

Inspur SmartRack

Rackscale Architecture for Hyperscale Datacenters



Inspur was the first server manufacturer to work on Project Scorpio design and prototype with Baidu, Alibaba and Tencent (the BAT companies) in 2010 to meet the demands of the hyperscale datacenter. Inspur SmartRack, designed based on Scorpio specification V3.0, started mass production deployment in December 2012. Today, Inspur is the leading supplier for Project Scorpio Rack Scale Servers. Inspur builds and deploys majority of the rackscale server platforms for Baidu and Alibaba datacenters and captures over 60% of the rackscale server market in China.

The Inspur SmartRack proves to be the ideal platform for datacenter and cloud deployments. Actual operation data from users is a powerful proof of outstanding performance of SmartRack in energy consumption control, space optimization, compute density and deployment speed: Inspur and Baidu cooperated to set the highest record in deployment speed in a single day - deployed 5000 SmartRack nodes in a single day into Baidu datacenter. The actual measured data of the largest and the most complicated online ticket booking system 12306 indicates that energy consumption of SmartRack reduces by 15% compared to conventional products, and reduces by 6% compared to conventional blade. SmartRack takes consideration of the overall rack level system design, breaks through the standard restriction of conventional rack server and cabinet - the depth of SmartRack is 47" and inner width of the rack is 21" (outer width is the same as conventional rack at 24"); the design allows the utilization rate of overall space to increase by 31% to improve compute and storage density and provides many possibilities for



SmartRack Architecture Overview

SmartRack: Centralized Power, Cooling and Management at Rack Level: Low TCO, High Power Efficiency

- Flexible rack configuration: SmartRack can be customized with the same node configuration cluster (i.e. for massive data storage/ Hadoop Cluster/Cloud resources pools), or mix of different types of nodes in same Rack to enable running multiple applications in the same Rack (i.e., web server/application server/file server/GPU server/storage server).
- Front IO, tool-less design for easy service and maintenance.
- Strict hot aisle containment: Cold air comes from front and hot air exhausts from rear.
- RMC centralized management, monitoring, inspection functions enhance deployment efficiency: Traditional server standard deployment is 300 nodes/day. SmartRack deployment is 60~105 Rack per day/up to 5000 nodes per day.



Network Switches

Compatible with industry standard switches. Up to 6 switches per rack.

Central Power Bank

6x2500W PSU/customizable power redundancy, 208V 3 phase/dual feeds for USA datacenters. 12.5KW single power bank standard per rack. Power Bank is customizable. Multiple power banks per rack is supported for applications requiring higher power consumption, such as up to 4 power banks per rack/50KW for GPU rack.

Rack Level Cooling Module

Up to 30 FANs, customizable cooling solutions, N+1 redundancy for each cooling group, rear tool-less maintenance, front air inlet, rear air outlet

RMC: Rack Level Management

Integrated RMC centralized management module in power bank, supporting status monitoring, log recording and fault alarm and assets management of power supply, fan and node;

Rack Size

24"(W) x 47"(D) x 83"(H) for 42U or 91"(H) for 46U

Reference Weight

1200KG / 2646 lbs

SmartRack Enterprise Cloud and HPC Node Configuration Options

SmartRack Node	SN6116M4	SN6126M4	SN3116M4	SN6184M4
Photo				
Nodes per chassis	1U1Node	1U2Nodes (new)	1U1Node	1U1Node
Processor	2 x E5-2600v3 or v4 series	2 x E5-2600v3 or v4 series	Avoton CPU	2 x E5-2600v4 series
Memory	16 DIMM DDR4	16 DIMM DDR4	4 DIMM DDR3	16 DIMM DDR4
Network	Optional mezz card: 10G SFP+/10G-BaseT	Optional mezz card: 10G SFP+/10G-BaseT	1 or 2 onboard 10G ports	Optional mezz card: 10G SFP+/10G-BaseT
Expansion Slot	1x PCIE 3.0 x16 Slot + 2 Mezz Card Slots	1x PCIE 3.0 x16 Slot + 2 Mezz Card Slots	1x PCIE 3.0 x8 Slot	4x PCIE 3.0 x16 Slots (for GPU)/2x PCIE 3.0 x8 Slots (standard card)
Management	Onboard BMC w/dedicate mgmt. port, IPMI2.0+KVM	Onboard BMC w/dedicate mgmt. port, IPMI2.0+KVM	Onboard BMC w/dedicate mgmt. port, IPMI2.0+KVM	Onboard BMC w/dedicate mgmt. port, IPMI2.0+KVM
Hard Disk	12x 3.5"/2.5" hot swap drive bays + 1x SATA DOM	6x 2.5" hot swap drive bays per node + 1x SATA DOM	18x 3.5"/2.5" hot swap SATA drive bays + 1x SATA DOM	2x 2.5" hot swap drive bays for HDD/SSD or NVMe + 1x SATA DOM
Raid	Onboard SATA controller/Optional 8-port SAS/RAID card (mezz card)	Onboard SATA controller/Optional 8-port SAS/RAID card (mezz card)	Onboard SATA controller	Onboard SATA controller/Optional 8-port SAS/RAID card (mezz card)
Max Rack Configuration	Up to 40 nodes per rack + 3 switches	Up to 74 nodes+6 switches or 80 nodes+2 switches per rack	Up to 40 nodes per rack + 3 switches	Up to 32 nodes per rack+2 switches (customized rack)

SmartRack Node	SN6115M4	SN6110M4	SN6120M4	SN3116J4
Photo				
Nodes per chassis	1U1Node	1U1Node	1U2Nodes	1U1Node
Processor	2 x E5-2600v3 or v4 series	2 x E5-2600v3 or v4 series	2 x E5-2600v3 or v4 series	N/A - JBOD
Memory	16 DIMM DDR4	16 DIMM DDR4	16 DIMM DDR4	N/A
Network	Optional mezz card: 10G SFP+/10G-BaseT	Optional mezz card: 10G SFP+/10G-BaseT	Optional mezz card: 10G SFP+/10G-BaseT	N/A
Expansion Slot	1x PCIE 3.0 x16 Slot + 2 Mezz Card Slots	1x PCIE 3.0 x16 Slot + 2 Mezz Card Slots	1x PCIE 3.0 x16 Slot + 2 Mezz Card Slots	N/A
Management	Onboard BMC w/dedicate mgmt. port, IPMI2.0+KVM	Onboard BMC w/dedicate mgmt. port, IPMI2.0+KVM	Onboard BMC w/dedicate mgmt. port, IPMI2.0+KVM	Onboard BMC w/dedicate mgmt. port, IPMI2.0+KVM
Hard Disk	8x 3.5"/2.5" non-hot swap drive bays + 1x SATA DOM	8x 2.5" hot swap drive bays + 1x SATA DOM	2x 2.5" hot swap drive bays per node + 1x SATA DOM	20x 3.5"/2.5" cold swap drive bays
Raid	Onboard SATA controller/Optional 8-port SAS/RAID card (mezz card)	Onboard SATA controller/Optional 8-port SAS/RAID card (mezz card)	Onboard SATA controller/Optional 8-port SAS/RAID card (mezz card)	Link Interface: 2x PCI-e x4 12Gb SAS inputs
Max Rack Configuration	Up to 40 nodes per rack + 3 switches	Up to 40 nodes per rack + 3 switches	Up to 74 nodes+6 switches or 80 nodes+2 switches per rack	Up to 39 nodes per rack + 1x1U2N Head Nodes + 1 IPMI switch