



Tundra AP

Bringing a new level of HPC and AI to the OCP form factor

Tundra AP, the next generation of Penguin Computing's highly dense Tundra supercomputing platform, combines the processing power of Intel® Xeon® Scalable 9200 series processors with Penguin's Relion XO1122eAP server in an OCP form factor that delivers a high density of CPU cores per rack.

Organizations of all sizes and all levels of compute needs can benefit from the performance of Intel's Scalable 9200 series processor in Penguin's Tundra platform that delivers industry-leading density, improved power efficiency, improved serviceability, and room-neutral cooling via an integrated direct-to-chip liquid cooling solution.

The Intel® Xeon® Scalable 9200 processor family provides a new level of capabilities across compute, storage, memory, network, and security. The Tundra AP platform adds to the power of these processors by disaggregating the high-power consumption of the individual servers to greatly improve density. With each S9200WK node needing up to 1kW, Tundra AP's higher AC voltages allow for up to 68 nodes per OCP rack, compared to the max of 64 in an EIA rack with the same footprint. The Tundra OCP rack, coupled with its innovative liquid cooling system, provides optimized serviceability. Access to the hot aisle side of the rack is not required for service and the disaggregated power configuration allows for quick exchange of servers.

Solution-at-a-Glance

Features

- Intel Xeon Scalable 9200 series processors
- 21" OCP form factor
- Power dis-aggregated from nodes and chassis
- Up to 68 nodes per 440U OCP rack
- Integrated direct-to-chip liquid cooling
- On-site or hosted

Technical Benefits

- Reduce footprint with increased node density
- Improve serviceability
- Allow scalability
- Achieve room-neutral cooling
- Reduce points of failure
- Enable higher power (50kW at 12V, 100kW at 48V)
- Deliver better than 2U4N density

Business Benefits

- Drive actionable insight
- Deploy dynamic service delivery
- Reduce total cost of ownership (reduce operating costs + lower capital expenses)

One of the benefits of the Open Compute Project (OCP) is that it lowers total cost of ownership (TCO)—lower capital expenses, thanks to removal of all vanity elements, and lower operating expenses due to service from the front, shared power, and other design changes—which makes OCP-based technology perfect for scale out.

Leading-edge organizations choose an OCP-based infrastructure so they can scale out cost-effectively. There is a strong argument for using OCP-based hardware in a data center; it is less expensive to buy and to maintain, reduces points of failure, is designed for more efficient power management, and significantly reduces security issues.

The Tundra AP platform combines the capital and operating expense savings of OCP-based hardware with today's technologies for HPC and AI.

Key Features

The Open Rack Standards design can achieve this in the following ways:

- The rack width is 21" compared with a traditional 19" rack, with a server unit height of 10U (1.89" compared with the 1U height of 1.75" for a traditional rack), allowing for more horizontal and vertical space in each tray for more compute, networking, and storage, or for better airflow or cabling space.
- The power supply for each server rackmount is removed and consolidated in a separate, central unit. This not only frees up more space for other components but also allows for better cooling and maintenance efficiency of the consolidated power supply unit. Power supply is instead supplied to compute, storage and GPU nodes directly through a "bus-bar" system running along the rear of the rack.



Intel Xeon Scalable 9200 Processors

Across infrastructures, from enterprise to technical computing applications, the Intel Xeon Scalable processor family is designed for data center modernization to drive operational efficiencies that lead to improved total cost of ownership (TCO) and higher productivity for users. Systems built on the Intel Xeon Scalable processor family are designed to deliver agile services with enhanced performance and groundbreaking capabilities.

Intel's 2nd Generation Xeon Platinum 9200 processors deliver twice the processor core count (up to 56 cores), higher memory bandwidth, and higher AI inference and training performance compared with the standard Intel Xeon Platinum 8200 platforms. Cooper Lake will be the first x86 processor to deliver built-in AI training acceleration through new bfloat16 support added to Intel[®] Deep Learning Boost[®] (Intel[®] DL Boost[®]).

Key Features

- Maximum 2nd Generation Intel® Xeon® Platinum 9200 Processors Performance
- Leadership CPU performance per socket with Intel's highest core count, 2nd Generation Intel Xeon Platinum 9200 processors
- Double the memory bandwidth for memory-intensive workloads with 12 memory channels per CPU, 24 memory channels per compute module
- New Intel Deep Learning Boost (Intel DL Boost) Instructions for data analytics greatly accelerates inference performance
- Multi-Chip packaging optimized for density and performance



The Tundra AP Density Advantage

Specification	440U OCP	
Dimension (W x D x H, mm)	750 x 1200 x2258 (Rack) 2250 x 1200 x 2258 (3 Racks)	762 x 1219 x2254 (Rack) 2286 x 1219 x 2254 (3 Racks)
Configuration (per Rack)	16 Servers 4 Switches 4 PDUs	34 Servers 3 Switches 1 Controller 4 PDUs
Max CLX-AP Node Density	64 (w/ 2U4N) per Rack 192 per 3 Racks	68 (w/ 1U2N OCP) per Rack 204 per 3 Racks
Power Capacity (per Rack)	69.8 kW (240/415V)	69kW (277/480V)
Power Redundancy (Rack)	None	A+B

Comparison chart uses standard 2U4N EIA systems and the Relion XO1122eAP, the first Tundra AP-based system.

Penguin Computing Relion XO1122eAP Server

As more organizations face challenges growing their compute capabilities, many are looking to the OCP form factor to improve their ROI. For researchers, scientists, and engineers working on compute-intensive projects, an OCP solution built for HPC is ideal.

That's why the Penguin Computing® Relion® XO1122eAP is built on the Intel Xeon Scalable 9200 series processor (formerly Cascade Lake AP). Relion XO1122eAP is the first Tundra AP system which uses the Intel Server System S9200WK. This system is designed for the most demanding workloads. With two nodes per system, a single Relion XO1122eAP can include 224 cores per 10U, this solution works to accelerate data-intensive workloads that need immense computing power.



Key Features

- A 10U, 2 node server with up to 224 cores per server for HPC and AI workloads
- 2 Intel® Xeon® Scalable Platinum Processors and up to 3TB DDR4-2933MHz ECC Memory per node
- Up to two (2) M.2 NVMe storage devices per node

FEATURE	TECHNICAL SPECIFICATIONS	
Form Factor	10U - 2 Node OpenRack	
Processors	Processor Number:	2 per node / 4 total
	Processor Type:	Intel® Xeon® Scalable Processors
Motherboard	Chipset:	Intel Lewisburg C621 Series Chipset
Board Management	BMC Chipset:	ASpeed AST2500
	Dedicated BMC Interface:	Yes
Memory	Memory Type:	DDR4-2933MHz ECC
	Memory Capacity:	Up to 3TB DDR4 per node
Storage Options	M.2 NVMe:	Up to 2x M.2 per node
Networking	Ethernet Controller	Intel I210
	On-Board LAN	2x 1GbE/RJ45 per node + 4 x1GbE/RJ45 Shared LAN Ports
PCI Expansion Slots	Number of Slots/Gen/Speed (Size):	
GPU:	GPU Capable:	No
Supported GPUs:	None	
External I/O Interfaces	USB Ports:	1x USB 3.0 per node (Front)
	VGA Ports:	Yes
	Serial Ports:	None
Power System	Power Supply:	OCP Rack V.2 (3 x 48V busbar)
Regulatory Compliance	Regulations:	N/A
Mounting Hardware	Rackmount Rails:	Standard Rails included
Operating Environment	Operating Temperature:	15C to 35C (59F to 95F)
	Non-operating Temperature:	0C to 70C (0F to 158F)
	Non-operating Relative Humidity:	30% to 0% (non-condensing)
System Dimensions & Weight	Height: 1.65' Width: 21.14' Depth: 31.32'	
Warranty	3 year standard; Up to 4 years on-site available.	

Available Configurations			
Compute Module	S9232WK1HLC (1U 1/2 Width)	S9248WK1HLC (1U 1/2 Width)	S9256WK1HLC (1U 1/2 Width)
Processor	Xeon Scalable Platinum 9222	Xeon Scalable Platinum 9242	Xeon Scalable Platinum 9282
TDP per Socket	250W	350W	400W
Storage	2x M.2 per node		
PCIe Gen3	2x HHHL x16 PCIe cards through riser slot 1&2 riser cards		
Video	One multi-purpose port on front panel per compute node		
Cooling	Direct-to-chip liquid-cooling via cold plates		
Shipping	Sept. 2020		

Contact Us

Use [this form](#) or call Penguin Computing today at 1-888-736-4846 to find out how you can leverage the power of Intel Xeon Scalable 9200 Series processors in an OCP form factor to:

- Drive actionable insight
- Deploy dynamic service delivery
- Reduce total cost of ownership (reduce operating costs and lower capital expenses)