



# SUPERCLOUD COMPOSER

*Your Infrastructure Gateway*



## Executive Summary

SuperCloud Composer is a composable cloud management platform that provides a unified dashboard to administer software-defined data centers.

Supermicro’s cloud infrastructure management software brings speed, agility, and simplicity to IT administration by integrating data center tasks into a single intelligent management solution. Our hybrid approach allows traditional paradigm data centers to continue to support their existing operations while allowing their current workloads to have the flexibility to move to a disaggregated infrastructure model. Our robust composer engine can orchestrate cloud workloads through a streamlined Redfish API.

SuperCloud Composer also monitors and manages the broad portfolio of multi-generation Supermicro servers and third-party systems through its data center lifecycle management feature set from a single unified console.



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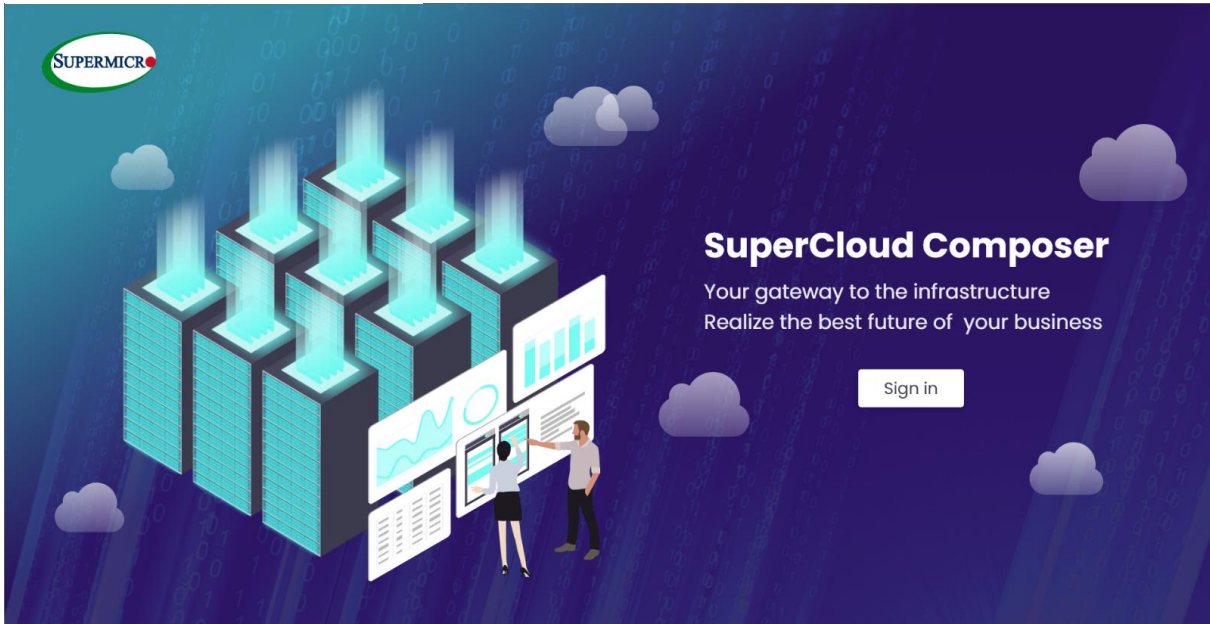
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## SUPERMICRO

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 needs.





Today's modern data centers face the growing need for operating efficiency through cost reduction in IT spending. Supermicro understands that IT organizations require a management platform to span multiple generations of infrastructure technology.

IT managers are faced with the ever-rising cost of technology refresh and scale-out of systems due to Big Data. The Intel Data Center Group estimates resources are underutilized at rates of up to 45 %, and data center operating efficiency is only at 50 %. In addition, PUE costs are increasing, data center real estate square footage prices are on the rise, and manpower hour rates are climbing exponentially. In addition, Patrick Nelson from Network World (Reference 1 ) estimates in-house server capacity to be in the range of 20% to 50% even when you factor in virtualization gains.

The traditional IT paradigm resulted in a cumbersome hardware provisioning process, with a fixed ratio of computing, storage, accelerator resources, and a lack of a one-size-fits-all platform capable of monitoring, telemetry, analytics, and intelligent system management. The new SuperCloud Composer embodies Supermicro's approach to software-defined and composable cloud solutions for future data centers. This solution brief provides you some of the key benefits and features of SuperCloud Composer and system requirements and licensing details of the solution.

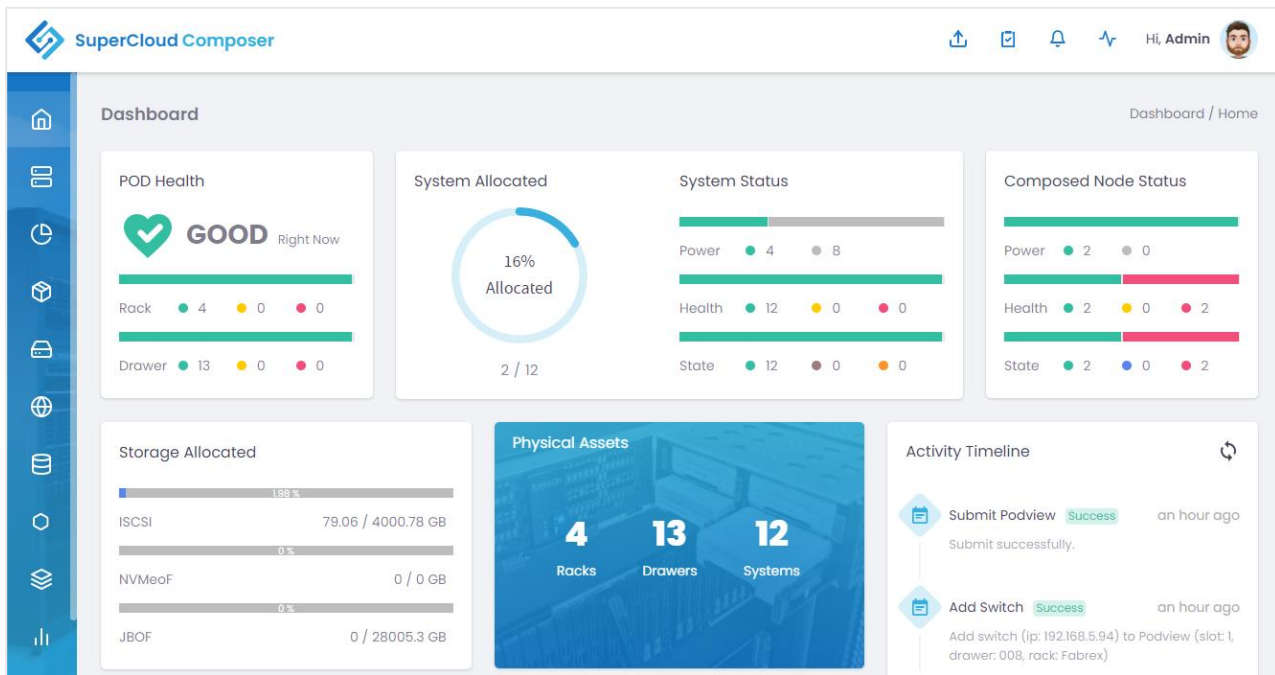
## Key Benefits of SuperCloud Composer

- A single-pane-of-glass platform with a streamlined, intuitive management interface
- A standardized Redfish Northbound API Message Bus for easy third-party software platform integration
- A scalable management platform without adding unnecessary complexity
- A unified dashboard that encompasses compute, storage, networking, and rack management
- The ability to monitor and manage all elements of the resource pools in a Composable Disaggregated Infrastructure (CDI)
- Inherently software-defined and automated in support of multi-tiered datacenter-to-edge cloud infrastructure management
- Role-based access control to support modern data center security policies
- Rich analytics, telemetry, and intelligent system lifecycle management
- Parallel multi-system upgrade and configuration capability reducing hardware maintenance downtime

## Features

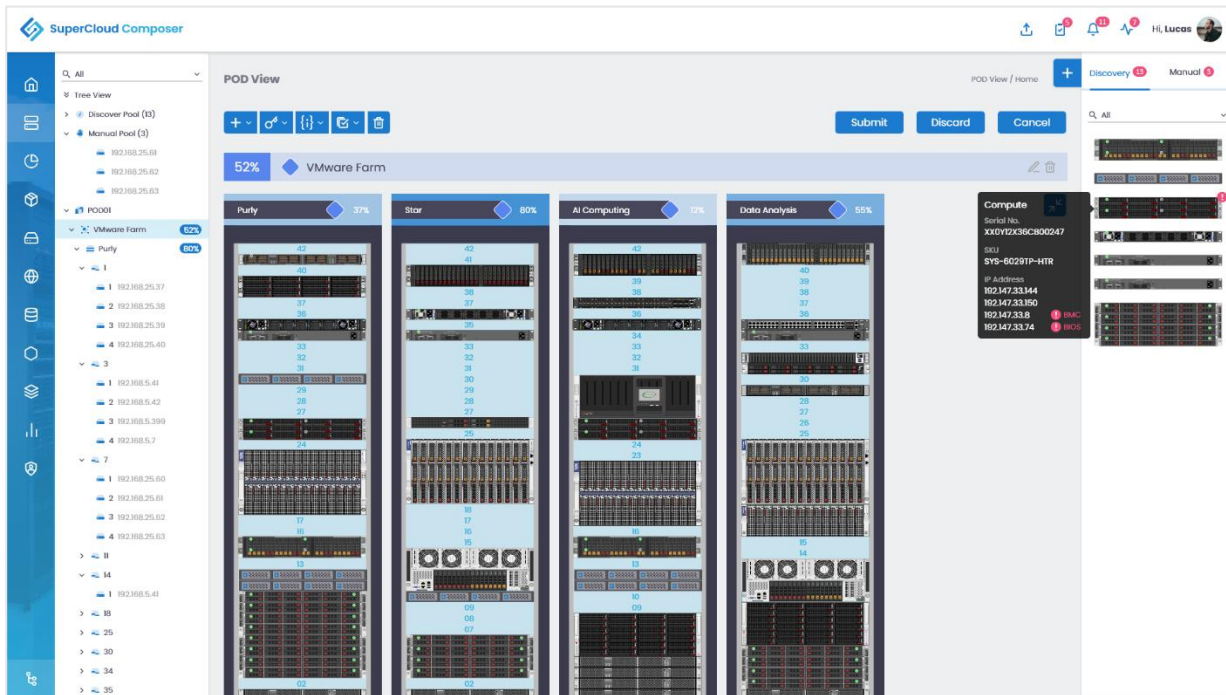
Intelligent Data Center Management	Network	Storage	Disaggregated Infrastructure	Composed Node	Administration of Management Appliance
Comprehensive system health monitoring and alerting	Top-of-rack (TOR) Network Provisioning utilizing streamlined GUI wizards	JBOF management	Integration support for GigaIO™ PCIe Switch	OS deployment in seconds utilizing fast-deploy (Centos, RHEL Ubuntu)	Support for SNMP v2 and SNMP v3
Rack management	Powerful network configurator wizard that creates network template build plans	Storage fabric configurator wizard that creates storage template build plans for NVMe network fabrics	JBOF management	Repository to store golden images for fast-deploy deployments	Change IP address/CIDR of SCC appliance
Device discovery and deep discovery	Robust network orchestrator that utilizes a REST API gateway to push network configuration build plans to infrastructure fabric	Creation of storage integration support, including GigaIO Switch	JBOG management	Operating provisioning utilizing PXE boot (ESX 6.8, RHEL 7.5, Ubuntu 18.04, 16.04, 14.04, SUSE Enterprise Linux 15.1, and Centos 7)	DNS
Pod management utilizing POD View	Switch sweeper	Management support for iSCSI initiators and targets	Allocation of GPUs from a resource pool utilizing GigaIO PCIe fabric	Software inventory to manage Kickstart and ISO images for PXE deployment	NTP
BMC access	Switch configuration detail	Management support for NVMe initiators and targets	Allocation of NVMe storage from a resource pool utilizing GigaIO PCIe fabric		Support to send logs to a Syslog server
iKVM console	Interface status and counters	RAID management and storage controller monitoring for Broadcom 3008 and 3108	Dynamic fabric topology discovery		Streamlined installation configuration wizard that utilizes Ansible Playbooks
UID management	MAC address table		Fabric configuration and reporting		
BIOS harvesting	Zero-touch provisioning		Fabric representation persistence & recovery		
Asset Tagging			Analytics of thermal and power for JBOG resource box		
Physical asset collateral and collection			JBOG physical asset collection		
FRU management			Interface status and counters		
DMI					
GPU monitoring					

## Dashboard



Dashboard is an information management tool to provide aggregated views of POD health, visualized system data analytics, activity event timeline tracking utilizing standardized icon footprints, providing the administrator at a glance awareness of data center operations. Administrators can click on each component within the dashboard to learn more detailed metadata about system status, composed node status, and allocated storage.

## POD View



The Pod View's rack management solution provides Data Center operatives the flexibility to organize their data center requirements based on common workloads assigned to a rack deployment either at the edge or physical appliances within a Data Center that are miles away.

## Network

**Network**

Operational State: ↑ 44/52 Up ↓ 8/52 Down

**Front View**

**Rear View**

**Physical Assets**

Switch Location	tw-18FB6:14-1	Mgmt. Port IP Address	192.168.100.102
Manufacturer	Supermicro	Mgmt. Port Netmask	255.255.255.0
Drawer Type	MS2	Mgmt. Port MAC Address	ac:1f:6b:38:43:14
Drawer Height	IU	Sireal Number	SSG36BR09700035
SKU	SSE-G3648BR	Firmware Version	2.1.3-25

SuperCloud Composer (SCC) enforces a network blueprint where it constructs VLANs to partition specific workloads from segmented broadcast domain traffic.

**Network Provision**

**Storage Fabric Configurator Wizard**

The network configurator is a powerful GUI based wizard that constructs network build plans to be later provisioned by network orchestrator.

1 Create VLAN Build 2 Select NVMe Port 3 NVMe Port setting 4 Confirm Detail

**Select NVMe Port**

From available port shown below, please choose Access ports you want configured by click the port number.  
The selected port will turn on flow control.

Select port

Legend: ■ NVMe Port ■ Selected NVMe Port

Buttons: Previous Next

SuperCloud Composer utilizes a rich feature called network provisioning. It pushes build plans to data switches either as single-thread or multi-thread operations where Composer updates multiple switches simultaneously by shared or unique build plan templates. Build plan templates for data switches are constructed by a Network Configurator Wizard in JSON format and pushed by a Network Orchestrator engine utilizing industry standardized API calls. During network management operation, SuperCloud Composer also offers a rich, intelligent network agent called switch sweeper to maintain configuration compliance between original build plans constructed by network configurator and operational build plans within switch dynamic memory.

## Fast OS Deployment and Provisioning

**SuperCloud Composer** Hi, Admin

**Fast Deploy Wizard**  
Please enter the minimal condition for filter node.

1 Basic Information 2 Remote Storage 3 OS Build 4 Confirm Detail

**Basic Information** 1 13

Node Name

#	Node Name
1	<input type="text"/>

**System Attributes**

System SKU:    
 Total System Core Count (PCS):    
 Total System Memory Size (GB):    
 QTY:

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During the fast-deploy composition phase, architects execute a composed new node wizard where snapshots of OS images are composed with customized metadata that has been ingested within the OS image. The architect instructs this customized metadata when performing the creation of a user-defined build template.

**SuperCloud Composer** Hi, Admin

**Composed Node** Composed Node / Home

**Fast Deploy Wizard**  
Please enter the minimal condition for filter node.

1 Basic Information 2 Remote Storage 3 OS Build 4 Confirm Detail

**OS Build**

**Edit**

**Host Settings**

Host Name \*  Password \*

**Network Settings for LAN 2**  **Static**

Physical Interface  DHCP  Static

IP Address \*  Gateway \*  Netmask \*

DNS1 \*  DNS2  DNS3

**VLAN Settings**  Yes  No

VLAN Interface  DHCP  Static

VLAN ID \*  IP Address \*  Gateway \*  Netmask \*



## Composed Node and GigalO™ PCIe Switch Integration

SuperCloud Composer

Composed Node

Composed Node List

Node ID	Node Name	Composed State	BMC IP	System Location	SSD Count
> 12	kraken	Assembled	192.168.5...	Carlsbad:20-1	12
> 13	leviathan	Assembled	192.168.5...	Carlsbad:34-1	0

Showing 1 to 2 of 2 entries

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SuperCloud Composer delivers a software-defined model, leveraging pools of Composable Disaggregated resources across GigalO's PCIe switch fabric for low latency workloads

SuperCloud Composer

Attach GPU of Composed Node 13

Available GPU

Device Name	Manufacturer	Description
<input type="checkbox"/> GK210GL [Tesla K80]	NVIDIA Corporation	PCIe Device 1 in jbog1(Endpoint jbog1)
<input type="checkbox"/> GK210GL [Tesla K80]	NVIDIA Corporation	PCIe Device 2 in jbog1(Endpoint jbog1)
<input type="checkbox"/> GK210GL [Tesla K80]	NVIDIA Corporation	PCIe Device 4 in jbog1(Endpoint jbog1)

Attached GPU

No records found

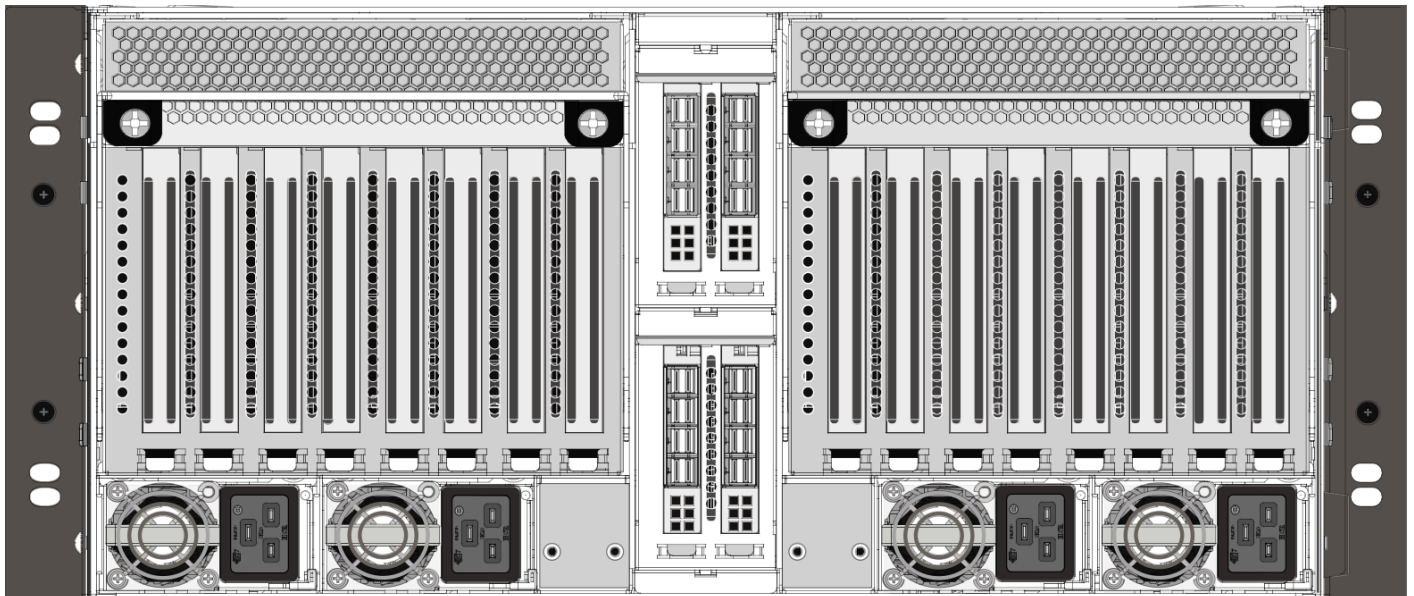
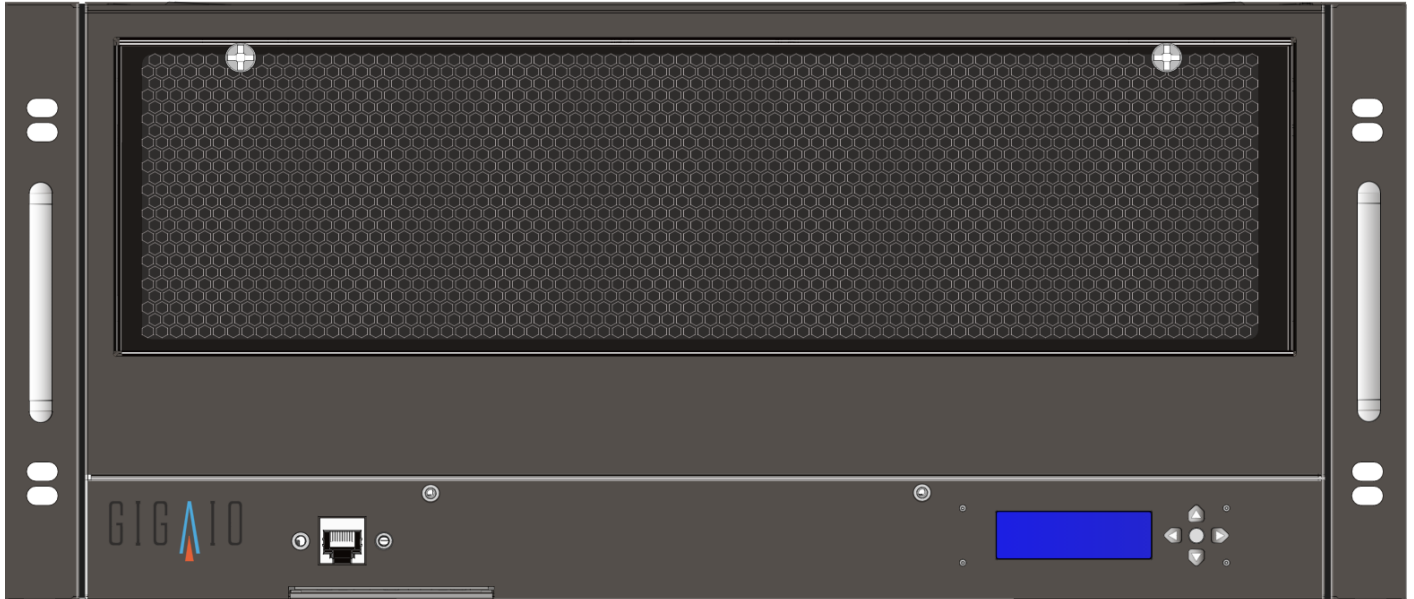
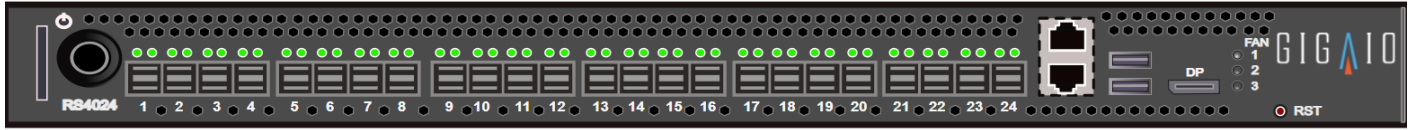
> Move

< Remove

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Supermicro's software framework enables Administrators to deploy collections of fluid resources (GPU, FPGA, and NVMe flash) utilizing an intuitive provisioning wizard within seconds. Each composed system can allocate resources on-demand across a scalable GigalO FabreX fabric and then return resources back to the pool for other systems.

## Composable Rack-Scale Infrastructure



Integration with GigaIO FabreX TOR Switch to deliver NVMe-oF, DAS performance with NAS sharing, and GPUDirect RDMA to GPU systems or JBOGs.



## JBOF Management

The screenshot displays the SuperCloud Composer interface for JBOF management. The top section shows the 'Storage' overview for 'Ocean:4-1' with a 'Current Health' of 0. Below this is a 'JBoF' drive map showing 32 slots (0-31) arranged in a grid. Slots 0-22 are marked as 'Attach' (blue), slots 23-29 as 'Drive Attachable' (light blue), and slots 30-31 as 'Empty' (white). A legend at the bottom of the map identifies these states. To the right of the map, system details are listed, including Location (TW-4-1), BMC IP (192.168.5.31), BMC Version (9.9), Zone Count (4), Part Count (32 Down / 4 Up), EndPoint Count (32 SSD/0 RootComplex), Chassis Model (55G-136R-N22JBF), Chassis Part Number, Chassis Serial Number, Health (OK), and Power State (Off).

Below the drive map is the 'Drive List' section, which shows a table of attached drives. The table has columns for ID, Slot ID, Capacity (GB), Model, Manufacture, Part Number, Serial Number, Drive Erased, and Asset Tags. The following table represents the data shown in the screenshot:

ID	Slot ID	Capacity (GB)	Model	Manufacture	Part Number	Serial Number	Drive Erased	Asset Tags
<input type="checkbox"/> 245-c-b-d-14	20	4000	P4500	INTEL	INTEL SSDPE2X0K40T7	PHL720600GD4POIGN	No	
<input type="checkbox"/> 245-c-b-d-13	21	4000	P4500	INTEL	INTEL SSDPE2X0K40T7	PHL723601534POIGN	No	
<input type="checkbox"/> 245-c-b-d-16	22	4000	P4500	INTEL	INTEL SSDPE2X0K40T7	PHL723601MA4POIGN	No	
<input type="checkbox"/> 245-c-b-d-8	24	4000	P4500	INTEL	INTEL SSDPE2X0K40T7	8TLF72700A54POIGN	No	

SuperCloud Composer uplifts the JBOF management experience by exposing an intuitive drive map tool giving the end-user visualization of drive level presence.

## Physical Asset Collateral

The screenshot displays the SuperCloud Composer interface for a compute node. The left sidebar shows a navigation menu with 'Physical Assets' selected. The main content area is titled 'Compute' and shows the node 'SJ-Bldg6:4...' with a 'Current Health' indicator set to 'GOOD System Health'. Below this, there are 'Front View' and 'Rear View' images of the server rack. To the right, a 'Physical Assets' table provides detailed information:

Property	Value	Property	Value
Location	SJ-Bldg6:42-1	CPU Count	2
System ID	60-s-6	CPU Model	Intel(R) Xeon(R) Gold 6130 Ct
BMC IP	192.168.5.4	Memory size	32 GB
Discovery State	Deep	TXT Enable	False
SKU	SYS-1029U-TRT	Power State	Off
Serial Number		Allocated	No
Form Factor	1	System State	Enabled
Manufacturer	Supermicro	Health	OK
BIOS Version	3.3 (02/21/2020)	Tag	
BMC Version	1.73.04	Task	-

The screenshot displays the SuperCloud Composer interface for a compute node, focusing on the 'Processor' details. The left sidebar shows 'Processor' selected under 'Physical Assets'. The main content area is titled 'Compute' and shows the node 'SJ-Bldg6:4...' with a 'Health' indicator set to 'system health'. Below this, there are 'CPU1 16 core' and 'CPU2 16 core' blocks, with a total of '32 core Installed'. To the right, a 'Processor' table provides detailed information:

Socket	Model	Total Core	State	Health
CPU1	Intel(R) Xeon(R) Gold 6130 CPU ...	16	Enabled	Good
CPU2	Intel(R) Xeon(R) Gold 6130 CPU ...	16	Enabled	Good

The compute module is a collection of monitored hosts that have been successfully registered by administrators. It is important to note that monitored hosts cannot perform simple system management tasks unless data center operatives complete drawer configuration functions during POD View execution. SuperCloud Composer provides an inventory of fluid pools of compute to manage physical fabric resources individually without entering the BMC webUI, allowing administrators to drill down and look at the physical attributes of a system.

## Hardware and Software Requirements

<b>Standalone Server</b>	SYS-1019P-WTR (SuperServer 1019P-WTR)
<b>HA Server Configuration</b>	2 of SYS-1019P-WTR (SuperServer 1019P-WTR)
<b>Motherboard</b>	Super X11SPW-TF
<b>CPU</b>	Single Socket P (LGA 3647) (Intel® Xeon® Scalable Processor)
<b>Memory</b>	256GB
<b>SSD Drive</b>	2X 1TB SATA set to Raid 1
<b>Operating System</b>	Ubuntu 18.04 LTS
<b>Browser</b>	Chrome, Firefox

## Virtual Machine Appliance

<b>Hypervisor Support</b>	Centos, RHEL, VMware ESX
<b>Anti-affinity</b>	Group virtual machines across different hypervisors
<b>CPU</b>	Requires one unit of CPU, 16 core count
<b>Memory</b>	256GB
<b>SSD Drive</b>	RAID SAN configuration of 1TB
<b>Operating System</b>	Ubuntu 18.04 LTS
<b>Browser</b>	Chrome, Firefox
<b>Hypervisor Support</b>	Centos, RHEL, VMware ESX

## Supported Server Platforms (as of September 23<sup>rd</sup>, 2020)

AS -2124BT-HNTR	SYS-1019P-WTR	SYS-2029U-E1CR4	SYS-6019P-WT	SYS-7049GP-TRT
AS -2124BT-HTR	SYS-1029GP-TR	SYS-2029U-E1CR4T	SYS-6019P-WTR	SYS-F619P2-RC0
MBE-314E-420	SYS-1029GQ-TRT	SYS-2029U-E1CR25M	SYS-6019U-TN4RT	SYS-F619P2-RC1
MBE-628E-822	SYS-1029GQ-TVRT	SYS-2029U-E1CRT	SYS-6019U-TR4	SYS-F619P2-RT
MBE-628L-816	SYS-1029GQ-TXRT	SYS-2029U-E1CRTP	SYS-6019U-TR4T	SYS-F619P2-RTN
SBE-414E-422	SYS-1029P-N32R	SYS-2029TP-HC1R	SYS-6019U-TR25M	SYS-F629P3-RC0B
SBE-610J-822	SYS-1029P-WTRT	SYS-2029TP-HTR	SYS-6019U-TRT	SYS-F629P3-RC1B
SBE-614E-822	SYS-1029U-E1CR4	SYS-2029U-TN24R4T	SYS-6019U-TRTP2	SYS-F629P3-RTB
SBE-820C-820	SYS-1029U-E1CR4T	SYS-2029U-TR4	SYS-6019U-TRTP	SYS-F629P3-RTBN
SSE-F3548	SYS-1029U-E1CR25M	SYS-2029U-TR4T	SYS-6029BT-DNC0R	
SSE-F3548S	SYS-1029U-E1CRT	SYS-2029U-TR25M	SYS-6029BT-HNC0R	
SSE-F3548SR	SYS-1029U-E1CRTP2	SYS-2029U-TRT	SYS-6029P-WTR	
SSE-G3648B	SYS-1029U-E1CRTP	SYS-2029U-TRTP	SYS-6029TP-HC0R	
SSE-G3648BR	SYS-1029U-TN10RT	SYS-2029UZ-TN20R25M	SYS-6029TP-HTR	
SSG-136R-N32JBF	SYS-1029U-TR4	SYS-4029GP-TRT2	SYS-6029U-E1CR4	
SSG-6029P-E1CR12H	SYS-1029U-TR4T	SYS-4029GP-TRT3	SYS-6029U-E1CR4T	
SSG-6029P-E1CR12T	SYS-1029U-TR25M	SYS-4029GP-TRT	SYS-6029U-E1CR25M	
SSG-6029P-E1CR16T	SYS-1029U-TRT	SYS-4029GP-TVRT	SYS-6029U-E1CRT	
SSG-6049P-E1CR24H	SYS-1029U-TRTP2	SYS-5019P-MR	SYS-6029U-E1CRTP	
SSG-6049P-E1CR36H	SYS-1029U-TRTP	SYS-5019P-MT	SYS-6029U-TNR	
SSG-6049P-E1CR60L+	SYS-1029UZ-TN20R25M	SYS-5019P-WT	SYS-6029U-TR4	
SYS-1019D-16C-FHN13TP	SYS-2029BT-HNC0R	SYS-5019P-WTR	SYS-6029U-TR4T	
	SYS-2029BT-HNTR	SYS-5019S-MT	SYS-6029U-TR25M	
	SYS-2029BT-HTR	SYS-5029P-WTR	SYS-6029U-TRT	
	SYS-2029GP-TR	SYS-6019P-MT	SYS-6029U-TRTP	

### Licensing Requirements for BMC advanced features

**BMC Data Center Product SKU:** SFT-DCMS-Single

Note: SuperCloud Composer (SCC) enforces licensing keys for advanced data center BMC licensing and SCC monitor node license.

### SuperCloud Composer License

Type of License	Description	SCC Appliance	License P/N
<b>Trial License</b>	90-day trial license with 200 monitored system activation	See the hardware requirements above.	SFT-SDDC-TRIAL (for SCC software and up to 200 systems managed)
<b>Monitor License (per node)</b>	Single monitored system license activation	See the hardware requirements above.	SFT-SDDC-SINGLE (1 license key per system managed by SCC appliance)
<b>BMC License</b>	DCMS License	Monitored system	SFT-DCMS-SINGLE (1 license key per system managed by SCC appliance)

## References:

- 1) <https://www.networkworld.com/article/2959532/startup-says-it-has-solved-server-underutilization.html>

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