

Which OCP Storage is right for you?

Adam Tarnowski

Hyve Solutions, Director of Sales

October 2014



Introduction



Hyve Solutions, located in Fremont, CA, is a leader in providing customers with energy-efficient servers and storage that are cost effective and built specifically to actual workloads and data center environments. We offer highly energy-efficient solutions via our unique role in the Open Compute Project.

A division of SYNnex
(NYSE: SNX)



Innovative Data
Center Solutions



Original OCP
Solution Provider



Global Solutions
and Services



Who are we?



In the Hyve, Server racks found for Facebook's data centers (Photo: Symyx)

<http://www.wired.com/wiredenterprise/2011/12/secret-servers>

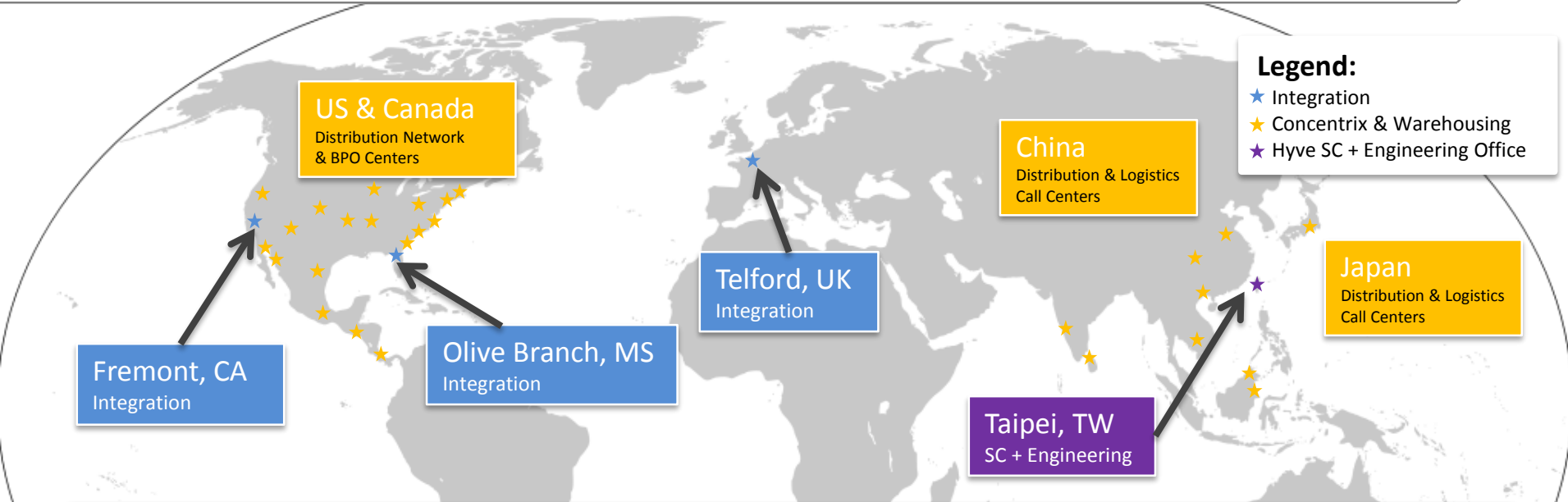
SYNNEX Corporation (NYSE: SNX) is a Fortune 500 company founded in 1980

- \$11 Billion Global Information Technology supply chain services company
- 2014 Ranked No. 260 on Fortune 500
- 50,000 employees worldwide
- 107 consecutive profitable quarters
- Largest HP distributor in North America
- Largest Intel server platforms distributor in North America
- Largest distributor of HDD's in North America
- Exclusive distributor of Nvidia's GPU products for high performance computing

Hyve Solutions – Data Center Solutions Division of SYNNEX

- Design & Integration of node and rack level server/storage solutions for hyper-scale data centers.
- Founding partner & lead integrator of Open Compute Platform (OCP) and largest OCP Integrator in the world
- Facebook 2011 Supplier of the Year
- Builder of TOP500.org supercomputers for the last decade

Hyve Strategic Global Footprint

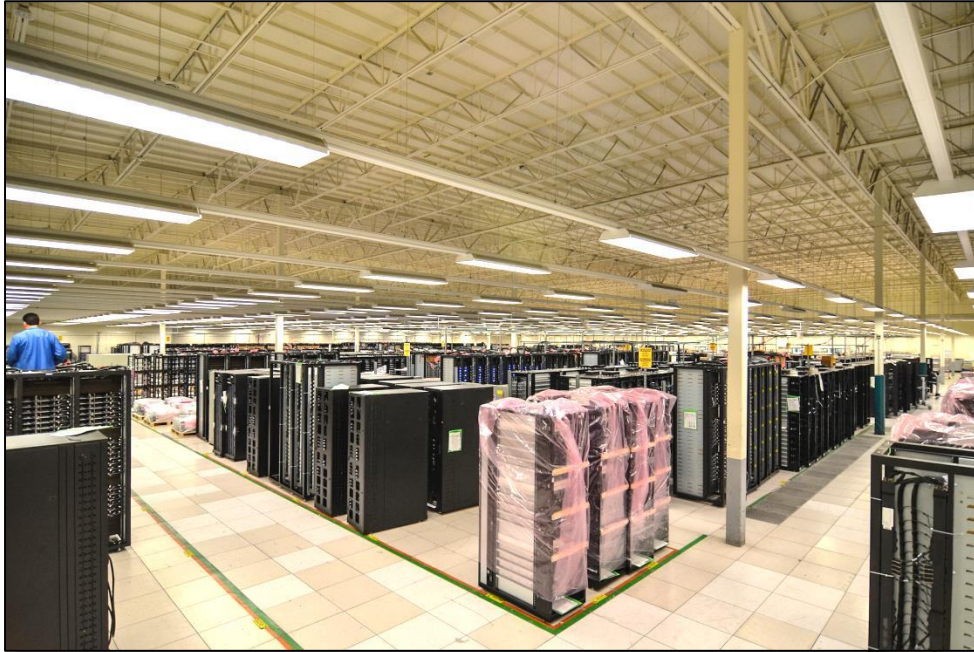


- 16 Distribution and Warehousing facilities in North America
- Integration in Fremont, CA; Telford, UK; Olive Branch, MS
- Supply Chain + Engineering Office in Taiwan
- Distribution and warehousing in Japan
- Synnex Locations in China, India, Phillipines, Costa Rica, Nicaragua

Hyper Scale Deployment



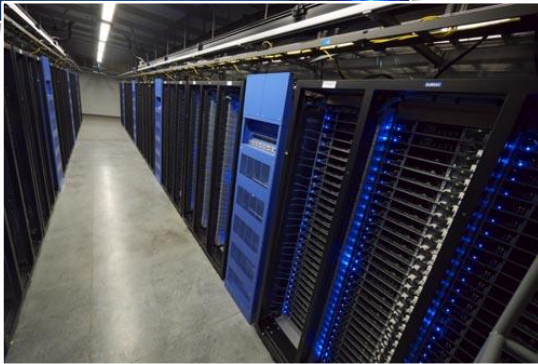
95,000 Sq Ft.



Fremont Manufacturing B4

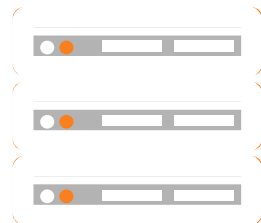


Hyper Scale Deployments



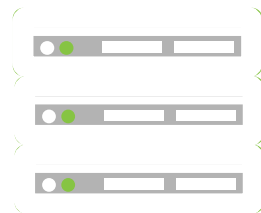
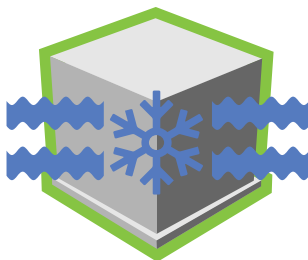
Efficient Data Center Design

Industry Standard



1.9
PUE

Hyve Solutions OCP



1.07
PUE

Open Compute Project



OPEN™
Compute Project
SOLUTION PROVIDER

Hyve Solutions is the original OCP solutions provider, having built all of the servers and racks for Facebook's Prineville and Forest City data centers and 95% of all racks in Facebook's datacenters worldwide, we are your best choice for deploying OCP hardware anywhere in the world. We provide our global customers with customized, purpose-built data center servers and storage solutions that are cost effective and built to be specific to actual workloads and data center environments.

OCP Design Benefits

- **Lowering cost of Infrastructure (52% Savings)**
 - Removal of unneeded components (Vanity Free)
 - Rack level system protection
 - Operates at a higher temperature environment
 - Eliminating weight and unnecessary materials
 - lowering the cost of maintenance

- **Lowering cost of operation (38% Savings)**
 - Power costs ~\$1 per a Watt / Year (@ \$.12 KWh)
 - Efficient power system (PUE of ~1.0)

- **Designed at the data center level**
 - Front I/O
 - Tool-Less designed
 - Strict hot aisle containment



OCP Open Rack

- 208Vac - 3 phase input power solution
- Dual AC Power Shelf - 12KW max
- 21.14" OCP Inner Width Specifications
- 1 Open Unit (OU) = 1.89"
- (2) 50A Hubbell CS8365C Plug
- RMC – Remote monitor control device
- 24"W x 42"D x 86.6"H

(6) 2.4KW PSU 5+1 RPS



18OU Space for Server & Storage Options

2OU Space for Switches

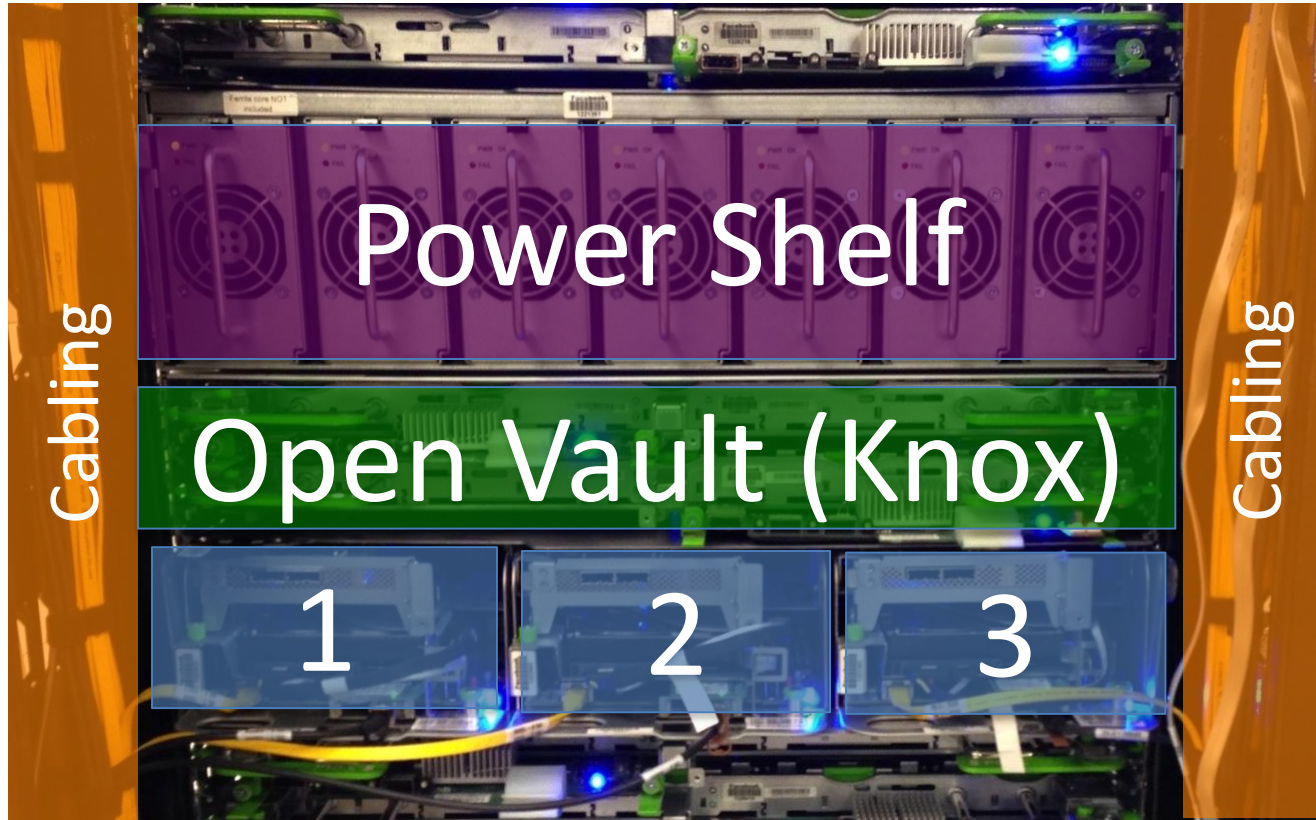
18OU Space for Server & Storage Options

Winterfell & Openvault (Knox)



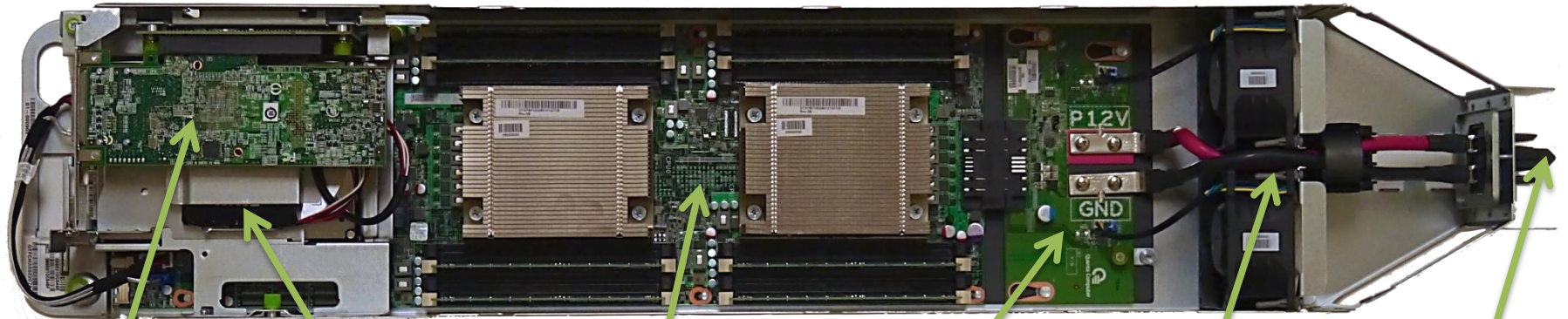
The OCP Winterfell and Knox OpenVault solution is a simple and cost-effective data center solution with a modular design that is purpose built for the Open Rack. Winterfell offers a 3 node 2U design, while the Knox offers high disk densities, holding up to 30 x 3.5" drives in a 2U chassis, and can operate with nearly any host server. Its innovative, expandable design puts serviceability first, with easy drive replacement no matter the mounting height. This solution is the latest in OCP design and considered OCP Version 3.0





OCP Winterfell Node

34 1/2"



PCIe
Card

HD/SSD

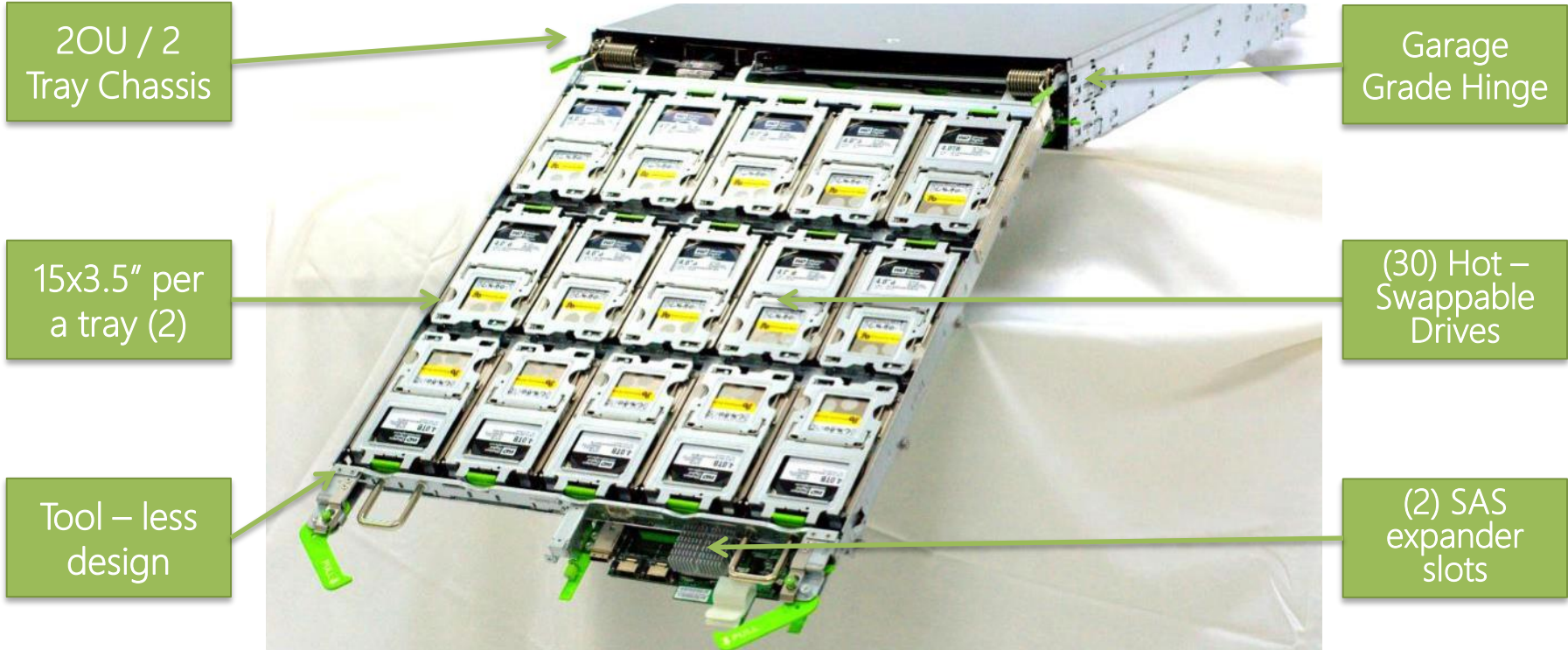
MB

PDB

Fans

DC Clip

OCP OpenVault / Knox



OCP Open Rack 3.0



Open Rack – Compute / Balanced

- Great for VM, Business applications
- 20 Independent Compute Nodes
- 10 Storage Nodes
- 300 x 3.5» HDD Trays – up to 1.8PB
- Node to HDD Ratio – 1:15
- Power Budget Requirement – 12.5kW

Open Rack – Storage

- Great for OpenStack/Hadoop
- 12 Independent Compute nodes
- 12 storage nodes
- 360 x 3.5» HDD trays – 2.26PB
- Node to HDD Ratio – 1:30
- Power Budget Requirement – 12.5kW

Open Rack – Cold Storage/Archiving

- 2 Independent Compute Nodes
- 16 storage nodes
- 480 x 3.5» HDD trays – 2.88PB
- Node to HDD Ratio – 1:240
- Power Budget Requirement – 12.5kW

2U	Winterfell	Winterfell	Winterfell
2U	Knox		
2U	Knox		
2U	Winterfell	Winterfell	Winterfell
2U	Knox		
2U	Knox		
2U	Winterfell	Winterfell	Winterfell
2U	Knox		
2U	blank	blank	Winterfell
1U	Switch		
1U	Switch		
3U	Power Shelf		
2U	Winterfell	blank	blank
2U	Knox		
2U	Winterfell	Winterfell	Winterfell
2U	Knox		
2U	Knox		
2U	Winterfell	Winterfell	Winterfell
2U	Knox		
2U	Knox		
2U	Winterfell	Winterfell	Winterfell

Compute / Balanced
300 HDDs in 10 knox 20 nodes

2U	Knox		
2U	Knox		
2U	Knox		
2U	Winterfell	blank	Winterfell
2U	Winterfell	blank	Winterfell
2U	Winterfell	blank	Winterfell
2U	Knox		
2U	Knox		
2U	Knox		
1U	Switch		
1U	Switch		
3U	Power Shelf		
2U	Knox		
2U	Knox		
2U	Knox		
2U	Winterfell	blank	Winterfell
2U	Winterfell	blank	Winterfell
2U	Winterfell	blank	Winterfell
2U	Knox		
2U	Knox		
2U	Knox		

Storage
360 HDDs in 12 knox 12 nodes

2U	Knox		
2U	Knox		
2U	Knox		
2U	Knox		
2U	Knox		
2U	Knox		
2U	Knox		
2U	blank	Winterfell	blank
1U	Switch		
1U	Switch		
3U	Power Shelf		
2U	blank	Winterfell	blank
2U	Knox		
2U	Knox		
2U	Knox		
2U	Knox		
2U	Knox		
2U	Knox		
2U	Knox		

Cold Storage
480 HDDs in 16 knox 2 nodes

New: Open Rack-RX Series



Open Rack-RXC – Compute Intensive

- Great for HPC
- High Density, 24kW rack
- 64 Independent Compute Nodes
- Power Budget Requirement – 25kW

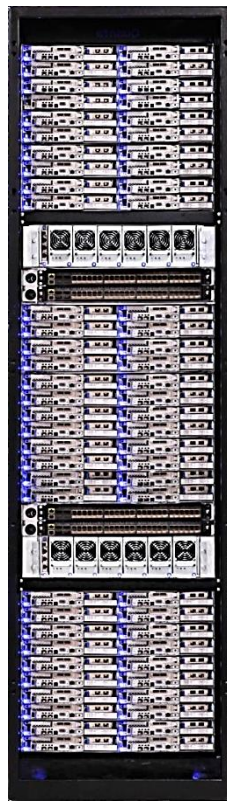
Open Rack-RXB – Balanced

- Great for VM, Business applications
- 24 Independent Compute nodes
- 12 storage nodes
- 336 x 3.5» HDD trays – 2.016PB
- Node to HDD Ratio – 1:14
- Power Budget Requirement – 12.5kW

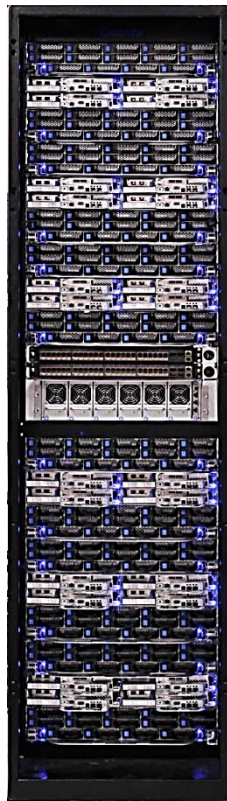
Open Rack-RXS – Storage

Great for OpenStack, Object Storage

- 15 Independent Compute Nodes
- 15 storage nodes
- 420 x 3.5» HDD trays – 2.52 PB
- Node to HDD Ratio – 1:28
- Power Budget Requirement – 12.5kW



RXC



RXB



RXS

RX2OU 4-Node Compute

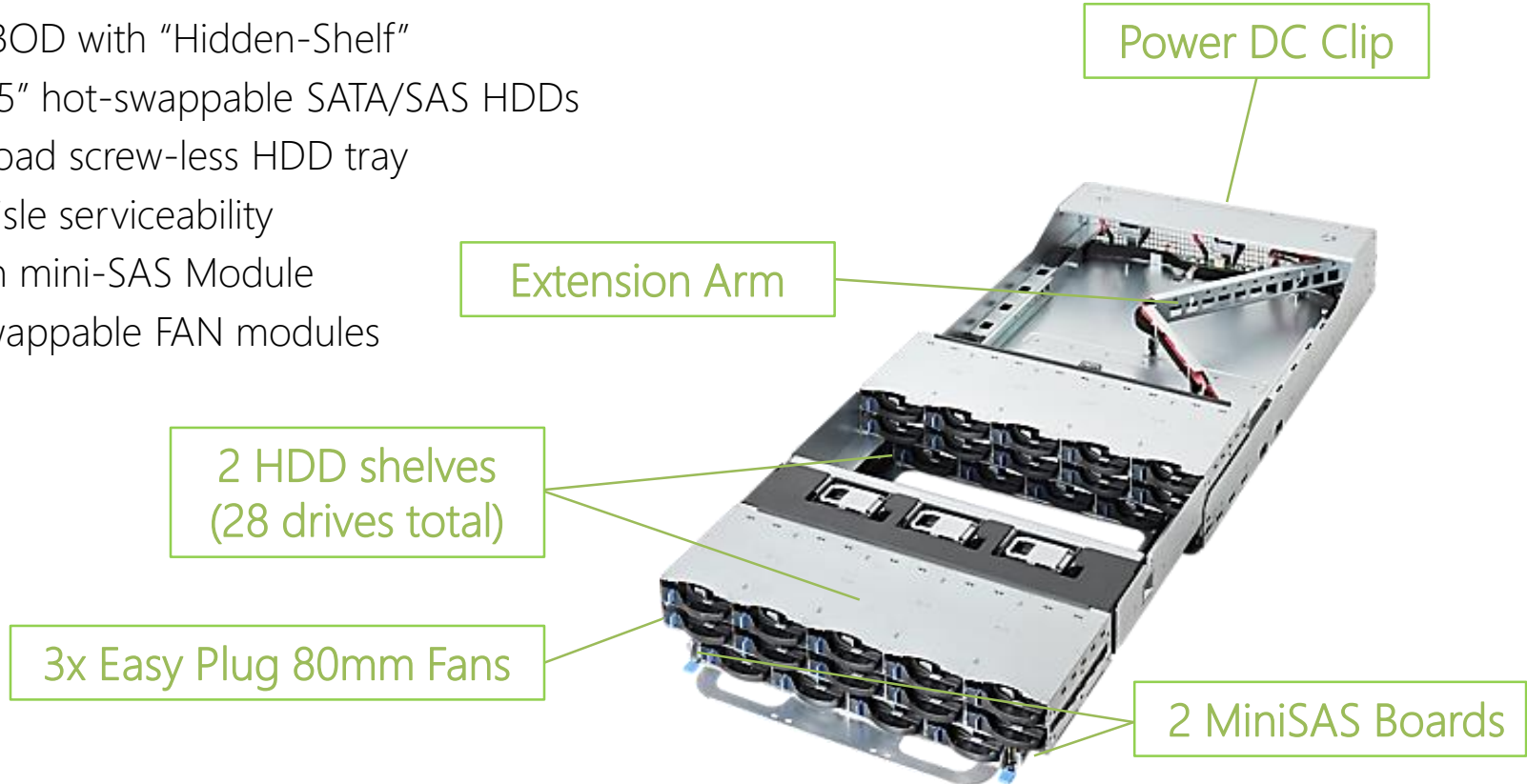


- 2OU 4 Compute Nodes
- Features (per node):
 - Dual Intel Xeon E5-2600 v2 processor
 - 16 x DDR3 DIMM slots
 - Support 2.5" hot-swappable SATA/SAS HDDs
 - 2 x PCIe Gen3 x8 expansion slots
 - 2 x 10GbE SFP+ ports (OCP Mezzanine card)
- 6x hot-swappable fan modules
- VGA-redirection for local video output (optional) by mezz card with dual 10G SFP+ ports and iKVM chip
- Two SKUs available:
 - 2x 2.5" HDD + 2 PCIe x8 slot
 - 4x 2.5" HDD + 1 PCIe x8 slot



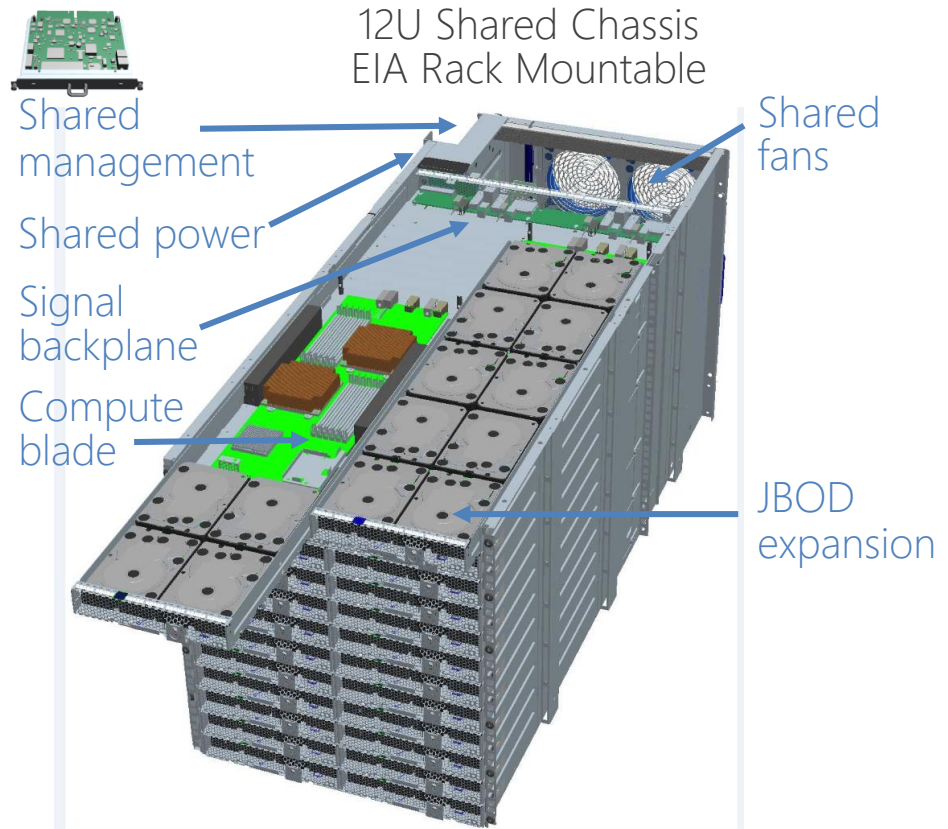
RX – 2OU Storage JBOD

- 2OU JBOD with “Hidden-Shelf”
- 28 x 3.5” hot-swappable SATA/SAS HDDs
- Front load screw-less HDD tray
- Cold aisle serviceability
- Lock-in mini-SAS Module
- Hot-swappable FAN modules

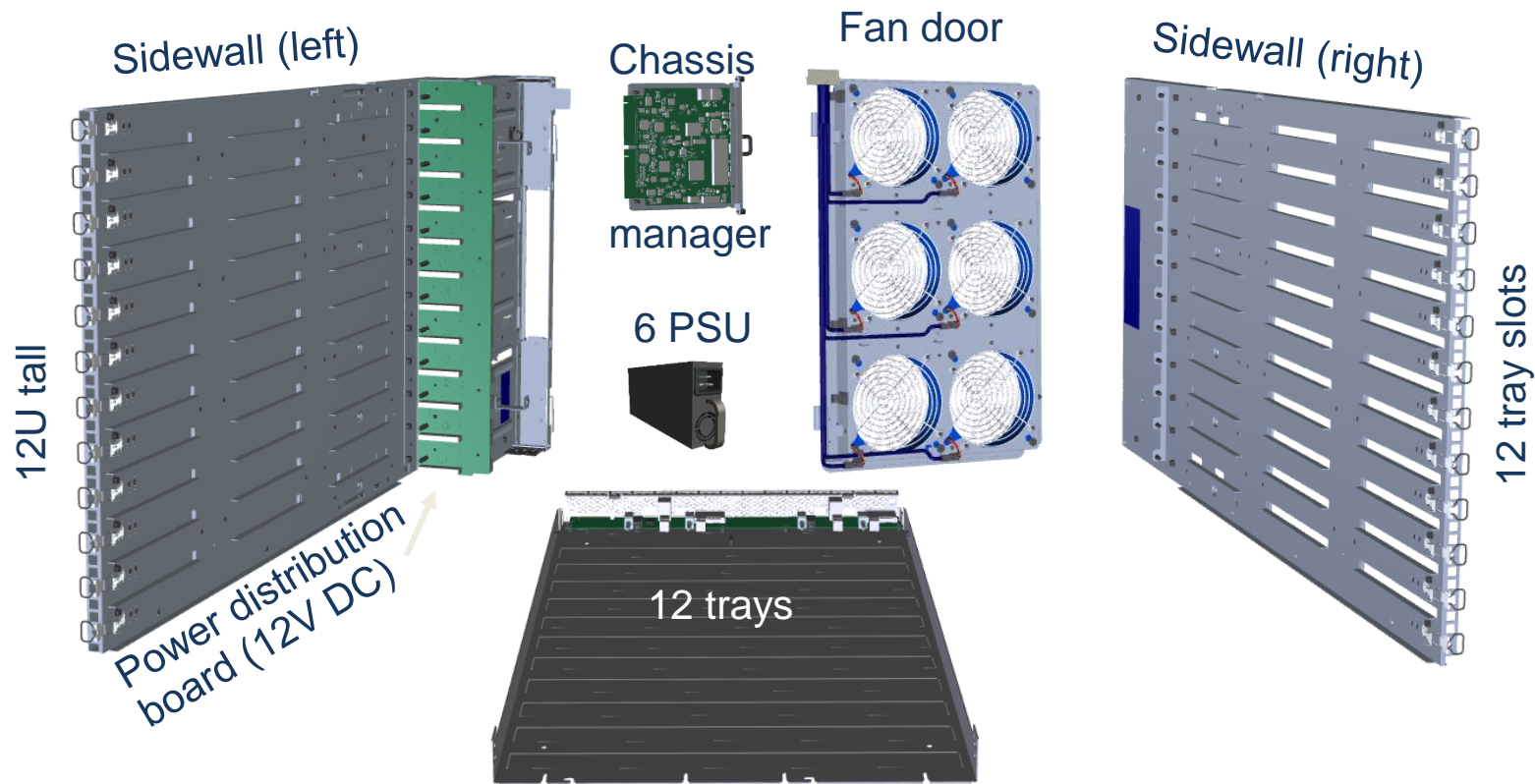


Shared infrastructure for efficiency and TCO optimization

- ▶ Power delivery, mechanicals, thermals/cooling, management
- ▶ Optimized for mass contract manufacturing and assembly
- ▶ Up to **40% cost savings** and **15% power efficiency** benefits
- ▶ **Saves 10,000 tons of metal** for a one million installed server base



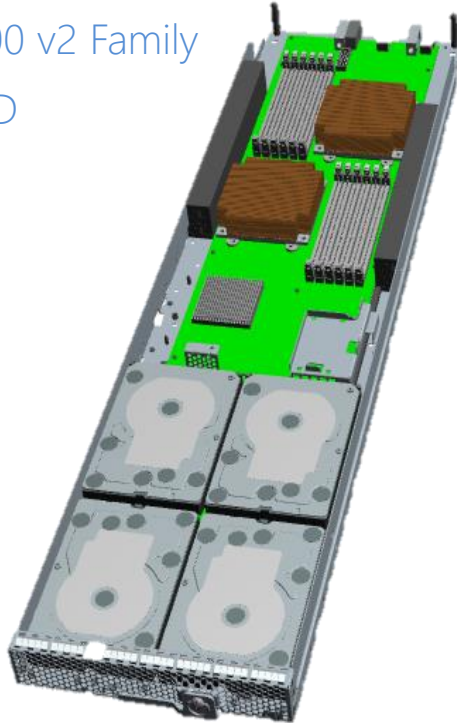
Microsoft OCP Components



Microsoft OCP Server & Storage

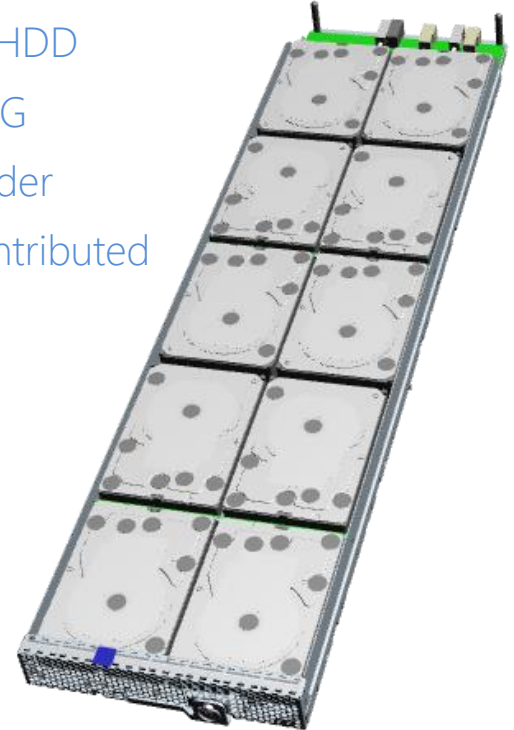
Compute blade

- Dual socket Intel E5-2400 v2 Family
- 4 x LFF HDD, 2 x SFF SSD
- Dual 10G networking
- Dual 4X SAS 6G
- Pro/E CAD contributed



Storage 6G JBOD

- 10 x LFF SATA HDD
- Dual 4X SAS 6G
- 6G SAS expander
- Pro/E CAD contributed



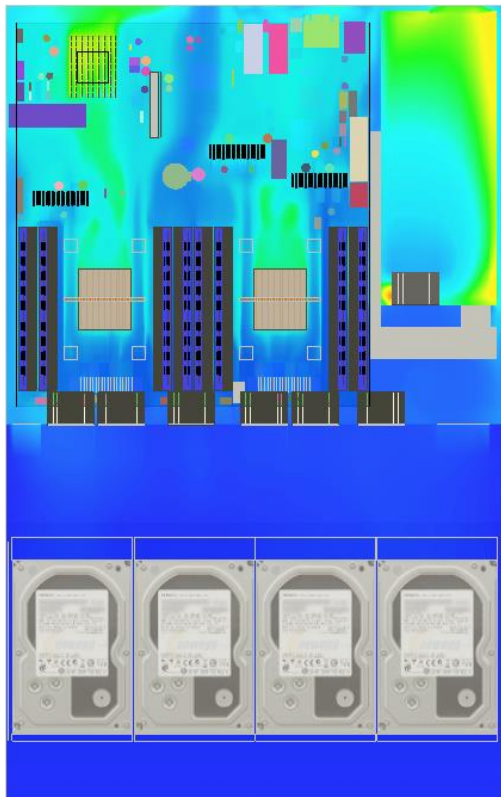
Hyve Ambient – OCP Inspired Design



Hyve Solutions
ambientSERIES

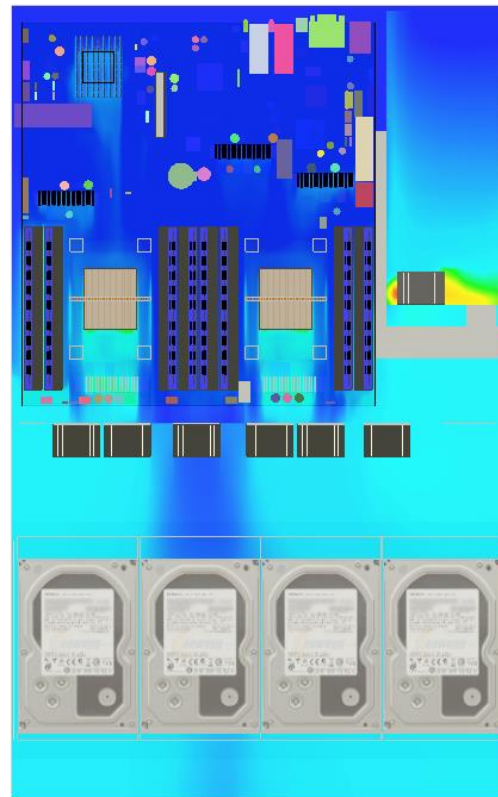
The Hyve Ambient Series rack & server solutions are designed and engineered to tolerate much higher inlet temperatures. Our custom design allows for the ambient air in a data center to efficiently cool the servers instead of resorting to power-hungry chilled cooling systems. The result is a substantial and measurable reduction in power consumption. **Purpose built and Preferred for Hyper-Scale Data Centers.**

Hyve Ambient – Cooling Efficiency



Rear I/O

Hyve Solutions
ambient^{SERIES}

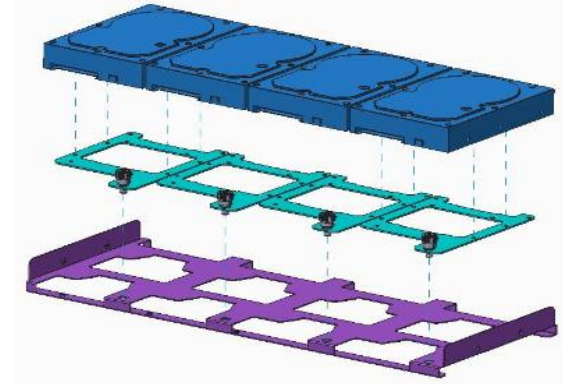
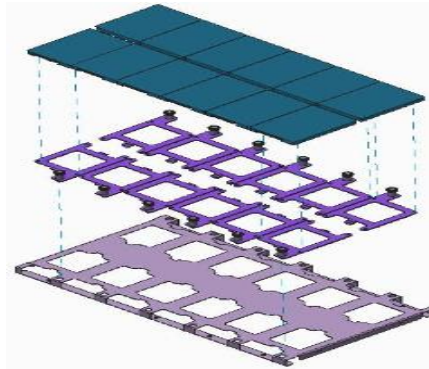
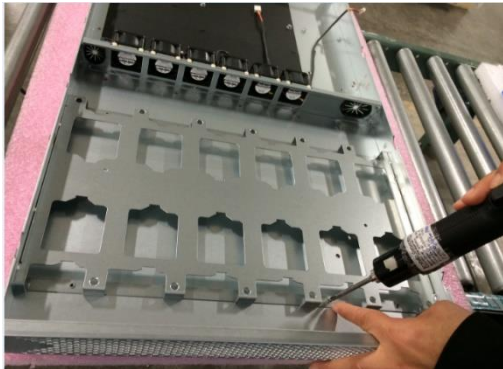


Front I/O

Ambient Modular / Flexible Design

Modular / Flexible / Customizable

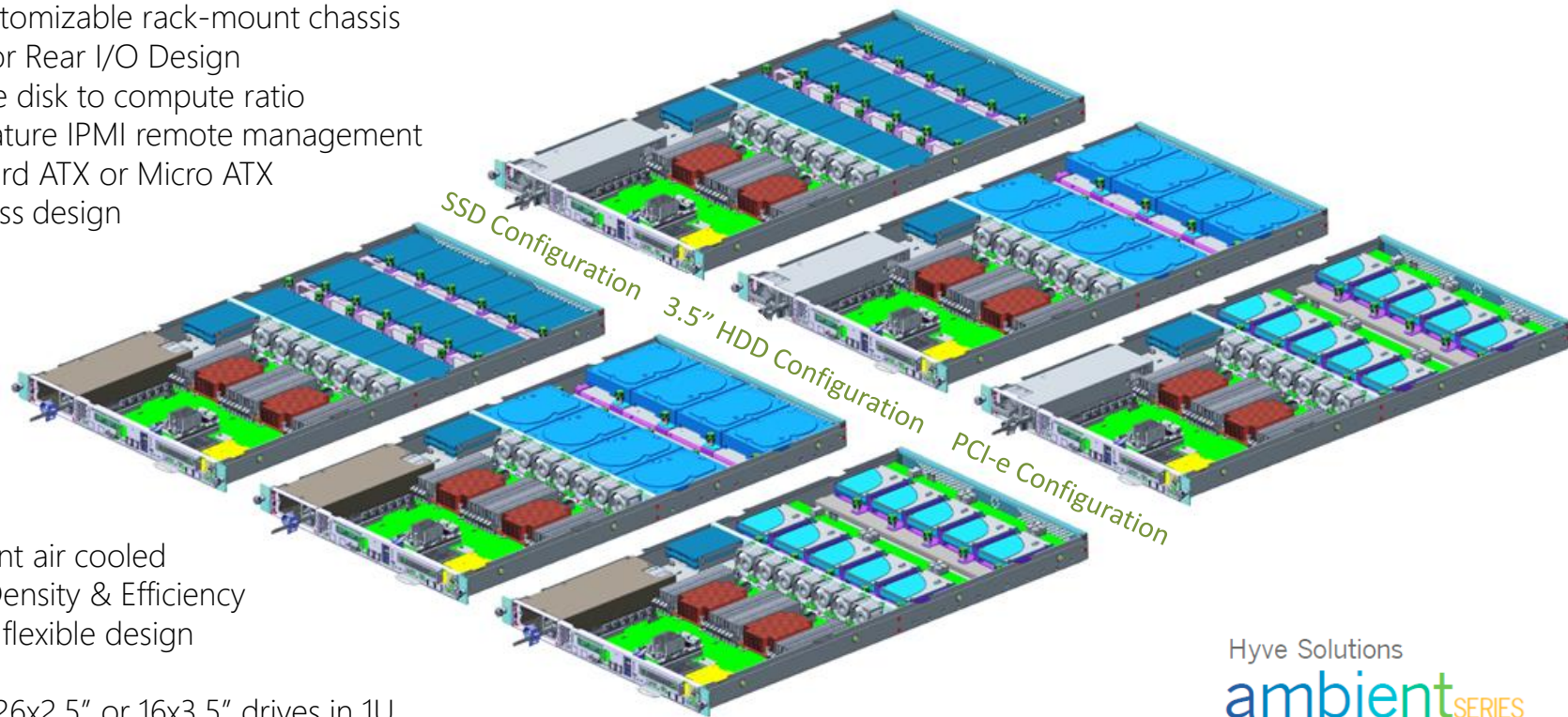
- Different HDD Mounting Trays fit into the same chassis.
- The 3.5" HDD Sled Assembly can accept both 3.5" and 2.5" HDD drives.
- Simple drive mounting bracket = better cooling, higher efficiency and lower cost.
- Cable routing beneath the HDD Mounting Tray allows optimum air flow and cooling for the system.
- Tool-less serviceable fans with rubber grommets that absorb shock and vibrations.



Hyve Ambient – Custom Designs



- 1U Customizable rack-mount chassis
- Front or Rear I/O Design
- Flexible disk to compute ratio
- Full feature IPMI remote management
- Standard ATX or Micro ATX
- Tool-less design

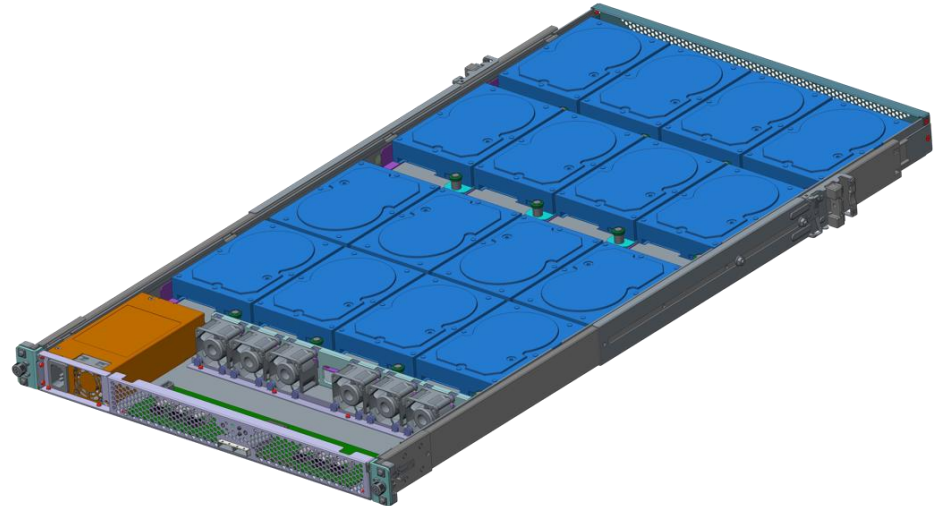


- Ambient air cooled
- High Density & Efficiency
- Highly flexible design
- Up to 26x2.5" or 16x3.5" drives in 1U

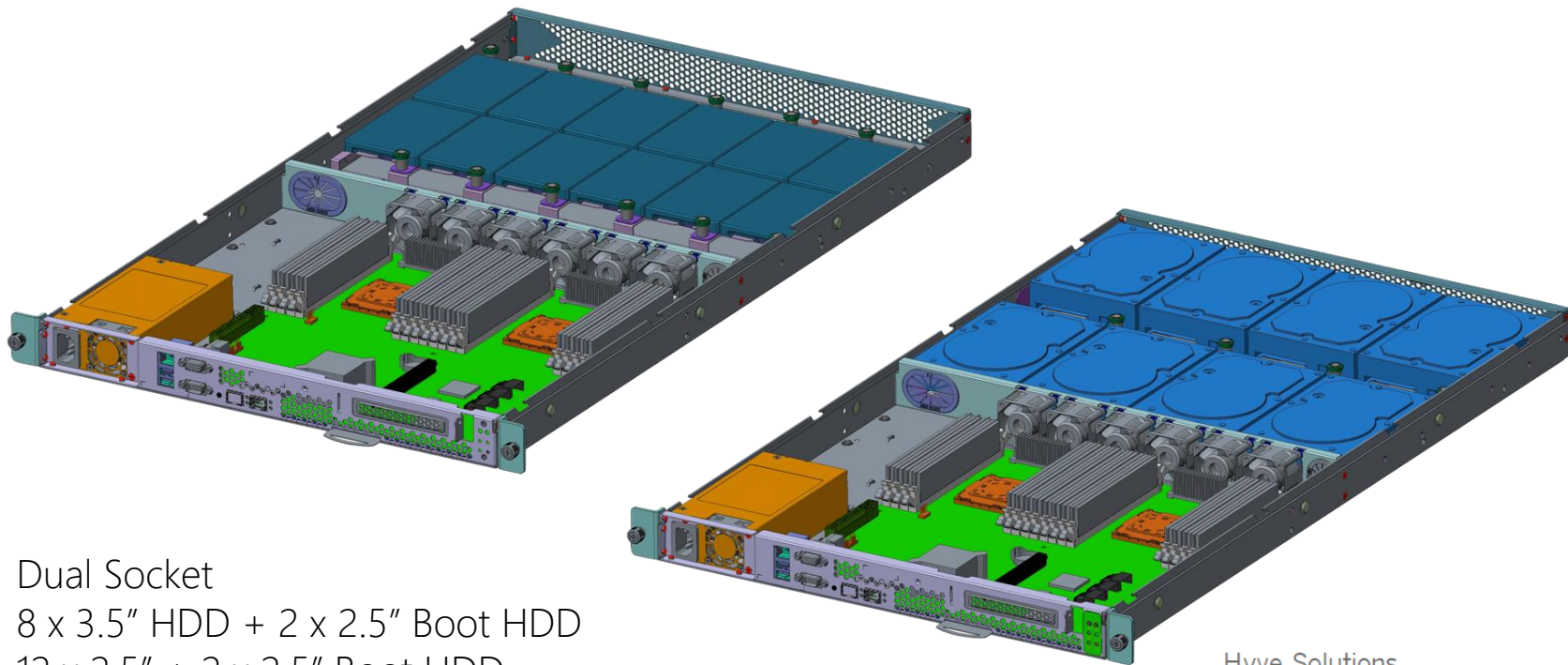
Hyve Solutions
ambientSERIES

Ambient Kinetic Series 1316

- Seagate Kinetic Open Storage Platform
- 16 x 3.5" Kinetic 4TB HDDs
- Each drive has 2 Ethernet connections and 2 IP addresses
- Kinetic drives connect directly to the network
- No Motherboard, Storage is disaggregated from Compute
- Built-in Switch board aggregates all 1GbE connections from all drives into 2 x 10GbE Uplinks



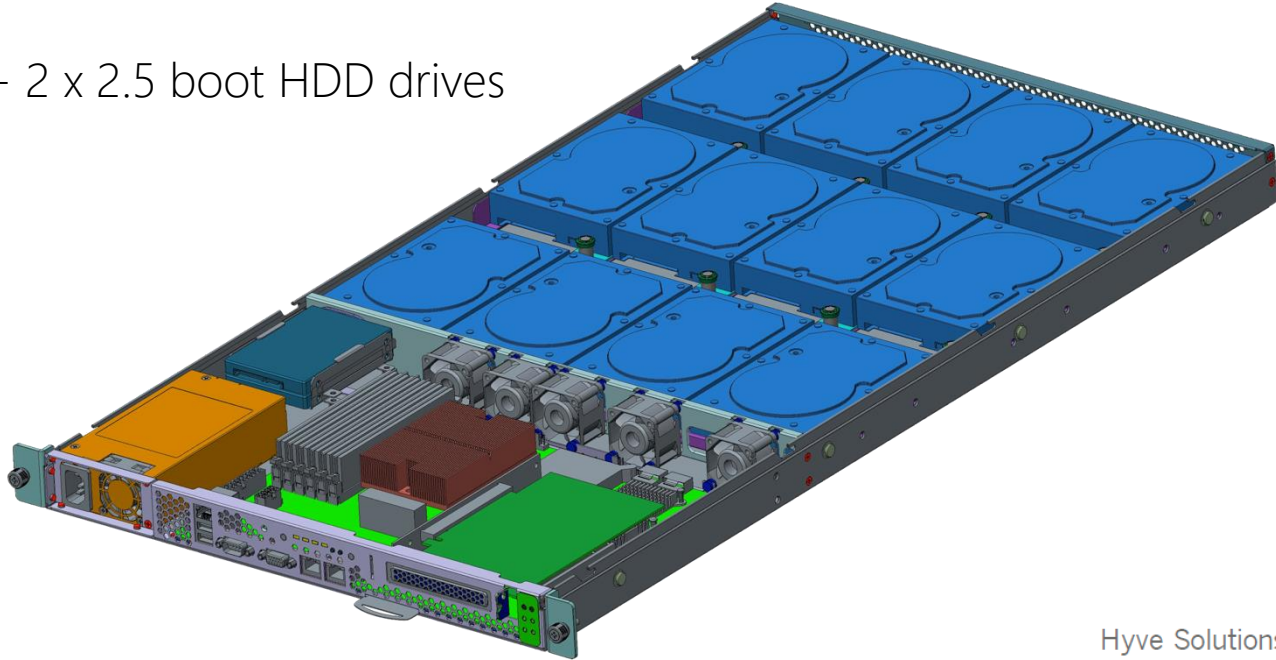
Ambient Series 1308 / 1212



- Dual Socket
- 8 x 3.5" HDD + 2 x 2.5" Boot HDD
- 12 x 2.5" + 2 x 2.5" Boot HDD
- 32.5" depth

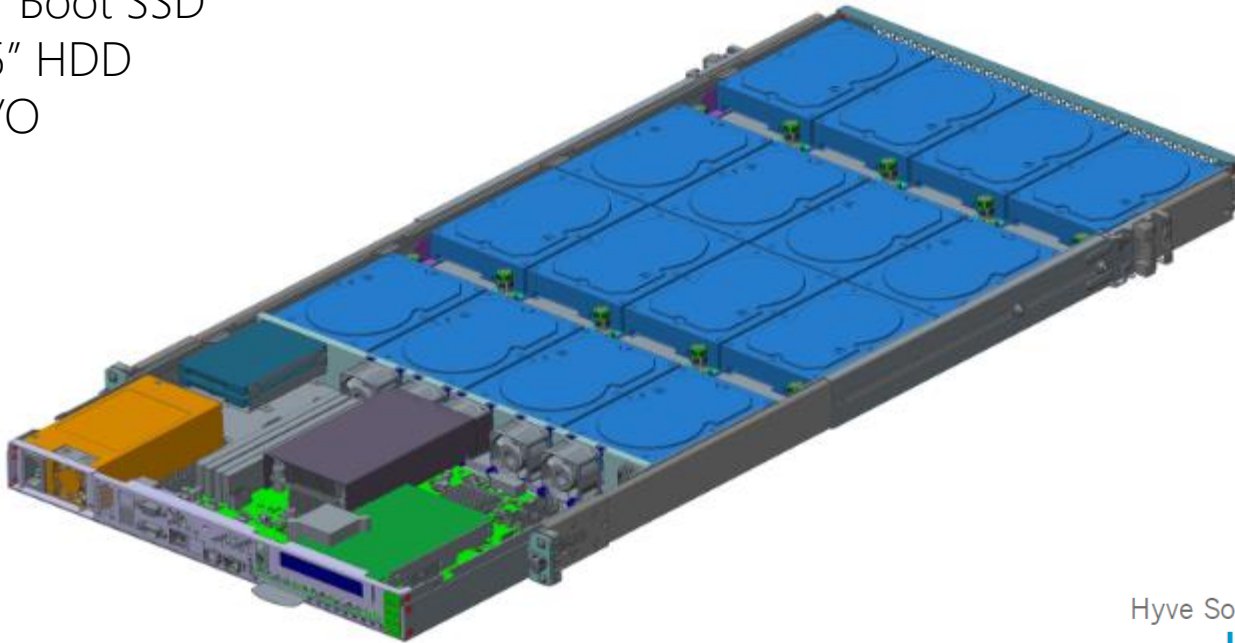
Ambient Series 1312

- Single Socket
- 12 x 3.5" HDD + 2 x 2.5 boot HDD drives
- 32.5" depth

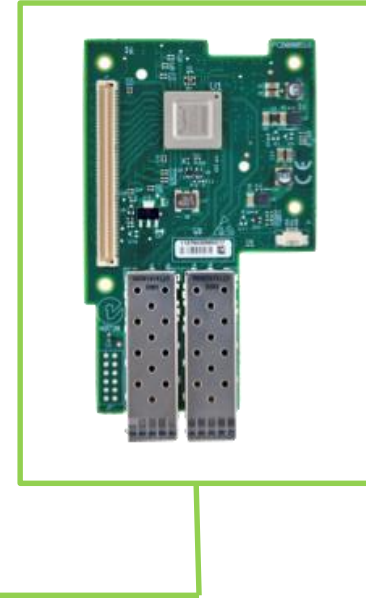
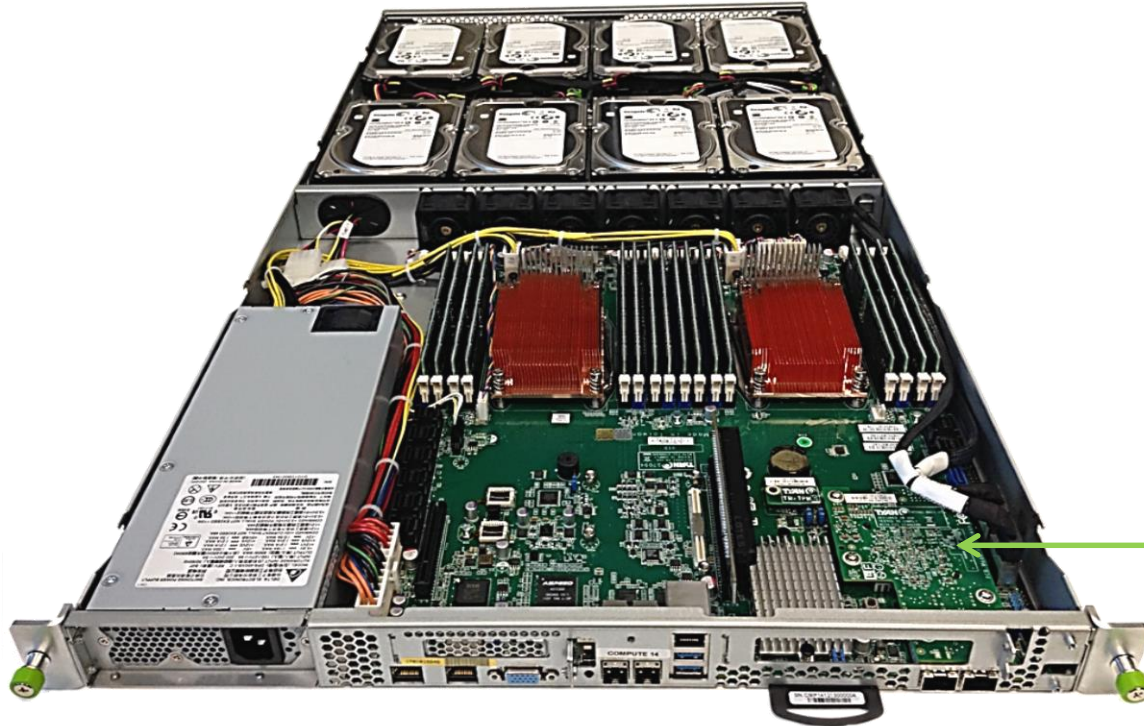


Ambient Series 1316

- Single Socket
- 2 x 2.5" Boot SSD
- 16 x 3.5" HDD
- Front I/O



Ambient + OCP Mezzanine Slot



Ambient Rack Design



Custom designed 42U Ambient Rack

- Optional Front door can support max 4 PDU's
- Standard PDU mounting brackets on rack for 2 PDU installation
- Tool-Less side panels
- Earthquake Brackets (Zone 3 compliance)
- 2000 lbs. loading
- Optimized for front I/O design

Why Hyve Solutions...



Engineering Engagement & Integration Services



Supply Chain & Vendor Management



Global Operations & Manufacturing



Comprehensive menu of Professional Services



Global Warranty & Support

Thank You.



Contact Information:

Adam Tarnowski

Director of Sales

AdamT@Synnex.com

Mobile: 408.421.0174