UP X12 Servers

Presenter

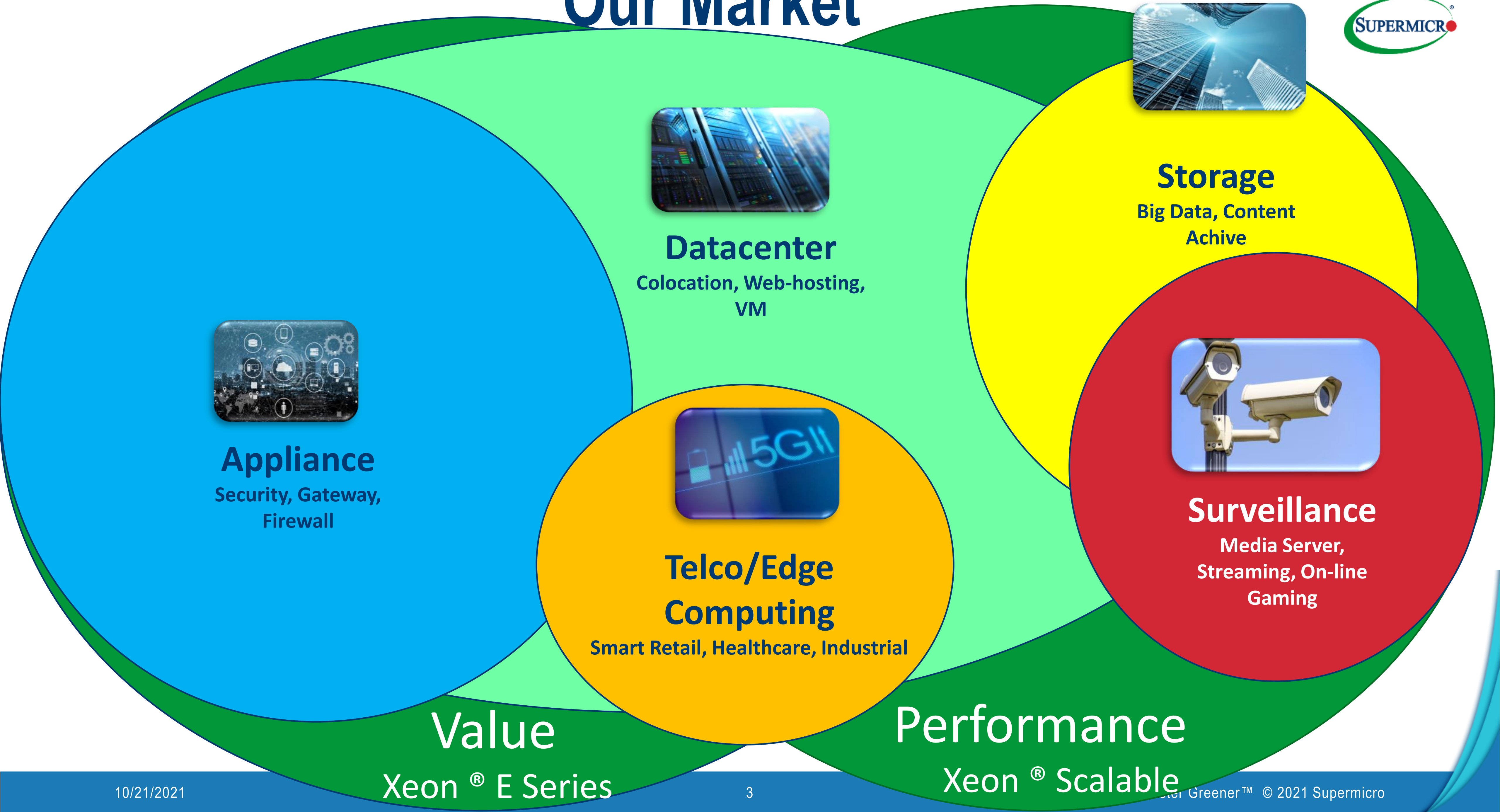
Wei Chang

System Solution PM

Agenda

- Market Segments
- UP X12 Xeon E-2300 (Rocket Lake)
- X12 Xeon Scalable (Ice Lake)
- Success Story, Positioning & Value
- Azure Stack HCI
- X12 Xeon Scalable (Ice Lake) Solutions
  - Azure Stack HCI Performance
  - ISS VCDN Solution

Our Market



Appliance

Security, Gateway, Firewall

Datacenter

Colocation, Web-hosting, VM

Telco/Edge Computing

Smart Retail, Healthcare, Industrial

Storage

Big Data, Content Achive

Surveillance

Media Server, Streaming, On-line Gaming

Value

Xeon ® E Series

Performance

Xeon ® Scalable

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)

Global Data Center Coloation Market

The global data center colocation market is expected to grow from $39.05 billion in 2020 to **$47.02 billion in 2021** at a compound annual growth rate (CAGR) of 20.4%. The market is expected to reach **$87.73 billion in 2025** at a CAGR of 16.9%.

World Wide a Total of **4861** Colocation data centers from 129 countries.

https://www.datacentermap.com/datacenters.html

Top 15 Data Center Colocation Global Market Report 2021

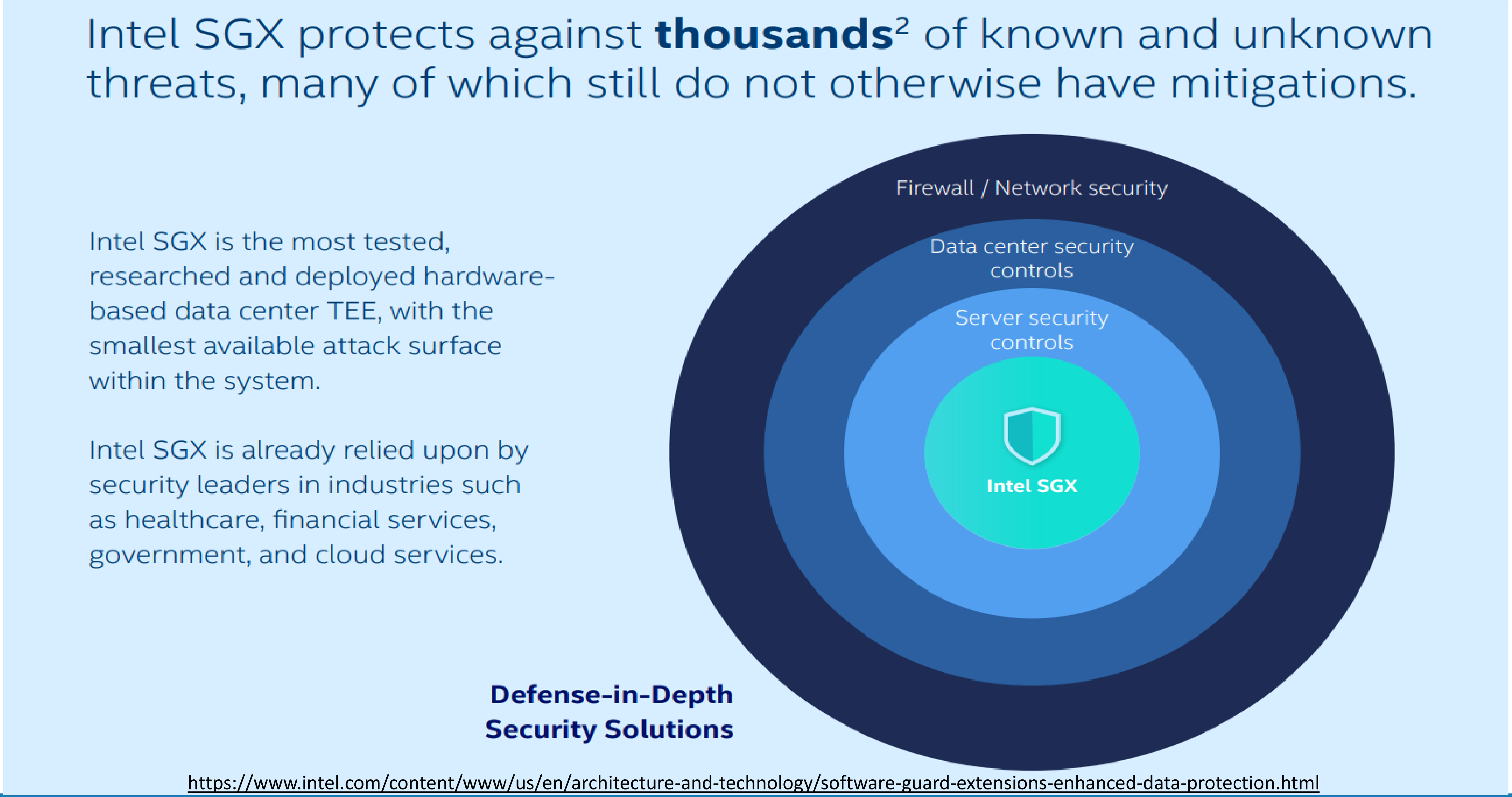
1. Equinix 11.1% (California)
2. Digital Realty Trust 7.6% (Texas)
3. China Telecom 6.1% (China)
4. NTT GDC 4.3% (Japan)
5. China Unicom 4.2% (China)
6. China Mobile 2.1% (China)
7. CyrusOne 1.9% (Texas)
8. KDDI Telehouse 1.9% (Japan)
9. GDS 1.6% (China)
10. Global Switch 1.4% (UK)
11. 21Vianet 1.4% (China)
12. CoreSite 1.3% (Colorado)
13. Cyxtera 1.2% (Florida)
14. Lumen (formerly CenturyLink) 1.1% (Louisiana)
15. Flexential 1.1% (North Carolina)

https://www.datacenterknowledge.com/archives/2017/01/20/here-are-the-10-largest-data-center-providers-in-the-world

IDC: Server Appliance Market Booming

- **Server Appliance** in 2019 Worldwide revenues is **$31.4 billion**, last year the market growth **166%**
- **Appliance Market** expected to grow from **$2.39 billion** in **2019** to **$4.27 billion** by **2023**
- As the world is becoming connected, the trend of IoT is also increasing, currently **15 billion devices** are connected to the internet and are expected to grow to **500 billion by 2030.** This has given the awareness and **need to protect the network infrastructure**
- According to Cyber Security Statistics, **43 percent** of all data breaches target small enterprises, making it essential to protect your business's network from malicious attacks

What is Intel SGX?



Intel SGX protects against **thousands**[2] of known and unknown threats, many of which still do not otherwise have mitigations.

Intel SGX is the most tested, researched and deployed hardware-based data center TEE, with the smallest available attack surface within the system.

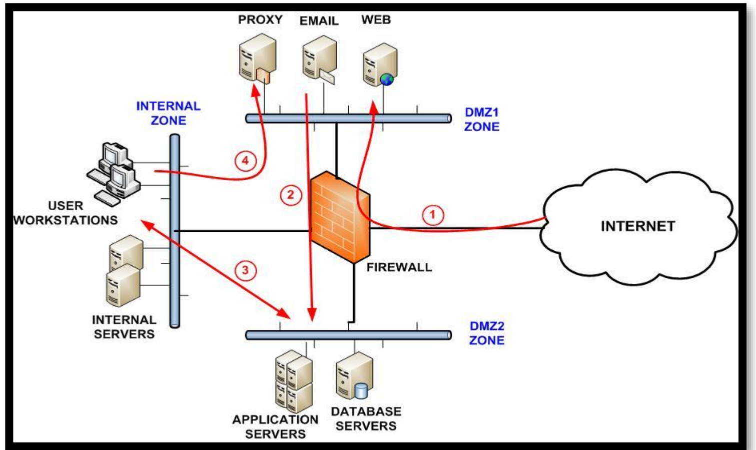
Intel SGX is already relied upon by security leaders in industries such as healthcare, financial services, government, and cloud services.

Defense-in-Depth Security Solutions

https://www.intel.com/content/www/us/en/architecture-and-technology/software-guard-extensions-enhanced-data-protection.html

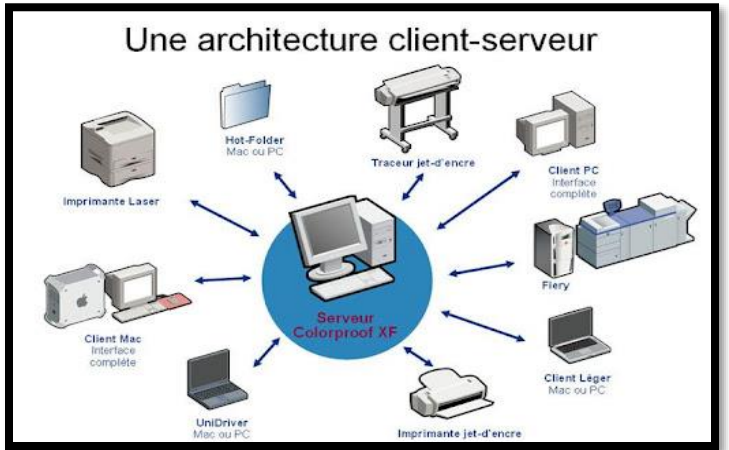
UP X12 Rocket lake (Tatlow) Servers

Intel Xeon E: Delivering Value to Multiple Segments



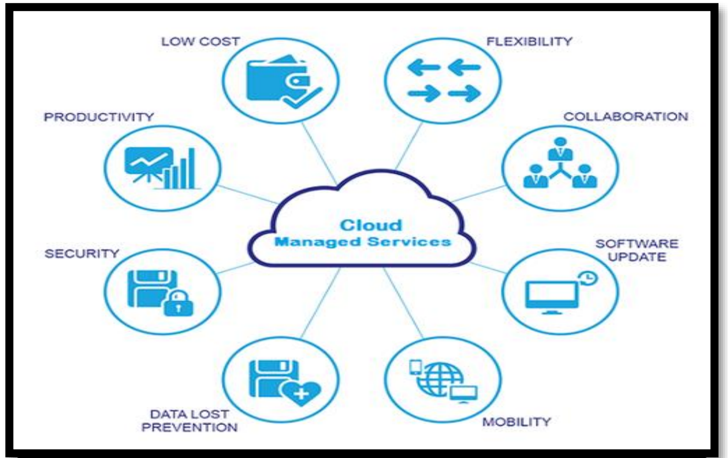
Edge Server/Appliances

Design edge servers or appliances with energy efficiency and performance at entry level prices.



Entry Client Servers

Small businesses require reliability and security to support their critical business and customer data needs.



Secure Cloud Services

Protect the most sensitive portions of a workload or services with hardware-enhanced security.

Entry server is a key portfolio play

- Stable demand in the Small Business (SMB) market
- Client Strategic Planning (CSP) adoption for Intel Software Guard Extensions (Intel SGX)
- Emerging workloads for cloud hosting and edge computing

Xeon E CPU transition

X11 2015 Q3
Sky Lake/Kaby Lake

E3-1200 v5/v6
Series
(Mostly EOLed)

X11 2018 Q3
Coffee Lake/Refresh

E-2100 & E-2200
Series
(E-2278G, E-2288G EOLed)

X12 2021 Q3
Rocket Lake

New E-2300
Series

Rocket Lake (Tatlow) Platform Processor Support

E-2374G
3.7/5.0/4.9
80W

E-2386G
3.5/5.1/4.7
95W

E-2388G
3.2/5.1/4.6
95W

G6605
2C/4T
4.3, 58W

Max Turbo Frequency 5.1 GHz

E-2378G
2.8/5.1/4.6
80W

G6505
2C/4T
4.2, 58W

E-2356G
3.2/5.0/4.8
80W

E-2378
2.6/4.8/4.5
65W

G6505T
2C/4T
3.6, 35W

E-2334
3.1/4.6/4.5
65W

E-2336
2.9/4.8/4.6
65W

G6405
2C/4T
4.3, 58W

No Hyperthreading

E-2324G
3.1/4.6/4.5
65W

G6405T
2C/4T
3.5, 35W

E-2314
2.8/4.5/3.5
65W

pGFX
No pGFX

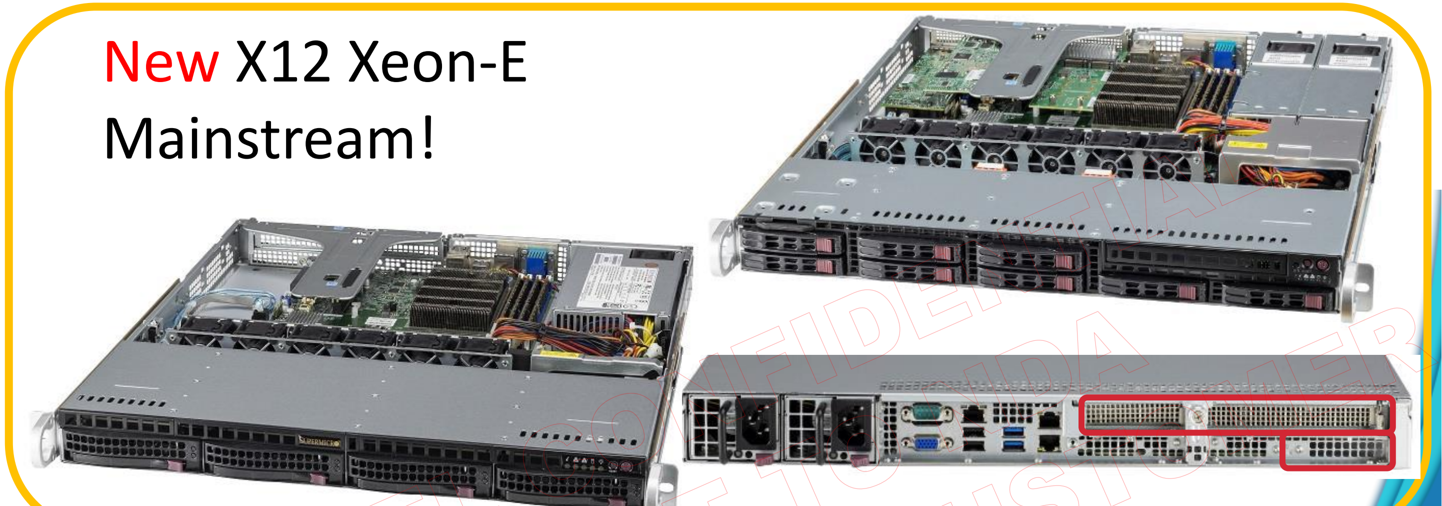
Feature\CPU	Xeon E-2300 (RKL)	Pentium Gold (CML)
Turbo Boost	Yes	No
PCIe	4.0, 20 lanes	3.0, 16 lanes
Cores	4, 6, 8	**2**
Memory	DDR4-3200	DDR4-2666
SGX	Up to 512MB enclave size	Not Supported
Graphic	Supported w/ a G suffix	Supported

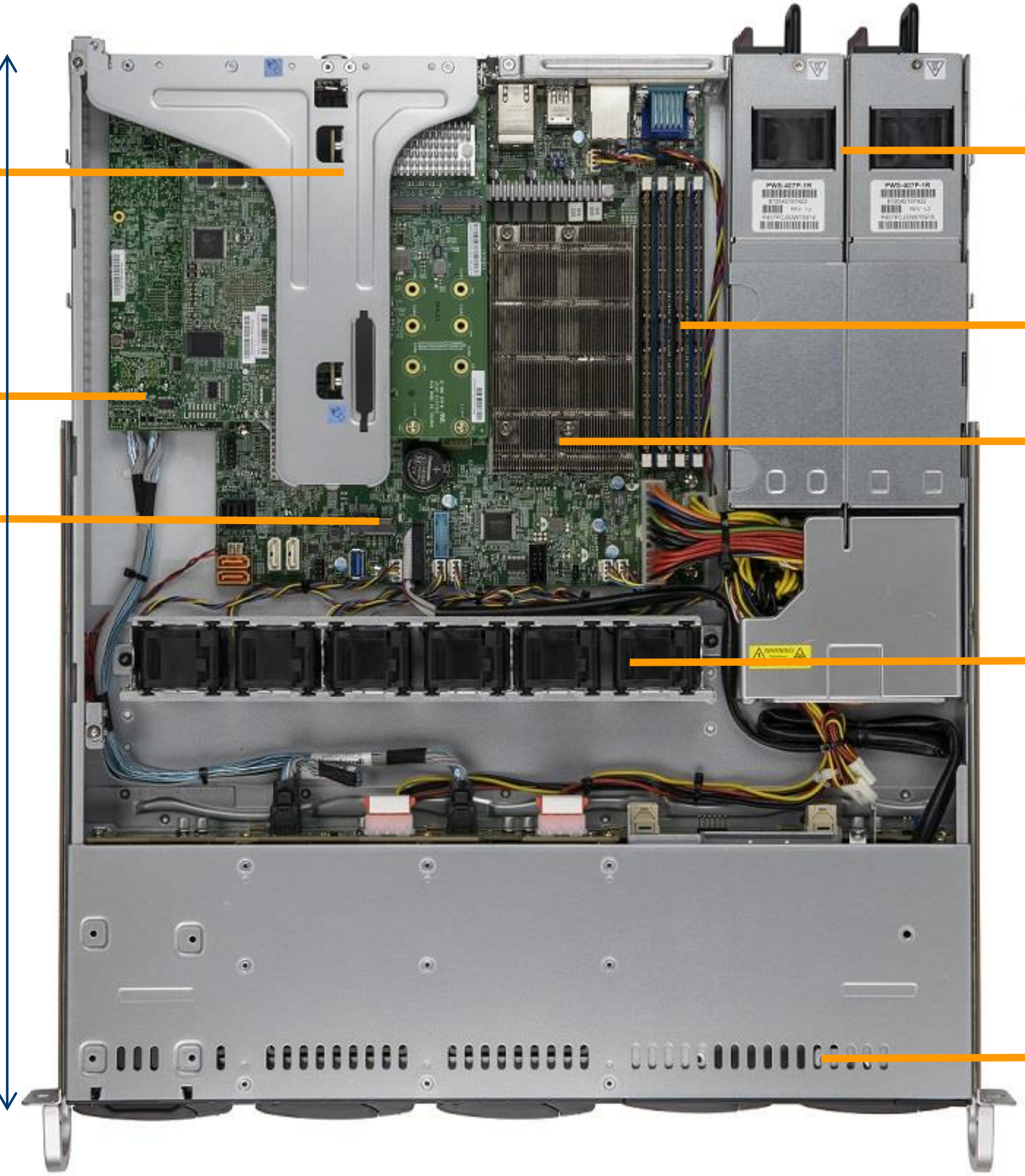
- Does **NOT** support **Core i3/i5/i7/i9** processors

X11 vs X12 UP Xeon-E Mainstream

	X11 UP Xeon-E	New X12 UP Xeon-E
CPU	E-2200 CFL (8C, 95W max)	E-2300 RKL (8C, 95W max)
Memory	4x DDR4 MEM @ 2666MHz	4x DDR4 MEM @ 3200MHz
Drive	• 4x 3.5'' SATA/SAS drives (1U)	• 4x 3.5'' SATA/SAS drives (1U) • 8x 2.5'' SATA/SAS drives (1U)
# of expansion slots	1x expansion slot	2x PCI-e Gen4 expansion slots +1x internal HBA slot
Supercap support	No	YES

New X12 Xeon-E Mainstream!





1x PCI-E 4.0 x16 FHHL
or
1x PCI-E 4.0 x8 FHHL
1x PCI-E 4.0 x8 LP

1x Dedicated HBA slot
(internal)

1x NGFF M.2 slot

20”

400W 1+1 Platinum level
350W Single Platinum level

4 DIMM slot, DDR4 3200 ECC UDIMM

Single Intel Xeon E-2300 series, up to 95W

4x 4cm chassis fans; 2x optional

Drive bay: 4x 3.5” or 8x 2.5”

20” short depth design
fit in to wide range of rack
or enclosures

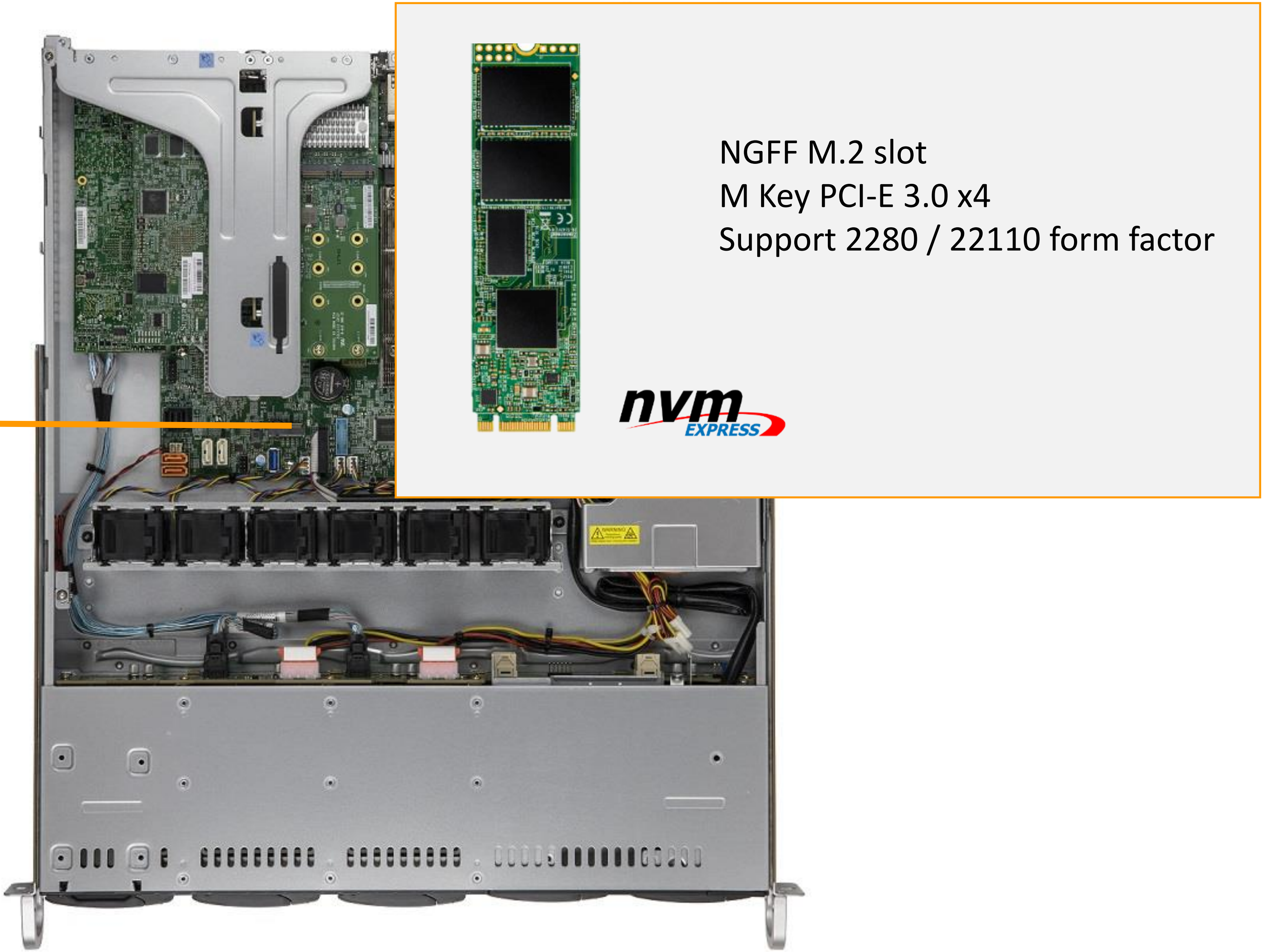
400W 1+1 Platinum level
350W Single Platinum level

80 PLUS PLATINUM

400W 1 + 1 Redundant power
Platinum level 94% Efficiency

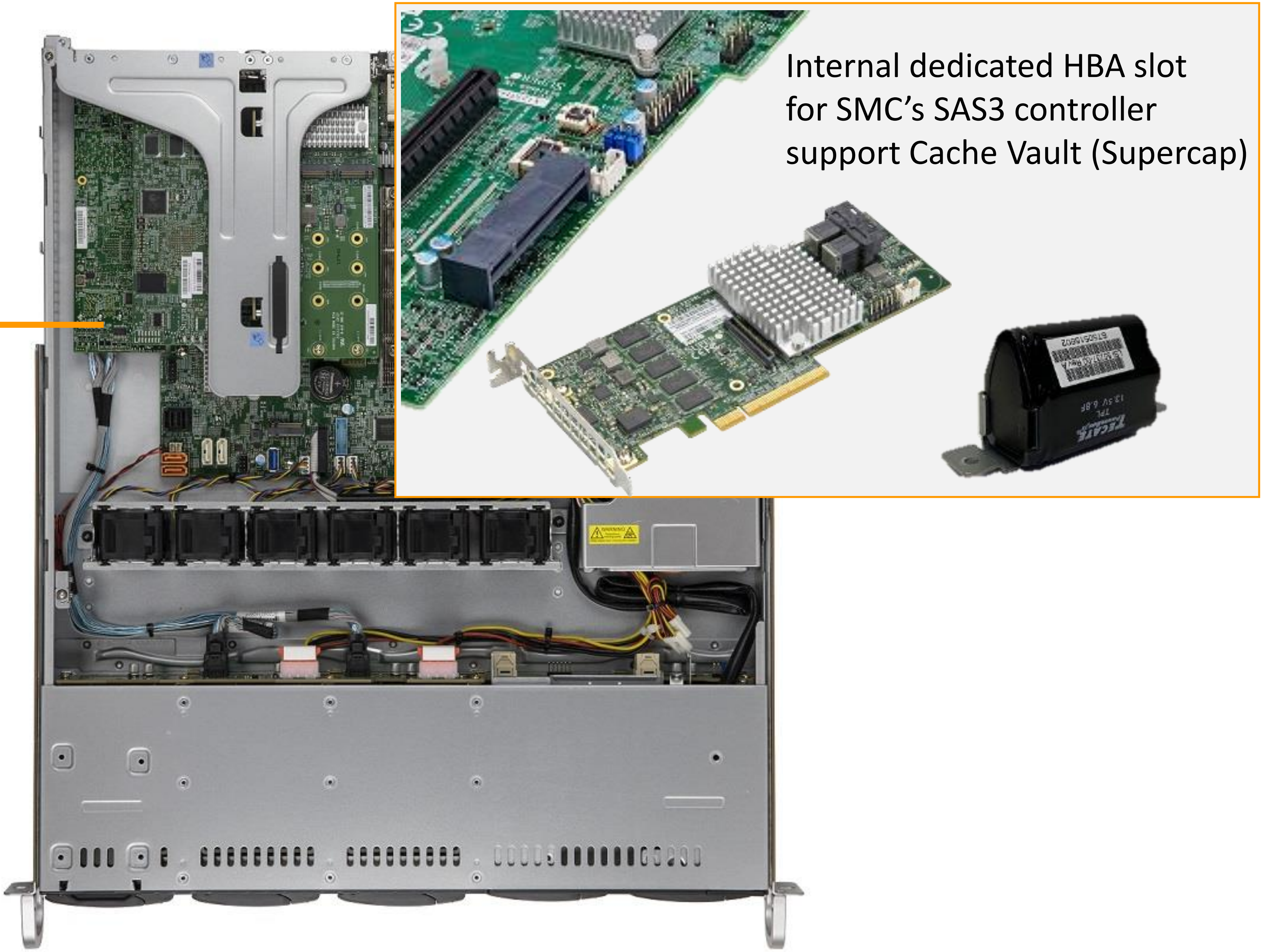
350W Single power
Platinum level 94% Efficiency

1x NGFF M.2 slot



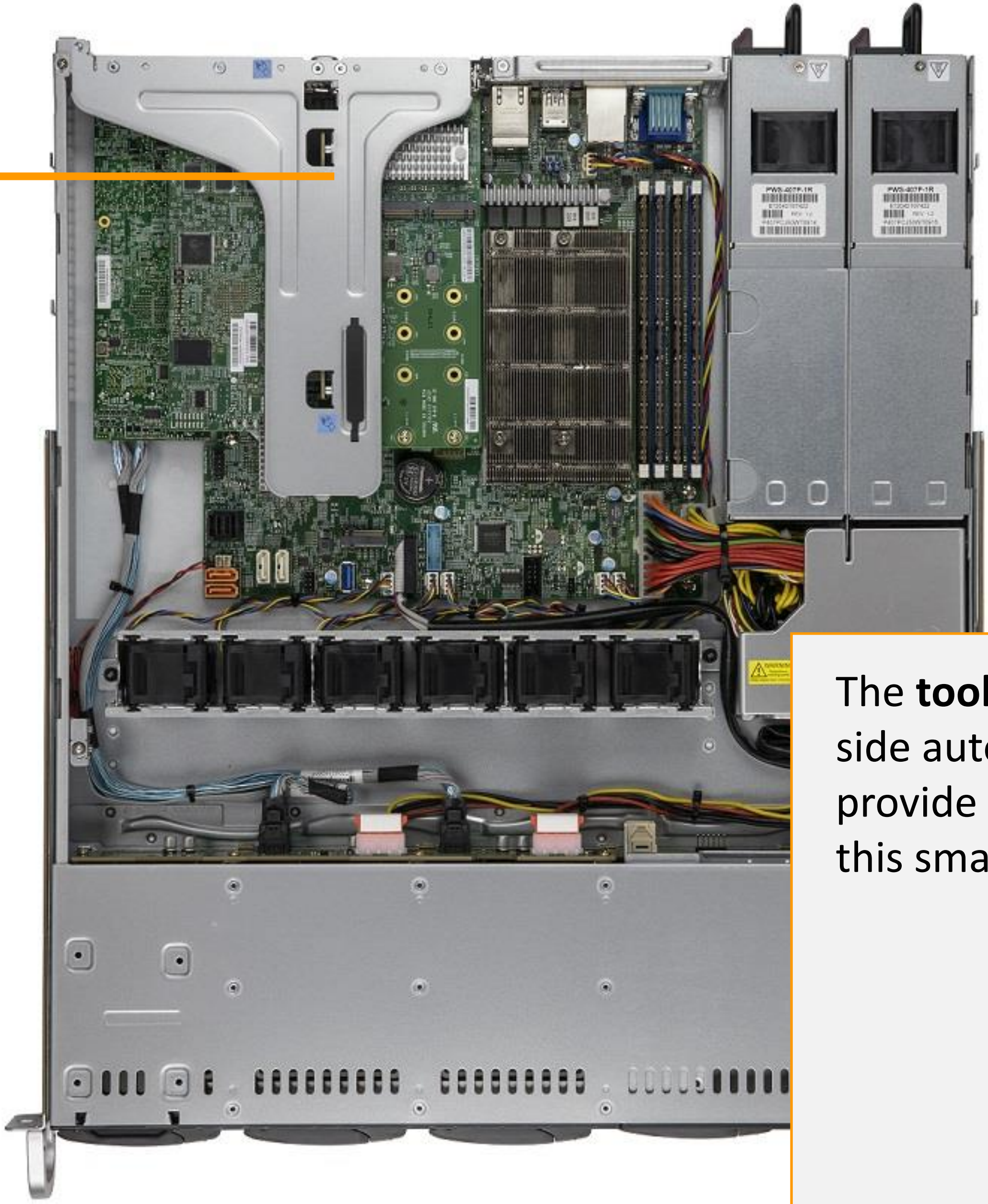
NGFF M.2 slot
M Key PCI-E 3.0 x4
Support 2280 / 22110 form factor

1x Dedicated HBA slot
(internal)



Internal dedicated HBA slot
for SMC's SAS3 controller
support Cache Vault (Supercap)

1x PCI-E 4.0 x16 FHHL
or
1x PCI-E 4.0 x8 FHHL
1x PCI-E 4.0 x8 LP

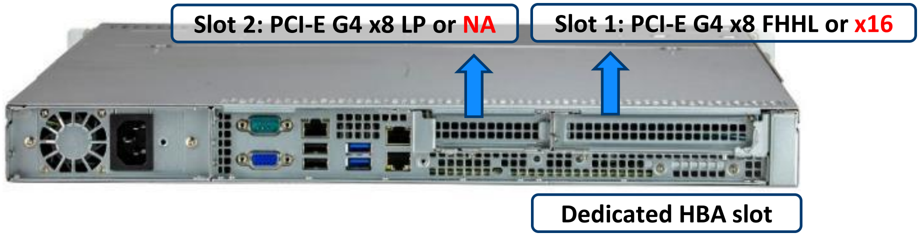


The **tool-less** design side by side auto switch riser card to provide two expansion slot in this small form factor system

Mainstream 1U: SYS-510T-M

- Motherboard: **X12STH-SYS**
- 1U Chassis: **CSE-813MF2TS-350RCB**

System Front



System Rear

Specifications

Processor Support – Single Socket H
- 3rd Gen Intel® Xeon® E-2300 processor (Rocket Lake) up to 95W TDP

Memory Capacity – 4 DIMM Slots
- 4x DIMM slots, Up to 128GB ECC UDIMM, DDR4-3200

Expansion – 2 + 1 PCI-E Slot
- 2x PCI-E 4.0 x8 (FHHL & LP) or 1x PCI-E 4.0 x16 (FHHL)
- 1x PCI-E 3.0 Dedicated HBA slot (internal)

Networking & I/O – 2x 1GbE
- 2x 1G Base-T LAN ports (Intel i210)
- 1x RJ45 Dedicated IPMI LAN port
- 5x USB 3.2 Gen 1 ports (2 rear, 2 headers, 1 Type A)
- 4x USB 2.0 ports (2 rear, 2 headers)
- 1x VGA port (rear)
- 2x Serial ports (1 rear, 1 header)

System Management – Dedicated IPMI Port & AST 2600
- Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port

Drive Bays – 4x Hot-Swap SATA/SAS*
- 4x Hot-swap 3.5" drive bays: 4x SATA (default)
  Option: SAS3 via AOC
- 1x M.2 PCI-E 3.0 x4 M-Key NVMe

System Cooling – 4x 40x40x28mm Fans
- 4x 40x40x28mm Middle Cooling PWM fans, 2x Fans (optional)

Power Supply – 1x 350W Platinum
- 1x 350W High-efficiency (Platinum level, 94%) Power Supply

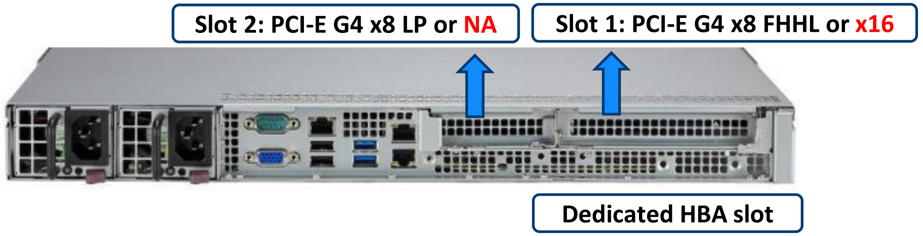
Dimensions
- 17.2” (W) x 1.7” (H) x 19.98” (D)

Subject to change without notice

Mainstream 1U: SYS-510T-MR

- Motherboard: **X12STH-SYS**
- 1U Chassis: **CSE-813MF2TS-R407RCB**


System Front



System Rear

Specifications

Processor Support – Single Socket H
- 3rd Gen Intel® Xeon® E-2300 processor (Rocket Lake) up to 95W TDP

Memory Capacity – 4 DIMM Slots
- 4x DIMM slots, Up to 128GB ECC UDIMM, DDR4-3200

Expansion – 2 + 1 PCI-E Slot
- 2x PCI-E 4.0 x8 (FHHL & LP) or 1x PCI-E 4.0 x16 (FHHL)
- 1x PCI-E 3.0 Dedicated HBA slot (internal)

Networking & I/O – 2x 1GbE
- 2x 1G Base-T LAN ports (Intel i210)
- 1x RJ45 Dedicated IPMI LAN port
- 5x USB 3.2 Gen 1 ports (2 rear, 2 headers, 1 Type A)
- 4x USB 2.0 ports (2 rear, 2 headers)
- 1x VGA port (rear)
- 2x Serial ports (1 rear, 1 header)

System Management – Dedicated IPMI Port & AST 2600
- Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port

Drive Bays – 4x Hot-Swap SATA/SAS*
- 4x Hot-swap 3.5" drive bays: 4x SATA (default)
  Option: SAS3 via AOC
- 1x M.2 PCI-E 3.0 x4 M-Key NVMe

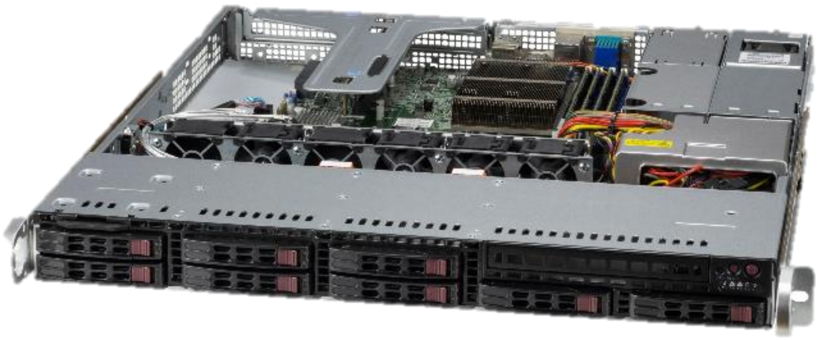
System Cooling – 4x 40x40x28mm Fans
- 4x 40x40x28mm Middle Cooling PWM fans, 2x Fans (optional)

Power Supply – 1+1 Redundant 400W Platinum
- 2x 400W High-efficiency Redundant power supplies (Platinum level, 94%)

Dimensions
- 17.2” (W) x 1.7” (H) x 19.98” (D)

Mainstream 1U: SYS-110T-M

- Motherboard: **X12STH-SYS**
- 1U Chassis: **CSE-113MFTS-407RCB-1P**



System Front

System Rear

Specifications

Processor Support – Single Socket H
- 3^{rd} Gen Intel® Xeon® E-2300 processor (Rocket Lake) up to 95W TDP

Memory Capacity – 4 DIMM Slots
- 4x DIMM slots, Up to 128GB ECC UDIMM, DDR4-3200

Expansion – 2 + 1 PCI-E Slot
- 2x PCI-E 4.0 x8 (FHHL & LP) or 1x PCI-E 4.0 x16 (FHHL)
- 1x PCI-E 3.0 Dedicated HBA slot (internal)

Networking & I/O – 2x 1GbE
- 2x 1G Base-T LAN ports (Intel i210)
- 1x RJ45 Dedicated IPMI LAN port
- 5x USB 3.2 Gen 1 ports (2 rear, 2 headers, 1 Type A)
- 4x USB 2.0 ports (2 rear, 2 headers)
- 1x VGA port (rear)
- 2x Serial ports (1 rear, 1 header)

System Management – Dedicated IPMI Port & AST 2600
- Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port

Drive Bays – 8x Hot-Swap SATA/SAS*
- 8x Hot-swap 2.5" drive bays: 8x SATA (default)
  Option: SAS3 via AOC
- 1x M.2 PCI-E 3.0 x4 M-Key NVMe

System Cooling – 4x 40x40x28mm Fans
- 4x 40x40x28mm Middle Cooling PWM fans, 2x Fans (optional)

Power Supply – 1x 400W Platinum
- 1x 400W High-efficiency power supplies (Platinum level, 94%) with Redundant option

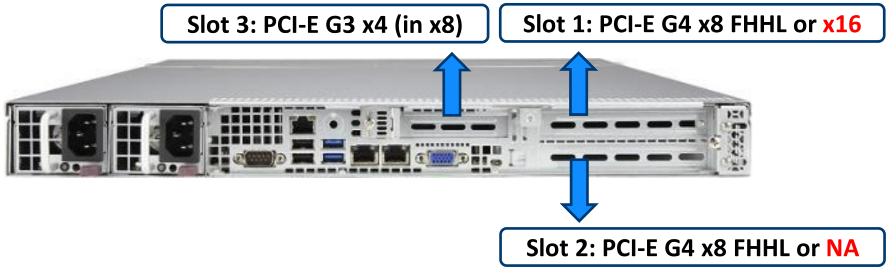
Dimensions
- 17.2” (W) x 1.7” (H) x 19.98” (D)

Subject to change without notice

WIO 1U: SYS-510T-WTR

- Motherboard: **X12STW-TF**
- 1U Chassis: **CSE-815TS-R504WB**

System Front



System Rear

Subject to change without notice

Specifications

Processor Support – Single Socket H
- 3rd Gen Intel® Xeon® E-2300 processor (Rocket Lake) up to 95W TDP

Memory Capacity – 4 DIMM Slots
- 4x DIMM slots, Up to 128GB ECC UDIMM, DDR4-3200

Expansion – 3 PCI-E Slot
- 2x PCI-E 4.0 x8 (FHFL) or 1x PCI-E 4.0 x16 (FHFL)
- 1x PCI-E 3.0 x4 (in x8 LP)

Networking & I/O – 2x 10GbE
- 2x 10G Base-T LAN ports (Intel X550)
- 1x RJ45 Dedicated IPMI LAN port
- 5x USB 3.2 Gen 1 ports (2 rear, 2 headers, 1 Type A)
- 4x USB 2.0 ports (2 rear, 2 headers)
- 1x VGA port (rear)
- 2x Serial ports (1 rear, 1 header)

System Management – Dedicated IPMI Port & AST 2600
- Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port

Drive Bays – 4x Hot-Swap SATA/SAS*
- 4x Hot-swap 3.5" drive bays: 4x SATA (default)
  Option: SAS3 via AOC
- 1x M.2 PCI-E 4.0 x4 M-Key NVMe (Xeon processor required)
- 1x M.2 PCI-E 3.0 x4 M-Key NVMe

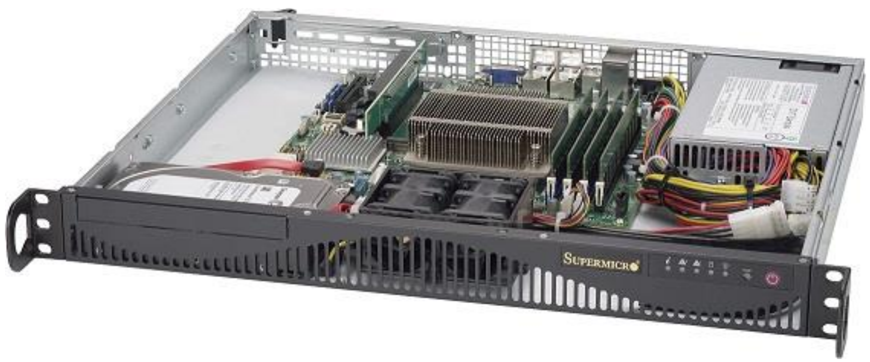
System Cooling – 4x 40x40x56mm Fans
- 4x 40x40x56mm Middle Cooling PWM fans, 2x Fans (optional)

Power Supply – 1+1 Redundant 500W Platinum
- 2x 500W High-efficiency Redundant power supplies (Platinum level, 94%)

Dimensions
- 17.2” (W) x 1.7” (H) x 25.6” (D)

Entry 1U: SYS-510T-ML

- Motherboard: **X12STL-F**
- 1U Chassis: **CSE-512F-350B1**



System Front

Slot 1: PCI-E G4 x8 (in x16)FHHL

System Rear

Specifications

Processor Support – Single Socket H
- 3rd Gen Intel® Xeon® E-2300 processor (Rocket Lake) up to 95W TDP

Memory Capacity – 4 DIMM Slots
- 4x DIMM slots, Up to 128GB ECC UDIMM, DDR4-3200

Expansion – 1 PCI-E Gen 4Slot
- 1x PCI-E 4.0 x8 (in x16) (FHHL)

Networking & I/O – 2x 1GbE
- 2x 1G Base-T LAN ports (Intel i210)
- 1x RJ45 Dedicated IPMI LAN port
- 5x USB 3.2 Gen 1 ports (2 rear, 2 headers, 1 Type A)
- 6x USB 2.0 ports (2 rear, 4 headers)
- 1x VGA port (rear)
- 2x Serial ports (1 rear, 1 header)

System Management – Dedicated IPMI Port & AST 2600
- Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port

Drive Bays – internal 3.5”/2.5” drive bays
- 2x 3.5" drive bays or 3x 2.5" drive bays
- 1x M.2 PCI-E 3.0 x4 M-Key NVMe

System Cooling – 2x 40x40x56mm Fans
- 2x 40x40x56mm Cooling PWM fans

Power Supply – 1x 350W Platinum
- 1x 350W High-efficiency (Platinum level, 94%) Power Supply

Dimensions
- 17.2” (W) x 1.7” (H) x 14.5” (D)

Spec/Feature Summary of X12 UP Xeon E Series

Product Family	Entry	Mainstream			WIO
System PN	SYS-510T-ML	SYS-110T-M	SYS-510T-M	SYS-510T-MR	SYS-510T-WTR
Form Factor	1U	1U	1U	1U	1U
CPU TDP Max	95W	95W	95W	95W	95W
Memory DIMM #	4	4	4	4	4
3.5" Disk Bay #	2 internal	-	4	4	4
2.5" Disk Bay #	Up to 3 (Opt)	8	2 (Opt)	2 (Opt)	2 (Opt)
M.2 Support	1 x4 NVME	1 x4 NVME	1 x4 NVME	1 x4 NVME	2 x4 NVME*
M.2 Form Factor	2280/22110	2280/22110	2280/22110	2280/22110	2280/22110
PCI-E 4.0 x16		1 or 0	1 or 0	1 or 0	1 or 0
PCI-E 4.0 x8	1	0 or 2	0 or 2	0 or 2	0 or 2
PCI-E 3.0 x4 (in x8)					1
Dedicated HBA slot		1	1	1	
Networking (Base T)	1G x2	1G x2	1G x2	1G x2	10G x2
Power Supply	350W Single	400W (Opt) 1+1	350W Single	400W 1+1	500W 1+1
Power Efficiency 80Plus	94%	94%	94%	94%	94%

* Xeon CPU required

UP X12 Ice lake (Whitley) Servers

Success Story- 3 Global Companies

Industry

- Media Entertainment & Enterprise

Challenges & Requirements

- Price/Performance
- Solution meets financial and technical objective

Winning Factors

- Building Block Solution with faster optimized design
- Enough I/O ports to meet the expansions
- Our solution provide secure, reliable and high-speed connections

- **System: SYS-110P-WTR, SYS-510P-WTR, SYS-520P-WTR**
- **Opportunity size: $50M**

Success Story- 3 of top 20 Colocation Datacenter

Industry

- Bare Metal, Colocation, Hosting Service

Challenges & Requirements

- Lower cost, reliable solutions & customization

Winning Factors

- Building Block Solution with faster optimized design

- **System: SYS-510P-MR**
- **Opportunity size: $50M**

Success Story- 3 Global Appliance Companies

Industry

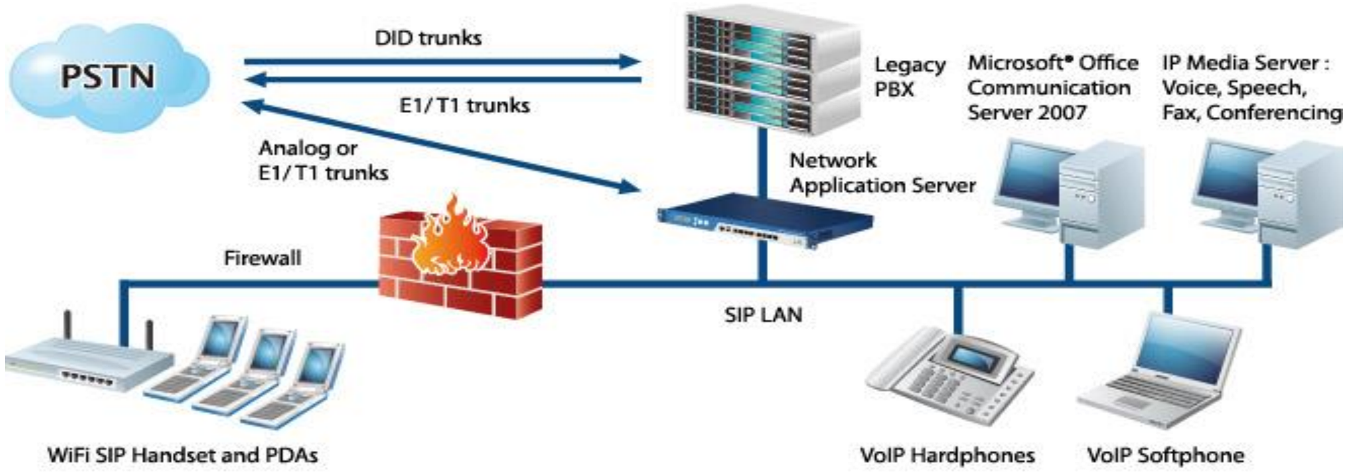
- Firewall & Gateway Security Service

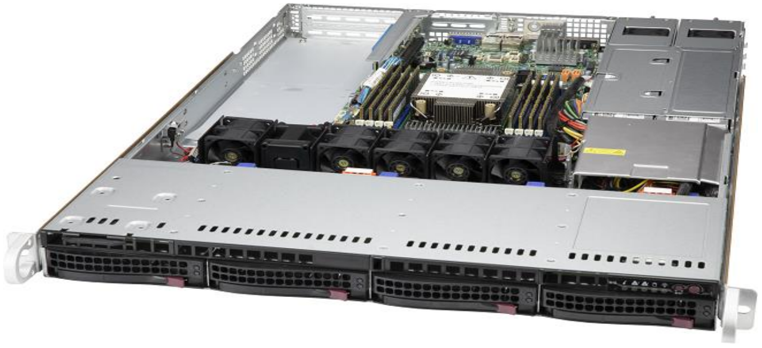
Challenges & Requirements

- Lower cost, reliable solutions & customization

Winning Factors

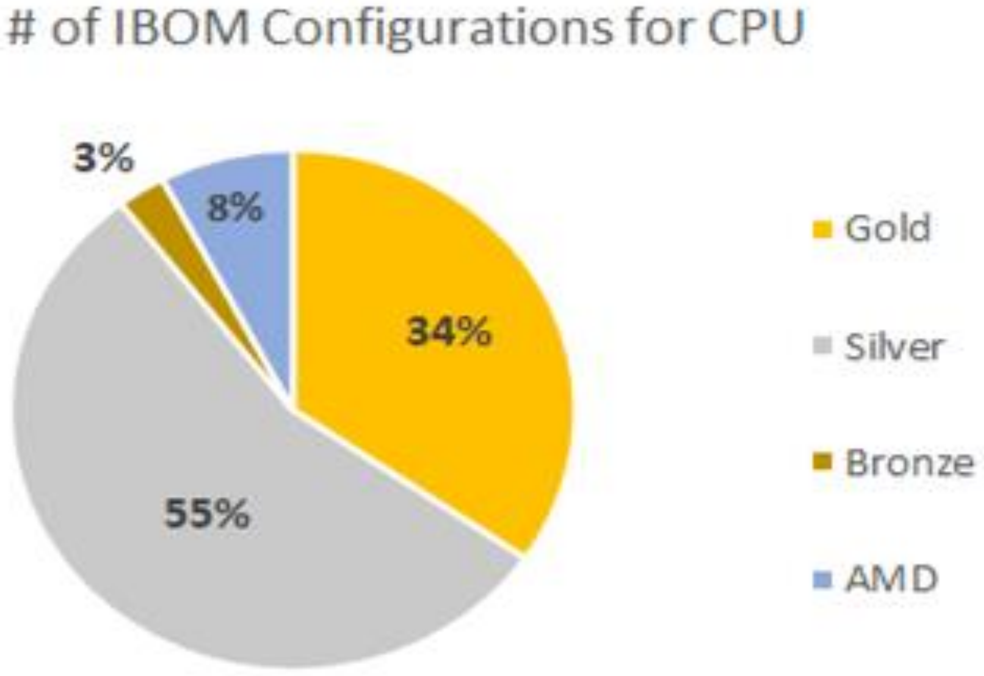
- Building Block Solution with faster optimized design provides the best price/performance

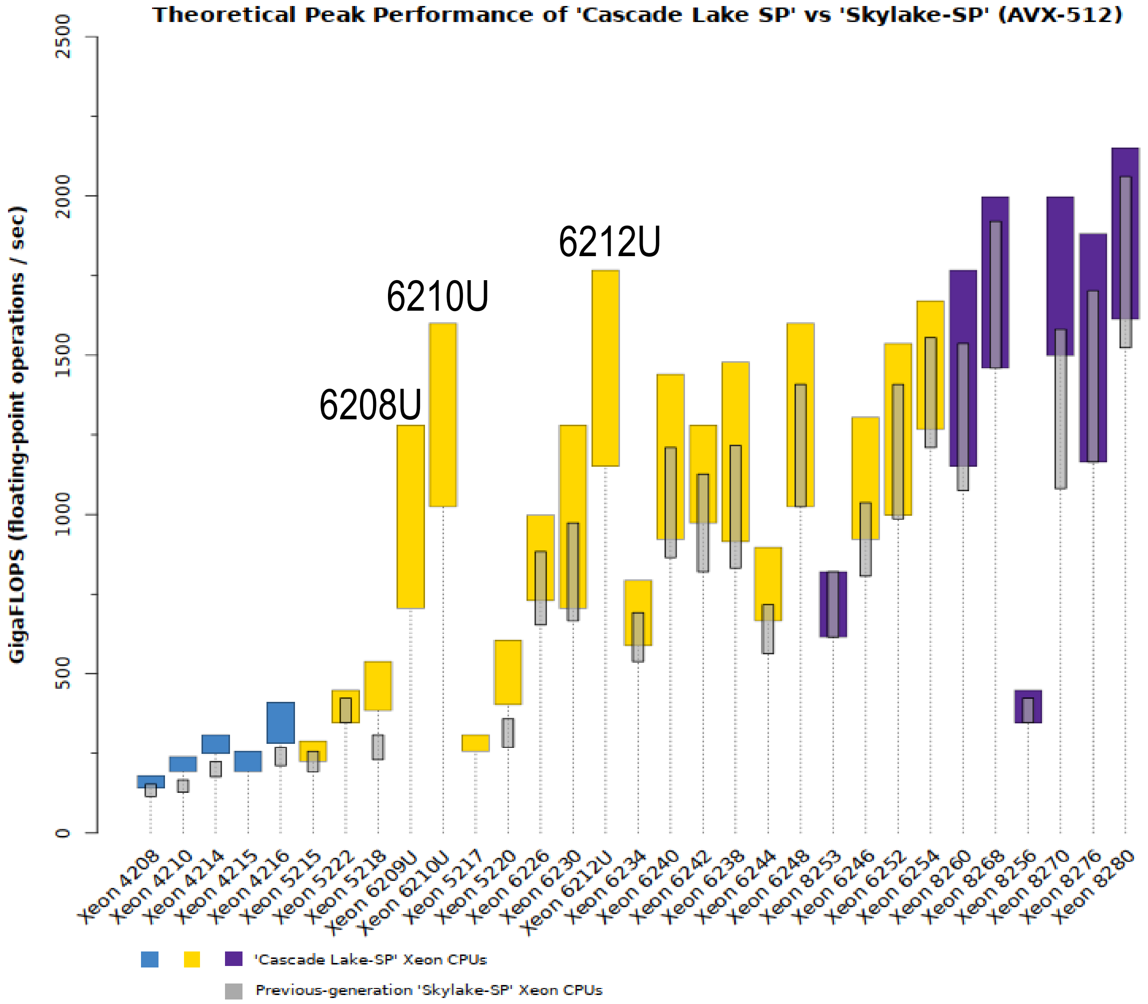




- **System: SYS-510P-WTR**
- **Opportunity size: $80M**

UP Value





- Core Count and frequency of CPUs have soared
  - **Highest Silver SKU: "4216" 16 core, 2.10GHz**
  - **X12 Ice Lake Top 2 SKU 1 Socket Optimized CPU**
  - **"8351N" 36 core, 2.4GHz @ $3,027 & "6314U" 32 core, 2.3GHz @ $2,600**

28 of the top 100 SMCI system SKUs are UP (2020)

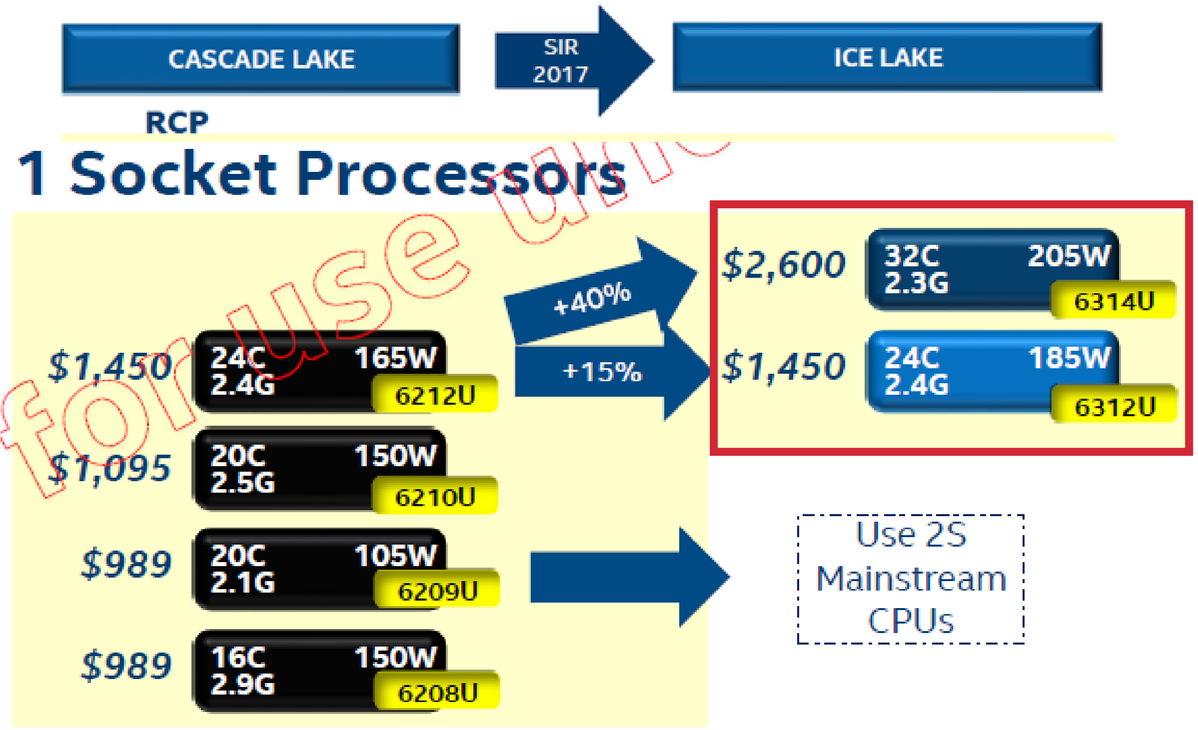
X12 UP Ice Lake (Whitley) Servers

FEATURE SHELVING EVOLUTION

	Cascade Lake	Ice Lake(1)
Platinum-8XXX	(8S support)	DDR4 3200 SGX up to 512GB
Gold-6XXX	3 UPI links @ 10.4 GT/s DDR4-2933 1DPC AVX512 – 2 FMA Node controller support	DDR4 3200(2)
Gold-5XXX	2 UPI links @ 10.4 GT/s DDR4-2666 Advanced RAS Intel Optane DC persistent memory module (8S support)	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
Silver-4XXX	2 UPI links @ 9.6GT/s DDR4 2400 AVX512 -1 FMA Standard RAS Intel® Turbo Boost Intel® Hyper-Threading	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

UP (1S) Special SKU



1 Socket Processors

Cascade Lake RCP	Cores	Freq	TDP	SKU
$1,450	24C	2.4G	165W	6212U
$1,095	20C	2.5G	150W	6210U
$989	20C	2.1G	105W	6209U
$989	16C	2.9G	150W	6208U

+40%

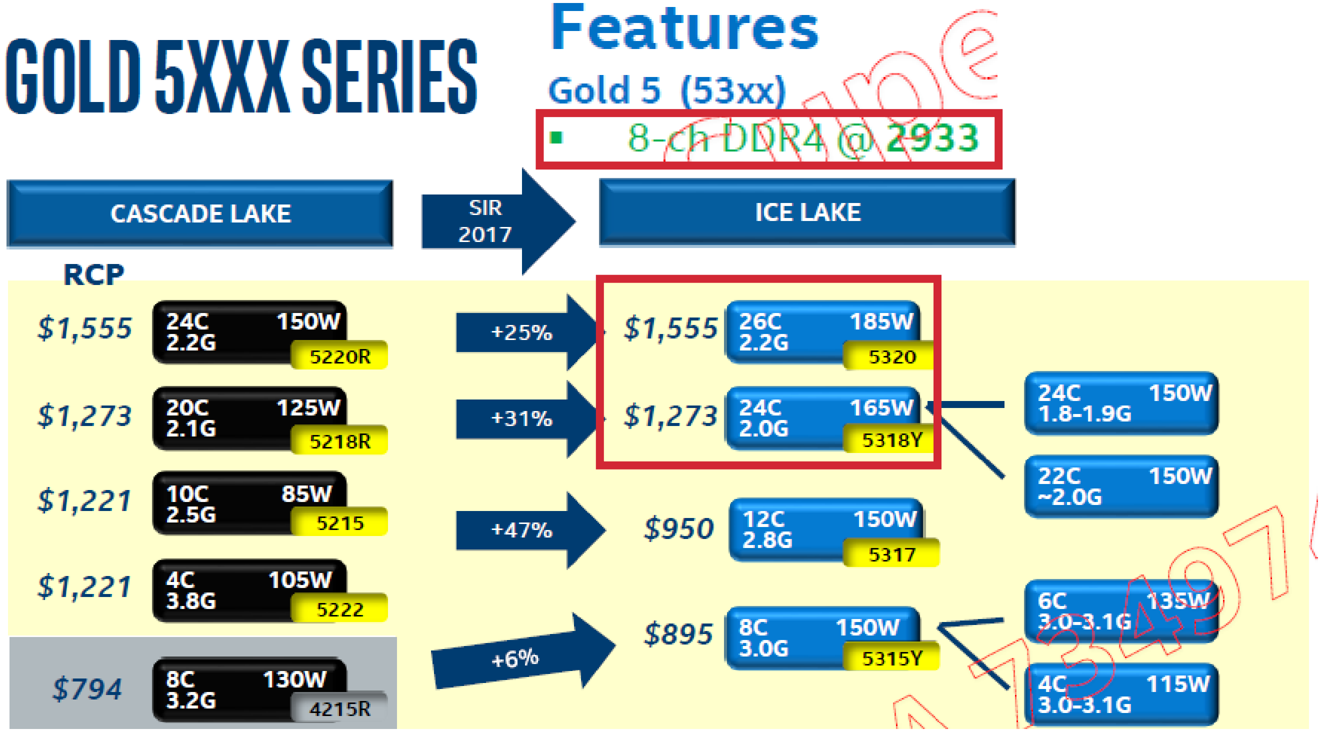
+15%

Ice Lake	Cores	Freq	TDP	SKU
$2,600	32C	2.3G	205W	6314U
$1,450	24C	2.4G	185W	6312U

Use 2S Mainstream CPUs

6312U = $527 Savings

	Cores	Freq	TDP	SKU
$1,450	24C	2.4G	185W	6312U
VS				
$1,977	24C	2.4G	185W	6336Y



GOLD 5XXX SERIES

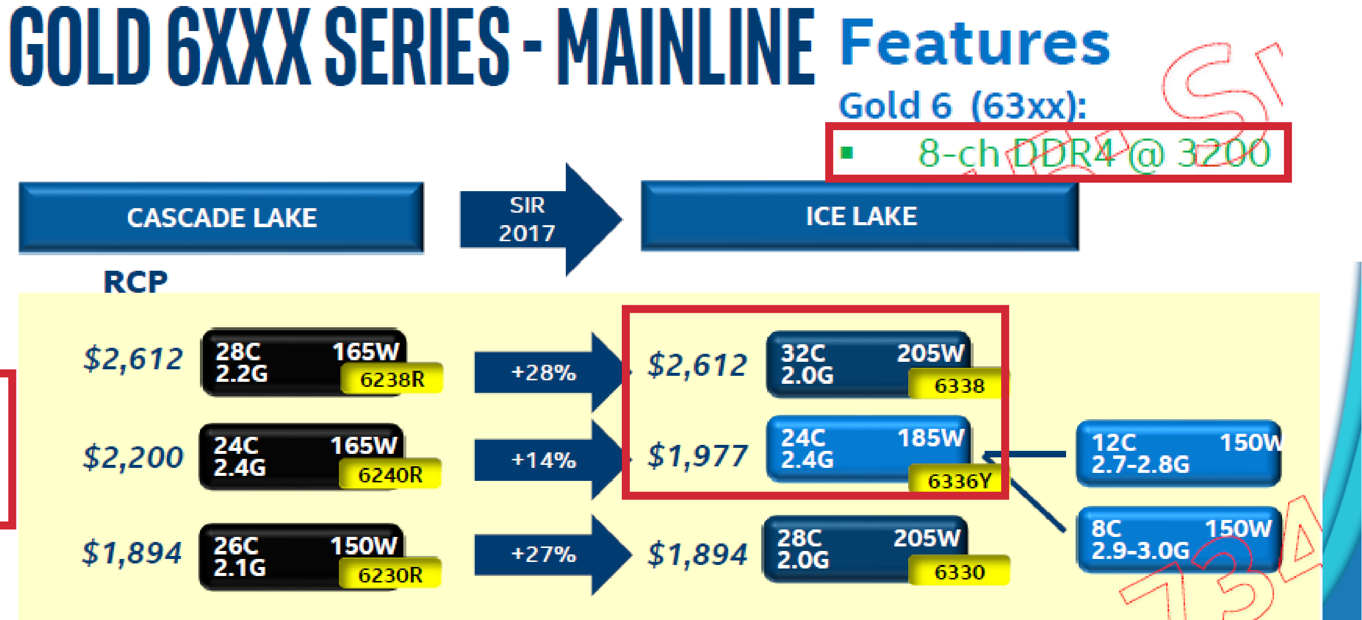
Features

Gold 5 (53xx)

- 8-ch DDR4 @ 2933

Cascade Lake RCP	Cores	Freq	TDP	SKU		Ice Lake	Cores	Freq	TDP	SKU
$1,555	24C	2.2G	150W	5220R	+25%	$1,555	26C	2.2G	185W	5320
$1,273	20C	2.1G	125W	5218R	+31%	$1,273	24C	2.0G	165W	5318Y
$1,221	10C	2.5G	85W	5215	+47%	$950	12C	2.8G	150W	5317
$1,221	4C	3.8G	105W	5222						
$794	8C	3.2G	130W	4215R	+6%	$895	8C	3.0G	150W	5315Y

Linked to	Cores	Freq	TDP
5318Y	24C	1.8-1.9G	150W
5318Y	22C	~2.0G	150W
5315Y	6C	3.0-3.1G	135W
5315Y	4C	3.0-3.1G	115W



GOLD 6XXX SERIES - MAINLINE

Features

Gold 6 (63xx):

- 8-ch DDR4 @ 3200

Cascade Lake RCP	Cores	Freq	TDP	SKU		Ice Lake	Cores	Freq	TDP	SKU
$2,612	28C	2.2G	165W	6238R	+28%	$2,612	32C	2.0G	205W	6338
$2,200	24C	2.4G	165W	6240R	+14%	$1,977	24C	2.4G	185W	6336Y
$1,894	26C	2.1G	150W	6230R	+27%	$1,894	28C	2.0G	205W	6330

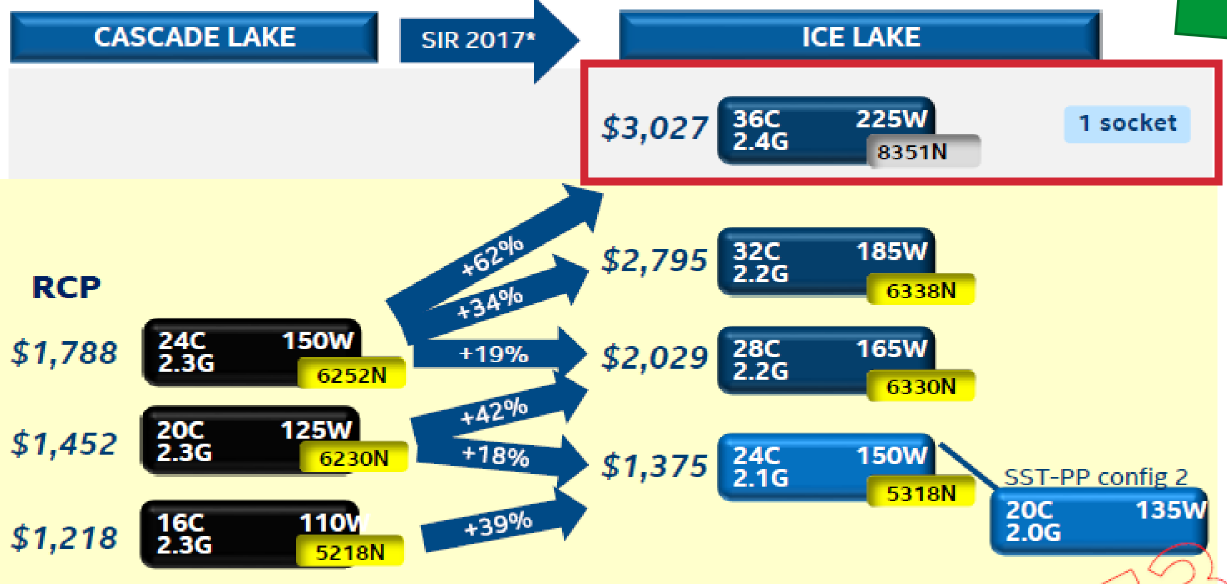
Linked to	Cores	Freq	TDP
6336Y	12C	2.7-2.8G	150W
6336Y	8C	2.9-3.0G	150W

ICE LAKE SEGMENT OPTIMIZED SKUS

XCC (100%)

HCC (95%)

Network Optimized SKUs**



CASCADE LAKE

SIR 2017*

ICE LAKE

RCP

$1,788 **24C 2.3G 150W** 6252N

$1,452 **20C 2.3G 125W** 6230N

$1,218 **16C 2.3G 110W** 5218N

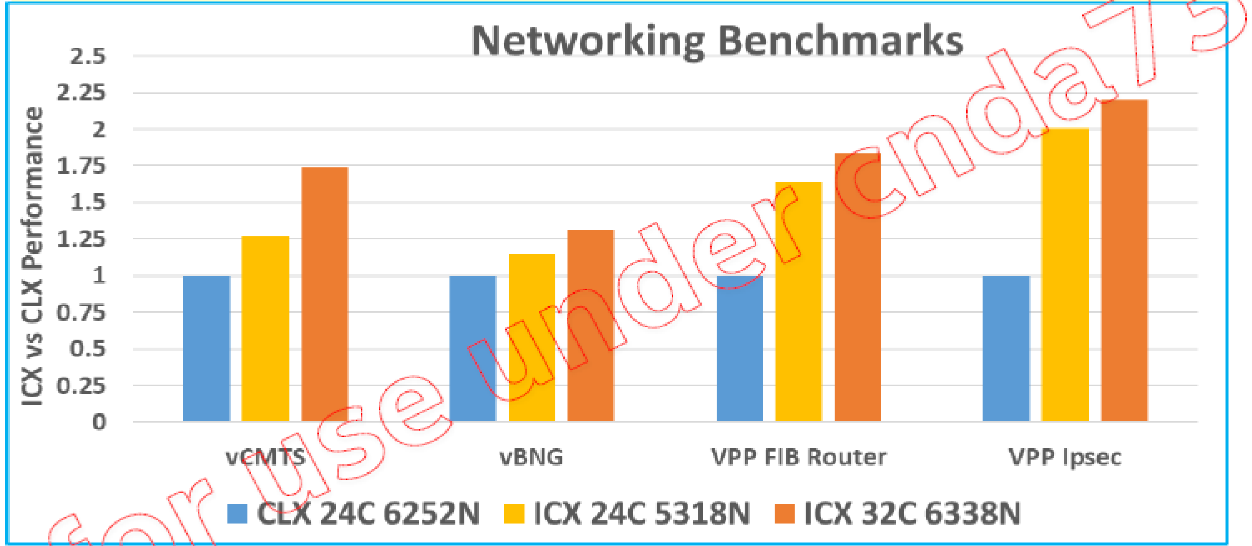
$3,027 **36C 2.4G 225W** 8351N — 1 socket

$2,795 **32C 2.2G 185W** 6338N

$2,029 **28C 2.2G 165W** 6330N

$1,375 **24C 2.1G 150W** 5318N

SST-PP config 2 **20C 2.0G 135W**



Networking optimized skus SKUs targeted for low latency, high throughput, deterministic performance for DPDK L3 Fwding, 5G UPF & vEPC, VPP Router, VPP Ipsec, vBNG, and vCMTS workloads

Prioritized Perf/Watt and lower TDP to deliver up to 100% G2G

5318N with SST-PP to enable 2:1 SKU to optimize for lower power

Extended supply life of 7 years

Updates from 80% Comms:

- No changes since 80%

** Deterministic base frequency rating only applicable for 'NFV' workloads. Other workloads may see throttling

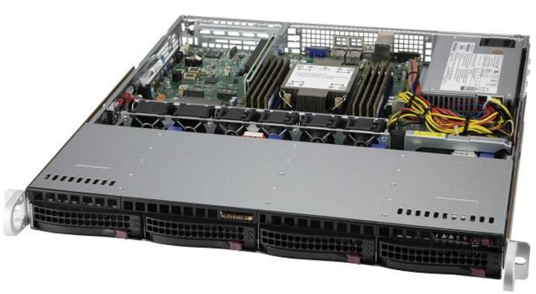
All SKUs, frequencies, and performance estimates are PRELIMINARY and can change without notice.

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.

Subject to change without notice

X12 UP Mainstream Key Features

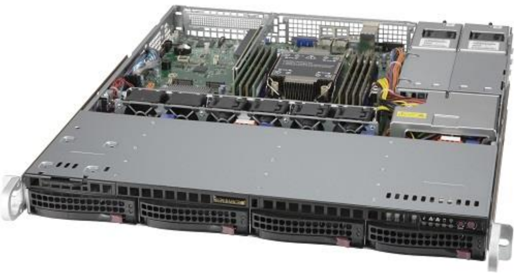
- Better Thermals: Optimize airflow design
  - **1U: 220W TDP**
- Compute Performance
  - Support single ICX up to 220W CPU
  - 8 DIMM for a large memory foot print **(up to 3TB)**
    - **New Intel® Optane™ Persistent Memory 200 Series**
- Platinum (94%) Power Supplies
  - 500W Single (510-M)
  - 400W 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-MR

- **Motherboard: X12SPO-F**
- **1U Chassis: CSE-813MF2TS-R407CB**

System Front

Slot 1: PCI-E G4 x16 FHHL

System Rear

Specifications

① **Processor Support** – Single Socket P
- 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 220W TDP

② **Memory Capacity** – 8 DIMM Slots
- 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM
- Supports Intel® Optane™ Persistent Memory

③ **Expansion** – 1 PCI-E Gen 4 Slot
- 1x PCI-E 4.0 x16 (FHHL)

④ **Networking & I/O** – 2x 1G Base-T
- 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
- Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port

⑥ **Drive Bays** – 4x Hot-Swap SATA/NVMe
- 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
- 4x 40x40x28mm Middle Cooling PWM fans, 2x Fans (optional)

⑧ **Power Supply** – 1+1 Redundant 400W Platinum
- 2x 400W High-efficiency Redundant power supplies (Platinum level, 94%)

⑨ **Dimensions**
- 17.2” (W) x 1.7” (H) x 19.98” (D)

Subject to change without notice

Azure Stack HCI

X12 MAINSTREAM

SYS-510P-MR

3rd Gen Intel® Xeon® Scalable processors
Single Socket LGA-4189 (Socket P+) supported

- 2.14 Million IOPS (4k, 100% Read, 100% Random)
- 42.7%↑ performance increase over X11 1U Ultra (1.5 Million IOPS)
- 16.67%↓ power saving at the meantime
- ~ $2.7 Million saving over 10 years period*
- √ Azure Stack HCI verified catalog system

- **Azure Stack HCI is:**
- Complete hybrid cloud solution, easy scale-out, secure and cost-efficient

	SYS-510P-MR	SYS-1029U-TN10RT
CPU	1x 8360Y (250W) (36C in total, 2.4G/3.5G)	2x 6248 (2x 150W) (40C in total, 2.5G/3.9G)
Drives	4x P4510 Gen 3 NVMe	4x P4510 + 2x P4610 Gen 3 NVMe
Network	1x Dual Port 25GbE Mellanox Connectx-4 Lx	1x Dual Port 25GbE Mellanox Connectx-4 Lx

*CPU power saving alone. 17.2 cents/kWh

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 foot print **(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

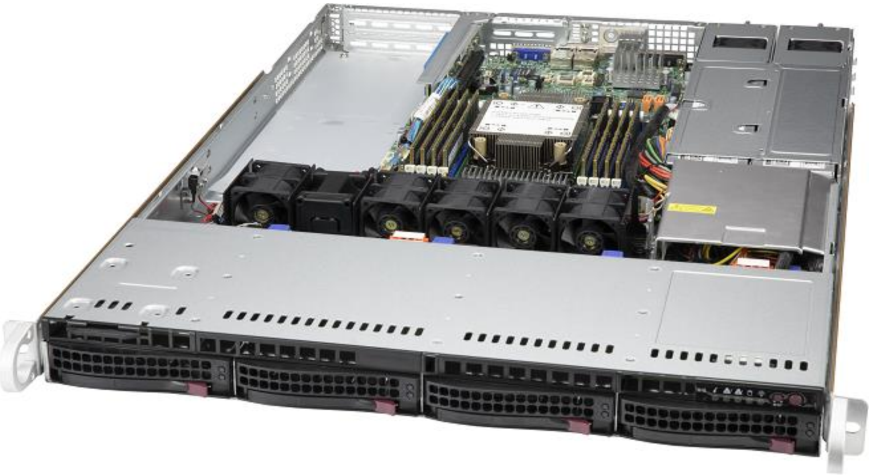
Compute & Storage Powerhouse

SYS-520P-WTR

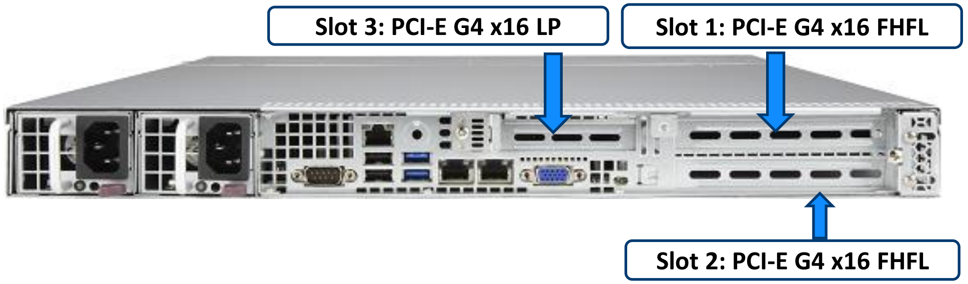
Capacity Optimized Storage

WIO 1U: SYS-510P-WTR

- **Motherboard:** **X12SPW-TF**
- **1U Chassis:** **CSE-815TS-R504WB**



System Front



System Rear

Specifications

① **Processor Support** – Single Socket P
- 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP

② **Memory Capacity** – 8 DIMM Slots
- 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM
- Supports Intel® Optane™ Persistent Memory

③ **Expansion** – 3x PCI-E Gen 4 Slots
- 2x PCI-E 4.0 x16 (FHFL)
- 1x PCI-E 4.0 x16 (LP)

④ **Networking & I/O** – 2x 10G Base-T
- 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
- Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port

⑥ **Drive Bays** – 4x Hot-Swap SATA/NVMe
- 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
- 5x Counter-rotating 40x40x56mm PWM fans, 1x Fan (optional)

⑧ **Power Supply** – 2x 500W Platinum
- 2x 500W High-efficiency Redundant Power Supplies (Platinum level, 94%)

⑨ **Dimensions**
- 17.2” (W) x 1.7” (H) x 25.6” (D)

Subject to change without notice

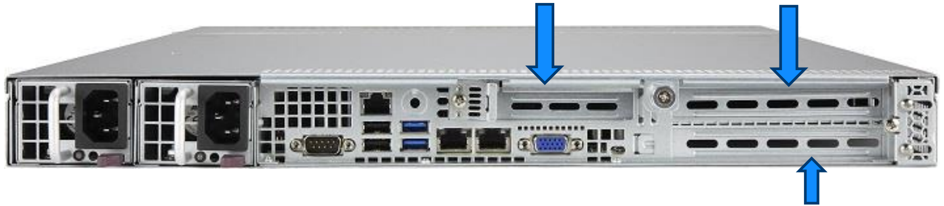
WIO 1U: SYS-110P-WTR

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

System Front

Slot 3: PCI-E G4 x16 LP

Slot 1: PCI-E G4 x16 FHFL



Slot 2: PCI-E G4 x16 FHFL

System Rear

Subject to change without notice

Specifications

① **Processor Support** – Single Socket P
- 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP

② **Memory Capacity** – 8 DIMM Slots
- 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM
- Supports Intel® Optane™ Persistent Memory

③ **Expansion** – 3x PCI-E Gen 4 Slots
- 2x PCI-E 4.0 x16 (FHFL)
- 1x PCI-E 4.0 x16 (LP)

④ **Networking & I/O** – 2x 10G Base-T
- 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
- 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)
- 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
- 5x Counter-rotating 40x40x56mm PWM fans, 1x Fan (optional)

⑧ **Power Supply** – 1+1 Redundant 750W Platinum
- 2x 750W High-efficiency Redundant Power Supplies (Platinum level, 94%)

⑨ **Dimensions**
- 17.2" (W) x 1.7" (H) x 23.5" (D)

Subject to change without notice

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 (Dedicated)
  - 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″
Compute & Storage Powerhouse
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 36x 3.5″
IOPS Optimized Storage
SSG-540P-E1CTR36L/H: 36x 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

SSG 1U: SSG-110P-NTR10

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

80 PLUS PLATINUM

System Front

Slot 1: PCI-E G4 x16 FHHL

System Rear

Specifications

① **Processor Support** – Single Socket P
- 3rd Gen Intel® Xeon® Scalable (Ice Lake), up to 270W TDP

② **Memory Capacity** – 8 DIMM Slots
- 8x DIMM slots, DDR4-3200 ECC RDIMM / LRDIMM
- Supports Intel® Optane™ Persistent Memory

③ **Expansion** – 1x PCI-E Gen 4 Slot
- 1x PCI-E 4.0 x16 (FHHL)

④ **Networking & I/O** – 2x 10G Base-T
- 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
- Built-in Server management tool (IPMI 2.0, KVM/media over LAN) with dedicated LAN port

⑥ **Drive Bays** – 10x Hot-Swap NVMe
- 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
- 6x Counter-rotating 40x40x56mm PWM fans

⑧ **Power Supply** – 1+1 Redundant 860W Platinum
- 2x 860W High-efficiency Redundant power supplies (Platinum level, 94%)

⑨ **Dimensions**
- 17.2” (W) x 1.7” (H) x 23.50” (D)

Subject to change without notice

X12 UP STORAGE All-Flash NVMe

1U UP 10x NVMe
(For Complete System Only)

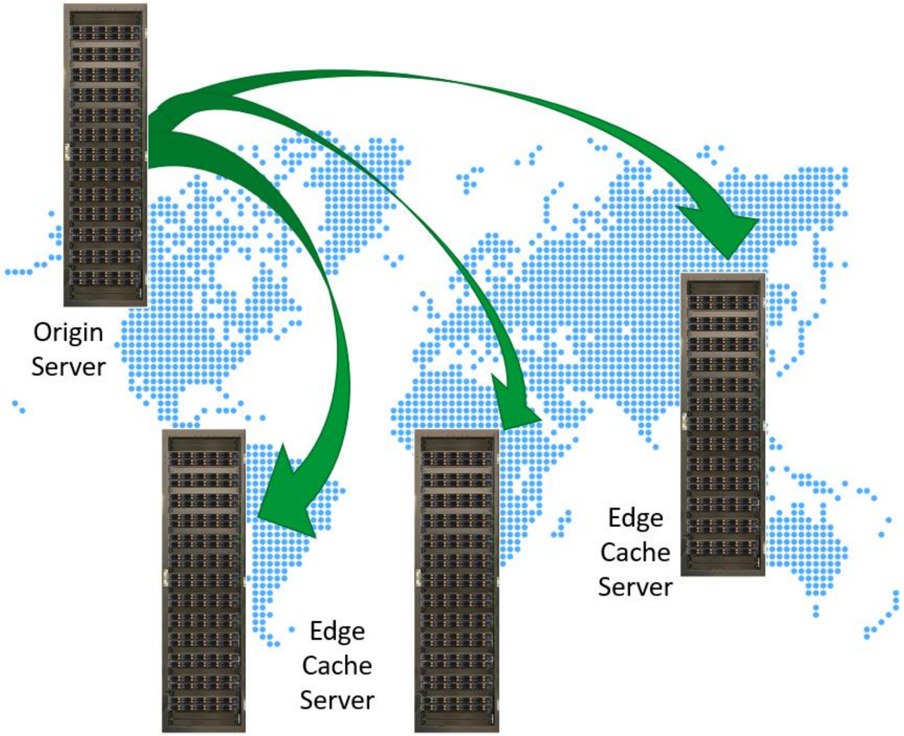
SSG-110P-NTR10

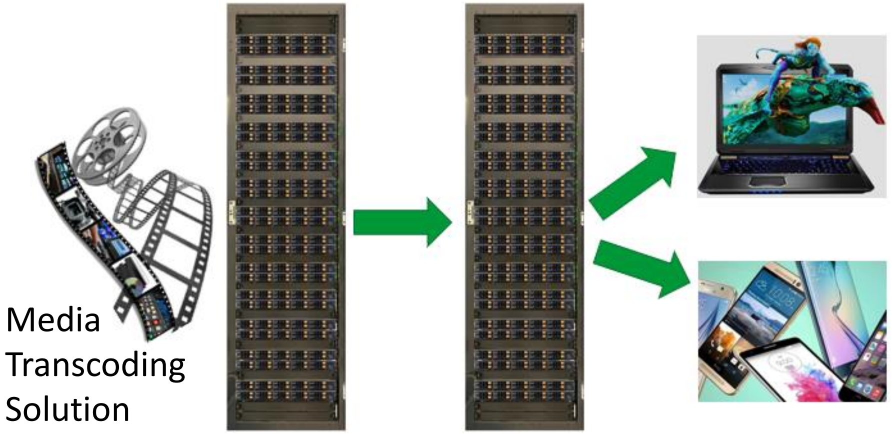
3rd Gen Intel® Xeon® Scalable processors
Single Socket LGA-4189 (Socket P+) supported

- ✓ Verified for Intel Select Solutions for VCDN Single Socket
- ✓ Enable rapid add of visual services
- ✓ Streamline infrastructure procurement with low TCO
- ✓ Scale naturally with low risk proven hardware
- ✓ Test cases include:
  - ✓ Web Caching
  - ✓ Video on Demand
  - ✓ Live Streaming
  - ✓ Media Transcoding

ISS VCDN Solution

- Supermicro + Intel® Select Solutions for Visual Cloud Delivery Network
  - Service Providers, Cloud Service Providers, Network Operators, or Enterprise Infrastructure companies
- 3rd Gen Intel® Xeon® Scalable processors
- Gen 4 PCIe
- High-performance; flexible configurations well balanced & optimized H/W
- Exceed Intel® performance requirement solution stack based on common & popular open source CDN caching framework
- Streamline procurement
- Quick to deploy
- Low TCO



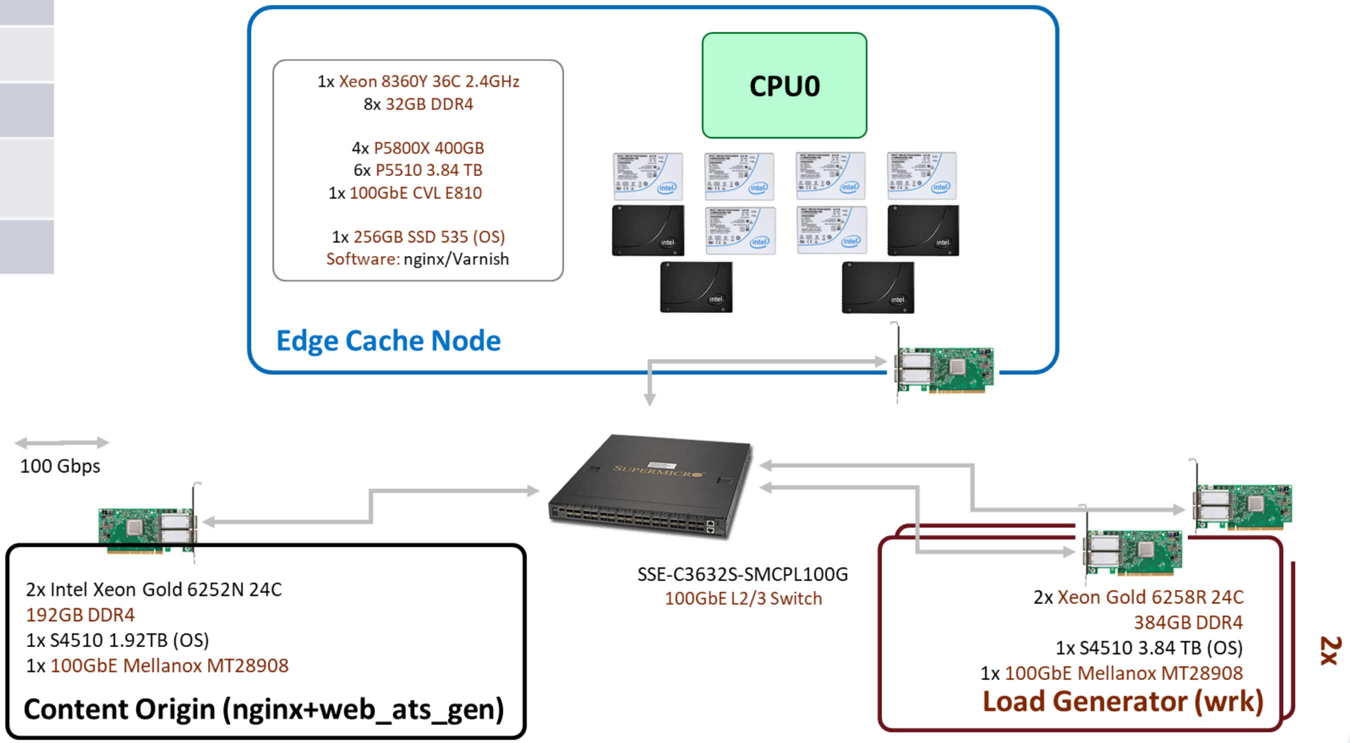


Qualified VCDN Solution

Ingredient	Configuration
Server	Supermicro SuperStorage SSG-110P-NTR10
Processor	1x Intel Xeon Gold 8360Y Processor (2.4GHz, 36C/72T, 250W)
Memory	8x 32GB DDR4-3200, Total 256GB
Network Adapters	1x 100GbE Intel Ethernet E810-C DA2, Total 100 Gbps
Intel Optane Technology	4x Intel Optane SSD P5800X 400GB
Storage Capacity	6x Intel SSD D7-5510 series (3.84TB)
Storage Boot Drive	1x M.2 NVMe SSD 1.92TB
BIOS	Version 1.1, build time: 04/21/2021 (ucode: 0xD000280)
BMC Firmware	Version 01.00.04, build time: 05/03/2021

- Benchmark (open-source NGINX)
  - Web Caching
  - Video On Demand
  - Live Streaming.
  - Media Transcoding

SSG-110P-NTR10 SuperStorage



1x Xeon 8360Y 36C 2.4GHz
8x 32GB DDR4

4x P5800X 400GB
6x P5510 3.84 TB
1x 100GbE CVL E810

1x 256GB SSD 535 (OS)
Software: nginx/Varnish

CPU0

Edge Cache Node

100 Gbps

2x Intel Xeon Gold 6252N 24C
192GB DDR4
1x S4510 1.92TB (OS)
1x 100GbE Mellanox MT28908

Content Origin (nginx+web_ats_gen)

SSE-C3632S-SMCPL100G
100GbE L2/3 Switch

2x Xeon Gold 6258R 24C
384GB DDR4
1x S4510 3.84 TB (OS)
1x 100GbE Mellanox MT28908

Load Generator (wrk)

2x

Solution Brief, Whitepaper & GTM

Solution brief published

SOLUTION BRIEF

ACCELERATE DELIVERY OF VISUAL SERVICES

Supermicro's Intel® Select Solution for Service Provider Visual Cloud Delivery Network (VCDN)

Drive Visual Services Innovation

Supermicro, Intel and Red Hat have partnered to develop a first-in-class services delivery platform based on industry-leading Supermicro SuperServer® and SuperStorage technologies, 3rd Generation Intel® Xeon® Scalable processors, and either CentOS or Red Hat Enterprise Linux. Using this innovative solution, communications service providers can rapidly add visual services in their networks to:

- **Offer emerging visual services** like cloud gaming, virtual reality, and volumetric video that are driving the need for more network capacity, higher bandwidth, and ultra-low latency.
- **Streamline infrastructure procurement and deployment** with low total cost of ownership (TCO) while ensuring high-quality services for consumers by utilizing pre-configured and pre-tested offerings.
- **Reduce the risk of advanced technology** with a proven hardware and software reference design that lets you select exactly the best configuration for your application, scaling naturally as your needs expand.

Supermicro Solution Overview

This certified Intel Select Solution for Service Provider Visual Cloud Delivery Network (VCDN) consists of optimized hardware resources and an open-source software stack residing within a virtualized infrastructure. The solution stack uses the most common and popular open source CDN caching frameworks such as NGINX, Apache Traffic Server (ATS), and Varnish. It also leverages open source media libraries such as FFmpeg and Scalable Video Technology for media transcoding. Acceleration is built into the system for key functions such as cryptography, data compression, and transcoding.

The certified Supermicro solution for Service Provider VCDN provides high-performance, well-balanced server systems along with flexible configuration options to meet diverse requirements. The solutions utilize NUMA-balanced I/O for maximum throughput and consistent latency. They also feature new memory and storage solution options for improved scalability, reduced latency, and cost savings. Please refer to Tables 1-3 for configuration details.

SUPERMICRO

As a global leader in high performance, high efficiency server technology and innovation, we develop and provide end-to-end green computing solutions to the data center, cloud computing, enterprise IT, big data, HPC, and embedded markets. Our Building Block Solutions® approach allows us to provide a broad range of SKUs, and enables us to build and deliver application-optimized solutions based upon your requirements.

RED HAT®

Red Hat is the world's leading provider of open source enterprise IT solutions. We're here to help you address change with open principles so that you can navigate today's need for transformation, and prepare for the future. With engineers connected to open source communities, the freedom of our subscription model, and a broad portfolio of products that's constantly expanding, Red Hat is here to help you face your business challenges head-on.

INTEL®

Intel is an industry leader, creating world-changing technology that enables global progress and enriches lives. Inspired by Moore's Law, we continuously work to advance the design and manufacturing of semiconductors to help address our customers' greatest challenges. By embedding intelligence in the cloud, network, edge and every kind of computing device, we unleash the potential of data to transform business and society for the better.

Whitepaper

WHITE PAPER

SUPERMICRO SOLUTION FOR HIGH PERFORMANCE VCDN

Certified as an Intel® Select Solution for Service Provider Visual Cloud Delivery Networks (VCDN)

Executive Summary

Consumer streaming media use is growing exponentially and evolving to richer content. This rapid growth in demand is an opportunity for service providers (SPs) to add visual services in their networks.

To support SPs, Supermicro has partnered with Intel to develop a first-in-class cloud services delivery platform based on industry leading SuperStorage technologies. Using this innovative solution, SPs can efficiently utilize their networks to drive advanced visual services innovations.

The Supermicro solution, a certified Intel Select Solution for Service Provider Visual Cloud Delivery Network (VCDN), consists of optimized hardware based on the Supermicro X12 single-socket SSG-110P-NTR10 and software residing within a virtualized infrastructure.

The Supermicro architecture is optimized for maximum throughput and lowest latency. It also features new persistent memory SSD technology and NVMe storage for reduced latency and highest performance. As a single socket solution it is NUMA-free and offers best cost/performance. Efficient thermal balancing allows the system to support up to 270 watt processors.

SSG-110P-NTR10

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SUPERMICRO

Supermicro is a global leader in high performance, green computing server technology and innovation. We provide our global customers with application-optimized servers and workstations customized with blade, storage, and GPU solutions. Our products offer proven reliability, superior design, and one of the industry's broadest array of product configurations, to fit all computational need.

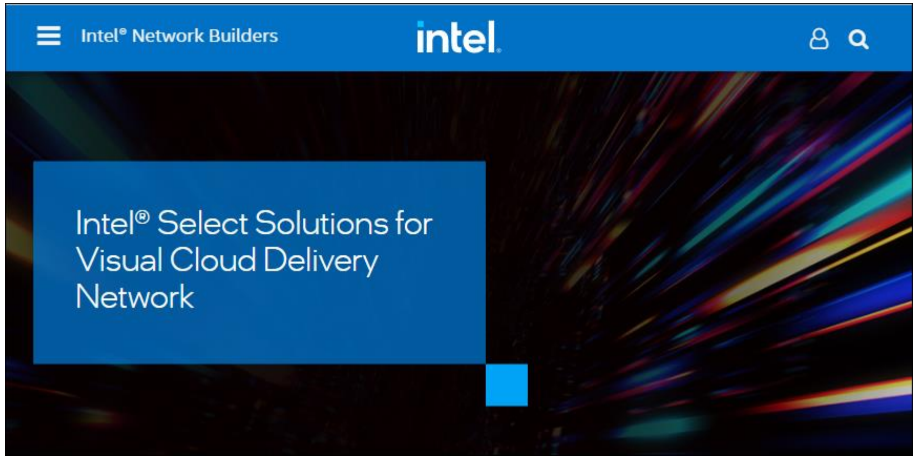
Partnerships

- Partnering with Intel to promote VCDN solution
  - Intel VCDN page link to Supermicro
  - Press release
  - Blog
  - Podcast
  - Roadshow / tradeshow event participation

- Exploring partnership with
  - Varnish-software.com
  - NGINX Plus (F5.com)

- Open source CDN software
  - Varnish
  - NGINX
  - Apache Traffic Server (ATS)

Intel® Select Solutions for Visual Cloud Delivery Network



Intel® Select Solutions for Visual Cloud Delivery Network

Intel® Network Builders -Varnish Software

High-performance edge caching for next-gen CDN deployments

Spec/Feature Summary of X12 UP Xeon Scalable Series

Product Family	Mainstream		WIO				Storage			
System PN	510P-M	510P-MR	110P-WTR	510P-WT	510P-WTR	520P-WTR	110P-NTR10	520P-ACTR12	540P-E1CTR36	540P-E1CTR45
Form Factor	1U	1U	1U	1U	1U	2U	1U	2U	4U	4U
CPU TDP Max	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 (Opt)	2 (Opt)	10	2 (Opt)	2 (Opt)	2 (Opt)	10	2 (Opt)	2 (Opt)	2 + 2 (Opt)
U.2 NVMe Support #	4 (Opt)	4 (Opt)	4 (Opt)	4 (Opt)	4 (Opt)	4 (Opt)	10	2 (Opt)	2 (Opt)	2 (Opt)
M.2 Support #	2	2	1	1	1	1	2	1	1	1
M.2 interface	x4 NVME/ SATA	x4 NVME/ SATA	x4 NVME/ SATA	x4 NVME/ SATA	x4 NVME/ SATA	x4 NVME/ SATA	x4 NVME/ SATA	x4 NVME/ SATA	x4 NVME/ SATA	x4 NVME/ SATA
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	1	2	2	2
PCI-E 4.0 x8						2		2	2	2
SAS Controller								3816 (L) 3916 (H)	3808 (L) 3908 (H)	3808 (L) 3908 (H)
Networking (Base T)	1G x2	1G x2	10G x2	10G x2	10G x2	10G x2	10G x2	10G x2	10G x2	10G x2
Power Supply	500W Single	400W 1+1	750W 1+1	600W Single	500W 1+1	650W 1+1	860W 1+1	800W 1+1	1200W 1+1	1600W 1+1
Power Efficiency 80Plus	94%	94%	94%	94%	94%	94%	94%	96%	96%	94%

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