GIGABYTE™

RACKLUTION-OP

Leading the way in flexible designs for the data center needs of today and tomorrow

OPEN COMMUNITY™

RACKLUTION-OP is the name of GIGABYTE's product line of server racks and nodes based on the Open Compute Project's (OCP) Open Rack Standards, a set of open source data center hardware design guidelines.

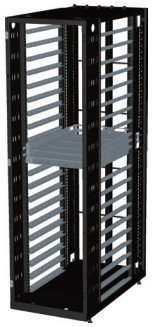
What are the advantages of RACKLUTION-OP?

Space: the rack width is 21" compared with a traditional 19" rack, with a server unit height of 1OU (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 higher compute, networking and storage density, or for better airflow or more cabling space.

Power: the power supply for each rackmount is removed and consolidated in a separate, central unit, not only freeing up more space for other components but also allowing for better cooling and maintenance efficiency of the consolidated PSU. Power is supplied to compute, storage and GPU nodes directly through a "bus-bar" system running along the rear of the rack.

Maintenance: the server nodes are designed like Lego bricks, which are small enough to be easily handled by a single person. This also adds to the design's ease of scalability: each node is available individually and can be ordered later in time to add capacity to existing infrastructure.

Rack





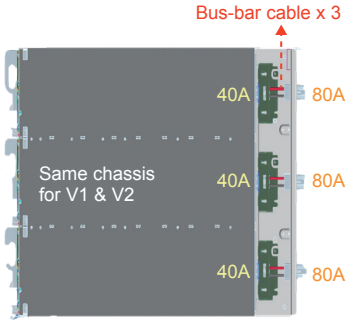
Model	DO20-ST0	DO20-ST1	DO60-MR0	DO21-ST0	DO21-ST1
Version	Version 1.0		Version 1.0	Version 2.0	
No. of Bus Bars	3		3	1	
Dimensions	2100x600x1067 mm		710x600x1067 mm	2210x600x1067 mm	
Total Capacity	41OU		12OU	41OU	
Power Shelf (Qty / Max. Watts / Location)	1 set (1OU) / 14.4 kW / at 21OU	2 sets (1OU) / 28.8 kW / at 11OU & 30OU	1 set (1OU) / 14.4 kW / at 11OU	1 set (1OU) / 14.4 kW / at 22OU	2 sets (1OU) / 28.8 kW / at 20OU & 22OU
19" Switch Tray (Qty / Location)	2 sets (1U) / at 22-23OU	3 sets (1U) / at 39-41OU	1 set (1U) / at 12OU	2 sets (1U) / at 21 and 23OU	3 sets (1U) / at 19, 21, 23OU
Available Node Space	18OU + 20OU	8OU + 18OU + 10OU	10OU	18OU + 20OU	18OU + 18OU
Part Numbers	6NDO20ST0MR-00	6NDO20ST1MR-00	6NDO60MR0MR-00	6NDO21ST0MR-00	6NDO21ST1MR-00

RACKLUTION-OP products feature two different power supply designs based on two different versions of the Open Rack Standards: Version 1.0 is a rack design that features power supply via three vertical 12V bus-bars, while Version 2.0 is a rack design where power is supplied via a single vertical 12V bus-bar only.

Version 1.0

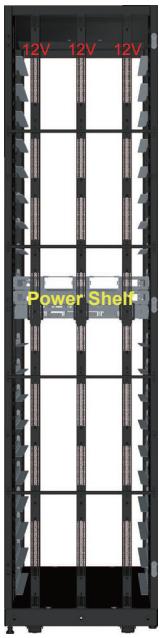
Higher power capacity, for racks featuring GPU nodes

3 x 12V 80A bus-bars
12V x 80A x 3 = 2,880W to each GPU node shelf
OR 12V x 40A = 480W to each compute node



TO20-BT1

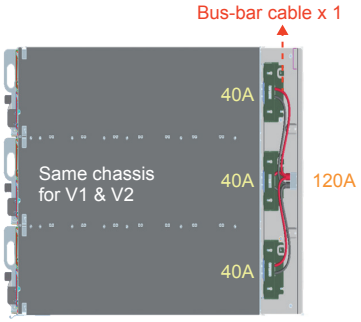
3 bus-bars



Version 2.0

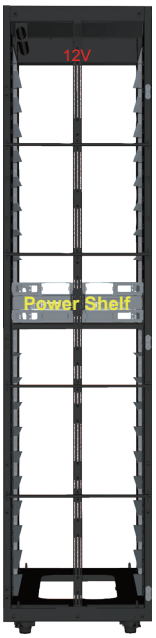
Cost efficient design for lighter power supply requirements

1 x 12V 120A bus-bar
12V x 120A = 1,440W per shelf
1,400W / 3 = 480W to each node



TO21-BT0

1 bus-bar



Computing Node

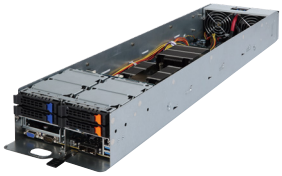
Model	TO22-Z61	TO22-Z62
Version	Version 1.0 or 2.0	
Form Factor	3 Nodes / 2OU (690x180x90 mm)	
CPU	AMD EPYC™ 7000 series processor families; Dual processor socket	
Memory	16 x DIMM slots; DDR4 8-Channel memory architecture RDIMM up to 64GB; LRDIMM up to 128GB Memory speed: 2666(1DPC)/2400/2133 MHz	
LAN	2 x GbE LAN ports (Intel® I350-AM2), 1 x GbE MLAN	
Video	Integrated in Aspeed® AST2500 2D Video Graphic Adapter with PCIe bus interface 1920x1200@60Hz 32bpp, DDR4 SDRAM	
Storage	2 x 2.5" hybrid NVMe/SATA/SAS hot-swap bays 2 x 2.5" SATA/SAS hot-swap bays	4 x 2.5" hybrid NVMe/SATA/SAS hot-swap bays 4 x 2.5" NVMe fixed bays
Backplane	6Gb/s, 12Gb/s, NVMe	6Gb/s, 12Gb/s, NVMe
SATA Drives	4	4
SAS Drives	Add-on card available	Add-on card available
NVMe Drives	2	8
RAID	Optional	Optional
Expansion Slot	2 x PCIe x16 (3.0 x16) slots 1 x OCP mezzanine slot (3.0 x16)	2 x PCIe x16 (3.0 x16) slots 1 x OCP mezzanine slot (3.0 x16) - occupied by CNVO124, 4 x U.2 HBA
Front I/O	2 x USB 3.0, 1 x VGA, 2 x RJ45, 1 x MLAN, 1 x Power button with LED, 1 x ID button with LED, 8 x HDD LED, 1 x System status LED	
TPM	1 x TPM header	
Server Management	Aspeed® AST2500 management controller Avocent® MergePoint IPMI 2.0 web interface GIGABYTE Server Management (GSM)	
Part Numbers	6NTO22Z61MR-00	6NTO22Z62MR-00

Computing Node



Model	TO22-C20	TO22-C21	TO22-C22
Version	Version 1.0 or 2.0		
Form Factor	3 Nodes / 2OU (690x180x90 mm)		
CPU	Intel® Xeon® Processor Scalable Family; Dual processor socket		
Memory	16 x DIMM slots; DDR4 6-channel memory architecture RDIMM up to 64GB; LRDIMM up to 64GB 1.2V modules: 2666/2400/2133 MHz		
LAN	2 x 10GbE LAN ports (Intel® X550-AT2), 1 x GbE MLAN		
Video	Integrated in Aspeed® AST2500 2D Video Graphic Adapter with PCIe bus interface 1920x1200@60Hz 32bpp, DDR4 SDRAM		
Storage	2 x 2.5" hybrid NVMe/SATA/SAS hot-swap bays 2 x 2.5" SATA/SAS hot-swap bays 4 x 2.5" NVMe fixed bays	2 x 2.5" hybrid NVMe/SATA/SAS hot-swap bays 2 x 2.5" SATA/SAS hot-swap bays	4 x 2.5" hybrid NVMe/SATA/SAS hot-swap bays 4 x 2.5" NVMe fixed bays
Backplane	6Gb/s, 12Gb/s, NVMe	6Gb/s, 12Gb/s, NVMe	6Gb/s, 12Gb/s, NVMe
SATA Drives	4	4	4
SAS Drives	Add-on card available	Add-on card available	Add-on card available
NVMe Drives	6	2	8
RAID	Intel® SATA RAID 0/1/10/5		
Expansion Slot	1 x PCIe x16 (3.0 x16) slot, 1 x PCIe x8 (3.0 x8) slot 1 x OCP mezzanine slot (3.0 x16)		
Front I/O	2 x USB 3.0, 1 x VGA, 2 x RJ45, 1 x MLAN, 1 x Power button with LED, 1 x ID button with LED, 8 x HDD LED, 1 x System status LED		
TPM	1 x TPM header		
Server Management	Aspeed® AST2500 management controller Avocent® MergePoint IPMI 2.0 web interface GIGABYTE Server Management (GSM)		
Part Numbers	6NTO22C20MR-00	6NTO22C21MR-00	6NTO22C22MR-00

Computing Node



Model	TO21-C20	TO21-C21
Version	Version 1.0 or 2.0	
Form Factor	3 Nodes / 2OU (690x180x90 mm)	
CPU	Intel® Xeon® E5-2600 V3/ V4 processors; Dual processor socket	
Memory	16 x DIMM slots; DDR4 4-channel memory architecture RDIMM up to 32GB; LRDIMM up to 64GB 1.2V modules: 2133/2400 MHz	
LAN	2 x 10GbE SFP+ LAN ports (Mellanox® ConnectX-3), 1 x GbE MLAN (Intel® I210)	
Video	Integrated in Aspeed® AST2400 2D Video Graphic Adapter with PCIe bus interface 1920x1200@60Hz 32bpp	
Storage	4 x 2.5" SATA/SAS hot-swap HDD/SSD bays	2 x 2.5" hybrid NVMe/SATA/SAS hot-swap bays 2 x 2.5" SATA/SAS hot-swap bays
Backplane	6Gb/s, 12Gb/s	6Gb/s, 12Gb/s, NVMe
SATA Drives	4	4
SAS Drives	Add-on card available	Add-on card available
NVMe Drives	-	2
RAID	Intel® SATA RAID 0/1/10/5	
Expansion Slot	1 x PCIe x16 (3.0 x16) slot 1 x PCIe x8 mezzanine slot (3.0 x8)	
Front I/O	2 x USB 3.0, 1 x VGA, 1 x COM_1, 2 x SFP+, 1 x RJ45, 1 x Power button with LED, 1 x ID button with LED,1 x NMI button, 1 x BMC reset button, 1 x System status LED	
TPM	1 x TPM header	
Server Management	Aspeed® AST2400 management controller Avocent® MergePoint IPMI 2.0 web interface GIGABYTE Server Management (GSM)	
Part Numbers	6NTO21C20MR-00	6NTO21C21MR-00

HPC Node



Model	T181-G20	T181-G23	T181-G24
Version	Version 1.0		
Form Factor	Proprietary; 1OU (537x46.5x799.2 mm)		
CPU	Intel® Xeon® Processor Scalable Family; Dual processor socket		
Memory	24 x DIMM slots; DDR4 6-channel memory architecture RDIMM up to 64GB; LRDIMM up to 64GB 1.2V modules: 2666/2400/2133 MHz		
LAN	2 x GbE ports (Intel® I350-AM2), 1 x GbE MLAN		
VGA / VRAM	Integrated in Aspeed® AST2500 2D Video Graphic Adapter with PCIe bus interface 1920x1200@60Hz 32bpp, DDR4 SDRAM		
Storage	4 x 2.5" hot-swap HDD/SSD bays		
Expansion Slots	4 x NVIDIA SXM2 modules 2 x PCIe x16 (3.0 x16) slots	4 x PCIe x16 for GPGPU 2 x PCIe x16 (3.0 x16) slots	4 x PCIe x16 for GPGPU 2 x PCIe x16 (3.0 x16) slots
PCIe Switch	PLX PEX8796	Microsemi PM8536B-FEI	N/A
Front I/O	1 x VGA, 2 x RJ45, 1 x MLAN, 2 x USB3.0, 1 x Power Switch,1 x ID Switch, 1 x NMI Switch, 1 x Status LED, 1 x Reset Switch, 1 x HDD access LED		
TPM	1 x TPM header		
Server Management	Aspeed® AST2500 management controller		
Power Supply	From bus-bar, supports OCP Version 1.0 power cable		
Part Numbers	6NT181G20MR-00	6NT181G23MR-00	6NT181G24MR-00

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HPC Node



Model	T180-G20	T180-G23	T180-G24
Version	Version 1.0		
Form Factor	Proprietary; 1OU (537x46.5x799.2 mm)		
CPU	Intel® Xeon® E5-2600 V3/ V4 series processors; Dual processor socket		
Memory	16 x DIMM slots; DDR4 Quad channel memory architecture RDIMM up to 32GB; LRDIMM up to 64GB 1.2V modules: 2133/2400 MHz		
LAN	2 x GbE ports (Intel® I350), 1 x GbE MLAN		
VGA / VRAM	Integrated in BMC with DDR3 256MB VRAM; 1920x1200@60Hz 32bpp		
Storage	4 x 2.5" hot-swap HDD/SSD bays		
Expansion Slots	4 x NVIDIA SXM2 modules 2 x PCIe x16 (3.0 x16) slots	4 x PCIe x16 for GPGPU 2 x PCIe x16 (3.0 x16) slots	4 x PCIe x16 for GPGPU 2 x PCIe x8 (3.0 x8) slots
PCIe Switch	PLX PEX8796	PLX PEX8796	N/A
Front I/O	1 x VGA, 2 x RJ45, 1 x MLAN, 2 x USB3.0, 1 x Power Switch,1 x ID Switch, 1 x NMI Switch, 1 x Status LED, 1 x Reset Switch, 1 x HDD access LED		
TPM	1 x TPM header		
Server Management	Aspeed® AST2400 management controller		
Power Supply	From bus-bar, supports OCP Version 1.0 power cable		
Part Numbers	6NT180G20MR-00	6NT180G23MR-00	6NT180G24MR-00

NVIDIA
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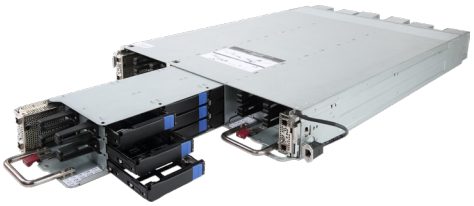
Storage Node



Model	T280-S3S	TO21-JS0
Version	Version 1.0	Version 2.0
Form Factor	3 Nodes / 2OU Rackmount (804.5x537x95.2 mm)	
Storage	15 x 3.5" or 2.5" HDD/SSD bays per node Total 45 x 3.5" or 2.5" HDD/SSD bays per system	
Expander	1 x LSI SAS3x24 expander per node	
External Port	2 x Mini-SAS HD ports per node	
JBOD Management	Aspeed® AST1250 management controller	
Management Port	1 x 10/100/1000 management LAN port	
Part Numbers	6NT280S3SMR-00	6NTO21JS0MR-00

Node Tray

Model	TO20-BT1	TO21-BT0
Version	Version 1.0	Version 2.0
Form Factor	2OU Node Tray (803x537x93.2 mm)	
Usage	For 3 x OCP Version 1.0 2OU nodes	For 3 x OCP Version 2.0 2OU nodes
Part Numbers	6NTO20BT1MR-00	6NTO21BT0MR-00

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