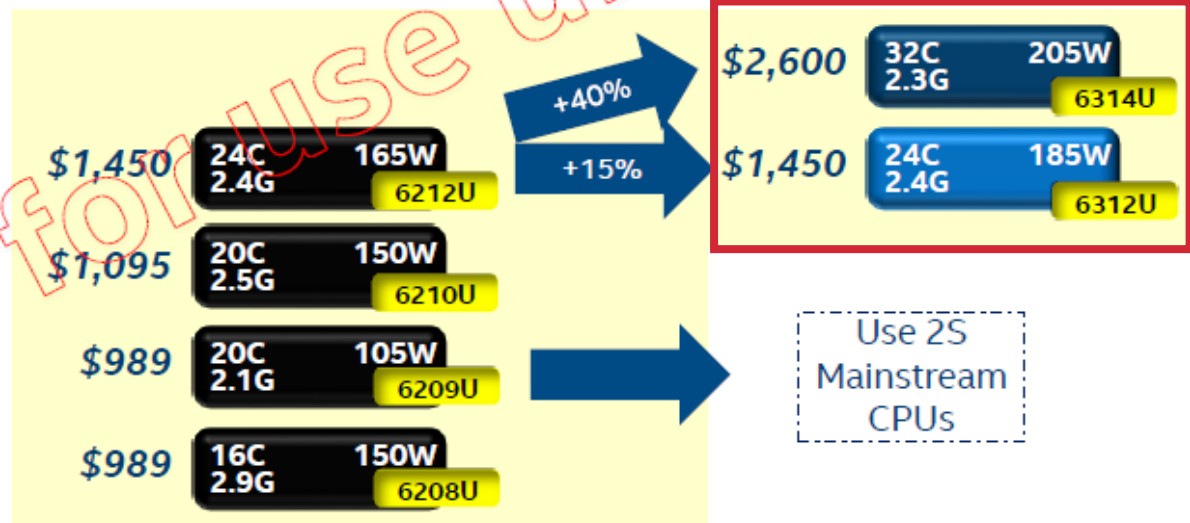
Intel Confidential

intel.

UP (1S) Special SKU



1 Socket Processors



6312U = \$527 Savings

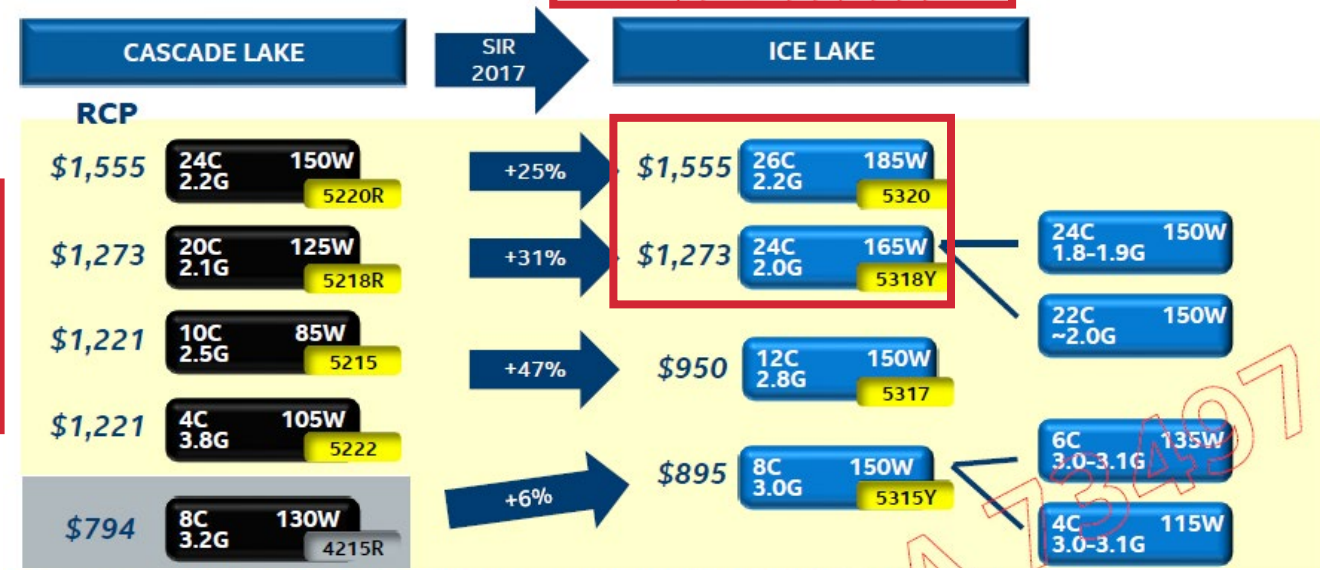


GOLD 5XXX SERIES

Features

Gold 5 (53xx)

8-ch DDR4 @ 2933

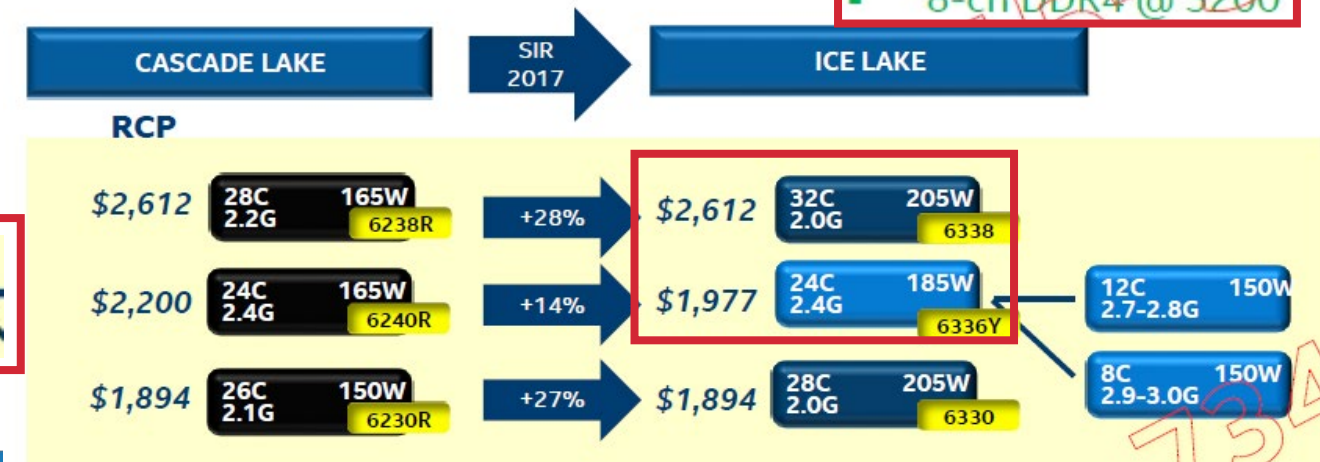


GOLD 6XXX SERIES - MAINLINE

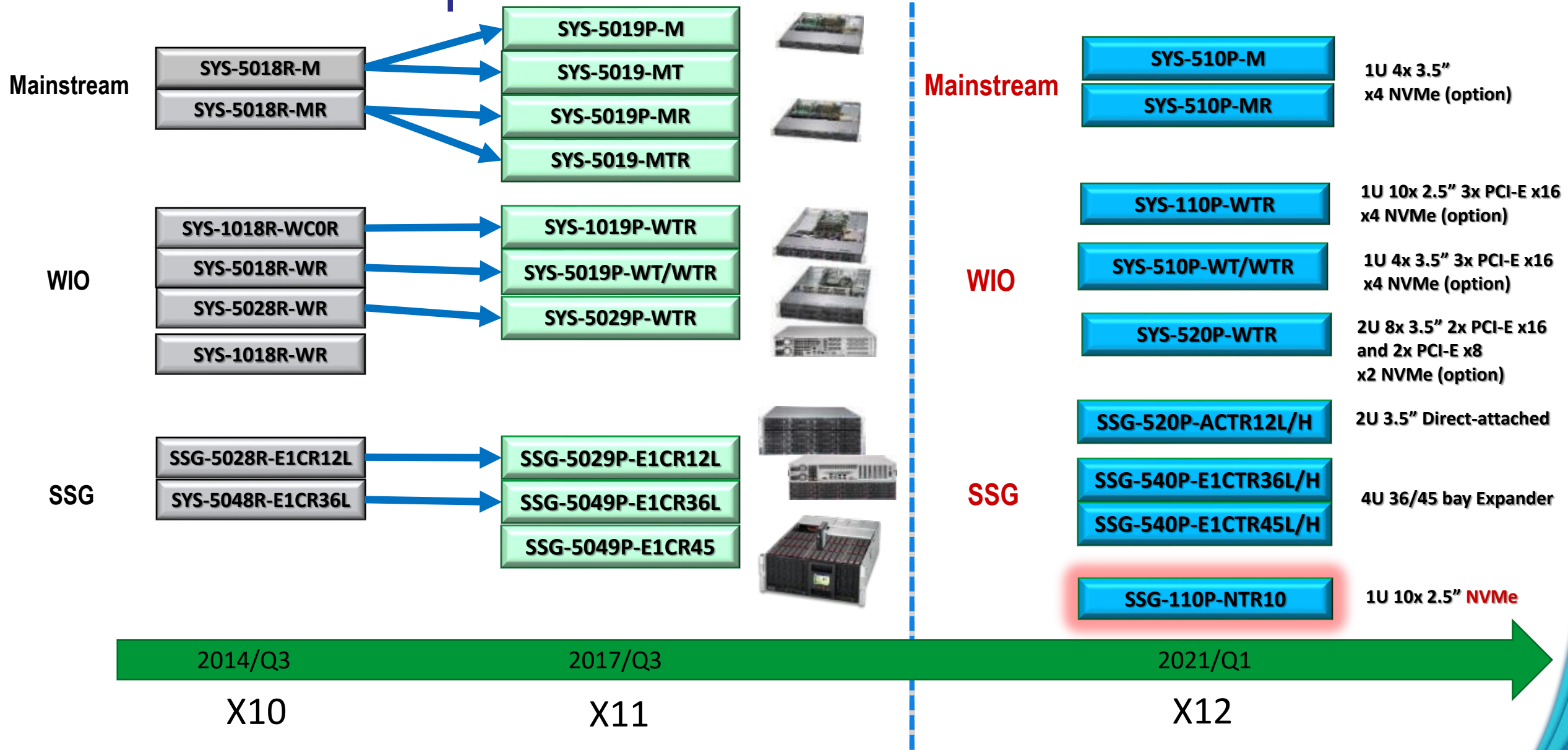
Features

Gold 6 (63xx):

8-ch DDR4 @ 3200



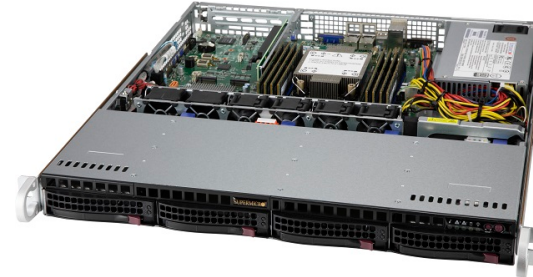
UP Roadmap





X12 UP Mainstream Key Features

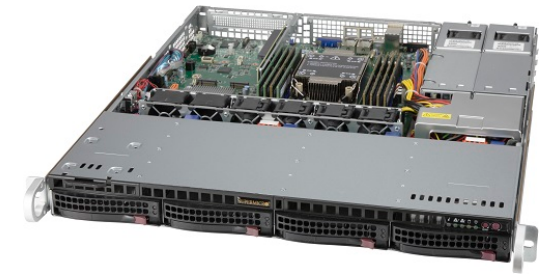
- Better Thermals: Optimize airflow design
 - **1U: 220W TDP**
- Compute Performance
 - Support single ICX up to 220W CPU
 - 8 DIMM for a large memory foot print (**up to 3TB**)
 - **New Intel® Optane™ Persistent Memory 200 Series**
- Platinum (94%) Power Supplies
 - 500W Single (510-M)
 - 400W Redundant (510P-MR)
- **All Flash NVMe Hybrid Storage Options**
 - **1U 4x NVMe**
- Flexible I/O Expansion Slots:
 - 1U: **1 PCI-E 4.0 x16 FHHL slot**
 - **2x M.2 with VROC Support**
- Networking
 - 2x 1G



1U 3.5"

Compute & Storage Powerhouse

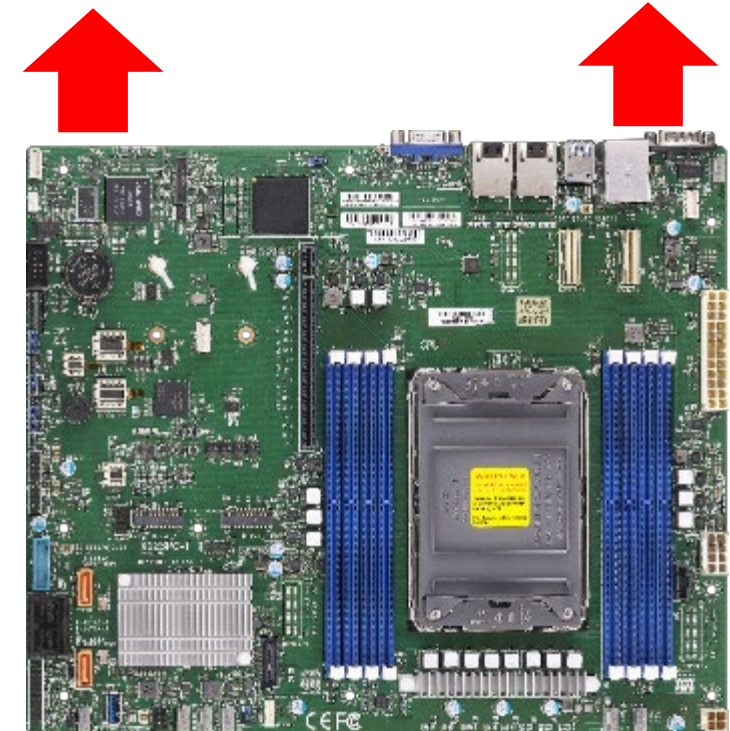
SYS-510P-M: 4x 3.5" SATA/NVMe (SAS via AOC)



1U 3.5"

Compute Optimized Redundant Power Supplies

SYS-510P-MR: 4x 3.5" SATA/NVMe (SAS via AOC)

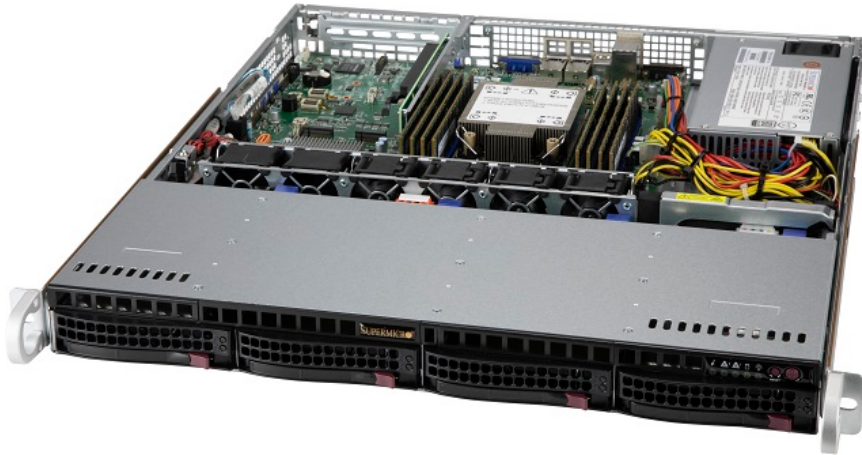


Mainstream 1U: SYS-510P-M



Specifications

- Motherboard: X12SPO-F
- 1U Chassis: CSE-813MF2TQC-505CB



System Front



System Rear

1	Processor Support – Single Socket P <ul style="list-style-type: none">• 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 220W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none">• 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM• Supports Intel® Optane™ Persistent Memory
3	Expansion – 1 PCI-E Gen 4 Slot <ul style="list-style-type: none">• 1x PCI-E 4.0 x16 (FHHL)
4	Networking & I/O – 2x 1G Base-T <ul style="list-style-type: none">• 2x 1G Base-T LAN ports• 1x RJ45 Dedicated IPMI LAN port• 3x USB 3.2 Gen 1 ports (2 rear, 1 Type A)• 2x USB 2.0 ports (2 rear)• 1x VGA port (rear)• 1x Serial ports (1 rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none">• Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 4x Hot-Swap SATA/NVMe <ul style="list-style-type: none">• 4x Hot-swap 3.5" drive bays: 4x SATA (default) Option: 4 NVMe – by additional cables or SAS3 via opt. AOC• 2x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA with VROC Support
7	System Cooling – 4x 40x40x28mm Fans <ul style="list-style-type: none">• 4x 40x40x28mm Middle Cooling PWM fans, 2x Fans (optional)
8	Power Supply – 1x 500W Platinum <ul style="list-style-type: none">• 1x 500W High-efficiency (Platinum level, 94%) Power Supply
9	Dimensions <ul style="list-style-type: none">• 17.2" (W) x 1.7" (H) x 19.98" (D)

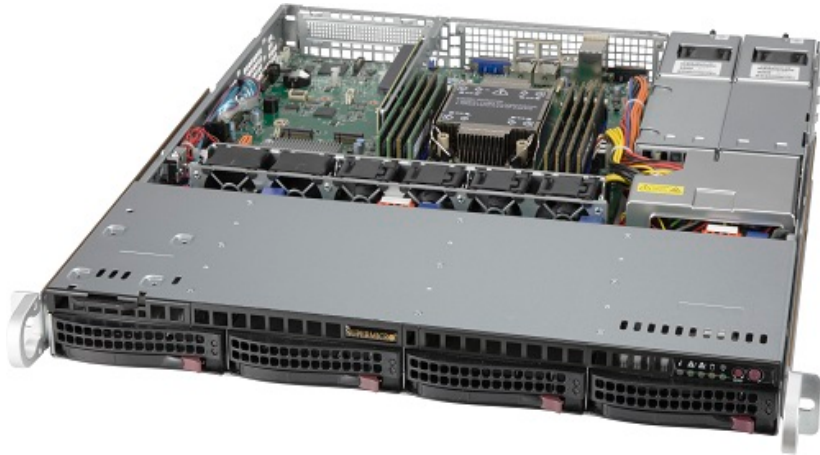
Subject to change without notice

Mainstream 1U: SYS-510P-MR



Specifications

- Motherboard: X12SPO-F
- 1U Chassis: CSE-813MF2TQC-R407CB



System Front



System Rear

1	Processor Support – Single Socket P <ul style="list-style-type: none"> • 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 220W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none"> • 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM • Supports Intel® Optane™ Persistent Memory
3	Expansion – 1 PCI-E Gen 4 Slot <ul style="list-style-type: none"> • 1x PCI-E 4.0 x16 (FHHL)
4	Networking & I/O – 2x 1G Base-T <ul style="list-style-type: none"> • 2x 1G Base-T LAN ports • 1x RJ45 Dedicated IPMI LAN port • 3x USB 3.2 Gen 1 ports (2 rear, 1 Type A) • 2x USB 2.0 ports (2 rear) • 1x VGA port (rear) • 1x Serial ports (1 rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none"> • Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 4x Hot-Swap SATA/NVMe <ul style="list-style-type: none"> • 4x Hot-swap 3.5" drive bays: 4x SATA (default) Option: 4 NVMe – by additional cables or SAS3 via opt. AOC • 2x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA with VROC Support
7	System Cooling – 4x 40x40x28mm Fans <ul style="list-style-type: none"> • 4x 40x40x28mm Middle Cooling PWM fans, 2x Fans (optional)
8	Power Supply – 1+1 Redundant 400W Platinum <ul style="list-style-type: none"> • 2x 400W High-efficiency Redundant power supplies (Platinum level, 94%)
9	Dimensions <ul style="list-style-type: none"> • 17.2" (W) x 1.7" (H) x 19.98" (D)

Subject to change without notice



X12 UP WIO Key Features

- Better Thermals: Optimize airflow design
 - **1U/2U 270W TDP**
- Compute Performance
 - Support single ICX up to 270W CPU
 - 8 DIMM for a large memory footprint
(up to 3TB)
 - **New Intel® Optane™ Persistent Memory 200 Series**
- Networking
 - 2x 10G BaseT

- 1U: 600W Single (510P-WT)
- 1U: 500W Redundant (510P-WTR)
- 1U: 750W Redundant (110P-WTR)
- 2U: 650W Redundant (520P-WTR)
 - 1U & 2U Platinum (94%) Level Power

• All Flash NVMe Hybrid Storage Options

- **1U: 4x NVMe**
- **2U: 2x NVMe**

• Flexible I/O Expansion Slots:

- 1U: **2 PCI-E 4.0 x16 FHFL slot**
1 PCI-E 4.0 x16 LP slot
- 2U: **2 PCI-E 4.0 x16 FHFL slot**
2 PCI-E 4.0 x8 LP slot



SYS-510P-WT
Compute Optimized



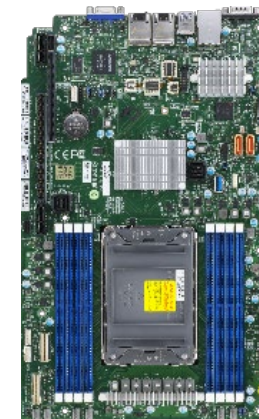
SYS-510P-WTR
Compute Optimized Redundant Power



SYS-110P-WTR
Compute & Storage Powerhouse



SYS-520P-WTR
Capacity Optimized Storage



WIO 1U: SYS-510P-WT

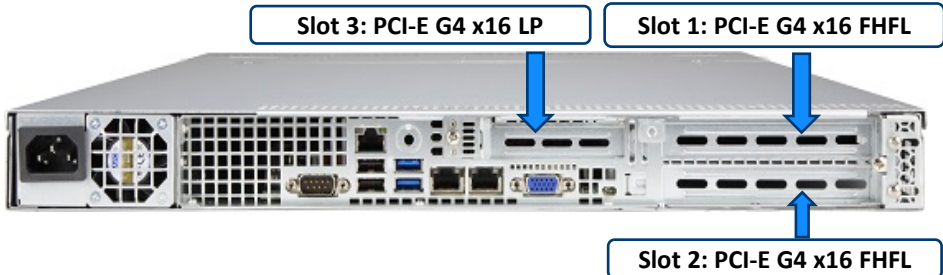


Specifications

- Motherboard: X12SPW-TF
- 1U Chassis: CSE-815TQC-605WBP2



System Front



System Rear

1	Processor Support – Single Socket P <ul style="list-style-type: none"> • 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none"> • 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM • Supports Intel® Optane™ Persistent Memory
3	Expansion – 3x PCI-E Gen 4 Slots <ul style="list-style-type: none"> • 2x PCI-E 4.0 x16 (FHFL) • 1x PCI-E 4.0 x16 (LP)
4	Networking & I/O – 2x 10G Base-T <ul style="list-style-type: none"> • 2x 10G Base-T LAN ports • 1x RJ45 Dedicated IPMI LAN port • 3x USB 3.2 Gen 1 ports (2 rear, 1 Type A) • 2x USB 2.0 ports (2 rear) • 1x VGA port (rear) • 1x Serial ports (1 rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none"> • Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 4x Hot-Swap SATA/NVMe <ul style="list-style-type: none"> • 4x Hot-swap 3.5" drive bays: 4x SATA (default) • Option: 4 NVMe – by additional cables or SAS3 via opt. AOC • 1x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA
7	System Cooling – 5x 40x40x56mm Fans <ul style="list-style-type: none"> • 5x Counter-rotating 40x40x56mm PWM fans, 1x Fan (optional)
8	Power Supply – 1x 600W Platinum <ul style="list-style-type: none"> • 1x 600W High-efficiency (Platinum level, 94%) Power Supply
9	Dimensions <ul style="list-style-type: none"> • 17.2" (W) x 1.7" (H) x 25.6" (D)

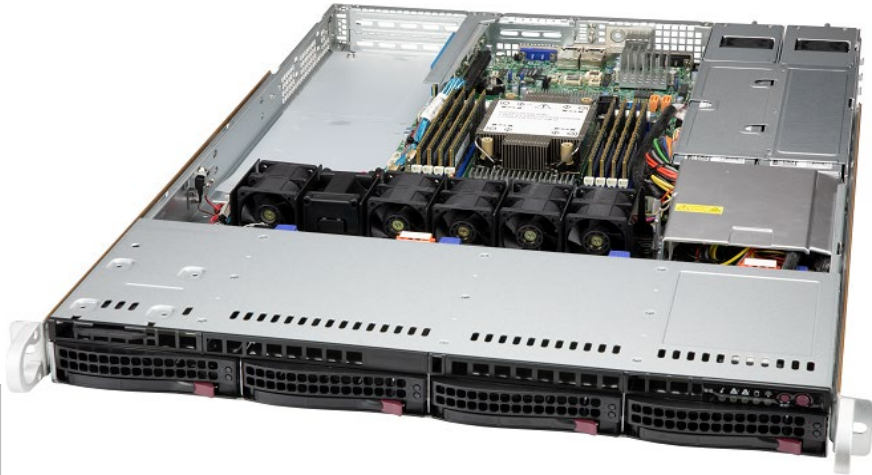
Subject to change without notice

WIO 1U: SYS-510P-WTR

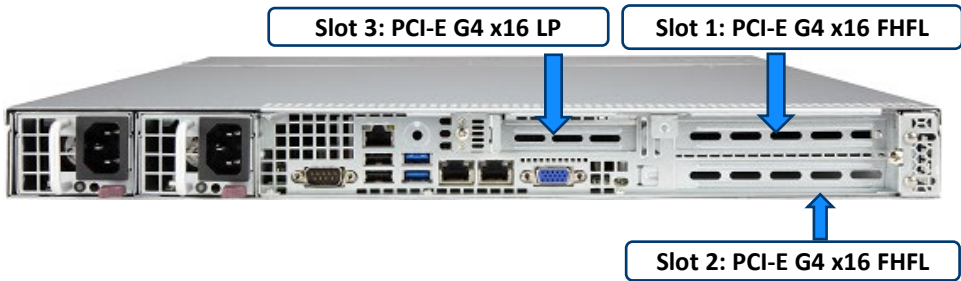


Specifications

- Motherboard: X12SPW-TF
- 1U Chassis: CSE-815TQC-R504WB



System Front



System Rear

1	Processor Support – Single Socket P <ul style="list-style-type: none"> • 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none"> • 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM • Supports Intel® Optane™ Persistent Memory
3	Expansion – 3x PCI-E Gen 4 Slots <ul style="list-style-type: none"> • 2x PCI-E 4.0 x16 (FHFL) • 1x PCI-E 4.0 x16 (LP)
4	Networking & I/O – 2x 10G Base-T <ul style="list-style-type: none"> • 2x 10G Base-T LAN ports • 1x RJ45 Dedicated IPMI LAN port • 3x USB 3.2 Gen 1 ports (2 rear, 1 Type A) • 2x USB 2.0 ports (2 rear) • 1x VGA port (rear) • 1x Serial ports (1 rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none"> • Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 4x Hot-Swap SATA/NVMe <ul style="list-style-type: none"> • 4x Hot-swap 3.5" drive bays: 4x SATA (default) • Option: 4 NVMe – by additional cables or SAS3 via opt. AOC • 1x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA
7	System Cooling – 5x 40x40x56mm Fans <ul style="list-style-type: none"> • 5x Counter-rotating 40x40x56mm PWM fans, 1x Fan (optional)
8	Power Supply – 2x 500W Platinum <ul style="list-style-type: none"> • 2x 500W High-efficiency Redundant Power Supplies (Platinum level, 94%)
9	Dimensions <ul style="list-style-type: none"> • 17.2" (W) x 1.7" (H) x 25.6" (D)

Subject to change without notice

WIO 1U: SYS-110P-WTR

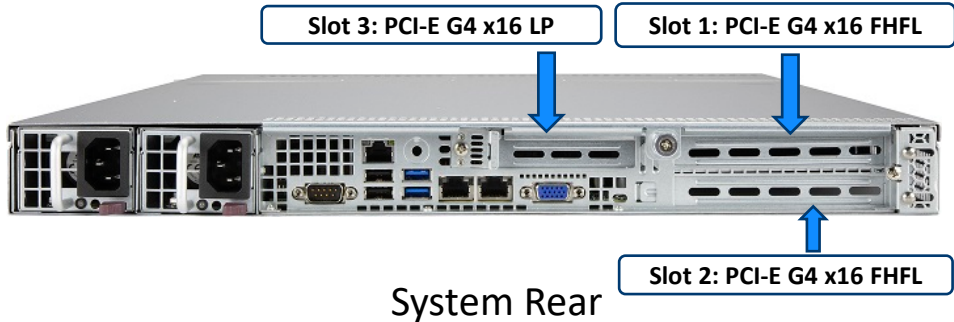


Specifications

- Motherboard: X12SPW-TF
- 1U Chassis: CSE-116TS-R706WBP4



System Front



System Rear

1	Processor Support – Single Socket P <ul style="list-style-type: none"> • 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none"> • 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM • Supports Intel® Optane™ Persistent Memory
3	Expansion – 3x PCI-E Gen 4 Slots <ul style="list-style-type: none"> • 2x PCI-E 4.0 x16 (FHFL) • 1x PCI-E 4.0 x16 (LP)
4	Networking & I/O – 2x 10G Base-T <ul style="list-style-type: none"> • 2x 10G Base-T LAN ports • 1x RJ45 Dedicated IPMI LAN port • 5x USB 3.2 Gen 1 ports (2 rear, 2 front, 1 Type A) • 2x USB 2.0 ports (2 rear) • 1x VGA port (rear) • 1x Serial ports (1 rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none"> • Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 10x Hot-Swap SATA (4x Hybrid NVMe) <ul style="list-style-type: none"> • 10x Hot-swap 2.5" drive bays: 10x 2.5" SATA (default) Option: 4 NVMe – by additional cables or SAS3 via opt. AOC • 1x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA
7	System Cooling – 5x 40x40x56mm Fans <ul style="list-style-type: none"> • 5x Counter-rotating 40x40x56mm PWM fans, 1x Fan (optional)
8	Power Supply – 1+1 Redundant 750W Platinum <ul style="list-style-type: none"> • 2x 750W High-efficiency Redundant Power Supplies (Platinum level, 94%)
9	Dimensions <ul style="list-style-type: none"> • 17.2" (W) x 1.7" (H) x 23.5" (D)

Subject to change without notice

WIO 2U: SYS-520P-WTR

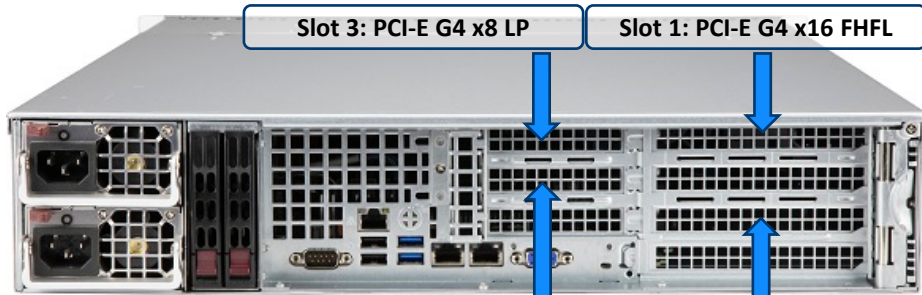


Specifications

- Motherboard: X12SPW-TF
- 2U Chassis: CSE-825BTS-R609WP



System Front



System Rear



Subject to change without notice

1	Processor Support – Single Socket P <ul style="list-style-type: none"> • 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none"> • 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM • Supports Intel® Optane™ Persistent Memory
3	Expansion – 4x PCI-E Gen 4 Slots <ul style="list-style-type: none"> • 2x PCI-E 4.0 x16 (FHFL) • 2x PCI-E 4.0 x8 (LP) • (Optional riser card available 4x PCI-E 4.0 x8 or 1x PCI-E 4.0 x16 + 2x PCI-E 4.0 x8)
4	Networking & I/O – 2x 10G Base-T <ul style="list-style-type: none"> • 2x 10G Base-T LAN ports • 1x RJ45 Dedicated IPMI LAN port • 3x USB 3.2 Gen 1 ports (2 rear, 1 Type A) • 2x USB 2.0 ports (2 rear) • 1x VGA port (rear) • 1x Serial ports (1 rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none"> • Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 8x Hot-Swap SATA (2x optional SATA/NVMe) <ul style="list-style-type: none"> • 8x Hot-swap 3.5" drive bays: 8x 3.5" SATA (default), SAS3 via opt. AOC • 2 NVMe/SATA (option w/rear kit) • 1x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA
7	System Cooling – 3x Hot-swap 80x80x38mm Fans <ul style="list-style-type: none"> • 3x Heavy duty 80x80x38mm PWM fan
8	Power Supply – 1+1 Redundant 650W Platinum <ul style="list-style-type: none"> • 2x 650W High-efficiency Redundant Power Supplies (Platinum level, 94%)
9	Dimensions <ul style="list-style-type: none"> • 17.2" (W) x 3.5" (H) x 25.5" (D)



X12 UP Storage Key Features

- Better Thermals: Optimize airflow design

- **1U/2U/4U: 270W TDP**

- Compute Performance

- Support single ICX up to 270W CPU
- 8 DIMM for a large memory foot print (**up to 3TB**)
- **New Intel® Optane™ Persistent Memory 200 Series**

- Flexible I/O Expansion Slots:

- 1U: **1 PCI-E 4.0 x16 FHHL slot**
- 2U/4U: **2 PCI-E 4.0 x16 LP slot**
2 PCI-E 4.0 x8 LP slot

- All Flash NVMe Hybrid Storage Options

- 1U 10x NVMe (Dedicate Attached)
- 2U/4U 2x NVMe (Option Rear)

- Networking

- 2 x 10G BaseT

- Power Supply Level

- 860W Redundant (Platinum) (110P-TRN10)
- 800W Redundant (**Titanium**) (520P-ACTR12L/H)
- 1200W Redundant (**Titanium**) (540P-E1CTR36L/H)
- 1600W Redundant (Platinum) (540P-E1CTR45L/H)

1U 10x 2.5"

CDN Optimize Solution

SSG-110P-NTR10: 10x 2.5" NVMe



2U 12x 3.5"

Compute & Storage Powerhouse

SSG-520P-ACTR12L/H: 12x 3.5" SATA/SAS + 2x 2.5" SATA/NVMe optional rear



4U 45x 3.5" (Top-Load)

Capacity Optimized Storage

SSG-540P-E1CTR45L/H: 45x 3.5" SATA/SAS + 2x 2.5" SATA

+ 2x 2.5" SATA/NVMe optional rear



4U 36x 3.5"

IOPS Optimized Storage

SSG-540P-E1CTR36L/H: 36x 3.5" SATA/SAS + 2x 2.5" SATA/NVMe optional rear



SSG 1U: SSG-110P-NTR10



Specifications

- Motherboard: X12SPO-NTF
- 1U Chassis: CSE-116TS-R860CBP-N10



System Front

Slot 1: PCI-E G4 x16 FHHL



System Rear

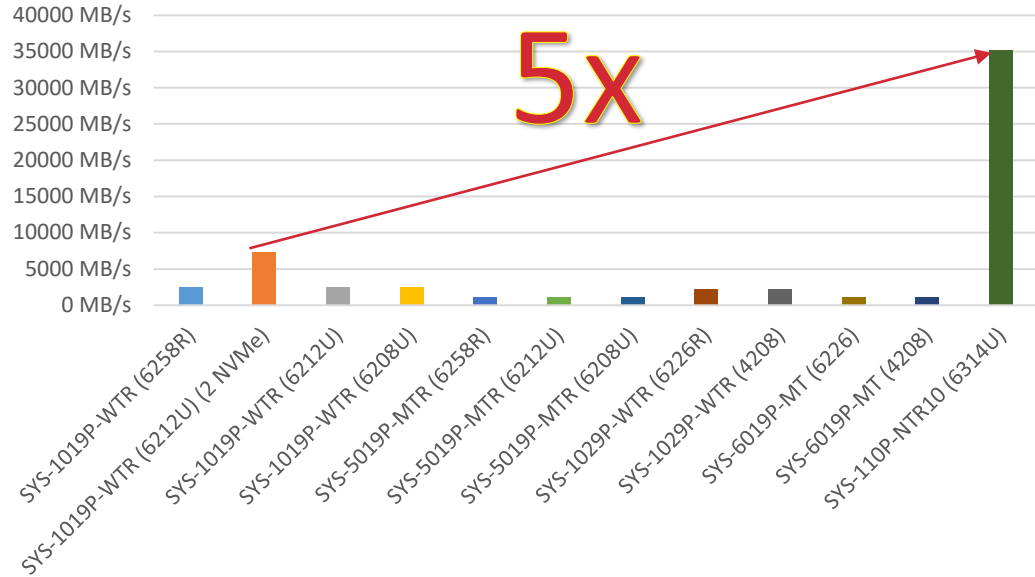
1	Processor Support – Single Socket P <ul style="list-style-type: none"> • 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none"> • 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM • Supports Intel® Optane™ Persistent Memory
3	Expansion – 1x PCI-E Gen 4 Slot <ul style="list-style-type: none"> • 1x PCI-E 4.0 x16 (FHHL)
4	Networking & I/O – 2x 10G Base-T <ul style="list-style-type: none"> • 2x 10G Base-T LAN ports • 1x RJ45 Dedicated IPMI LAN port • 5x USB 3.2 Gen 1ports (2 rear, 2 front, 1 Type A) • 2x USB 2.0 ports (2 rear) • 1x VGA port (rear) • 1x Serial ports (1 rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none"> • Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 10x Hot-Swap NVMe <ul style="list-style-type: none"> • 10x Hot-swap 2.5" Dedicated NVMe drive bays • 2x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA
7	System Cooling – 6x 40x40x56mm Fans <ul style="list-style-type: none"> • 6x Counter-rotating 40x40x56mm PWM fans
8	Power Supply – 1+1 Redundant 860W Platinum <ul style="list-style-type: none"> • 2x 860W High-efficiency Redundant power supplies (Platinum level, 94%)
9	Dimensions <ul style="list-style-type: none"> • 17.2" (W) x 1.7" (H) x 23.50" (D)

Subject to change without notice

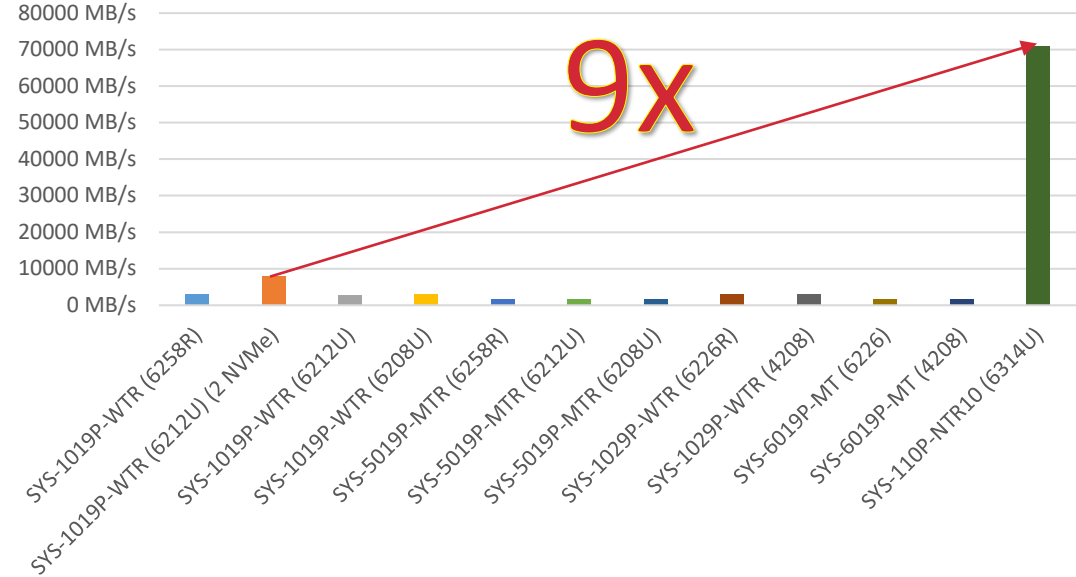
The All-Flash NVMe Power



128k Sequential Write, Group Drives



128k Sequential Read, Group Drives



Perf. Per Drive	Intel P4510 PCIe Gen3	Intel P5510 PCIe Gen4
Read	Up to 3000MB/S	Up to 6500MB/S
Write	Up to 2900MB/s	Up to 3400MB/S

SSG 2U: SSG-520P-ACTR12L/H

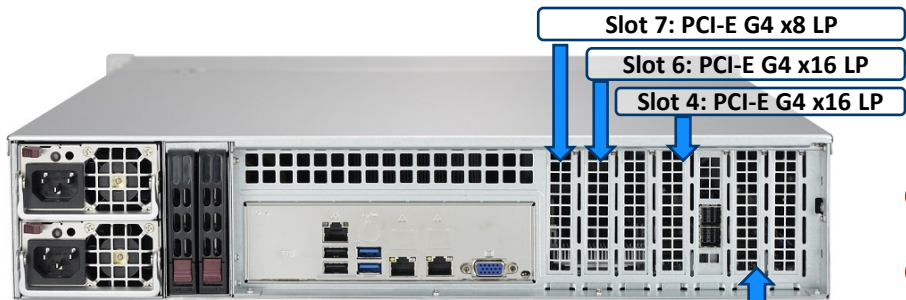


Specifications

- **Motherboard: X12SPi-TF**
- **1U Chassis: CSE-826BAC12-R802LPB**



System Front



System Rear

1	Processor Support – Single Socket P <ul style="list-style-type: none"> • 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none"> • 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM • Supports Intel® Optane™ Persistent Memory
3	Expansion – 4x PCI-E Gen 4 Slots <ul style="list-style-type: none"> • 2x PCI-E 4.0 x16 (LP) • 2x PCI-E 4.0 x8 (LP)
4	Networking & I/O – 2x 10G Base-T <ul style="list-style-type: none"> • 2x 10G Base-T LAN ports • 1x RJ45 Dedicated IPMI LAN port • 3x USB 3.2 Gen 1 ports (2 rear, 1 Type A) • 2x USB 2.0 ports (2 rear) • 1x VGA port (rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none"> • Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 12x Hot-Swap SATA/SAS w/S3816L(model L) or S3916L(model H) <ul style="list-style-type: none"> • 12x Hot-swap Direct-attached 3.5" drive bays; 2x SATA/NVMe (optional) rear • 1x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA
7	System Cooling – 3x 80x80x38mm Fans <ul style="list-style-type: none"> • 3x Heavy duty 80x80x38mm PWM fans
8	Power Supply – 1+1 Redundant 800W Titanium <ul style="list-style-type: none"> • 2x 800W High-efficiency Redundant power supplies (Titanium level, 96%)
9	Dimensions <ul style="list-style-type: none"> • 17.2" (W) x 3.5" (H) x 25.5" (D)

Subject to change without notice

SSG 4U: SSG-540P-E1CTR36L/H

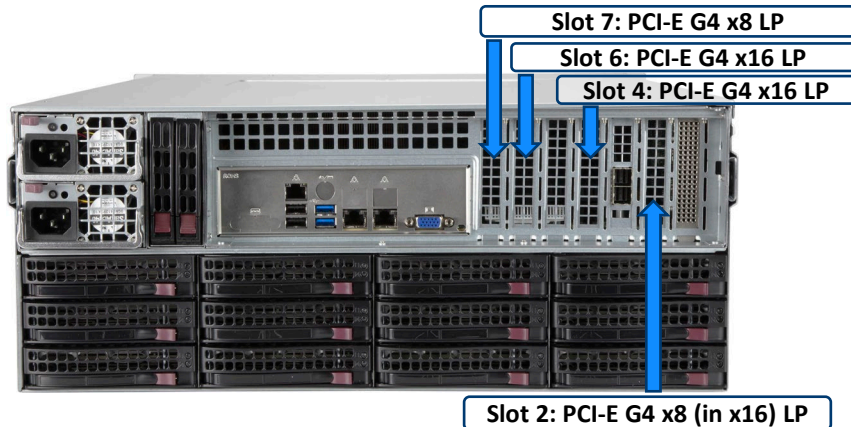


Specifications

- Motherboard: X12SPi-TF
- 1U Chassis: CSE-847BE1C-R1K23LPB



System Front



System Rear

1	Processor Support – Single Socket P <ul style="list-style-type: none"> • 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none"> • 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM • Supports Intel® Optane™ Persistent Memory
3	Expansion – 4x PCI-E Gen 4 Slots <ul style="list-style-type: none"> • 2x PCI-E 4.0 x16 (LP) • 2x PCI-E 4.0 x8 (LP)
4	Networking & I/O – 2x 10G Base-T <ul style="list-style-type: none"> • 2x 10G Base-T LAN ports • 1x RJ45 Dedicated IPMI LAN port • 3x USB 3.2 Gen 1 ports (2 rear, 1 Type A) • 2x USB 2.0 ports (2 rear) • 1x VGA port (rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none"> • Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 36x Hot-Swap SATA/SAS w/S3808L(model L) or S3908L(model H) <ul style="list-style-type: none"> • 36x Hot-swap 3.5" drive bays; 2x SATA/NVMe (optional) rear • 1x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA
7	System Cooling – 7x 80x80x38mm Fans <ul style="list-style-type: none"> • 7x Heavy duty 80x80x38mm PWM fans
8	Power Supply – 1+1 Redundant 1200W Titanium <ul style="list-style-type: none"> • 2x 1200W High-efficiency Redundant power supplies (Titanium level, 96%)
9	Dimensions <ul style="list-style-type: none"> • 17.2" (W) x 7" (H) x 27.5" (D)

Subject to change without notice

SSG 4U: SSG-540P-E1CTR45L/H

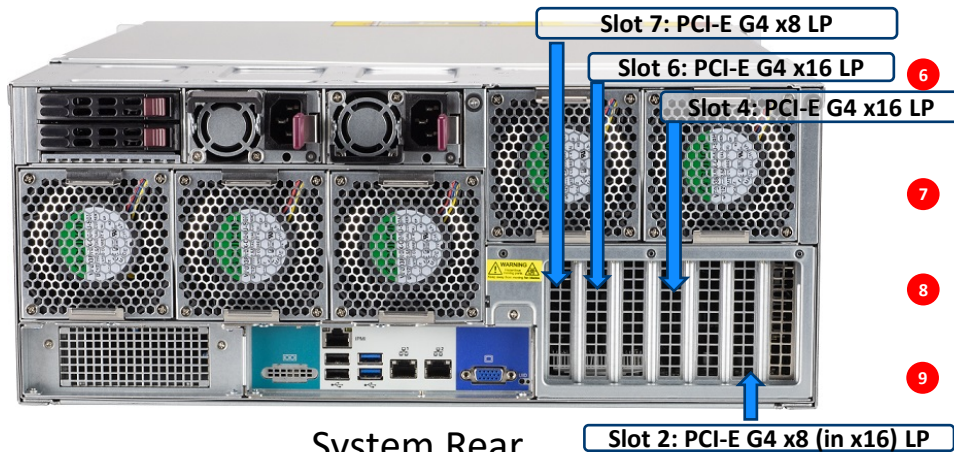


Specifications

- Motherboard: X12SPi-TF
- 1U Chassis: CSE-946LTS-R1K66P1



System Front



System Rear

1	Processor Support – Single Socket P <ul style="list-style-type: none"> • 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP
2	Memory Capacity – 8 DIMM Slots <ul style="list-style-type: none"> • 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM • Supports Intel® Optane™ Persistent Memory
3	Expansion – 4x PCI-E Gen 4 Slots <ul style="list-style-type: none"> • 2x PCI-E 4.0 x16 (LP) • 2x PCI-E 4.0 x8 (LP)
4	Networking & I/O – 2x 10G Base-T <ul style="list-style-type: none"> • 2x 10G Base-T LAN ports • 1x RJ45 Dedicated IPMI LAN port • 3x USB 3.2 Gen 1 ports (2 rear, 1 Type A) • 2x USB 2.0 ports (2 rear) • 1x VGA port (rear)
5	System Management – Dedicated IPMI Port & AST 2600 <ul style="list-style-type: none"> • Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port
6	Drive Bays – 45x Top Loading hot-Swap SATA/SAS w/S3808L(model L) or S3908L(model H) <ul style="list-style-type: none"> • 45x Top Loading hot-swap 3.5" drive bays; 2x SATA + 2x SATA/NVMe (optional) rear • 1x M.2 PCI-E 3.0 x4 M-Key NVMe/SATA
7	System Cooling – 5x 80x80x38mm Fans <ul style="list-style-type: none"> • 5x Heavy duty 80x80x38mm PWM fans
8	Power Supply – 1+1 Redundant 1600W Platinum <ul style="list-style-type: none"> • 2x 1600W High-efficiency (Platinum level, 94%) supply
9	Dimensions <ul style="list-style-type: none"> • 17.2" (W) x 7" (H) x 26" (D)

Subject to change without notice

Spec/Feature Summary of X12 Ice Lake UP Series



Model Series	Mainstream		WIO				SSG			
Features	510P-MR	510P-M	110P-WTR	510P-WTR	510P-WT	520P-WTR	520P-ACTR12L/H	540P-E1CTR36L/H	540P-E1CTR45L/H	110P-NTR10
Form Factor	1U	1U	1U	1U	1U	2U	2U	4U	4U	1U
CPU TDP Max. watt	220W	220W	270W	270W	270W	270W	270W	270W	270W	270W
Memory DIMM #	8	8	8	8	8	8	8	8	8	8
3.5" Disk Bay #	4	4	-	4	4	8	12	36	45	-
2.5" Disk Bay #	2 (Op.)	2 (Op.)	10	2 (Op.)	2 (Op.)	2 (Op.)	2 (Op.)	2 (Op.)	2 + 2 (Op.)	-
NVMe Support #	4 (Op.)	4 (Op.)	4 (Op.)	4 (Op.)	4 (Op.)	2 (Op.)	2 (Op.)	2 (Op.)	2 (Op.)	10
M.2 Support #	2	2	1	1	1	1	1	1	1	2
M.2 Interface	x4/SATA/ NVMe	x4/SATA/ NVMe	x4/SATA/ NVMe	x4/SATA/ NVMe	x4/SATA/ NVMe	x4/SATA/ NVMe	x4/SATA/ NVMe	x4/SATA/ NVMe	x4/SATA/ NVMe	x4/SATA/ NVMe
M.2 Form Factor	2280/ 22110	2280/ 22110	2280/ 22110	2280/ 22110	2280/ 22110	2280/ 22110	2280/ 22110	2280/ 22110	2280/ 22110	2280/ 22110
PCI-E 4.0 x16	1	1	3	3	3	2	2	2	2	1
PCI-E 4.0 x8	-	-	-	-	-	2	2	2	2	-
SAS Controller	-	-	-	-	-	-	SAS3816 (L) 3916 (H)	SAS3808 (L) 3908 (H)	SAS3808 (L) 3908 (H)	-
Networking (BaseT)	1G x2	1G x2	10G x2	10G x2	10G x2	10G x2	10G x2	10G x2	10G x2	10G x2
Power Supply	400W 1+1	500W Single	750W 1+1	500W 1+1	600W Single	650W 1+1	800W 1+1	1200W 1+1	1600W 1+1	860W 1+1
Power Efficiency (80PLUS) Max. %	94%	94%	94%	94%	94%	94%	96%	96%	94%	94%

X12 UP System Performance



Systems In Comparison



X11 SYS-1019P-WTR

X12 SYS-110P-WTR



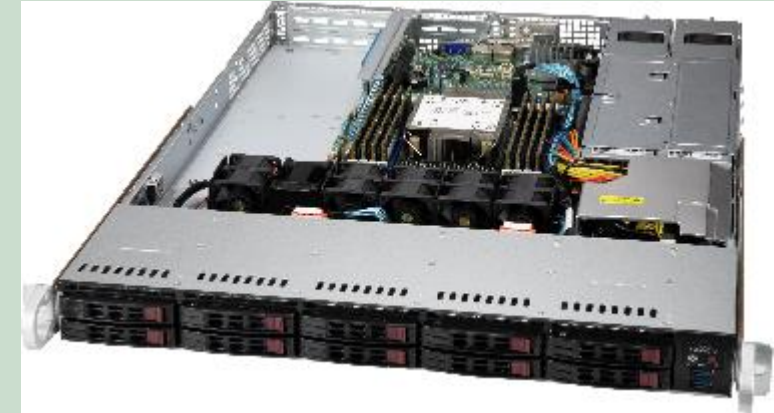
	X11 SYS-1019P-WTR	X12 SYS-110P-WTR
		
Motherboard	X11SPW-TF	X12SPW-TF
CPU	2nd Gen Xeon Scalable Processor Up to 28 Cores	3rd Gen Xeon Scalable Processor Up to 40 Cores
Memory	Up to 6x 2933MHz DDR4	Up to 8x 3200MHz DDR4 With support for 4x Barlow Pass DCPMM
Main Drives	Up to 2x Hybrid NVMe Gen3 drives in 10x 2.5" Drive Bays	Up to 4x Hybrid NVMe Gen4 drives in 10x 2.5" Drive Bays
Network	Dual 10G	Dual 10G

Systems In Comparison - CPU



X11 SYS-1019P-WTR

X12 SYS-110P-WTR



Motherboard

X11SPW-TF

X12SPW-TF

CPU

2nd Gen Xeon Scalable Processor
Up to **28 Cores**

3rd Gen Xeon Scalable Processor
Up to **40 Cores**

Memory

Up to **6x 2933MHz** DDR4

Up to **8x 3200MHz** DDR4
With support for 4x Barlow Pass DCPMM

Main Drives

Up to **2x** Hybrid **NVMe Gen3** drives in 10x 2.5"
Drive Bays

Up to **4x** Hybrid **NVMe Gen4** drives in 10x 2.5"
Drive Bays

Network

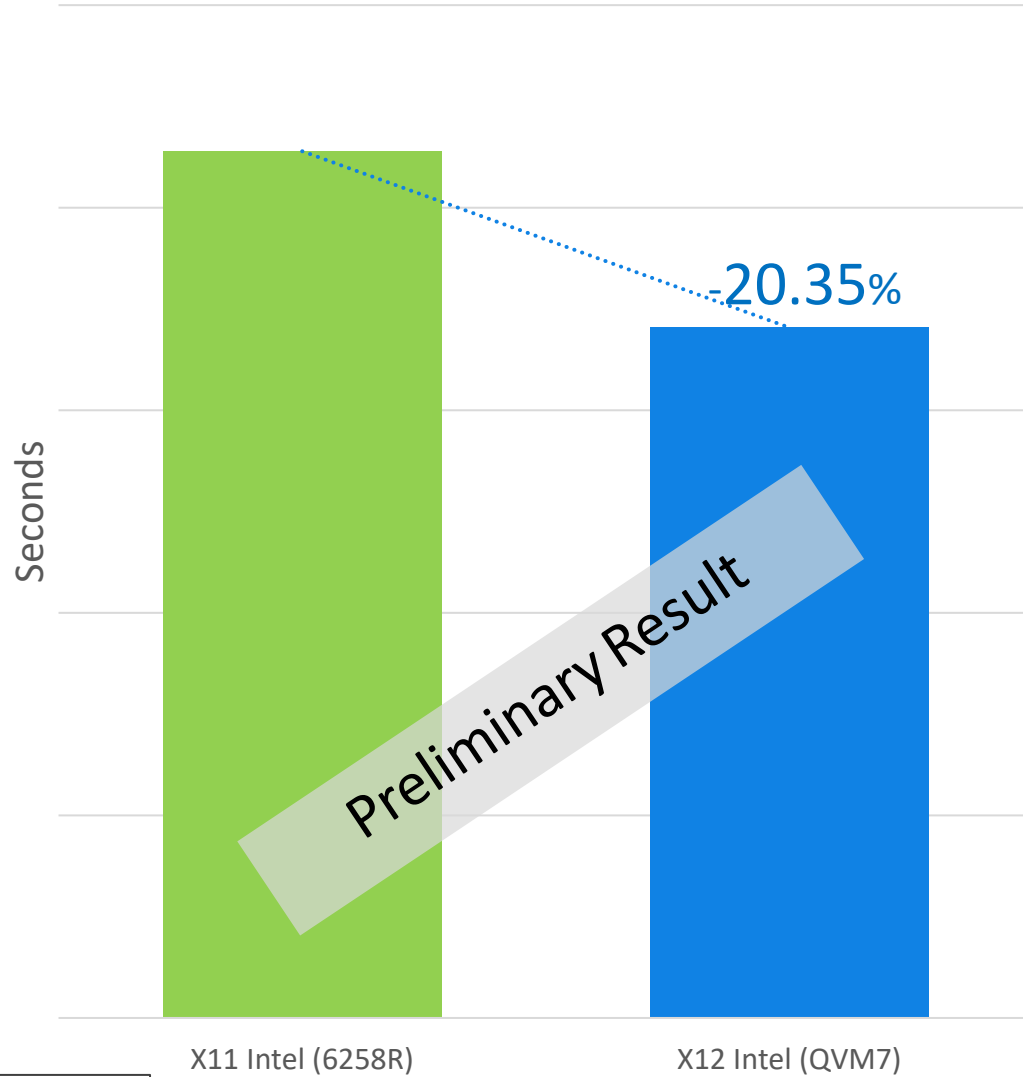
Dual 10G

Dual 10G

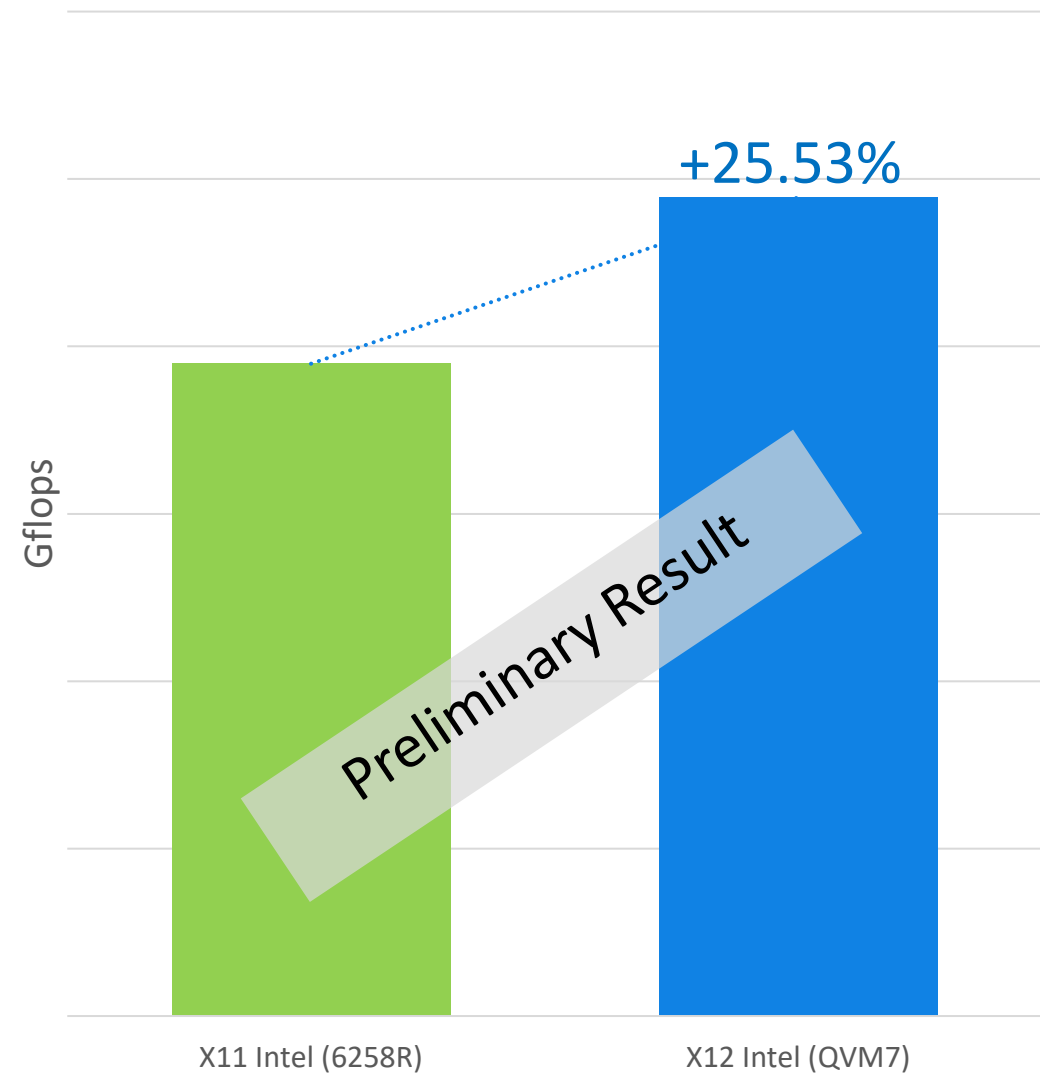
CPU Performance (mkl 2020.2)



Calculation Time



Performance



6258R 28C 2.7G
QVM7 36C 2.2G

Systems In Comparison - Memory



X11 SYS-1019P-WTR

X12 SYS-110P-WTR



Motherboard

X11SPW-TF

X12SPW-TF

CPU

2nd Gen Xeon Scalable Processor
Up to **28 Cores**

3rd Gen Xeon Scalable Processor
Up to **40 Cores**

Memory

Up to **6x 2933MHz** DDR4

Up to **8x 3200MHz** DDR4
With support for 4x Barlow Pass DCPMM

Main Drives

Up to **2x** Hybrid **NVMe Gen3** drives in 10x 2.5"
Drive Bays

Up to **4x** Hybrid **NVMe Gen4** drives in 10x 2.5"
Drive Bays

Network

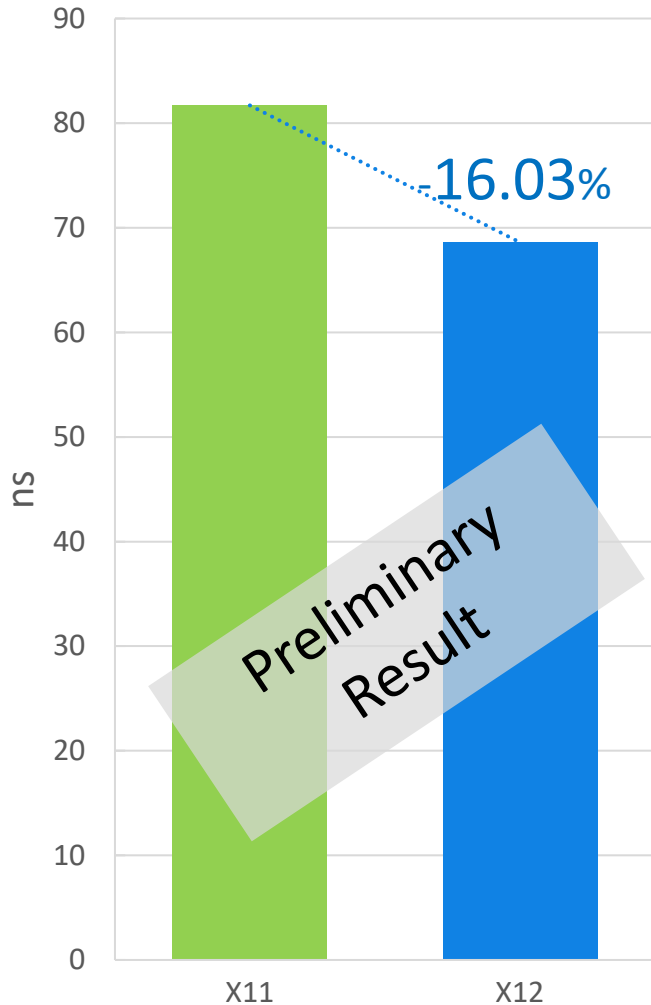
Dual 10G

Dual 10G

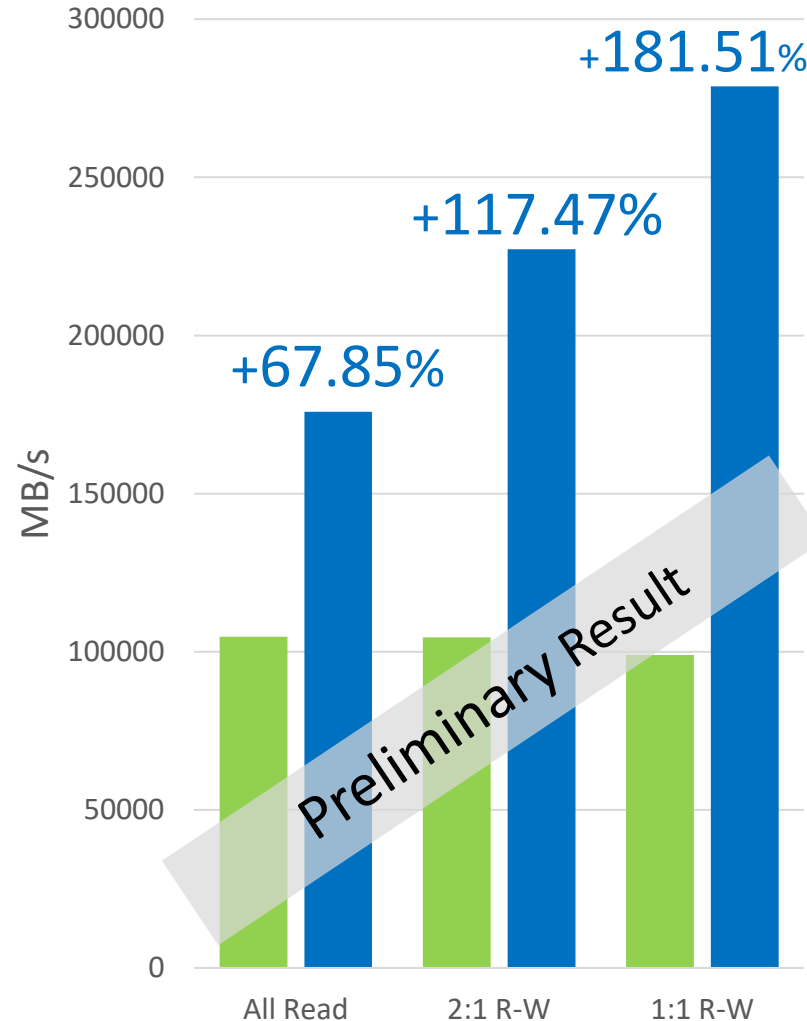
Memory Performance (mlc v3.9 2020.6)



Latency



Bandwidth



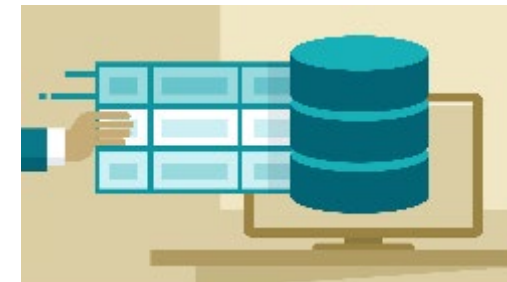
Hosting

Simultaneously support more VM per system



Enterprise

Larger memory pool per node



Database

Access

Faster R-W request response

Preliminary Result

Preliminary Result

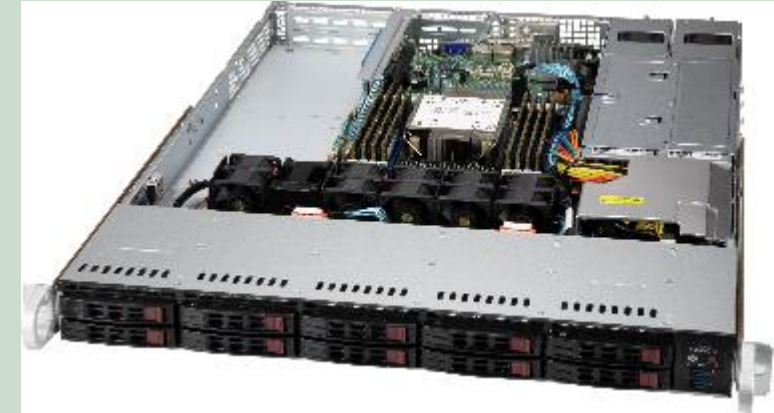
- X11: 6x Samsung DDR4 64GB 2933MHz
- X12: 8x Samsung DDR4 64GB 3200MHz
- SYS-1019P-WTR vs SYS-110P-WTR

Systems In Comparison - Drives



X11 SYS-1019P-WTR

X12 SYS-110P-WTR



Motherboard

X11SPW-TF

X12SPW-TF

CPU

2nd Gen Xeon Scalable Processor
Up to **28 Cores**

3rd Gen Xeon Scalable Processor
Up to **40 Cores**

Memory

Up to **6x 2933MHz** DDR4

Up to **8x 3200MHz** DDR4
With support for 4x Barlow Pass DCPMM

Main Drives

Up to **2x** Hybrid **NVMe Gen3** drives in 10x 2.5"
Drive Bays

Up to **4x** Hybrid **NVMe Gen4** drives in 10x 2.5"
Drive Bays

Network

Dual 10G

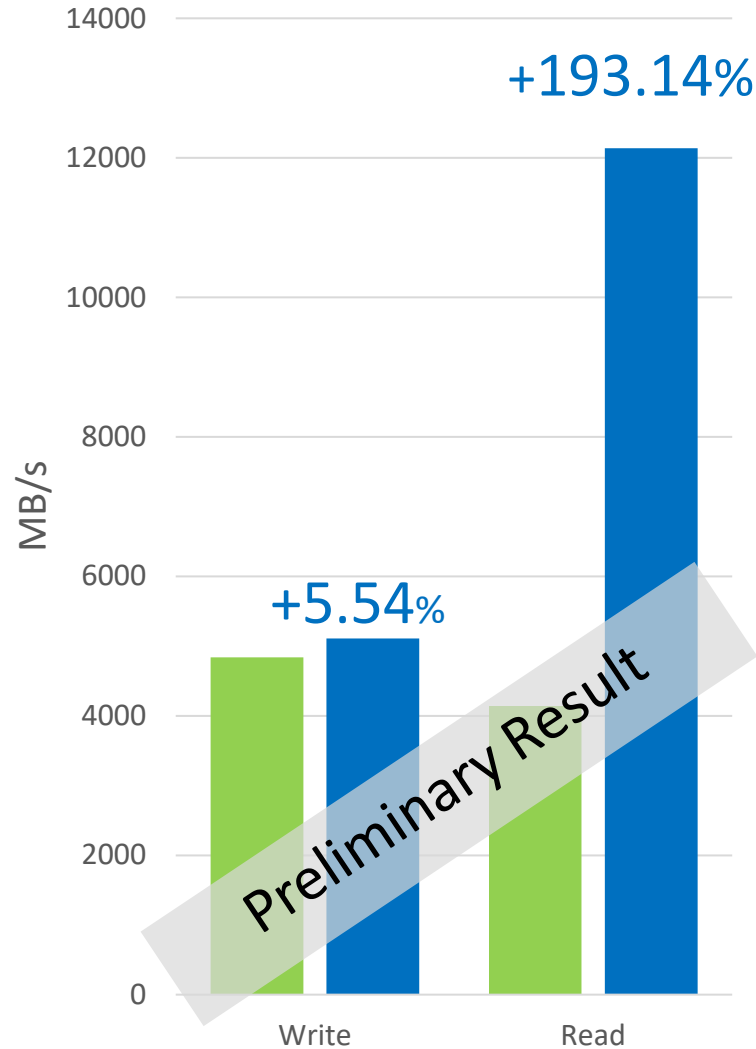
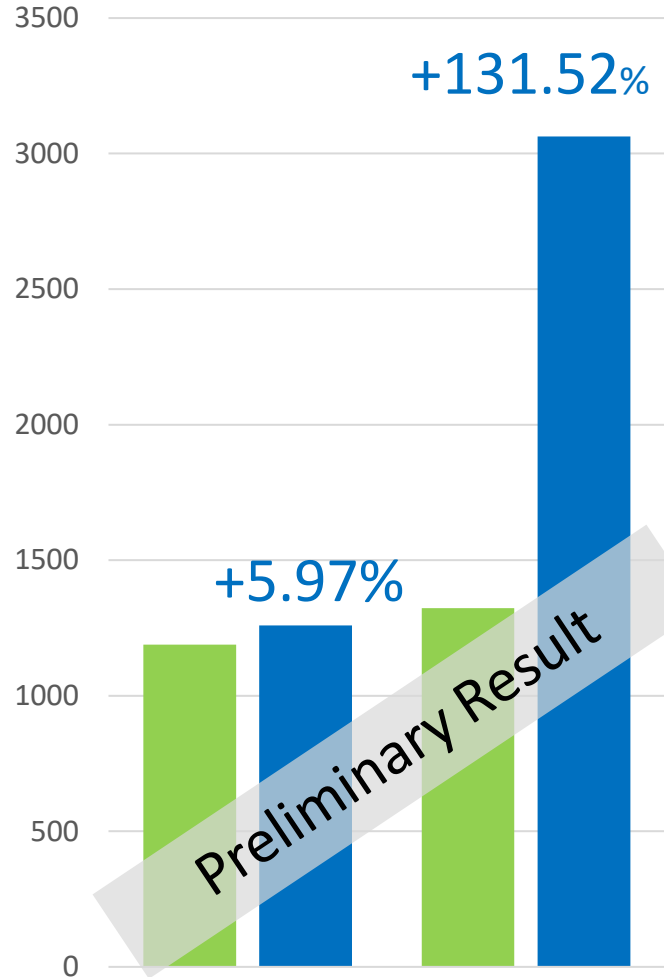
Dual 10G

Storage Performance (fio-3.12)



IOPS

Throughput



Preliminary Result

Preliminary Result



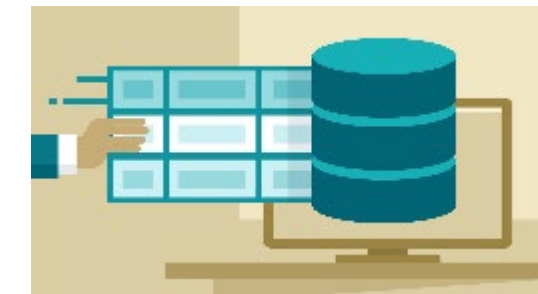
CDN

Quicker content delivery



HCI

Smaller overhead, responsive administrative platform



Database Access

Faster R-W request response

- X11: 2x Intel P4510 U.2 Gen 3 NVMe
- X12: 4x Kioxia CD6 U.2 Gen 4 NVMe
- SYS-1019P-WTR- vs SYS-110P-WTR

Questions?

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