

# 適用於最新雲端資料中心的 超融合HCI 架構

AIC營邦企業-前瞻技術研發中心  
周佑祖, Henry Chou



## **Outline:**

- **About AIC**
- **Traditional virtualization architecture and HCI**
- **HP20x series design for HCI**
- **Intel Eagle Stream and AIC HP202-KT**
- **HCI solution**
- **Partner's virtualized HCI system**
- **HCI All-In-One appliance**
- **Use Case**

# 關於營邦企業 AIC (1/2)



**1996** Founded in Taoyuan, Taiwan.

**2000** Moved HQ office and plant to Luchu, Taoyuan and increased production capacity threefold.

**2001** Established Subsidiary in City of Industry, California, USA.

**2003** Established Sales Office in East Hanover, New Jersey, USA.

**2004** Established Subsidiary in the Netherlands.

**2007** Built Plant-II in Dachu Industrial Zone, Taoyuan, Taiwan.

**2008** Established Sales Office in Shanghai, China.

**2013** Taipei Exchange Market Public Listed.

**2015** Q2 – New HQ Building Established at Ching-Pu, Taoyuan City.

Q3 – Established Sales Office in Fremont, California, USA.

Q4 – Established Sales Office in EMEA.

**2018** Built Plant-III and Plant-IV with automated production lines in Dachu Industrial Zone, Taoyuan, Taiwan.

**2020** China sales office scaled up and established as a subsidiary



Fremont, California



New Jersey



Netherlands



Taiwan (Global HQ)



EMEA



China

# 關於營邦企業 AIC (2/2)



AIC HQ

4.5km  
(10 mins by car)



Plant 1

120m



Plant 2

70m



Plant 3

30m



Plant 4

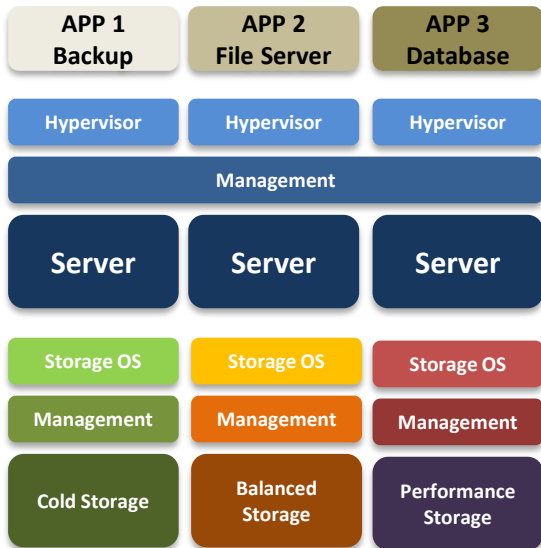
Sales & Marketing, R&D Center

No. 152, Linghang North Road, Section 4<sup>th</sup>,  
Dayuan District, Taoyuan City, Taiwan 337

# Traditional Virtualization Architecture and HCI (1/2)

## Traditional

*Purpose built standalone hardware managed independently or with common protocol*

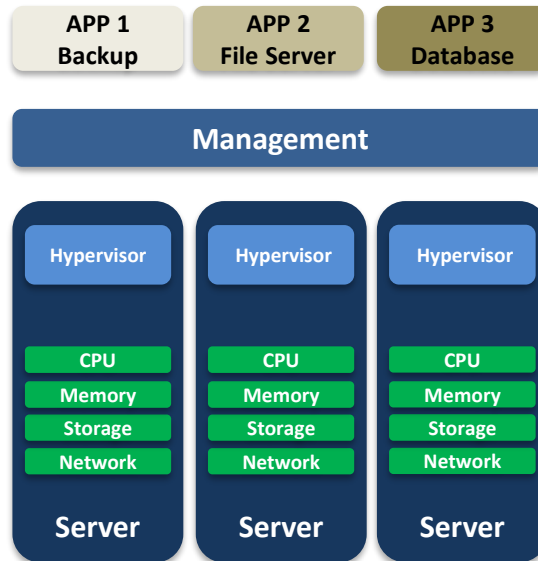


Simplified Hardware and Management

One type of storage for all types of application?

## Hyperconverged

*Converged and homogenous hardware with unified management*



# Traditional Virtualization Architecture and HCI (2/2)



## MEC

- Flexibility Intel and AIC platforms ensure the best cost scenario
- High Density Compute



## HCI

- Cluster in a box for easy deployment
- High density compute, storage, and network



## HPC

- 8 CPU + 64 DDR4 + 24 NVMe SSD +  
12 PCIe x16 adapters all in 2U space

# HP20x series design for HCI (1/2)

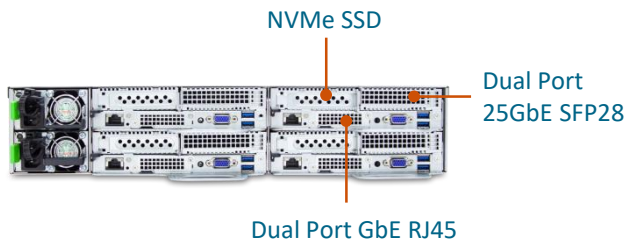
Traditional



Hyperconverged

- ★ Multi-Tier Storage Support
- ★ Configurable Resiliency-Policy options
- ★ Heterogeneous Hardware Support

Easy to Manage HCI Solution with **Storage Options** that adapt different **Application Needs**.



## Customer preference

·HCI Appliance:

Easy to deploy, Virtualization + Storage + Network Cluster-In-a-Box

·Different storage media types for Storage Tiering

·Expansion flexibility for different network requirements

# HP20x series design for HCI (2/2)

- **HP201 series**
- **24x total 2.5" NVMe drives**
  - 6x NVMe drives per node

24 x NVMe



- **HP202 series**
- **12x total 3.5" SATA/SAS drives**
  - 3x SATA/SAS drives per node

12 x 3.5" SATA/SAS





# Intel Eagle Stream and AIC HP202-KT (1/3)

## 4th Gen Intel® Xeon® Scalable Processors are Redefining Performance

Formerly codenamed Sapphire Rapids

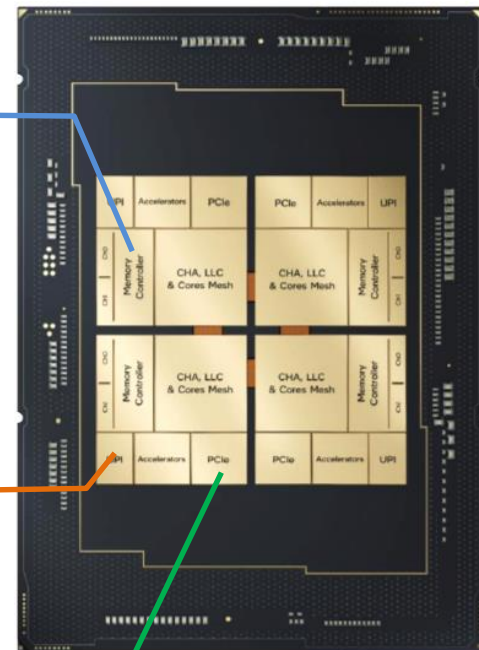
Redefine performance with 4th Gen Intel® Xeon® Scalable processors—featuring built-in accelerators to improve performance across the fastest-growing workloads in AI, analytics, networking, storage, and HPC.

- AI gets even better with all-new Intel® Advanced Matrix Extensions (Intel® AMX), delivering exceptional AI training and inference performance through accelerated matrix multiply operations.
- Other seamlessly integrated accelerators speed up data movement and compression for faster networking, boost query throughput for more responsive applications, and improve queue management to dynamically balance loads.
- By making the best use of CPU core resources, built-in accelerators can result in more efficient utilization and power efficiency advantages, helping businesses achieve their sustainability goals.
- Intel® Software Guard Extensions (Intel® SGX) and other security features help bring a zero-trust security strategy to life while unlocking new opportunities for business collaboration and insights—even with sensitive or regulated data.

8ch DDR 5 ( per CPU)

UPI 2.0 (Up to 4 UPI links)

PCIe 5.0(Up to 2X vs. PCIe 4.0)



Built-In Accelerators & Security

# Intel Eagle Stream and AIC HP202-KT (2/3)

Front View

12 x 3.5" hot swap drive bays



Rear View



Model	4th Gen. Intel® Xeon®	AIC HP202-KT
<b>Specifications</b>		
Multi-node Server	4th Gen. Intel® Xeon® Scalable processors 2U4Nodes	
Motherboard	AIC Kratos	
Processor	Intel® next Gen Sapphire Rapids--SP/ Emerald Rapids-SP Family Processors UPI 2.0 up to 16GT/s	2 x Socket E2: 4677 pins
Chipset	Intel® Emmitsburg PCH	
System Memory (Per node)	DDR5 up to 5600 MTs	16 x DDR5 DIMM slots
Drive Bays (Per node)	3 x 3.5" hot-swap (12 x drives total)	
Expansion Slots (Per node)	PCIe 5.0	<ul style="list-style-type: none"> <li>• 2 x PCIe X16 slots (HHHL)</li> <li>• 1 x OCP 3.0 bay (PCIe X16 width)</li> </ul>
Riser Cards (Per node)	PCIe 5.0	<ul style="list-style-type: none"> <li>• 1 x BRC-PE10050AA01 PCIe 5.0 x16 (Left side)</li> <li>• 1 x BRC-PE10051AA01 PCIe 5.0 x16 (Right side)</li> </ul>

# Intel Eagle Stream and AIC HP202-KT (3/3)

## AIC HP202-KT

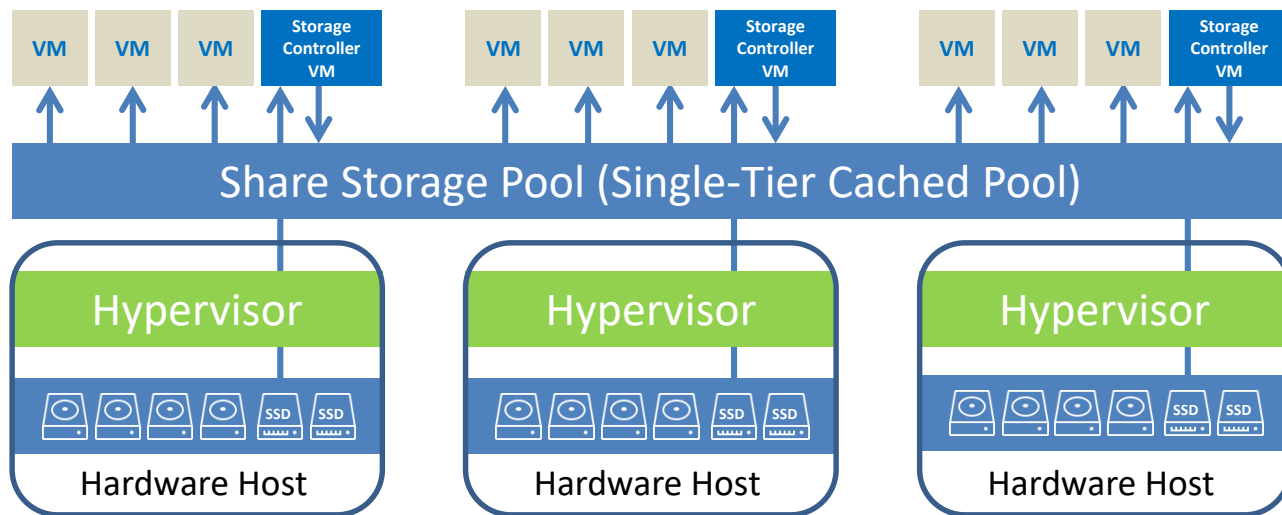
### Key Features

- **2U 4-Node** hybrid storage server supports 12 hot swap 3.5" SATA/SAS drive bays
- **Supports 4th Gen. Intel® Xeon® Scalable processors** (Sapphire Rapids)
- Maximizing the use of the processor, memory, and add-on cards in one single system
- Onboard Baseboard Management Controller for system management and IPMI control
- **3 x PCIe Gen5 X16 extensions on each node**
- **3 x 3.5" hot-swap (12 x drives total)**
- **Front-to-back airflow and easy swap redundant fans to provide optimal thermal conditions**



# HCI solution (1/4)

## Mainstream HCI Architecture



### Pain Point

Mainstream HCI solutions only support a Single Storage Tier

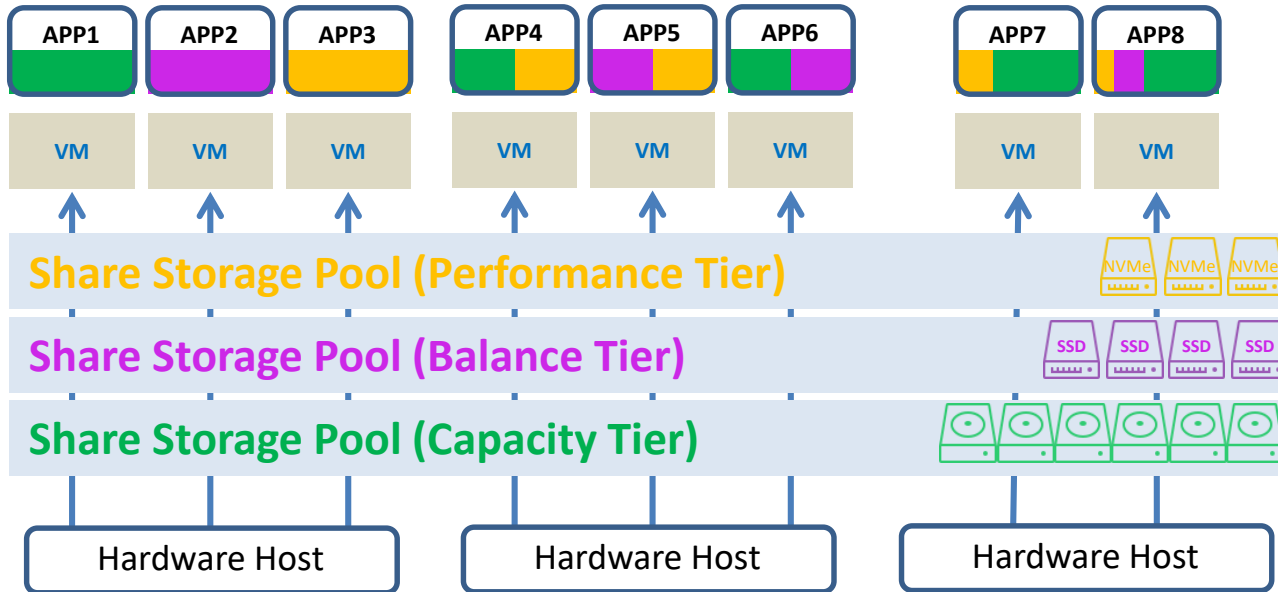


### Pain Point


Pre-defined cache ratio which can not be adjusted according to each application


# HCI solution (2/4)


- **Multi-Tier Storage:** Assign different type of storage media according to the needs of your applications.
- **Composable:** Cache or no cache? Compose according to your applications.
- **Proprietary Resource Scheduler:** Automatically finds hosts with available hardware resources to launch VM.

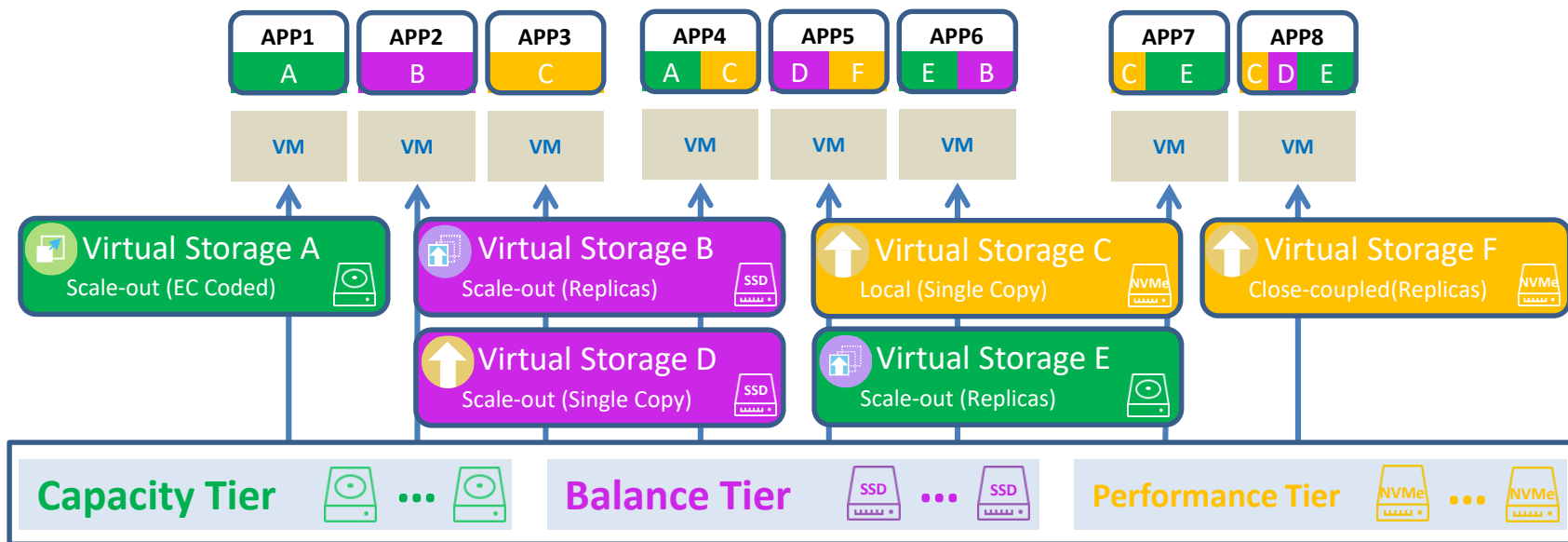


# HCI solution (3/4)

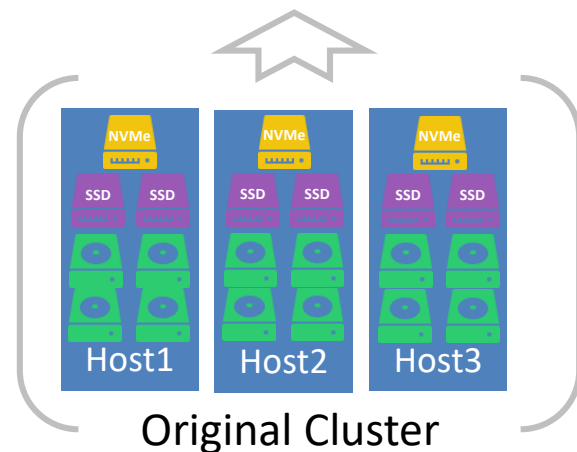
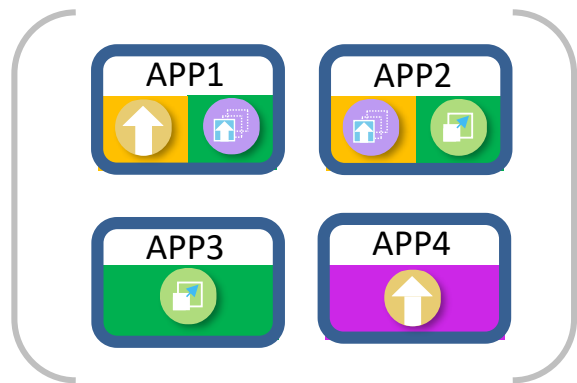
 **Local:** Single Local Copy VM Disk that provides the Highest performance but no protection

 **Close-coupled:** User defined number of replicas that protects data with *minimum performance penalty* at the *expense of disk space*.

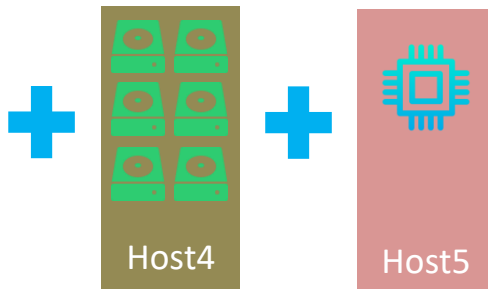
 **Erasure Coding:** User defined EC ratio that protects data with *minimum sacrifice of disk space* at the *expense of performance*.



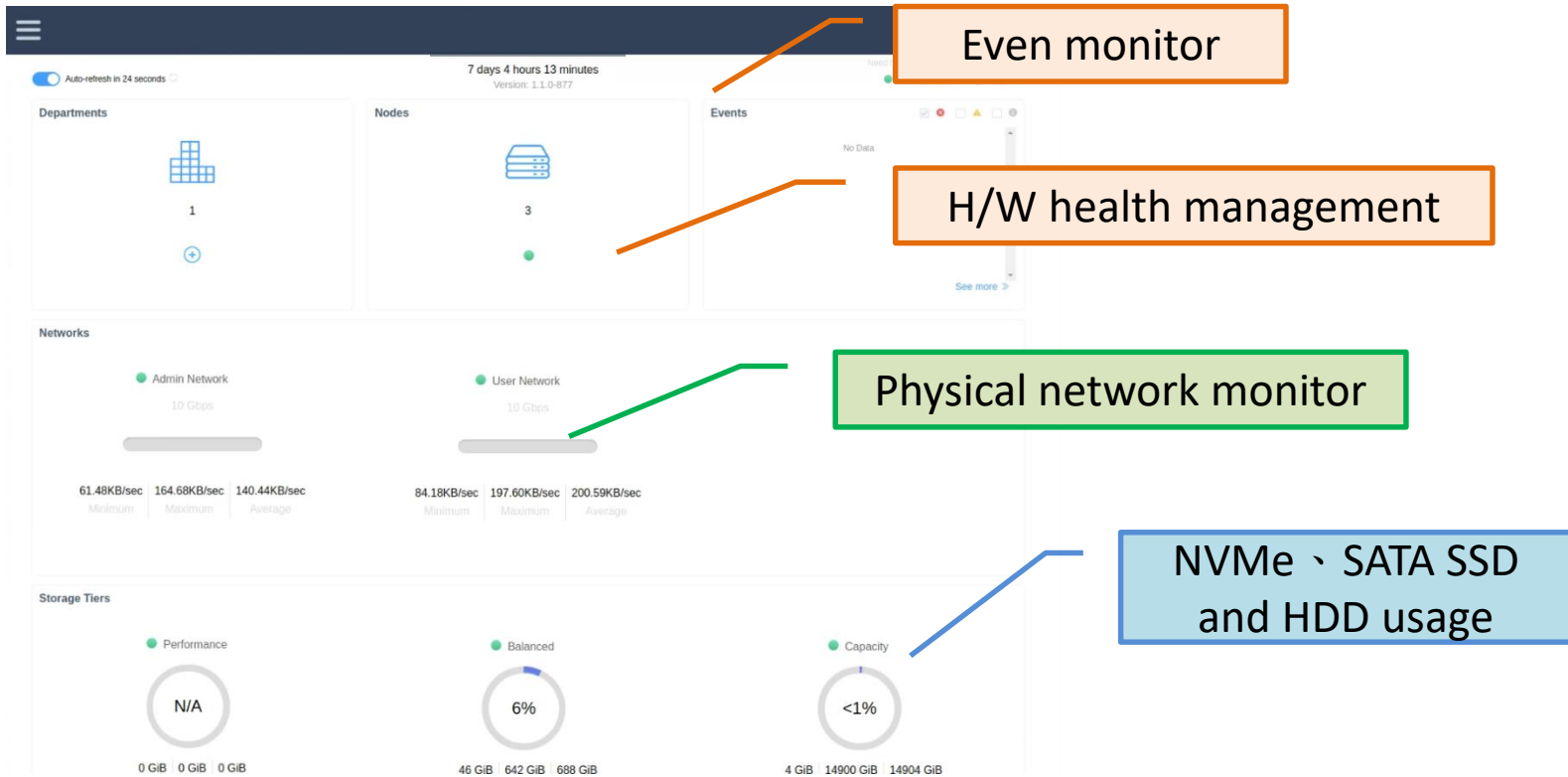
# HCI solution (4/4)



- **Expand as you grow:** Only purchase the equipment that you need, nothing else.
- **Mix old and new:** Protect your investment by adding new generation hardware into existing cluster instead of starting over.



# Partner's virtualized HCI system (1/6)





# Partner's virtualized HCI system (2/6)



Hardware

node1

Environmental Status

### Power Supplies

Label	Status	Power
PSU1	Normal	Good
PSU2	Normal	Good

### Fans

Label	Status	Speed
FAN1_A	Normal	5544 RPM
FAN1_B	Normal	5544 RPM
FAN2_A	Normal	5445 RPM
FAN2_B	Normal	5544 RPM
FAN3_A	Failed	No Reading
FAN3_B	Failed	No Reading
FAN4_A	Failed	No Reading
FAN4_B	Failed	No Reading
OS_FAN	Normal	8217 RPM

### Temperature

Label	Status	Celsius
BMC	Normal	56°C
CPU0	Normal	49°C
CPU0_VR	Normal	48°C
CPU1	Normal	41°C
CPU1_VR	Normal	39°C
DIMMB0	Normal	40°C
DIMMC0	Normal	40°C
DIMMF0	Normal	40°C
DIMMG0	Normal	36°C
DIMMH0	Normal	35°C
DIMMI0	Normal	34°C
DIMML0	Normal	34°C
Inlet	Normal	32°C
PCH	Normal	65°C
Rear I/O	Normal	42°C
TEMP_SY	Normal	22°C
S_INLET	Normal	22°C

IPMI monitor ( PSU 、 Fans 、 Temperature etc... )

Chassis

**Manufacturer**  
AIC

**Model**  
HP202-VL

**Serial Number**  
C19-21060800400163

**Version**  
01

Baseboard >

BIOS >

Chassis information  
(Vendor 、 Model 、 F/W version)

Component Status

CPU >

# Partner's virtualized HCI system (3/6)

The screenshot displays a storage management interface with a dark blue header containing a menu icon, a notification bell, a refresh icon, and a user profile icon. The main content area is titled "Storage Tiers" and contains a table with the following data:

Name	Status	Available Space	Disks	Storage Pools
Performance	●	0 GiB	0/0	0
Balanced	●	688 GiB	46 GiB	642 GiB
Capacity	●	14904 GiB	4 GiB	14900 GiB

Serial No.	Node Name	Disk Name	Status	I/O Load	Total Space	Used Space	Available Space
1951E23031FC	node1	/dev/sdc	Healthy	1.41%	463 GiB	3 GiB	462 GiB
CVDA451202FH2403GN	node3	/dev/sdb	Healthy	27.57%	223 GiB	3 GiB	220 GiB
Z98XKAOWFJKA	node1	/dev/sdo			3726 GiB	1 GiB	3725 GiB
Z98XKAOVFJKA	node1	/dev/sda			3726 GiB	1 GiB	3725 GiB
Z98YK9LDFJKA	node2	/dev/sda	Healthy	0.00%	3726 GiB	1 GiB	3725 GiB
Z98YK9LEFJKA	node2	/dev/sdb	Healthy	0.00%	3726 GiB	1 GiB	3725 GiB

Callout boxes and arrows in the image identify the following resources:

- NVMe SSD resources:** Indicated by an orange box and arrow pointing to the "Performance" tier.
- SATA/SAS SSD resources:** Indicated by a green box and arrow pointing to the "Balanced" tier.
- SATA/SAS HDD resources:** Indicated by a blue box and arrow pointing to the "Capacity" tier.

# Partner's virtualized HCI system (4/6)

Department: Cloud Project: Common Storage Pools

Create Pool Delete Pool Add Caching Remove Erasure Coding

Status Pool Name Scope Storage

Create Storage Pool

Please enter the following information to create a new Storage Pool

\* Pool Name Balance-Pool-R2

Description Demo test

Storage Tier  Performance  Balanced  Capacity

Redundancy  Replicated  Erasure Coding

\* C - 2 +

Pool Size Maximum 360 GB - 200 +  GB  TB

Pool Scope  Cloud  Project

\* Required fields Cancel Create

Multiple storage pools can be customized

Storage Tier  
Performance: NVMe SSD  
Balanced: SATA SSD  
Capacity: SATA HDD

Redundancy policy  
(Replicated or Erasure coding)

# Partner's virtualized HCI system (5/6)



Physical Networks

Create Network Delete Network Add Interfaces Remove Interfaces

Name Search

	Name	Status	Nodes Connected	Nodes Disconnected	Minimum			
					Tx	Rx	Tx+Rx	
<input type="checkbox"/>	Admin Network	<span style="color: green;">●</span>	3	0	56.45 KB/sec	75.66 KB/sec	56.45 KB/sec	
					Network Throughput			
	Port	Node Name	Label	Vendor	Model	Capability	Speed	Connection
<input type="checkbox"/>	0	node1	0000:18:00	Intel Corporation	82599ES 10-Gigabit SFI/SFP+ Network Connection	10000baseT/Full	10000Mb/s	
<input type="checkbox"/>	0	node2	0000:18:00	Intel Corporation	82599ES 10-Gigabit SFI/SFP+ Network Connection	10000baseT/Full	10000Mb/s	
<input type="checkbox"/>	User Network	<span style="color: green;">●</span>	3	0	70.88 KB/sec	55.73 KB/sec	70.88 KB/sec	136.03 KB/sec 189.87 KB/sec 270.53
	Port	Node Name	Label	Vendor	Model	Capability	Speed	Connection
<input type="checkbox"/>	1	node1	0000:18:00	Intel Corporation	82599ES 10-Gigabit SFI/SFP+ Network Connection	10000baseT/Full	10000Mb/s	Direct Attach Copper
<input type="checkbox"/>	1	node2	0000:18:00	Intel Corporation	82599ES 10-Gigabit SFI/SFP+ Network Connection	10000baseT/Full	10000Mb/s	Direct Attach Copper

Total 2 < 1 > Go to 1

NIC information and health status

Model Name: Intel 82599  
Capability: 10,000BaseT/Full  
Speed: 10,000Mb/s  
Connection: DAC cable

# Partner's virtualized HCI system (6/6)

H/W power control

Scale-out

Free Nodes

Power Cycle Quarantine Shutdown

Name Search

Status	Name	Admin IP Address	# VMs	CPU Utilization	RAM Utilization	Storage Space		Disk Status		Network Status			
						Total	Free	Total Disks	Failed Disk	Admin		User	
										# Up I/F	# Down I/F	# Up I/F	# D
Healthy	node1	10.10.1.11	0						0	1	0	1	
Healthy	node2	10.10.1.12	1	2.10%	11.93%	8382GB	7450GB	4	0	1	0	1	
Healthy	node3	10.10.1.13	0	1.68%	68.83%	2085GB	220GB	2	0	1	0	1	

Cluster hardware node status

Legend: Critical (red), Marginal (yellow), Healthy (green), Down (black), Unknown (grey), Power Cycle (power icon), Quarantine (quarantine icon)

Total 3 < 1 > Go to 1

# HCI All-In-One Appliance (1/2)



2.5" 2\*960GB SATA SSD (each node)



3.5" 3\*4TB 7200RPM SATA HDD (each node)

1\* NVMe SSD for storage (each node)



2\* 500GB SATA M.2 SSD for OS (each node)



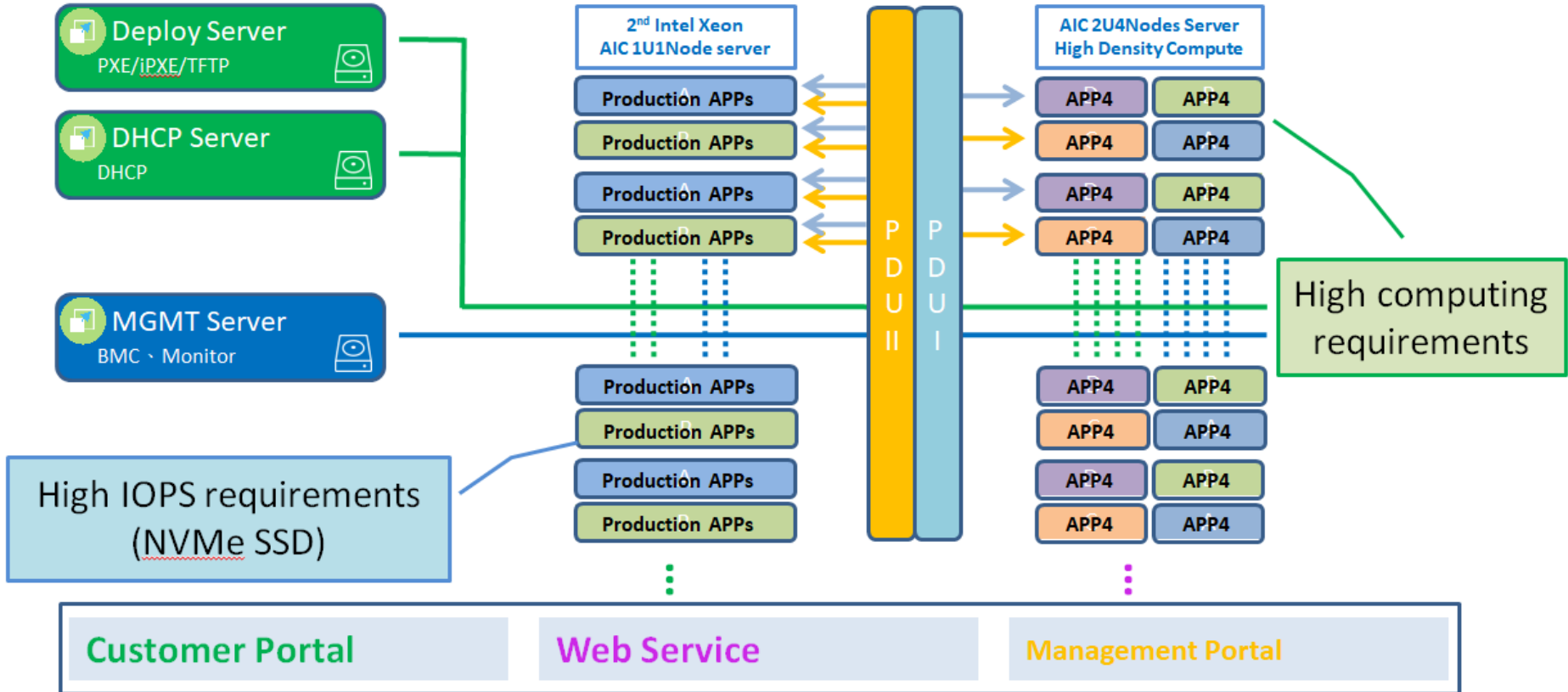
Dual Port 10GbE SFP+

Dual Port GbE RJ45 OCP2.0

# HCI All-In-One Appliance (2/2)

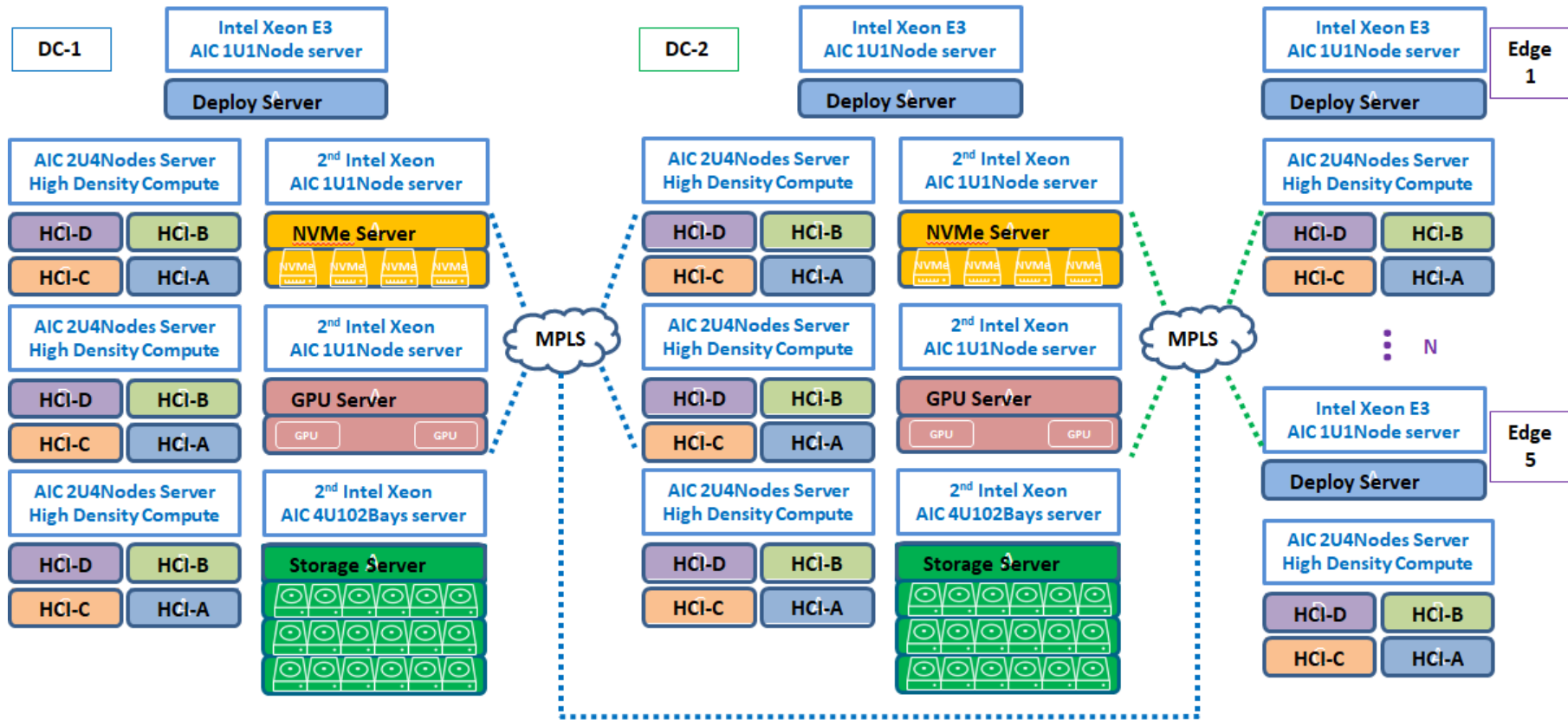
Model	AD202-VL Lite	AD202-VL
<b>Specifications</b>		
<b>Number of Nodes</b>	<b>3 Nodes per Block (Cluster size limit 16 nodes)</b>	<b>4 Nodes per Block (Cluster size limit 256 nodes)</b>
<b>Software</b>	Airdeck Express version	Airdeck Enterprise version
<b>CPUs per Node</b>	2 x Intel® Xeon® Silver 4214 Processor 2.2GHz, 12 Cores	2 x Intel® Xeon® Gold 6230 Processor 2.1GHz, 20 Cores
<b>Memory per Node</b>	128GB DDR4-2666 RDIMM	256GB DDR4-2666 RDIMM
<b>Data Disk per Node</b>	a. 2x 4TB HDD 7200RPM b. 1x 960GB SATA SSD	a. 3x 8TB HDD 7200RPM b. 2x 960GB SATA SSD                      Option: 2x 1.92TB SATA SSD c. 1x 2TB TLC NVMe SSD (HHHL)        Option: 1x 4TB TLC NVMe SSD (HHHL)
<b>OS Disk per Node</b>	2x 480GB M.2 SATA SSD	2x 480GB M.2 SATA SSD
<b>Network Adapters per node</b>	a. 1x Dual port GbE RJ45 (OCP) b. 1x Dual port 10GbE SFP+	a. 1x Dual port GbE RJ45 (OCP) b. 1x Dual port 10GbE SFP+ / Option: 1x Dual port 25GbE SFP28
<b>Dimensions per Block</b>	W x D x H: 438 x 800 x 87.5 (mm)	
<b>Data Protection Configuration Options</b>		
<b>Hard Drives (Capacity Tier)</b>	1 Replica (Local)	1 Replica (Local)
	2 Replica (Close-Coupled) / 3 Replica (Close-Coupled)	2 Replica (Close-Coupled) / 3 Replica (Close-Coupled)
	2+1 EC (Scale-Out)	2+1 EC (Scale-Out) / 3+1 EC (Scale-Out) / 2+2 EC (Scale-Out)
<b>SATA SSD (Balanced Tier)</b>	1 Replica (Local)	1 Replica (Local)
	2 Replica (Close-Coupled) / 3 Replica (Close-Coupled)	2 Replica (Close-Coupled) / 3 Replica (Close-Coupled)
	2+1 EC (Scale-Out)	2+1 EC (Scale-Out) / 3+1 EC (Scale-Out) / 2+2 EC (Scale-Out)
<b>Optane NVMe SSD (Performance Tier)</b>		1 Replica (Local)
		2 Replica (Close-Coupled) / 3 Replica (Close-Coupled)

# Use case I - Automatic deployment of Linux clusters





# Use case II - HCI+GPU、NVMe and Storage server





## Key Takeaways

- Intel + AIC platform確保成本、高密度運算、虛擬化存儲靈活性最佳方案。
- 最新**AIC HP202-KT**，HCI server提供2U四節點以及12個3.5” Disk Drive。
- 搭載Intel Eagle Stream提供PCIe 5.0、DDR5 memory、UPI 2.0高速傳輸。
- 每個節點提供2 x PCIe 5.0 x16 slots (HHHL)、1 x OCP 3.0 (PCIe 5.0 x16)。

# Thank You

AIC Confidential. All specifications and data are subject to change without notice.

**AIC**